Dynamics of Subjective Risk Premia

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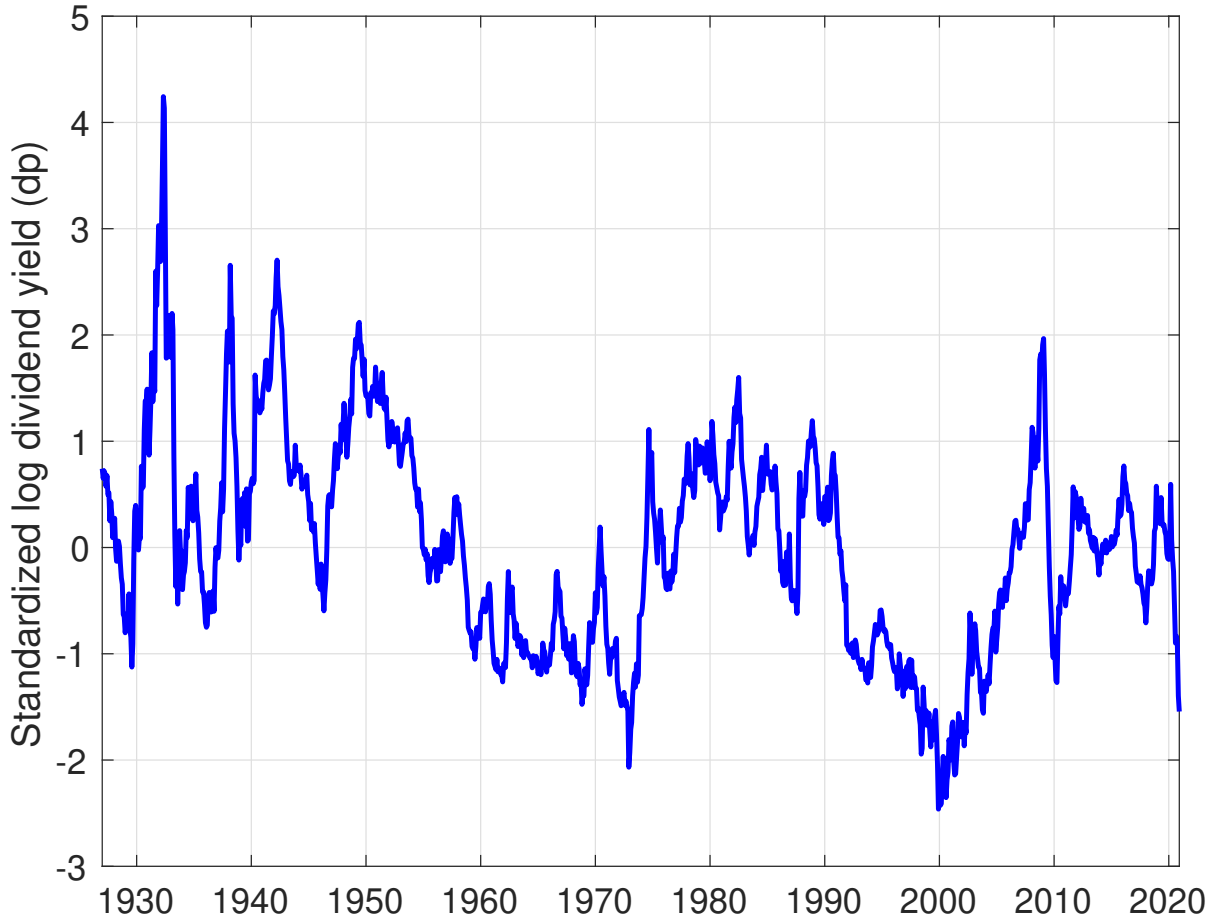
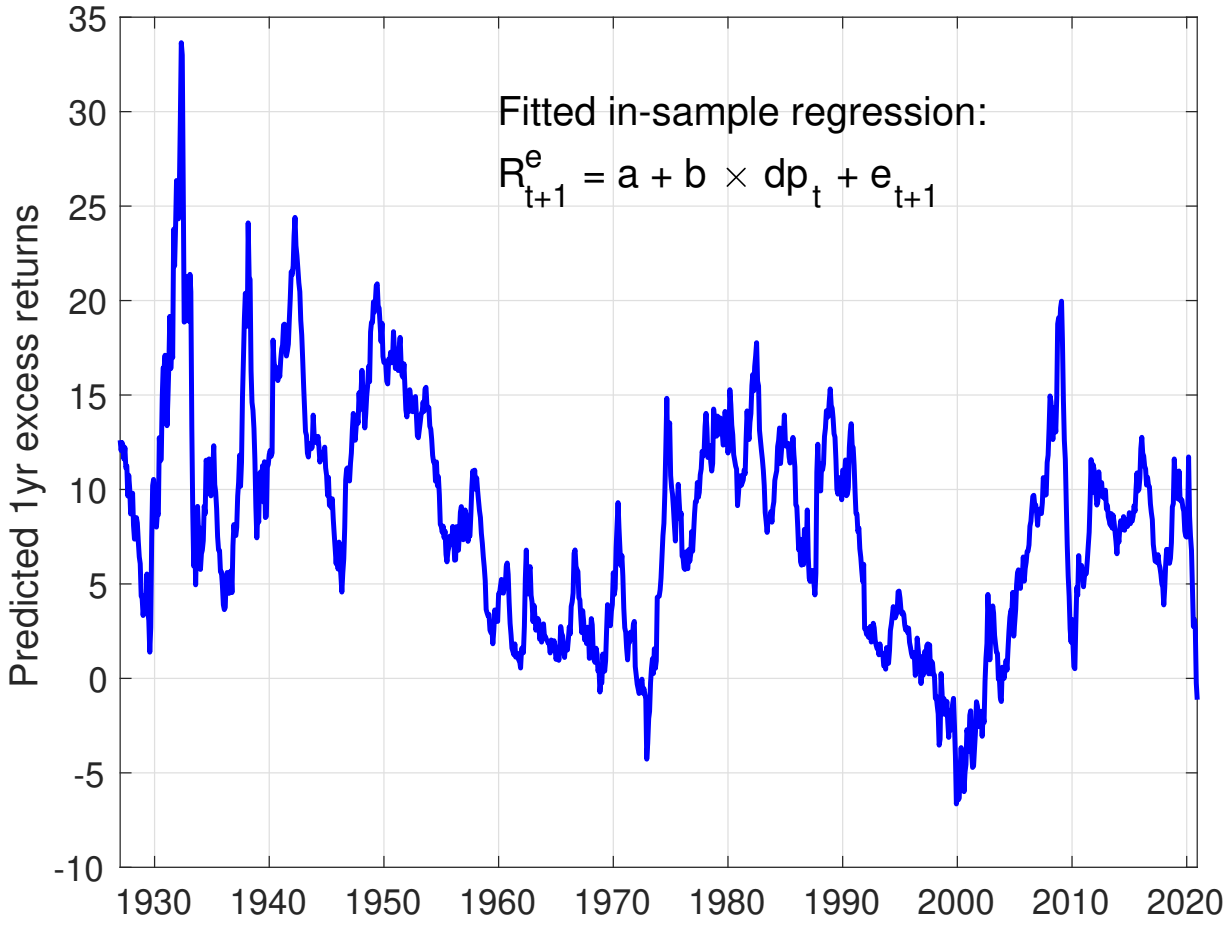
Asset price cycles

Example: U.S. stock market dividend yield



Time-variation in objective risk premia

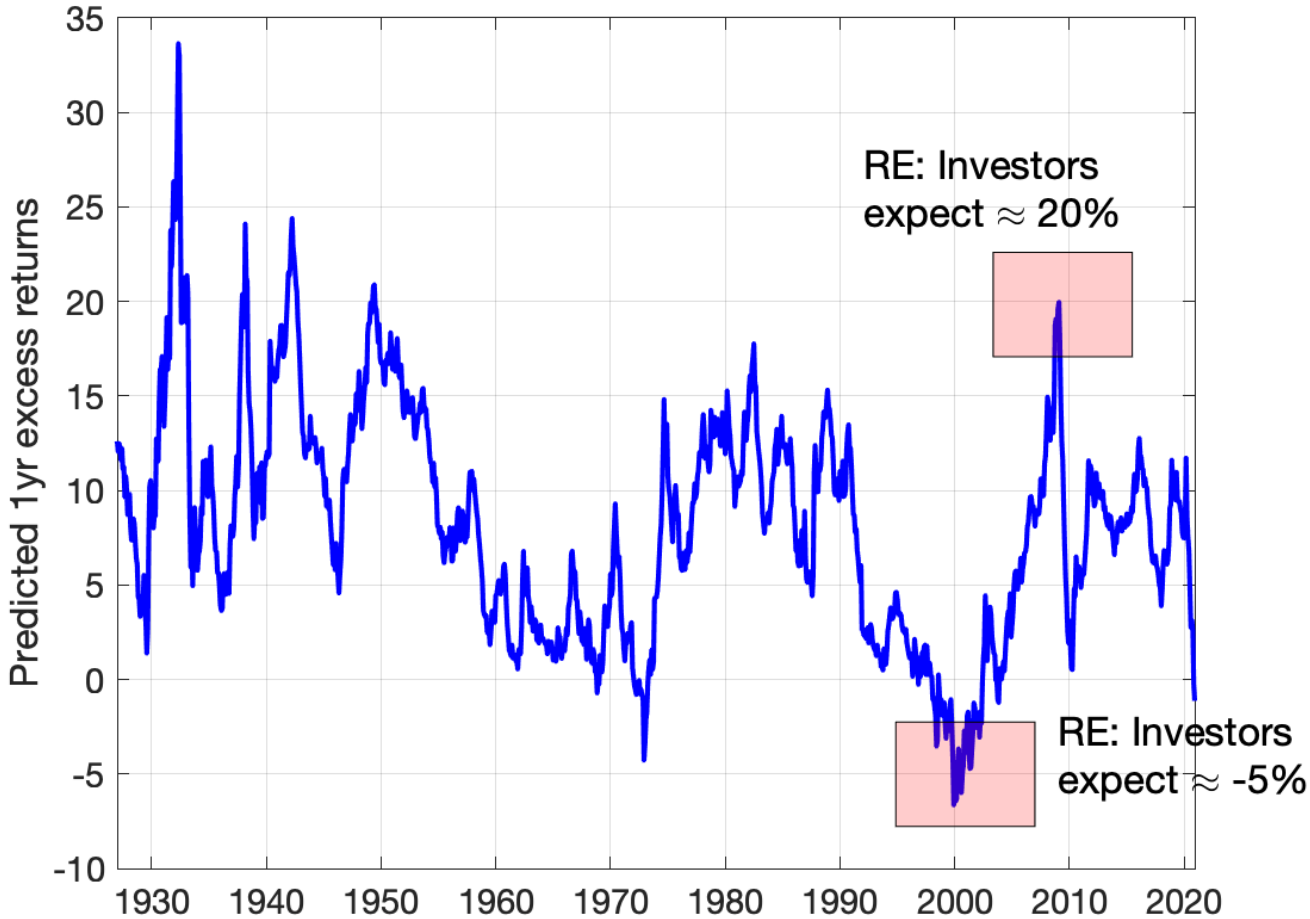
Objective risk premia = as estimated by econometrician ex post



