Macroeconomic Drivers: A Cross-Sectional and Time-Series Analysis of Factor Dynamics

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Abstract

1 Model Design

1.1 Theoretical Framework

From Hansen and Jagannathan (1991), the relationship between the stochastic discount factor (SDF) and individual stock return is expressed as:

$$m_{t+1} = 1 - b'_t(R_{t+1} - E_t[R_{t+1}]) \tag{1}$$

where m_{t+1} is the SDF, R_{t+1} is excess return, so $E_t[m_{t+1}R_{t+1}] = 0$ can be satisfied.

For industry portfolios and factor returns, we first estimate their risk-adjusted returns:

$$R_{i,t} = \alpha_i + \beta_{i,M}(R_{M,t} - R_{f,t}) + \sum_{k=1}^{13} \beta_{i,k}F_{k,t} + \epsilon_{i,t} \tag{2}$$

where $R_{i,t}$ represents returns of industry i or factor portfolio, α_i captures the risk-adjusted return, and $F_{k,t}$ represents the 13 risk factors.

The time-varying relationship between industry returns and momentum strategies can be expressed as:

$$\beta_{i,t}^{Mom} = \phi(R_{i,t}, Mom_{j,t}) \tag{3}$$

where $Mom_{j,t}$ represents the four types of momentum strategies (TS/CS industry/factor momentum).

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These time-varying betas can be explained by macroeconomic conditions:

$$\beta_{i,t}^{Mom} = \delta_0 + \sum_{k=1}^{K} \delta_k X_{k,t} + \eta_{i,t} \tag{4}$$

where $X_{k,t}$ represents macroeconomic variables.

Similarly, for the factor loadings:

$$\beta_{i,k,t} = \lambda_0 + \sum_{m=1}^{M} \lambda_m X_{m,t} + \nu_{i,k,t} \tag{5}$$

where $\beta_{i,k,t}$ is the time-varying loading of industry i on factor k.

The SDF can then be expressed as:

$$m_{t+1} \approx 1 - E_t[Z_{t+1}]\Sigma_Z^{-1}(Z_{t+1} - E_t[Z_{t+1}]) \tag{6}$$

where Z_{t+1} incorporates both the industry and factor information:

$$Z_{t+1} = \begin{bmatrix} R_{I,t+1} \\ F_{t+1} \end{bmatrix} \tag{7}$$

The expected returns can be modeled as a function of characteristics and external variables:

$$E_t[R_{i,t+1}] = \theta_i C_{i,t} + \beta_{i,t}^{Mom} Mom_t + \sum_{k=1}^{K} \beta_{i,k,t} F_{k,t} + \beta X_t \tag{8}$$

With these relationships, the optimal weights can be adjusted as:

$$\gamma_t' = \Sigma_Z^{-1}(\theta_i C_{i,t} + \beta_{i,t}^{Mom} Mom_t + \sum_{k=1}^{K} \beta_{i,k,t} F_{k,t} + \beta X_t) \tag{9}$$

1.2 Empirical Model Specification

Our empirical strategy systematically investigates the relationships among sector returns, risk factors, momentum strategies, and macroeconomic conditions through several interconnected stages.

First, we examine the risk premiums of sector indices and factors relative to the market benchmark. For each asset i (sector or factor), we estimate:

$$R_{i,t} = \alpha_i + \beta_i(R_{M,t} - R_{f,t}) + \epsilon_{i,t}$$

where $R_{i,t}$ is the excess return, $R_{M,t} - R_{f,t}$ is the market excess return, and α_i represents the risk-adjusted return.

We then incorporate our 13 risk factors to get a more comprehensive risk-adjusted return measure:

$$R_{i,t} = \alpha_i + \beta_{i,M}(R_{M,t} - R_{f,t}) + \sum_{k=1}^{13} \beta_{i,k} F_{k,t} + \epsilon_{i,t}$$

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where $F_{k,t}$ represents returns of factor portfolios including accruals, debt issuance, investment, low leverage, low risk, momentum, profit growth, profitability, quality, seasonality, short-term reversal, size, and value.

The resulting risk-adjusted returns are then regressed on macroeconomic variables:

$$\alpha_i = \delta_0 + \sum_{k=1}^{K} \delta_k X_{k,t} + \eta_{i,t}$$

where $X_{k,t}$ represents macroeconomic variables including TED spread, term spread, economic uncertainty, CPI, personal savings rate, PPI, and consumer sentiment.