Rational expectations models: Subjective = objective

RE: Investors' subj. perception of risk premia = obj. risk premia

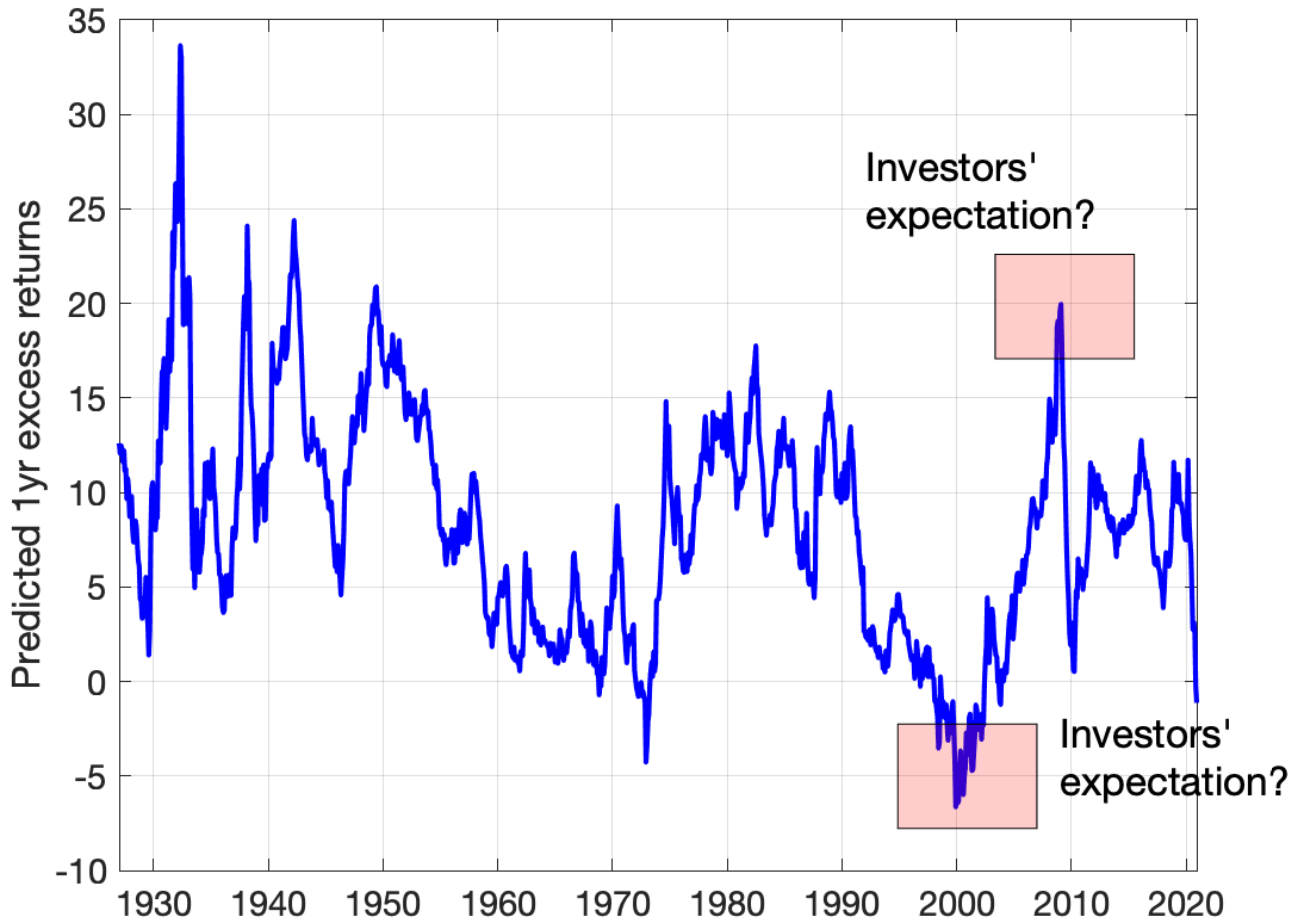
- Asset price cycles attributed to varying risk or risk aversion
- Example: Campbell-Cochrane, Bansal-Yaron models



Actual subjective risk premia?

Subjective $\neq$ objective e.g., under

- rational learning with parameter and/or model uncertainty
- adaptive learning
- diagnostic expectations



Subjective risk premium dynamics

- We extract subjective risk premia from price forecasts of professionals and individuals
  - Stock market
  - Treasury bond market
  - Foreign exchange
  - Commodity futures

Subjective risk premium dynamics

- We extract subjective risk premia from price forecasts of professionals and individuals
  - Stock market
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- We contrast dynamics of
  - objective risk premia
  - subjective risk premia

  with regards to business and asset price cycle variables

Related literature

- Piazzesi et al. (2015): Subjective bond risk premia less cyclical than predictive regression forecasts
  Here: more asset classes, state variables, market participants; comparison with OOS forecasts

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- Debate about differences in cyclicality of subjective equity premia of different groups
  - Amromin and Sharpe (2013), Greenwood and Shleifer (2014): individuals, CFOs, procyclical w.r.t. valuation ratios and past returns
  - Dahlquist and Ibert (2021), Wang (2021): professional forecasters, countercyclical w.r.t. valuation ratios

  Here: Subjective risk premia of both groups lack cyclicality relative to objective risk premia

Roadmap

1. Cyclicality of objective and subjective risk premia
   - Stock market
   - Bond market
   - Currencies
   - Commodity futures
2. Comparison with out-of-sample forecasts
3. Subjective risk-return tradeoff
4. Conclusion

General approach

- Data
  - Predictor variable x_t:
    standard predictors + business cycle indicators
  - Realized excess returns R^e_{t+1}
  - Subjective risk premium $\tilde{\mathbb{E}}_t R^e_{t+1}$ from survey data

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$$R^e_{t+1} = a + bx_t + e_{t+1}$$

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$$\tilde{\mathbb{E}}_t R^e_{t+1} = \tilde{a} + \tilde{b}x_t + u_t$$

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$$\tilde{\mathbb{E}}_t R^e_{t+1} = \tilde{a} + \tilde{b}x_t + u_t$$

- Compare magnitudes b vs. $\tilde{b}$
  - Under RE: $b \approx \tilde{b}$

Stock market: Returns and expectations data

	Frequency	Sample Period	Mean	S.D.
Realized	Monthly	1926/12–2020/12	8.15	21.15
NX	Quarterly	1972Q3–2021Q2	5.95	1.98
CFO	Quarterly	2000Q3–2021Q2	3.98	1.75
Livingston	Semi-annually	1952Q2–2020Q4	4.09	5.86

- Survey data: $\tilde{\mathbb{E}}_t R_{t+1}$ at one-year horizon
  - Nagel and Xu (2022): individual investor expectations from UBS/Gallup, Conference Board, Michigan survey, and a few others
  - Graham-Harvey CFO survey
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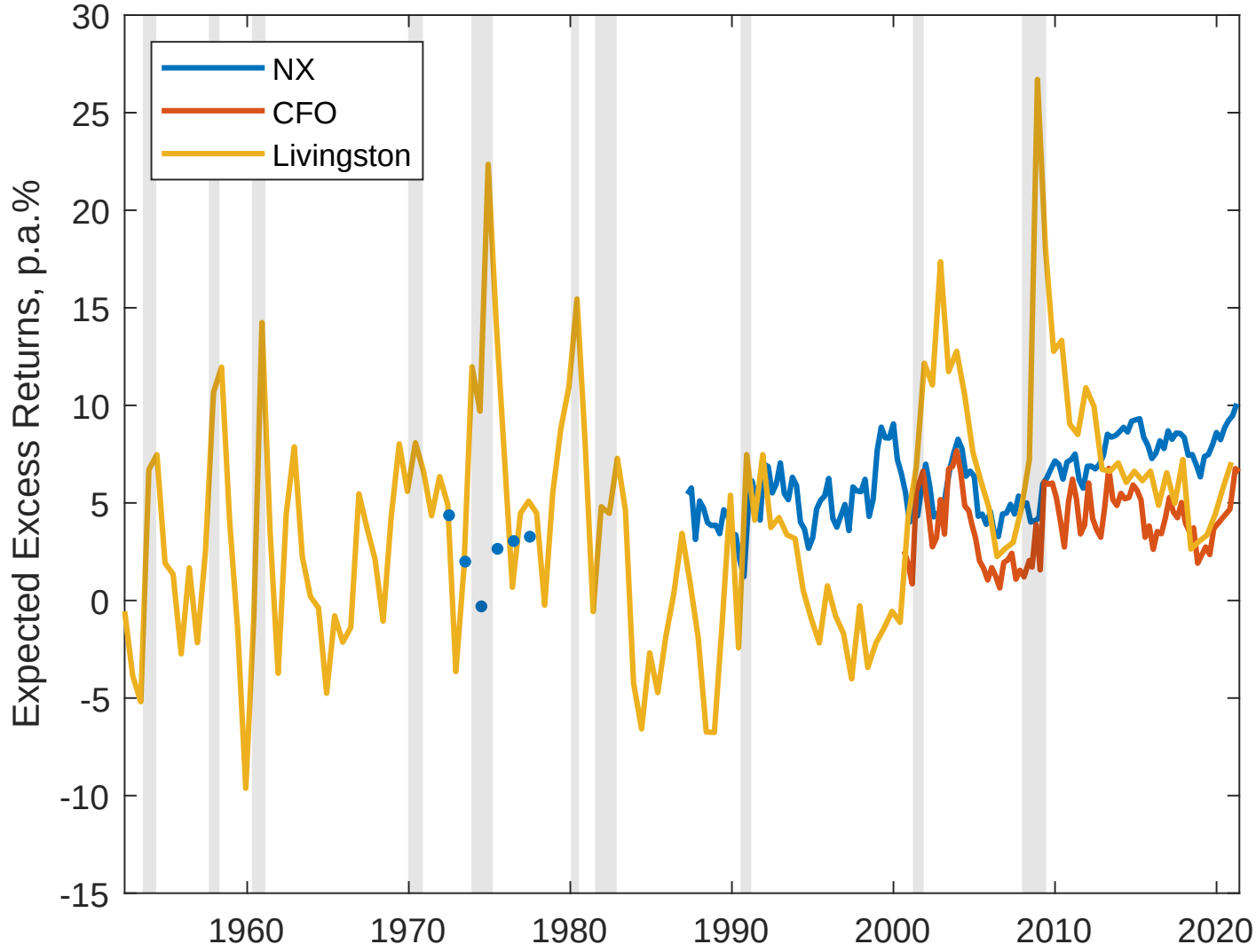
- Subjective risk premium using one-year Treasury yield

$$\tilde{\mathbb{E}}_t R^e_{t+1} = \tilde{\mathbb{E}}_t R_{t+1} - R_{f,t}$$

Stock market excess return expectations: Individuals, CFOs, professionals



Stock market: Predictive regressions for realized excess returns

	Asset-Specific Predictors							
	CAY		D/P		EXPD		NTIS	
Coeff	3.24	3.71	6.01	5.83	-6.44	-7.19	-4.87	-4.93
(p-value)	(0.08)	(0.10)	(0.00)	(0.00)	(0.03)	(0.04)	(0.16)	(0.16)
R^e_{past}		-3.32		0.36		-3.70		-1.47
(p-value)		(0.12)		(0.71)		(0.09)		(0.51)
Adj. R^2	0.03	0.06	0.09	0.09	0.08	0.11	0.06	0.06
N	272	272	1117	1117	377	373	1117	1117

- All predictors standardized to unit standard deviations in full sample period
- Predictive regressions are bootstrap bias-adjusted

Stock market: Subjective risk premium regressions

		Asset-Specific Predictors							
		CAY		D/P		EXPD		NTIS	
NX	Coeff	-0.75	-0.75	-0.24	-0.00	0.17	0.20	-0.36	-0.55
	(p-value)	(0.04)	(0.03)	(0.52)	(1.00)	(0.63)	(0.54)	(0.48)	(0.23)
	R^e_{past}		0.87		0.87		0.88		0.98
	(p-value)		(0.01)		(0.02)		(0.00)		(0.00)
	Adj. R^2	0.21	0.33	0.00	0.11	0.00	0.12	0.01	0.16
	N	142	142	142	142	142	142	142	142
CFO	Coeff	-0.23	-0.15	-0.47	-0.41	-0.94	-0.92	0.74	0.67
	(p-value)	(0.64)	(0.76)	(0.32)	(0.31)	(0.01)	(0.02)	(0.01)	(0.03)
	R^e_{past}		0.35		0.30		0.16		0.20
	(p-value)		(0.18)		(0.29)		(0.60)		(0.48)
	Adj. R^2	-0.00	0.01	0.04	0.05	0.35	0.34	0.08	0.07
	N	77	77	77	77	77	77	77	77
Liv.	Coeff	-1.70	-1.42	1.01	0.42	-0.37	-0.59	-1.05	-0.88
	(p-value)	(0.08)	(0.09)	(0.48)	(0.73)	(0.40)	(0.17)	(0.43)	(0.34)
	R^e_{past}		-2.70		-2.78		-2.94		-2.83
	(p-value)		(0.02)		(0.01)		(0.01)		(0.01)
	Adj. R^2	0.06	0.17	0.01	0.13	-0.00	0.14	0.01	0.14
	N	138	138	138	138	138	138	138	138

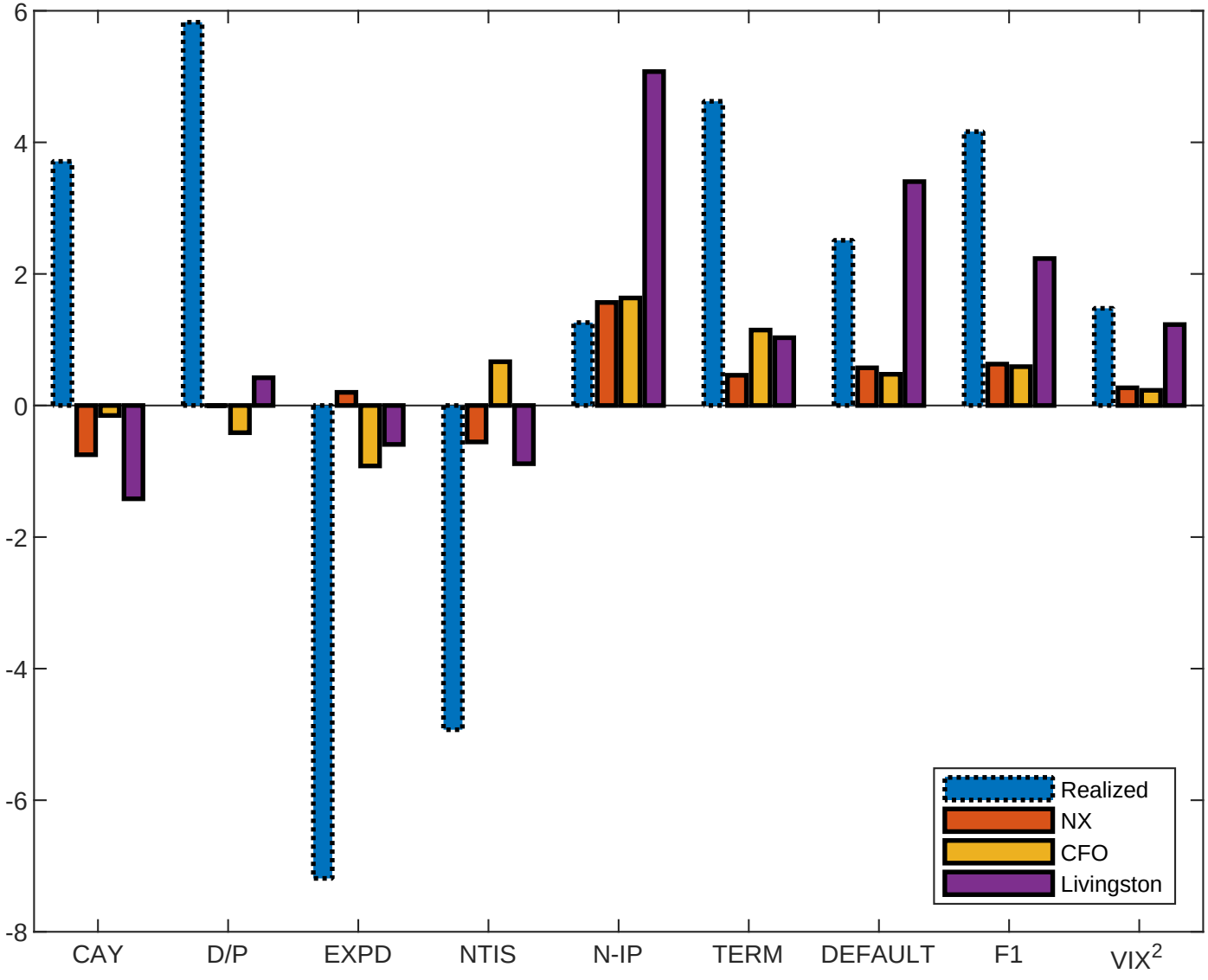
Stock market: Predictive regressions for realized excess returns

	Business-Cycle Indicators									
	N-IP		TERM		DEFAULT		F1		VIX^2	
Coeff	1.55	1.26	4.40	4.62	2.84	2.51	4.54	4.16	1.82	1.48
(p-value)	(0.51)	(0.49)	(0.00)	(0.01)	(0.12)	(0.13)	(0.00)	(0.04)	(0.31)	(0.39)
R^e_{past}		-1.23		-1.39		-0.55		-0.65		-1.24
(p-value)		(0.74)		(0.55)		(0.91)		(0.69)		(0.62)
Adj. R^2	0.01	0.01	0.04	0.04	0.02	0.02	0.06	0.06	0.00	0.00
N	1129	1117	1129	1117	1129	1117	717	717	1129	1117