For momentum strategies, we construct four types:

1. Time-series Industry Momentum (TS-I):

$$Mom_{TS,I,t} = \sum_{i=1}^{N} w_{i,t}^{TS} R_{i,t}, \quad w_{i,t}^{TS} = sign(R_{i,t-1:t-12})$$

2. Cross-sectional Industry Momentum (CS-I):

$$Mom_{CS,I,t} = \sum_{i=1}^{N} w_{i,t}^{CS} R_{i,t}, \quad w_{i,t}^{CS} = \begin{cases} 1/N_W & \text{if } R_{i,t-1:t-12} \in \text{top 30\%} \\ -1/N_L & \text{if } R_{i,t-1:t-12} \in \text{bottom 30\%} \end{cases}$$

3. Time-series Factor Momentum (TS-F):

$$Mom_{TS,F,t} = \sum_{k=1}^{13} w_{k,t}^{TS} F_{k,t}, \quad w_{k,t}^{TS} = sign(F_{k,t-1:t-12})$$

4. Cross-sectional Factor Momentum (CS-F):

$$Mom_{CS,F,t} = \sum_{k=1}^{13} w_{k,t}^{CS} F_{k,t}, \quad w_{k,t}^{CS} = \begin{cases} 1/N_W & \text{if } F_{k,t-1:t-12} \in \text{top 30\%} \\ -1/N_L & \text{if } F_{k,t-1:t-12} \in \text{bottom 30\%} \end{cases}$$

where $R_{i,t-1:t-12}$ represents the cumulative return over the past 12 months, N_W and N_L are the numbers of winners and losers respectively.

For each industry i, we then estimate the relationship between its alpha and these momentum strategies:

$$\alpha_{i,t} = \lambda_0 + \lambda_{TS,I} Mom_{TS,I,t} + \lambda_{CS,I} Mom_{CS,I,t} + \lambda_{TS,F} Mom_{TS,F,t} + \lambda_{CS,F} Mom_{CS,F,t} + \nu_{i,t}$$

The sensitivity (beta) of industry alphas to each momentum strategy is calculated using rolling windows:

$$\beta_{i,Mom,t}^{j} = \frac{Cov(\alpha_{i,t}, Mom_{j,t})}{Var(Mom_{j,t})}, \quad j \in \{TS\text{-}I, CS\text{-}I, TS\text{-}F, CS\text{-}F\}$$

These time-varying betas are then regressed on macroeconomic variables:

$$\beta_{i,Mom,t}^{j} = \phi_0 + \sum_{k=1}^{K} \phi_k X_{k,t} + \omega_{i,t}$$

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Similarly, we examine how macroeconomic conditions influence the time-varying relationship between industries and factors:

$$\beta_{i,k,t} = \psi_0 + \sum_{m=1}^{M} \psi_m X_{m,t} + \xi_{i,k,t}$$

where $\beta_{i,k,t}$ represents the time-varying beta between industry i and factor k, estimated using rolling windows:

$$\beta_{i,k,t} = \frac{Cov(R_{i,t}, F_{k,t})}{Var(F_{k,t})}$$

This framework allows us to:

- Quantify risk-adjusted returns relative to both market and multiple factors

- Identify macroeconomic determinants of risk-adjusted returns

- Compare the effectiveness of different momentum strategies

- Analyze how macroeconomic conditions influence momentum effects

- Examine time-varying industry-factor relationships and their drivers

2 Calibration

2.1 Data procedures and Statistics

Using data from 2000 to 2021 on US markets, our analysis integrates macroeconomic indicators, sector indices, and firm characteristics. We draw macro variables from the Federal Reserve, including the US TED spread, term spread, CPI, PPI, personal saving rate, economic uncertainty, and consumer sentiment. SP500 component stocks from 11 industries are sourced from Bloomberg, while factor characteristics such as accruals, debt issuance, investment, leverage, risk, profitability, quality, seasonality, and size come from Jensen, Kelly, and Pedersen (2023).
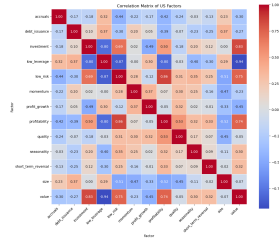
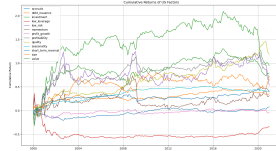Figure 1: Correlation Matrix of US Factors