Stock market: Subjective risk premium regressions

		Business-Cycle Indicators									
		N-IP		TERM		DEFAULT		F1		VIX^2	
NX	Coeff	0.98	1.57	0.44	0.46	-0.30	0.57	0.15	0.63	-0.01	0.27
	(p-value)	(0.17)	(0.01)	(0.20)	(0.18)	(0.35)	(0.13)	(0.68)	(0.08)	(0.95)	(0.14)
	R^e_{past}		0.88		1.07		1.13		1.13		
	(p-value)		(0.00)		(0.00)		(0.00)		(0.00)		(0.01)
	Adj. R^2	0.04	0.23	0.04	0.16	-0.00	0.13	-0.00	0.16	-0.01	0.15
	N	143	142	143	142	143	142	142	142	143	142
CFO	Coeff	0.32	1.64	1.12	1.15	-0.15	0.47	0.08	0.59	0.01	0.23
	(p-value)	(0.55)	(0.02)	(0.00)	(0.00)	(0.60)	(0.18)	(0.68)	(0.07)	(0.92)	(0.16)
	R^e_{past}		0.89		0.39		0.63		0.85		0.73
	(p-value)		(0.01)		(0.08)		(0.08)		(0.03)		(0.05)
	Adj. R^2	-0.01	0.12	0.37	0.44	-0.01	0.03	-0.01	0.06	-0.01	0.04
	N	79	77	79	77	79	77	77	77	79	77
Liv.	Coeff	5.62	5.08	1.06	1.03	4.18	3.41	2.67	2.23	1.65	1.23
	(p-value)	(0.00)	(0.00)	(0.38)	(0.37)	(0.03)	(0.04)	(0.00)	(0.00)	(0.00)	(0.02)
	R^e_{past}		-2.28		-2.87		-1.79		-1.67		-2.23
	(p-value)		(0.01)		(0.01)		(0.05)		(0.08)		(0.06)
	Adj. R^2	0.27	0.35	0.03	0.16	0.22	0.26	0.23	0.26	0.13	0.20
	N	138	138	138	138	138	138	122	122	138	138

Stock market: Summary



Magnitude of Slope Coefficients

Treasury bond market: Returns and expectations data

	Frequency	Sample Period	Mean	S.D.
Realized	Monthly	1952/03–2020/12	1.32	5.08
BCFF	Monthly	1988/01–2020/12	-0.76	1.70

- Extract return expectations from yield forecasts
  - Par yield forecasts for 6m, 1y, 2y, 5y, and 10y bond maturity yields from current quarter to several quarters ahead
  - Fit a Nelson-Siegel term structure model to these forecasts period-by-period
  - Bootstrap zero-coupon yield forecasts from these par yield forecasts
  - Extract expected excess return forecasts from zero-coupon yield yield forecasts

- Form portfolio expected return by taking equal-weighted average across maturities

Treasury bond market: Asset Class-Specific Return Predictors

- LN: macro factor from Ludvigson and Ng (2009)
- CYCLE: cycle factor from Cieslak and Povala (2015).

Standardized to have unit standard deviations in the full sample period starting from 1952.

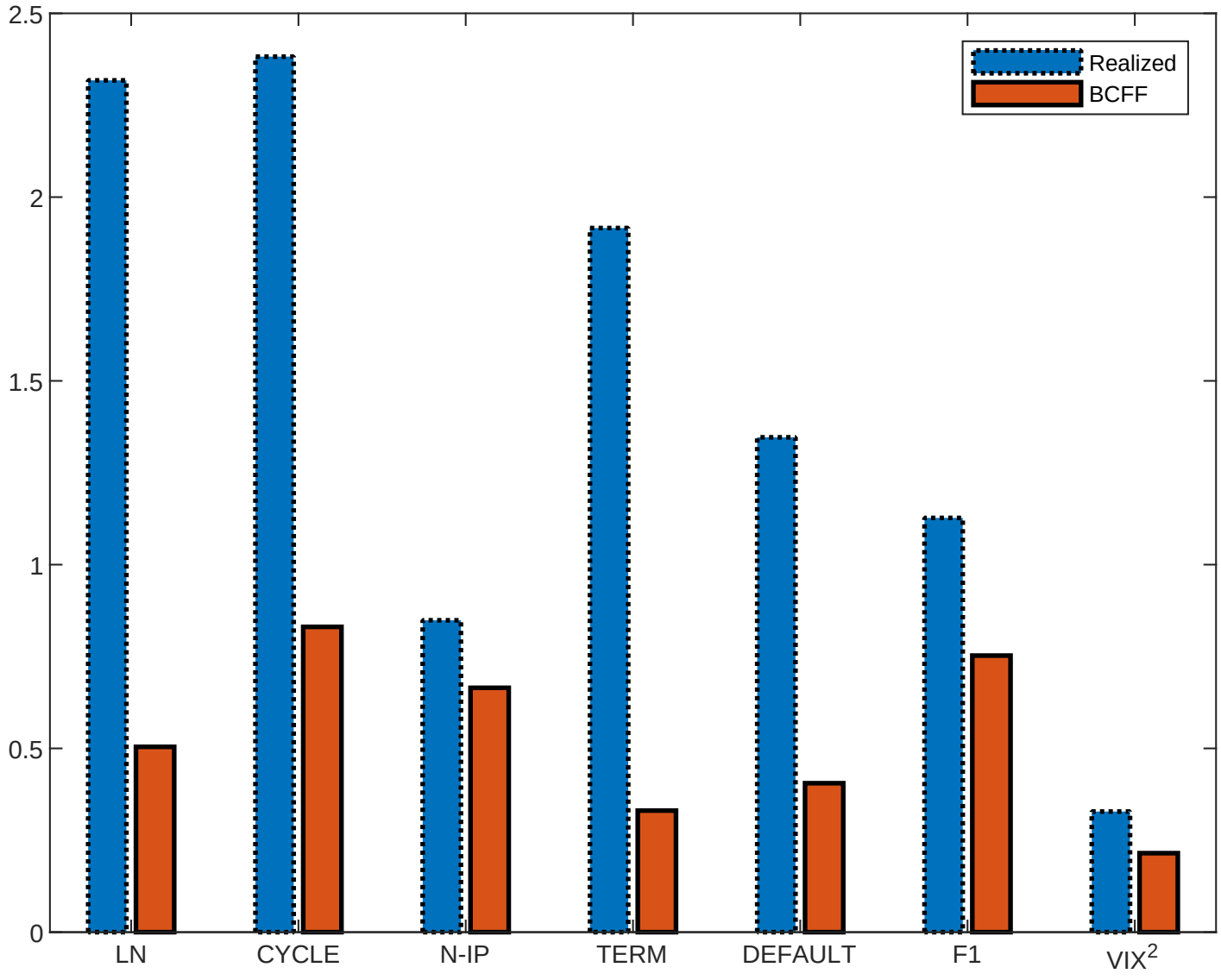
Treasury bond market: Realized and subjective premia

	Asset-Specific Predictors			
	LN		CYCLE	
A. Realized				
Coeff	1.94	2.32	2.29	2.38
(p-value)	(0.00)	(0.00)	(0.01)	(0.02)
R^e_{past}		-0.85		-0.37
(p-value)		(0.20)		(0.79)
Adj. R^2	0.14	0.16	0.24	0.24
N	717	717	578	578
B. BCFF				
Coeff	0.37	0.50	0.83	0.83
(p-value)	(0.16)	(0.05)	(0.00)	(0.00)
R^e_{past}		-0.35		0.02
(p-value)		(0.08)		(0.90)
Adj. R^2	0.03	0.05	0.23	0.22
N	397	397	397	397

Treasury bond market: Realized and subjective premia

	Business-Cycle Indicators									
	N-IP		TERM		DEFAULT		F1		VIX^2	
A. Realized										
Coeff	0.75	0.85	1.48	1.92	1.36	1.35	1.08	1.13	0.30	0.33
(p-value)	(0.61)	(0.60)	(0.00)	(0.00)	(0.12)	(0.13)	(0.04)	(0.07)	(0.22)	(0.20)
R^e_{past}		-0.12		-0.94		-0.13		-0.10		0.02
(p-value)		(0.84)		(0.08)		(0.73)		(0.77)		(0.88)
Adj. R^2	0.00	0.00	0.09	0.12	0.02	0.02	0.03	0.03	0.00	0.00
N	826	814	826	814	826	814	717	717	826	814
B. BCFF										
Coeff	0.54	0.67	0.30	0.33	0.30	0.41	0.57	0.75	0.17	0.22
(p-value)	(0.31)	(0.22)	(0.15)	(0.11)	(0.47)	(0.35)	(0.02)	(0.00)	(0.13)	(0.07)
R^e_{past}		-0.25		-0.22		-0.24		-0.44		-0.28
(p-value)		(0.27)		(0.26)		(0.32)		(0.06)		(0.24)
Adj. R^2	0.02	0.03	0.03	0.04	0.01	0.02	0.07	0.11	0.02	0.04
N	397	397	397	397	397	397	397	397	397	397

Treasury bond market: Summary



Magnitude of Slope Coefficients

Foreign exchange market: Returns and expectations data

	Frequency	Sample Period	Mean	S.D.
Realized	Monthly	1984/10–2021/06	1.78	9.76
CE & FX4casts	Monthly	1986/08–2021/06	0.50	3.16

- Extract return expectations from spot rate forecasts and forward rates
- Focus on returns of an equal-weighted developed markets currency portfolio
  - AUD, CAN, DKK, DEM/EUR, JPY, NZD, NOK, SEK, CHF, GBP

  from perspective of a U.S. investor

Foreign exchange market: Asset Class-Specific Return Predictors

- Forward discount for each currency

$$FD_t \equiv \frac{F_t}{S_t} - 1,$$

averaged across all currencies as in Lustig et al. (2014).

Standardized to have unit standard deviations in the full sample period starting from 1984.

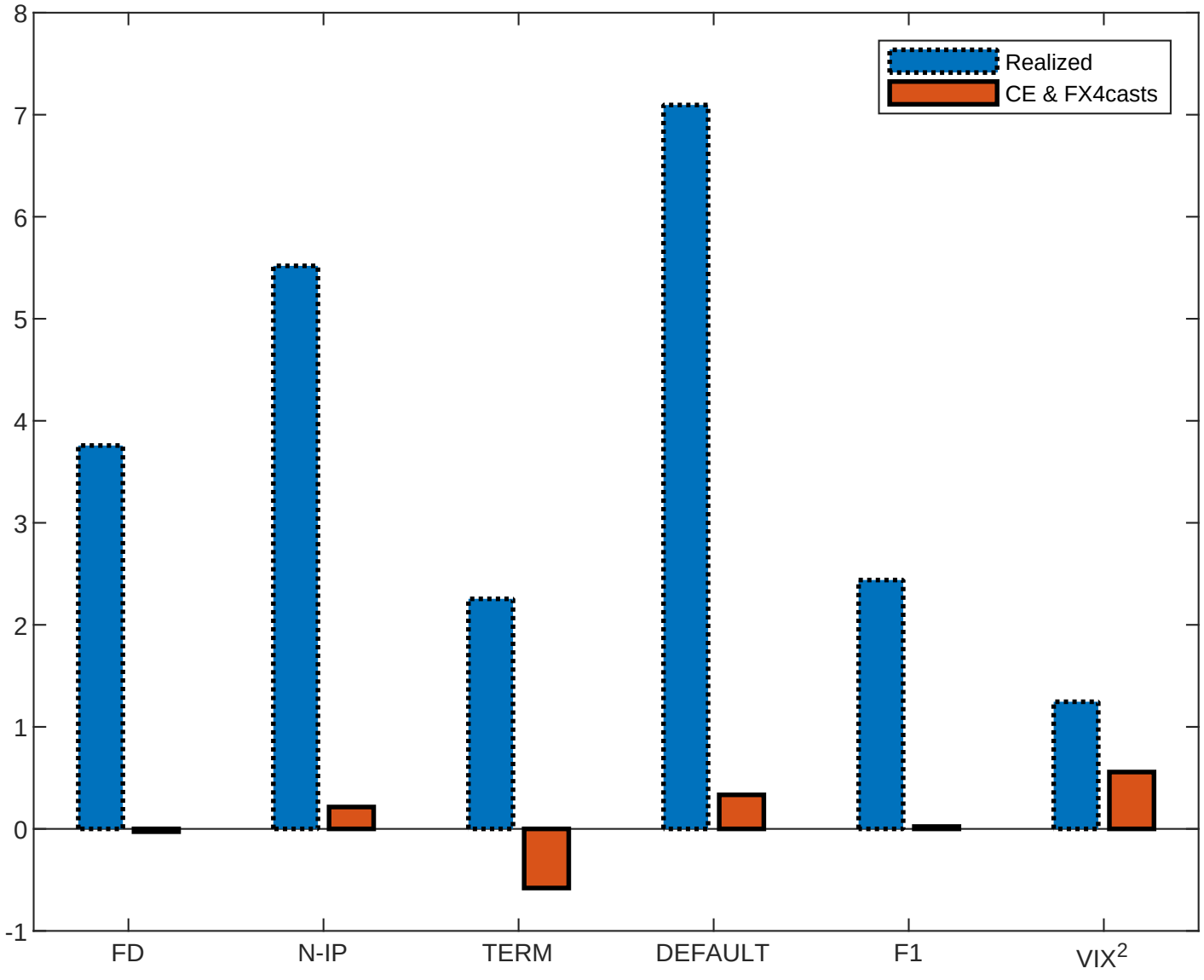
Foreign exchange market: Realized and subjective premia

	Asset-Specific Predictors	
	Avg. FD	
A. Realized		
Coeff	3.75	3.79
(p-value)	(0.03)	(0.08)
R^e_{past}		-1.23
(p-value)		(0.42)
Adj. R^2	0.15	0.13
N	442	430
B. CE & FX4casts		
Coeff	-0.19	0.01
(p-value)	(0.75)	(0.99)
R^e_{past}		-0.41
(p-value)		(0.54)
Adj. R^2	0.00	0.01
N	419	419

Foreign exchange market: Realized and subjective premia

	Business-Cycle Indicators									
	N-IP		TERM		DEFAULT		F1		VIX^2	
A. Realized										
Coeff	6.66	5.55	1.99	2.24	5.99	7.05	2.65	2.50	1.44	1.24
(p-value)	(0.04)	(0.10)	(0.27)	(0.29)	(0.07)	(0.07)	(0.06)	(0.14)	(0.03)	(0.04)
R^e_{past}		1.03		-0.12		0.50		0.76		0.75
(p-value)		(0.62)		(0.97)		(0.67)		(0.69)		(0.66)
Adj. R^2	0.10	0.07	0.03	0.04	0.11	0.15	0.04	0.02	0.03	0.04
N	442	430	442	430	442	430	442	430	442	430
B. CE & FX4casts										
Coeff	0.27	0.10	-0.68	-0.62	0.27	0.23	0.06	-0.03	0.56	0.53
(p-value)	(0.74)	(0.91)	(0.24)	(0.25)	(0.69)	(0.77)	(0.89)	(0.94)	(0.10)	(0.13)
R^e_{past}	-0.40		-0.20		-0.40		-0.43		-0.25	
(p-value)	(0.57)		(0.76)		(0.57)		(0.54)		(0.71)	
Adj. R^2	-0.00	0.01	0.04	0.04	-0.00	0.01	-0.00	0.01	0.07	0.07
N	419	419	419	419	419	419	414	414	419	419

Foreign exchange market: Summary



Magnitude of Slope Coefficients

Commodity futures market: Returns and expectations data

	Frequency	Sample Period	Mean	S.D.
Realized, Metals	Monthly	1978/09–2021/06	1.53	25.54
CE, Metals	Monthly	1995/08–2021/06	0.70	5.67
Realized, Oil	Monthly	1984/12–2021/06	8.49	33.68
CE, Oil	Monthly	1995/08–2021/06	2.46	9.70

- Focus on commodities with the longest history and highest coverage in CE:
  - Energy: Crude Oil (WTI)
  - Metals: Gold, Silver, Aluminum, and Copper
- Extract return expectations from spot price forecasts and futures prices

Commodities futures market: Asset Class-Specific Return Predictors

- One-year futures basis averaged across commodities

$$Basis_t \equiv \frac{F_t}{S_t} - 1,$$

- One-year open interest (in \$) growth

Averaged across commodities (for metals) and standardized to have unit standard deviations in the full sample period starting from 1978 (metals) and 1984 (oil).

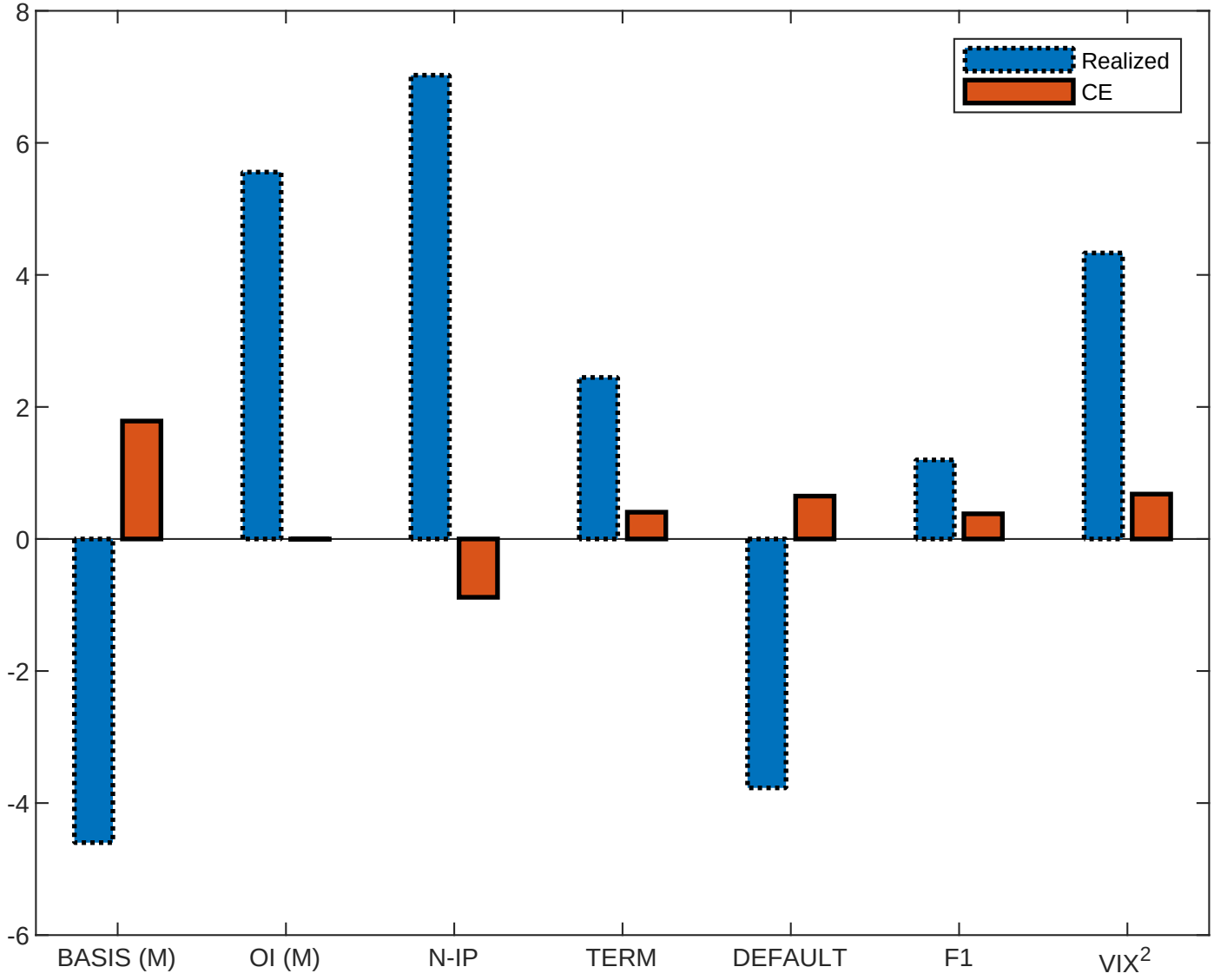
Metal futures: Realized and subjective premia