Figure 2: Factor Return Series

Figure 3: Indices Correlation Matrix
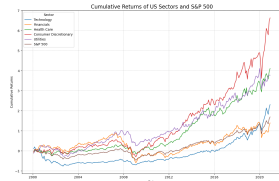
Figure 4: Indices Return
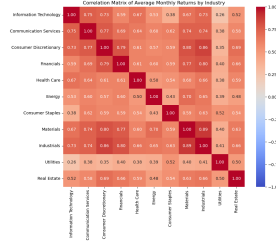
Figure 5: Industry Correlation Matrix
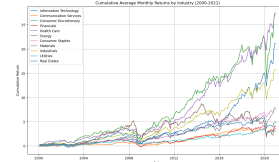
Figure 6: Industry Return

Figure 7: Panel of Figures: US Factors, Indices, and Industry Data

Statistical Summary (Table 1): The table provides insights into the mean, standard deviation, skewness, kurtosis, and ADF p-values of the dataset. High skewness and kurtosis in variables like "debt issuance" indicate extreme values, while stationarity is confirmed in factors such as "Financials." Notably, "US_CPI" and "US_PPI" display signs of time dependence.

Correlation Analysis (Figures 1, 3, and 5): The correlation matrices reveal strong relationships among certain factors and between sectors. Technology and Consumer Discretionary, for instance, show high correlations with the S&P 500, pointing to common market drivers. Industry-specific patterns are also observed, such as Financials and Real Estate exhibiting distinct return behaviors, while Technology aligns more closely with broader market movements.

Return Series and Cumulative Performance (Figures 2, 4, and 6): Time-series plots illustrate volatility and growth trends. Technology and Consumer Discretionary outperform the market, while factors like momentum show relative stability.

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Table 1: Stationarity Test Results

Variable	S-β	S-p value	D-β	D-p value
Macro Variables				
TED spread	-2.569	0.100	-0.001	0.000
Term spread	-3.343	0.013	-0.002	0.006
EMU Index	-3.056	0.030	-0.136	0.013
CPI	2.389	0.999	0.360	0.000
Personal saving rate	-2.718	0.071	0.028	0.000
PPI	2.132	0.999	0.284	0.000
Consumer Sentiment	-2.717	0.071	-0.015	0.124
Asset Returns				
Risk-Free Rate	-3.990	0.002	0.000	0.000
Technology	-15.577	0.000	0.000	0.004
Financials	-7.947	0.000	0.000	0.456
Health Care	-12.520	0.000	0.000	0.071
Consumer Discretionary	-12.480	0.000	0.000	0.125
Utilities	-15.555	0.000	0.000	0.548
S&P 500	-14.780	0.000	0.000	0.039
Factor Returns				
Accruals	-16.021	0.000	0.000	0.071
Debt issuance	-19.379	0.000	0.000	0.013
Investment	-5.920	0.000	-0.000	0.003
Low leverage	-3.854	0.002	0.000	0.012
Low risk	-17.105	0.000	-0.000	0.049
Momentum	-13.516	0.000	0.000	0.646
Profit growth	-15.442	0.000	0.000	0.936
Profitability	-5.027	0.000	-0.000	0.002
Quality	-13.383	0.000	0.000	0.128
Seasonality	-4.395	0.000	0.000	0.000
Short-term reversal	-6.624	0.000	0.000	0.202
Size	-9.368	0.000	0.000	0.185
Value	-4.027	0.001	-0.000	0.001

Notes: This table reports the results of augmented Dickey-Fuller tests and deterministic trend tests. S-β and S-p value represent the ADF test statistic and its corresponding p-value. D-β and D-p value represent the deterministic trend coefficient and its significance level. For the ADF test, p-values less than 0.05 reject the null hypothesis of non-stationarity. For the trend test, p-values less than 0.05 indicate a significant deterministic trend. Variables are grouped into macro variables, asset returns and factor returns.