	Asset-Specific Predictors			
	Basis		OI	
A. Realized				
Coeff	-5.86	-4.57	7.45	5.51
(p-value)	(0.20)	(0.31)	(0.11)	(0.19)
R^e_{past}		4.50		3.61
(p-value)		(0.34)		(0.81)
Adj. R^2	0.06	0.09	0.09	0.09
N	516	504	441	441
B. CE				
Coeff	7.27	1.79	-2.22	-0.01
(p-value)	(0.02)	(0.43)	(0.01)	(0.99)
R^e_{past}		-3.83		-4.12
(p-value)		(0.00)		(0.00)
Adj. R^2	0.12	0.35	0.13	0.34
N	150	150	150	150

Metal futures: Realized and subjective premia

	Business-Cycle Indicators									
	N-IP		TERM		DEFAULT		F1		VIX^2	
A. Realized										
Coeff	5.91	7.03	2.33	2.48	-5.19	-3.78	-0.88	1.24	3.80	4.31
(p-value)	(0.55)	(0.43)	(0.75)	(0.64)	(0.69)	(0.86)	(0.80)	(0.96)	(0.06)	(0.03)
R^e_{past}		5.68		5.98		4.58		5.51		6.10
(p-value)		(0.27)		(0.20)		(0.33)		(0.27)		(0.13)
Adj. R^2	0.01	0.04	0.00	0.03	0.00	0.02	-0.00	0.02	0.03	0.07
N	516	504	516	504	516	504	516	504	516	504
B. CE										
Coeff	-0.05	-0.89	0.47	0.41	2.28	0.65	1.24	0.38	1.09	0.68
(p-value)	(0.97)	(0.52)	(0.52)	(0.62)	(0.28)	(0.71)	(0.32)	(0.72)	(0.05)	(0.20)
R^e_{past}		-4.19		-4.12		-4.01		-3.83		-3.86
(p-value)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)
Adj. R^2	-0.01	0.35	-0.00	0.35	0.04	0.35	0.02	0.30	0.08	0.38
N	150	150	150	150	150	150	145	145	150	150

Metals futures: Summary



Magnitude of Slope Coefficients

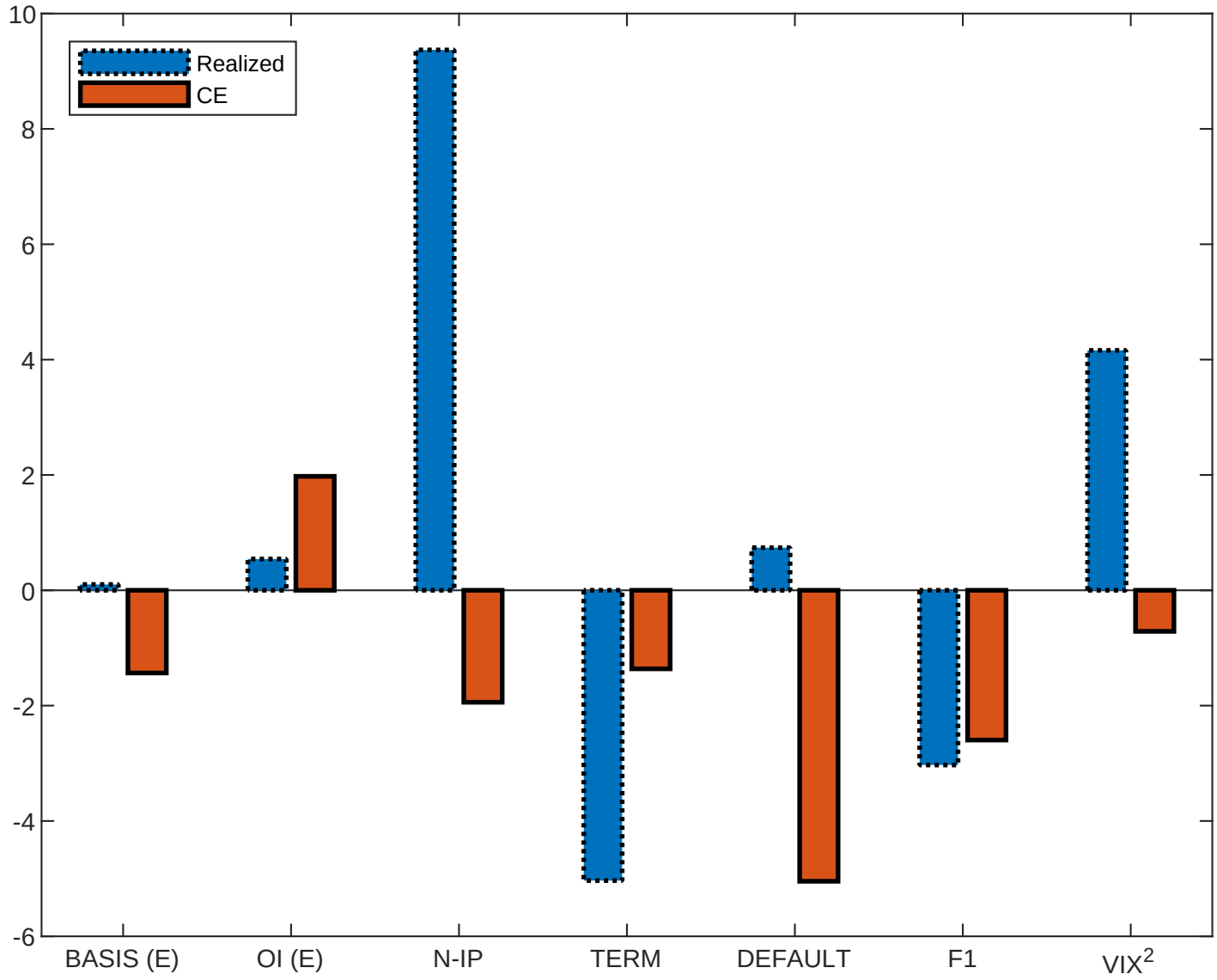
Oil futures: Realized and subjective premia

	Asset-Specific Predictors			
	Basis		OI	
A. Realized				
Coeff	1.74	0.24	-0.71	0.45
(p-value)	(0.81)	(0.90)	(0.95)	(0.58)
R^e_{past}		-1.38		-2.59
(p-value)		(0.67)		(0.55)
Adj. R^2	-0.00	-0.00	-0.00	0.00
N	439	427	426	426
B. CE				
Coeff	2.46	-1.43	-3.61	1.98
(p-value)	(0.04)	(0.36)	(0.13)	(0.38)
R^e_{past}		-6.47		-7.143
(p-value)		(0.01)		(0.00)
Adj. R^2	0.07	0.33	0.14	0.33
N	150	150	150	150

Oil futures: Realized and subjective premia

	Business-Cycle Indicators									
	N-IP		TERM		DEFAULT		F1		VIX^2	
A. Realized										
Coeff	10.26	9.32	-4.46	-5.16	0.58	0.66	-0.47	-2.98	4.05	4.18
(p-value)	(0.21)	(0.48)	(0.53)	(0.57)	(0.71)	(0.81)	(0.84)	(0.51)	(0.25)	(0.33)
R^e_{past}		-0.66		-2.44		-2.19		-2.52		-0.51
(p-value)		(0.77)		(0.57)		(0.67)		(0.55)		(0.75)
Adj. R^2	0.01	0.01	0.01	0.02	-0.00	0.00	-0.00	0.00	0.03	0.02
N	439	427	439	427	439	427	439	427	439	427
B. CE										
Coeff	3.82	-1.94	-1.73	-1.36	0.19	-5.05	0.22	-2.60	0.52	-0.71
(p-value)	(0.23)	(0.55)	(0.35)	(0.41)	(0.95)	(0.00)	(0.92)	(0.19)	(0.52)	(0.29)
R^e_{past}	-5.93		-5.41		-6.60		-7.24		-5.83	
(p-value)	(0.01)		(0.00)		(0.00)		(0.00)		(0.01)	
Adj. R^2	0.03	0.32	0.01	0.32	-0.01	0.38	-0.01	0.43	0.00	0.32
N	150	150	150	150	150	150	145	145	150	150

Oil futures: Summary



Magnitude of Slope Coefficients

Some variations and summary: Ratios

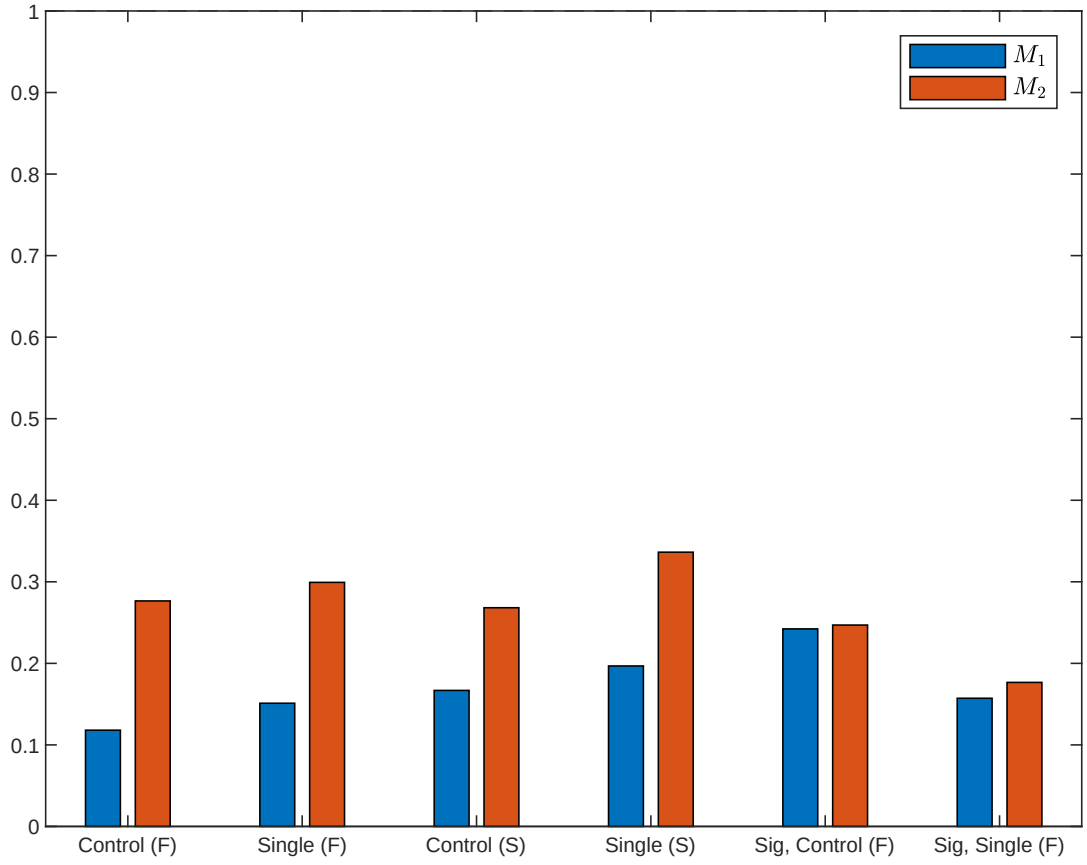
- For each survey, we calculate the following two ratios:

$$M_1 \equiv \frac{\sum_{k\in\mathbb{K}} \text{sgn}\left(\beta_k^{real}\right)\cdot\beta_k^{sub}}{\sum_{k\in\mathbb{K}} \text{sgn}\left(\beta_k^{real}\right)\cdot\beta_k^{real}}, \qquad M_2 \equiv \frac{\sum_{k\in\mathbb{K}} |\beta_k^{sub}|}{\sum_{k\in\mathbb{K}} |\beta_k^{real}|},$$

  where
  - β_k^{sub}: slope coefficient from regressing survey excess return expectations on predictor k
  - β_k^{real}: bias-adjusted slope coefficient from regressing realized excess returns on predictor k

- We then average M_1 and M_2 within asset classes (if there are multiple surveys) then across asset classes

Some variations and summary: Ratios



- Control and Single: with and without controlling for past excess returns
- (F): estimates using the full sample
- (S): estimates using the matched-to-survey sample
- Sig: using only realized excess return predictors w/ $p < 0.05$.

Statistical inference on cyclicality wedges

- Cyclicality wedge d: average difference between realized-return-based and survey-based slope coefficient estimates
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- Asymptotic inference approach that accounts for different predictors, sample periods, data sets, and measurement frequencies.

Some variations and summary: Cyclicality wedges

	Full-Sample		Survey-Sample	
	w/o R^e_{past}	with R^e_{past}	w/o R^e_{past}	with R^e_{past}
Stock Market	3.56	3.55	3.37	3.09
	(0.96)	(1.01)	(1.16)	(1.36)
Treasury Bonds	0.90	0.95	0.40	0.62
	(0.35)	(0.40)	(0.42)	(0.45)
Foreign Exchange	3.67	3.76	3.29	3.55
	(0.92)	(1.00)	(0.93)	(0.97)
Commodities				
Metals	4.97	4.25	10.43	10.70
	(2.27)	(2.40)	(2.22)	(2.46)
Oil	2.54	3.97	3.68	5.95
	(1.86)	(2.64)	(2.49)	(3.45)
Composite				
Equal-weighted	2.97	3.09	3.53	3.90
	(0.53)	(0.61)	(0.66)	(0.67)
σ^{-1}-weighted	2.23	2.31	2.04	2.29
	(0.40)	(0.43)	(0.44)	(0.44)

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- Suggests comparison of subjective expectations with out-of-sample forecasts of excess returns

Comparison with out-of-sample forecasts

1. Estimate

$$R_k^e = \alpha_{i,t} + \beta_{i,t} x_{i,k-1} + \varepsilon_{i,k}, \quad k = 2, \ldots, t.$$

over expanding windows, possibly with unequal weights $\omega_{t,k}$,

$$(\hat{\alpha}_{i,t}, \hat{\beta}_{i,t}) \equiv \underset{\alpha,\ \beta}{\operatorname{argmin}} \sum_{k=2}^{t} \omega_{t,k} (R_k^e - \alpha - \beta x_{i,k-1})^2.$$

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2. Shrink predictive regression forecast toward trailing mean $\bar{R}^e_t$,

$$\hat{\mathbb{E}}_{i,t} R^e_{t+1} \equiv s_{i,t} (\hat{\alpha}_{i,t} + \hat{\beta}_{i,t} x_{i,t}) + (1 - s_{i,t}) \bar{R}^e_t,$$

where weight $s_{i,t}$ minimizes past OOS forecast errors until t,

$$s_{i,t} = \underset{s}{\operatorname{argmin}} \sum_{k=t_{min}}^{t} \omega_{t,k} u_k(s)^2,$$

$$u_k(s) \equiv R^e_k - s(\hat{\alpha}_{i,k-1} + \hat{\beta}_{i,k-1} x_{i,k-1}) - (1 - s) \bar{R}^e_{k-1}.$$

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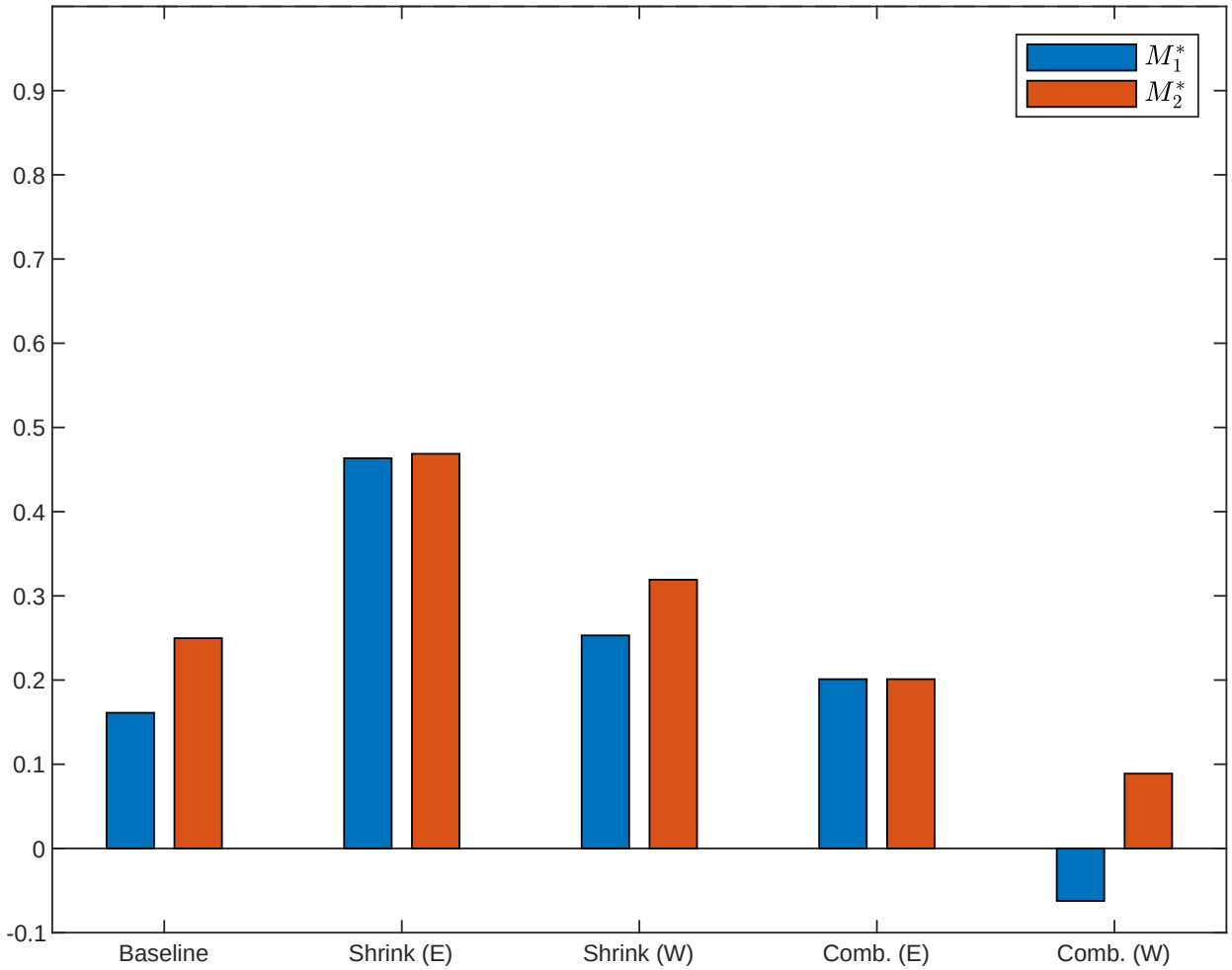
  - OOS forecast sample period matched to survey sample periods
- To summarize, use the same ratios as before but with β_k^{sub} replaced by β_k^{OOS}:

$$M_1^* \equiv \frac{\sum_{k\in\mathbb{K}} \operatorname{sgn}\left(\beta_k^{real}\right)\cdot\beta_k^{OOS}}{\sum_{k\in\mathbb{K}} \operatorname{sgn}\left(\beta_k^{real}\right)\cdot\beta_k^{real}}, \qquad M_2^* \equiv \frac{\sum_{k\in\mathbb{K}} |\beta_k^{OOS}|}{\sum_{k\in\mathbb{K}} |\beta_k^{real}|},$$