Table 2: Summary Statistics of Returns

Panel A: Industry Returns

Variable	Mean	Std Dev	Skewness	Kurtosis	Sharpe Ratio	Sortino Ratio	Max Drawdown
Information Technology	0.015	0.073	0.016	1.314	0.206	0.316	−0.512
Communication Services	0.0081	0.057	−0.440	2.091	0.142	0.193	−0.545
Consumer Discretionary	0.016	0.068	0.104	4.322	0.230	0.326	−0.551
Financials	0.0084	0.062	−0.346	2.929	0.136	0.178	−0.676
Health Care	0.014	0.045	−0.070	2.306	0.318	0.481	−0.359
Energy	0.0095	0.084	0.059	4.219	0.114	0.166	−0.711
Consumer Staples	0.0091	0.033	−0.711	1.459	0.274	0.369	−0.264
Materials	0.010	0.060	−0.143	1.484	0.176	0.256	−0.520
Industrials	0.013	0.054	−0.382	1.539	0.235	0.320	−0.499
Utilities	0.0066	0.044	−0.650	1.208	0.148	0.192	−0.393
Real Estate	0.0088	0.058	−0.554	5.968	0.150	0.182	−0.629
S&P 500	0.0050	0.044	−0.530	1.147	0.116	0.153	−0.526
accruals	0.0003	0.010	0.096	0.872	0.034	0.052	−0.206
debt issuance	0.0012	0.0087	1.847	12.757	0.139	0.264	−0.099
investment	0.0026	0.026	1.081	8.960	0.101	0.160	−0.248
low leverage	−0.0010	0.041	0.620	15.168	−0.024	−0.028	−0.706
low risk	0.0030	0.049	−0.148	6.707	0.061	0.081	−0.320
momentum	0.0019	0.041	−0.490	9.855	0.045	0.052	−0.405
profit growth	−0.0001	0.012	−0.945	5.489	−0.0074	−0.0085	−0.193
profitability	0.0026	0.028	0.604	10.860	0.092	0.124	−0.262
quality	0.0034	0.016	−0.111	2.598	0.210	0.298	−0.121
seasonality	0.0014	0.0067	0.362	2.345	0.209	0.334	−0.070

Variable	Mean	Std Dev	Skewness	Kurtosis	Sharpe Ratio	Sortino Ratio	Max Drawdown
short term reversal	0.0015	0.015	1.752	15.601	0.099	0.156	−0.114
size	0.0022	0.023	1.103	4.055	0.096	0.200	−0.193
value	0.0038	0.042	−0.047	14.927	0.089	0.116	−0.369
Panel B: Industry Momentum Returns							
TS industry Momentum	0.0032	0.042	−0.159	3.725	0.076	0.105	−0.306
CS industry Momentum	−0.0004	0.027	−0.087	2.231	−0.015	−0.022	−0.324
Panel C: Factor Momentum Returns							
TS Factor Momentum	0.0018	0.023	−0.187	3.646	0.078	0.104	−0.232
CS Factor Momentum	0.0012	0.024	−0.614	5.826	0.050	0.060	−0.258

Notes: This table presents summary statistics for industry, factor, and momentum returns. Statistics include mean monthly returns, standard deviation, higher moments (skewness and kurtosis), and risk-adjusted performance measures. The Sharpe ratio is calculated as the mean excess return divided by standard deviation. The Sortino ratio uses downside deviation as the risk measure. Max Drawdown represents the maximum peak-to-trough decline.

2.2 Implementation Algorithm

1. **Stage 1: Industry and Factor Risk Premium Analysis**:

   (a) Estimate market-adjusted returns for each industry and factor:

   $$R_{i,t} = \alpha_i + \beta_i(R_{M,t} - R_{f,t}) + \epsilon_{i,t}$$

   (b) Extend to multi-factor model including all 13 factors:

   $$R_{i,t} = \alpha_i + \beta_{i,M}(R_{M,t} - R_{f,t}) + \sum_{k=1}^{13} \beta_{i,k} F_{k,t} + \epsilon_{i,t}$$

   (c) Regress alphas on macro variables:

   $$\alpha_i = \delta_0 + \sum_{k=1}^{K} \delta_k X_{k,t} + \eta_{i,t}$$

2. **Stage 2: Momentum Strategy Construction**:

   (a) Time-series Industry Momentum:
     - For each industry i, calculate cumulative returns over past 12 months
     - Assign weights: $w_{i,t}^{TS} = sign(R_{i,t-1:t-12})$
     - Portfolio return: $Mom_{TS,I,t} = \sum_{i=1}^{N} w_{i,t}^{TS} R_{i,t}$