Comparison with out-of-sample forecasts: Stocks



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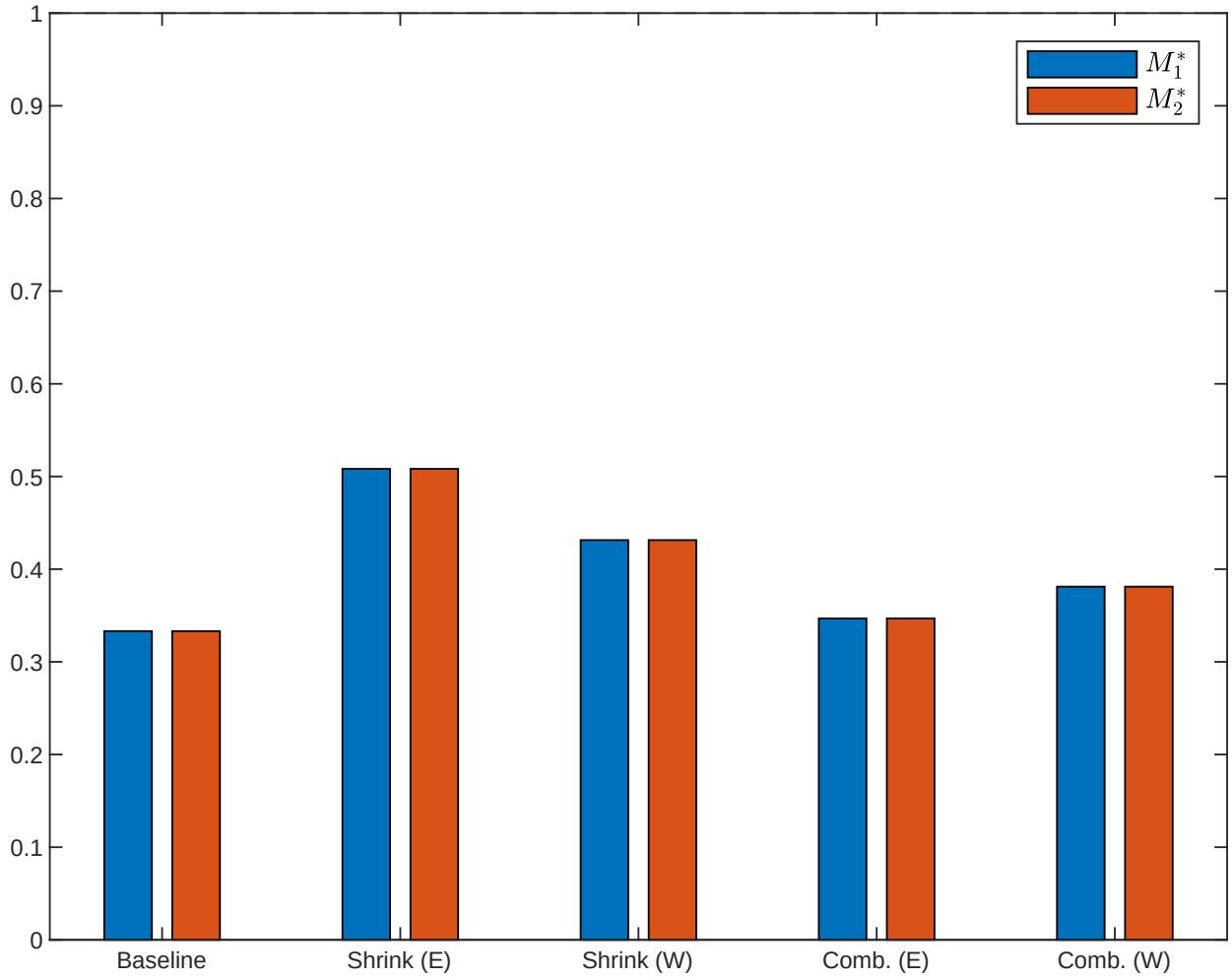
- W = data exponentially weighted as in Nagel and Xu (2022)

Comparison with out-of-sample forecasts: Bonds



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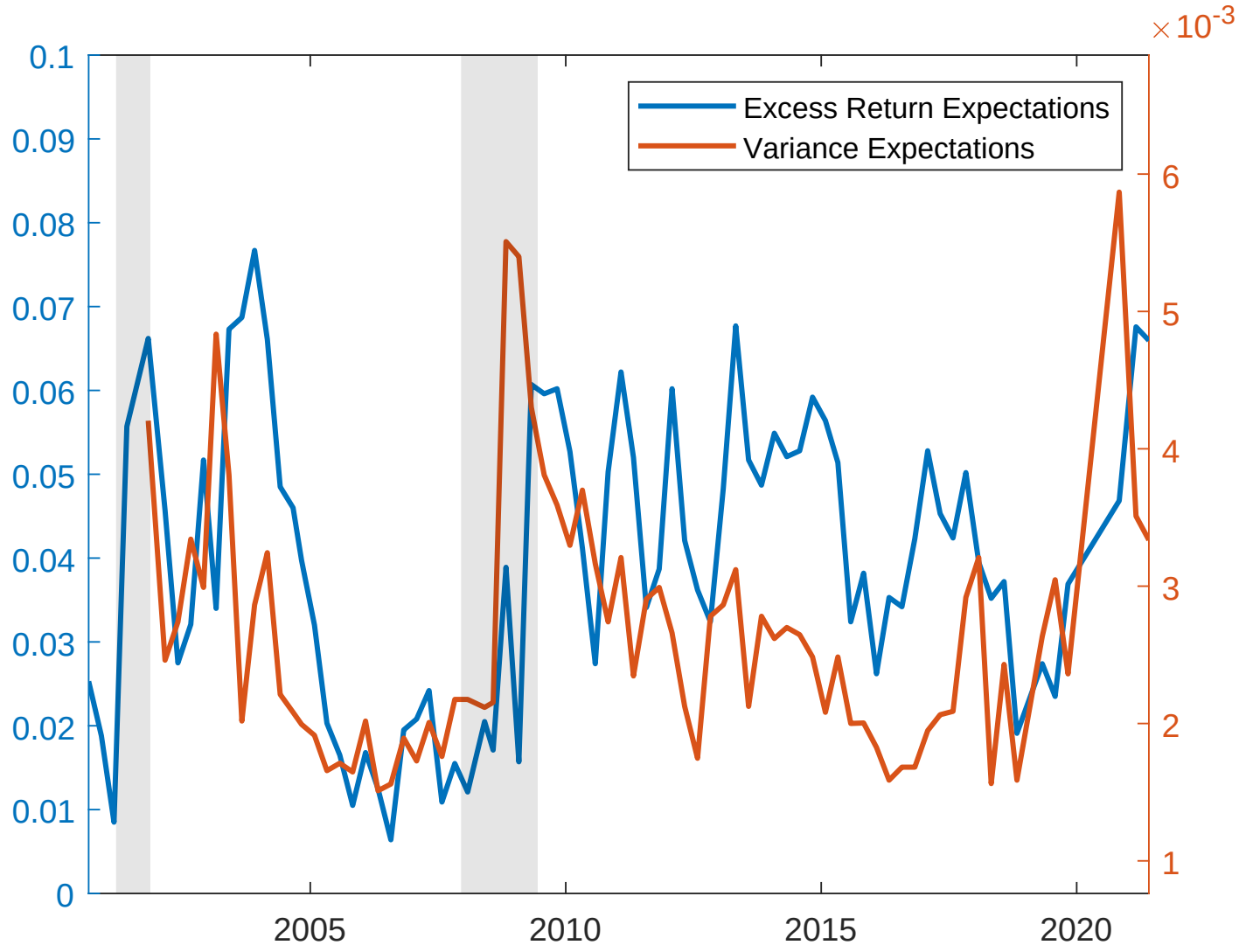
- Here: subjective risk premia and subjective perceptions of risk

Subjective risk perceptions

- Proxies for perceived stock market risk (Lochstoer and Muir 2022):
  - Graham-Harvey CFO survey: subjective assessment of the 10th and 90th pctile of 1y stock market returns
  - Yale ICF survey (individuals): subjective probability of a "catastrophic" U.S. stock market crash
  - Yale ICF survey (institutional): subjective probability of a "catastrophic" U.S. stock market crash

Subjective risk premia and subjective risk perceptions in CFO survey



Excess Return Expectations and Variance Expectations

Subjective risk premia and subjective risk perceptions

	NX		CFO		Livingston	
Const	0.08	0.09	0.02	0.01	0.19	0.17
(p-value)	(0.00)	(0.00)	(0.06)	(0.25)	(0.03)	(0.02)
Crash (Indiv.)	0.38	0.60				
(p-value)	(0.36)	(0.11)				
Var. Exp.			6.72	8.65		
(p-value)			(0.06)	(0.04)		
Crash (Insti.)					2.53	1.76
(p-value)					(0.10)	(0.14)
R^e_{past}		1.01		0.74		-2.84
(p-value)		(0.00)		(0.02)		(0.00)
Adj. R^2	0.04	0.28	0.12	0.20	0.24	0.40
N	87	86	75	73	39	39

Conclusion

- Pervasive lack of cyclical movement of subjective risk premia
  - Not consistent with standard time-varying risk or risk aversion theories
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- Some evidence for positive risk-return tradeoff in subjective beliefs, but not aligned with asset price cycles
- Simultaneously matching volatile asset prices, cyclical objective risk premia, and acyclical subjective risk premia, requires a time-varying wedge between subjective and objective forecasts of fundamentals, e.g.,
  - Subjective dividend growth for stocks
  - Subjective interest rate expectations for bonds