   (b) Cross-sectional Industry Momentum:
     - Rank industries by past 12-month returns
     - Long top 30%, short bottom 30%:

     $$w_{i,t}^{CS} = \begin{cases} 1/N_W & \text{if } R_{i,t-1:t-12} \in \text{top 30\%} \\ -1/N_L & \text{if } R_{i,t-1:t-12} \in \text{bottom 30\%} \end{cases}$$

     - Portfolio return: $Mom_{CS,I,t} = \sum_{i=1}^{N} w_{i,t}^{CS} R_{i,t}$

   (c) Apply same methodology to factors to construct $Mom_{TS,F,t}$ and $Mom_{CS,F,t}$

3. **Stage 3: Momentum-Alpha Relationships**:

   (a) For each industry, estimate alpha-momentum betas using 36-month rolling windows:

   $$\beta_{i,Mom,t}^{j} = \frac{Cov(\alpha_{i,t}, Mom_{j,t})}{Var(Mom_{j,t})}, \quad j \in \{TS\text{-}I, CS\text{-}I, TS\text{-}F, CS\text{-}F\}$$

   (b) Regress betas on macro variables:

   $$\beta_{i,Mom,t}^{j} = \phi_0 + \sum_{k=1}^{K} \phi_k X_{k,t} + \omega_{i,t}$$

4. **Stage 4: Industry-Factor Relationships**:

   (a) Calculate time-varying industry-factor betas using 36-month rolling windows:
   $$\beta_{i,k,t} = \frac{Cov(R_{i,t}, F_{k,t})}{Var(F_{k,t})}$$

   (b) Analyze macro influence on these relationships:
   $$\beta_{i,k,t} = \psi_0 + \sum_{m=1}^{M} \psi_m X_{m,t} + \xi_{i,k,t}$$

3   Results and Discussion

Variable	Alpha	Beta	Newey-West t	P-value
Consumer Discretionary	0.0042	1.0811	24.2615	0.0000
Financials	−0.0001	1.2161	17.6286	0.0000
Health Care	0.0034	0.7532	19.5744	0.0000
Technology	0.0010	1.2979	15.8737	0.0000
Utilities	0.0042	0.4552	6.6261	0.0000
accruals	0.0001	0.0638	3.5077	0.0005
debt_issuance	0.0012	0.0028	0.1898	0.8495
investment	0.0031	−0.1287	−2.0790	0.0376
low_leverage	−0.0019	0.2572	2.8740	0.0041
low_risk	0.0054	−0.6364	−7.5846	0.0000
momentum	0.0036	−0.4544	−6.3167	0.0000
profit_growth	0.0000	−0.0338	−1.1927	0.2330
profitability	0.0036	−0.2555	−4.9337	0.0000
quality	0.0039	−0.1343	−4.4373	0.0000
seasonality	0.0016	−0.0485	−2.8333	0.0046
short_term_reversal	0.0013	0.0376	1.1104	0.2668
size	0.0014	0.2145	6.8165	0.0000
value	0.0043	−0.1386	−1.4657	0.1427

Table 3: Market-adjusted premiums with Newey-West Adjusted T-Statistics

Based on our results in Table 3 (Market-Adjusted Premiums with Newey-West Adjusted T-Statistics), we find evidence of significant risk-adjusted premiums across various factors and industry sectors. For example, "*Consumer Discretionary*" exhibits a positive and highly significant alpha (0.0042) alongside a strong beta of 1.0811, suggesting it offers a substantial return premium beyond market exposure. Conversely, factors like "*momentum*" and "*low risk*" have negative betas, indicating these factors may serve as defensive elements within a portfolio, with returns less sensitive to broad market fluctuations. This pattern highlights the differentiated risk-return profiles among factors and industries, underscoring the value of diversifying across these exposures.

The use of Newey-West adjusted T-statistics here is particularly important as it accounts for potential autocorrelation and heteroskedasticity in the error terms. This adjustment provides robust standard errors, ensuring that the T-statistics accurately reflect the true significance of each factor's and industry's alpha and beta, allowing for a more reliable interpretation of statistical significance in the presence of data dependencies.

Table 4: Economic explanation of factor premium

Macro	Var	α	β	t-stat
TED	Cons Disc	0.0062	-0.0037	-2.98
Term	Cons Disc	0.0022	0.0016	3.86
EMU	quality	0.0044	0.0000	3.64
CPI	size	0.0316	-0.0001	-12.14
PSR	season	0.0036	-0.0001	-4.12
PPI	size	0.0310	-0.0001	-13.62
MCS	accruals	0.0063	-0.0001	-4.85

Notes: This table presents the most significant relationships between macroeconomic variables and factor premiums. Macro variables include: TED (TED spread), Term (term spread), EMU (Equity Market Uncertainty Index), CPI (Consumer Price Index), PSR (Personal Saving Rate), PPI (Producer Price Index), and MCS (Michigan Consumer Sentiment). Factor variables include: Cons Disc (Consumer Discretionary), quality, size, season (seasonality), and accruals. α represents the intercept, β the slope coefficient, and t-stat the Newey-West adjusted t-statistics. All coefficients are estimated using monthly data and are statistically significant at the 1% level.

Based on our analysis in Table 4 (Economic Explanation of Factor Premium), we aim to identify the most significant relationships between macroeconomic variables and factor premiums. Understanding these relationships is essential for evaluating how economic conditions influence the returns of specific factors and sectors.

For instance, the TED spread—a measure of economic uncertainty calculated as the difference between the interest rates on interbank loans and short-term U.S. government debt—negatively impacts the "Consumer Discretionary" premium (significant at the 1% level). This negative relationship suggests that as the TED spread widens, signaling heightened economic uncertainty or financial stress, returns in the Consumer Discretionary sector tend to decline. This effect makes intuitive sense, as Consumer Discretionary companies (e.g., retailers, entertainment) are often more sensitive to economic downturns; when uncertainty rises, consumers may cut back on non-essential spending, negatively affecting these companies' performance.

In contrast, "quality" factors, which typically include companies with stable earnings and strong financial metrics, show a positive relationship with the EMU Index (Equity Market Uncertainty Index). This suggests that quality in-

vestments may serve as a defensive buffer during periods of market uncertainty, as they tend to be more resilient in volatile conditions. These findings highlight how different economic indicators uniquely influence factor premiums, emphasizing the role of macroeconomic conditions in shaping investment performance across various factors and sectors.

Table 5: Factor Regression Results for Industry Returns

Industry	Factor Loadings				
	α	Market	Accruals	Debt	Invest
Information Technology	0.0038***	1.0548***	0.0268	−1.1192**	0.9375***
Communication Services	0.0005	0.9519***	0.0813	−0.6911	0.4220
Consumer Discretionary	0.0073***	0.9108***	−0.8260***	−0.3924	0.0654
Financials	0.0054***	1.0167***	−0.7885***	0.6035	−0.2843
Health Care	0.0047***	0.9199***	−0.4672*	0.6862	−0.0718
Energy	−0.0015	1.0228***	2.6276***	−0.3546	−1.1469**
Consumer Staples	0.0017	0.7827***	0.1172	0.4054	−0.0855
Materials	0.0039**	0.8865***	0.1336	−0.4730	0.4037
Industrials	0.0042***	0.9519***	0.0997	0.5119	−0.1045
Utilities	−0.0007	0.8203***	1.2176**	−0.1463	−0.5573
Real Estate	0.0015	0.8035***	0.3238	−0.1839	−0.5635

Factor Regression Results (continued)

Industry	Factor Loadings				
	Low Lev	Low Risk	Mom	Prof G	Prof
Information Technology	1.2446***	−0.5720***	0.1184	−0.0424	0.7504***
Communication Services	−0.3518	−0.3774**	0.0452	−0.0664	−0.8788**
Consumer Discretionary	−1.3715***	−1.0009***	−0.0604	−0.3030	−1.5181***
Financials	−0.1879	−0.2909**	0.1446*	−0.0575	0.5504**
Health Care	0.8808**	0.2330	0.2758**	−0.3118	−0.2042

Energy	0.8504	−1.1066***	0.9520***	1.0198***	1.8791***
Consumer Staples	−0.3689*	0.4671***	−0.0702	−0.1997	−1.0443***
Materials	−1.1761***	−1.0228***	0.0775	−0.1257	0.0241
Industrials	−0.9774***	−0.6108***	0.1233*	−0.1628	−0.1804
Utilities	0.5297	0.9376***	0.2420*	0.0919	−0.2815
Real Estate	0.0449	0.0619	0.2291*	0.5338*	−1.5701***

Factor Regression Results (continued)

	Factor Loadings and Model Fit					
Industry	Quality	Season	ST Rev	Size	Value	Adj. R^2
Information Technology	0.6957***	−0.2959	−0.0687	0.6386***	0.2690	0.9022
Communication Services	1.0439***	−0.1225	0.2893	−0.0827	0.1482	0.7282
Consumer Discretionary	2.1347***	−0.8877**	0.3167*	0.1987	0.5122	0.8358
Financials	−1.4971***	−0.7448**	0.1189	0.1722	0.3742	0.8835
Health Care	0.0584	0.8998**	0.0961	−0.1224	0.5399	0.6895
Energy	−2.0839***	2.4082***	−0.1287	0.3967*	2.0317***	0.7414
Consumer Staples	0.9255***	0.1082	−0.0745	−0.2897***	0.1172	0.6662
Materials	0.5628**	0.0642	0.1669	0.1461	−0.1378	0.8064
Industrials	0.8753***	−0.7710***	0.0638	0.2998**	0.1555	0.8507
Utilities	−0.4653	0.3288	−0.0978	0.0690	0.5698	0.3931
Real Estate	0.4230	0.2228	−0.2133	0.0656	1.4608***	0.5455

Notes: This table presents regression results of industry excess returns on market and factor returns. α represents the intercept. Market is the S&P 500 excess return. Factors include: Accruals, Debt Issuance (Debt), Investment (Invest), Low Leverage (Low Lev), Low Risk, Momentum (Mom), Profit Growth (Prof G), Profitability (Prof), Quality, Seasonality (Season), Short-term Reversal (ST Rev), Size, and Value. Adjusted R^2 shows model fit. *, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively.

Based on our results in Table 5 (Factor Regression Results for Industry Returns), we aim to analyze how various industries are influenced by specific risk factors, thereby uncovering distinct factor sensitivities across sectors. By examining these factor loadings, we can understand how different types of exposures drive returns in each industry, which is crucial for tailoring investment strategies to sector-specific risks and opportunities.

For instance, the Information Technology sector shows a strong loading on the market factor, with a beta of 1.0548 (the highest in our data set). This high sensitivity to the overall market reflects the dominant role technology stocks have played in driving U.S. markets since the dot-com era, fueled by rapid innovation and disruptive business models. And since our data set is based on the US market from 2000 to 2021, it makes sense. Technology's close alignment with market movements highlights its cyclical nature and its substantial impact on broader indices, underscoring why this sector is often a focal point for market trends.

In contrast, the Energy sector demonstrates significant loadings on "accruals" and "investment" factors, which makes sense given its capital-intensive nature. Energy companies typically require substantial investment in physical assets and long-term projects, making them particularly sensitive to factors that influence capital expenditures and cash flow. High capital intensity also means that energy companies are more cyclical, with performance closely tied to economic conditions that affect energy demand and prices.

Additionally, industries like Financials and Consumer Discretionary show distinct factor loadings, highlighting their unique exposures. For example, Financials may exhibit sensitivity to leverage and credit-related factors due to their reliance on interest rate conditions, while Consumer Discretionary may be influenced by consumer sentiment and economic cycles, reflecting the sector's dependence on consumer spending trends.

This detailed factor analysis in Table 5 reveals how each sector responds differently to risk factors, underscoring the importance of a nuanced approach to sector allocation. By understanding these factor exposures, investors can better manage risk and enhance returns through informed, sector-specific investment strategies.

In Table 8 our objective is to pinpoint the most influential macroeconomic factors for each industry, identifying the variables that significantly impact sector performance. By examining these top relationships, we aim to highlight how sensitive each industry is to different economic conditions, allowing us to understand which macro factors drive or hinder sector-specific returns.

For example, the Information Technology sector is notably influenced by the TED spread, particularly through factors like seasonality and low leverage. The TED spread suggests that higher financial stress or economic uncertainty may dampen returns in Information Technology. This sector's reliance on investor confidence and capital flows, often necessary to sustain innovation and growth, makes it sensitive to credit market conditions. It also makes sense with our previous findings on table 5 and the beta the sector have in the US markets.Additionally, the positive impact of low leverage on this sector implies

Table 8: Top 3 Significant Macroeconomic Effects by Industry

Industry/Variable	Macro Factor	Coefficient	Significance
Information Technology			
seasonality	TED	−0.6455	***
low leverage	TED	−0.5862	***
accruals	TED	0.5305	***
Communication Services			
seasonality	TED	1.3615	***
value	TED	−1.3074	***
profit growth	TED	−1.2846	***
Consumer Discretionary			
seasonality	TED	−2.0778	***
investment	TED	1.1690	***
accruals	TED	1.1523	***
Financials			
low leverage	TED	0.8235	***
accruals	TED	0.6870	***
profit growth	TED	0.6602	***
Health Care			
investment	TED	0.9341	***
debt issuance	TED	−0.9030	***
low leverage	TED	0.8606	***
Energy			
investment	TED	−1.9447	***
value	TED	1.0705	***
investment	Term	−0.9598	***
Consumer Staples			
debt issuance	TED	0.6111	**
seasonality	Term	−0.5120	***
low leverage	TED	−0.3414	**
Materials			
value	TED	−1.0572	***
low leverage	TED	−0.8539	***
profit growth	TED	0.4781	**
Industrials			
seasonality	TED	−1.2775	***
profit growth	TED	0.5625	***
profitability	Term	−0.4896	***
Utilities			
value	TED	−1.7269	***
low leverage	TED	−1.0962	***
profitability	TED	1.0433	***
Real Estate			
profitability	TED	1.9113	***
value	TED	−1.6611	***
debt issuance	TED	−1.3615	***

Notes: This table presents the three most significant macroeconomic explanation for the time-varying factor exposure of each industry. Coefficients are sorted by absolute magnitude within each category. Macro variables are abbreviated as: TED (TED spread), Term (Term spread), EMU (Economic Uncertainty Index), CPI (Consumer Price Index), PSR (Personal Savings Rate), PPI (Producer Price Index), and MCS (Michigan Consumer Sentiment). Significance levels are indicated by:

that technology firms with less debt exposure are more resilient during uncertain periods, likely due to a stronger balance sheet that allows them to weather economic turbulence.

In the Health Care sector, we see strong dependencies on the TED spread via debt issuance and low leverage, indicating that this industry is also sensitive to credit conditions. However, unlike Technology, Health Care's exposure to debt issuance suggests that companies in this sector may frequently rely on debt financing, possibly for research, development, and expansion. When credit conditions tighten, companies with high debt issuance may experience increased costs or reduced access to capital, affecting their ability to innovate or expand. Meanwhile, the positive association with low leverage indicates that less-indebted Health Care companies are likely more stable, benefiting from lower financial risk during periods of economic stress.

Similarly, Consumer Discretionary shows a high sensitivity to the TED spread and investment factors. The TED spread's negative impact on seasonality within this sector aligns with its cyclical nature; during periods of heightened economic uncertainty, consumers often reduce discretionary spending on non-essential goods, directly affecting this sector's revenues. Additionally, investment-related variables further indicate that consumer spending trends are capital-sensitive, with lower consumer confidence and tighter credit markets translating into weaker returns.

Overall, this analysis illustrates the ways macroeconomic factors, and especialy the TED, influence each sector. While sectors like Information Technology and Consumer Discretionary are more vulnerable to credit risk, Health Care's dependencies highlight the importance of balance sheet stability.

Table 9: Industry momentum Results Analysis

Variable	Time-Series Analysis				Cross-Sectional Analysis			
	α	β	p-val	R^2	α	β	p-val	R^2
Information Technology	0.014	−0.119	0.268	0.0049	0.013	−0.407	0.012	0.025
Consumer Discretionary	0.015	−0.314	0.0017	0.039	0.013	−0.676	0.0000	0.077
Financials	0.0073	−0.390	0.0000	0.074	0.0053	−0.719	0.0000	0.108
Health Care	0.013	−0.125	0.060	0.014	0.012	−0.371	0.0002	0.054
Materials	0.0093	−0.164	0.062	0.014	0.0079	−0.501	0.0002	0.056
Industrials	0.011	−0.132	0.098	0.011	0.010	−0.378	0.0018	0.038

Notes: This table presents between the significant alphas of industry returns in Table 5 and time-series and cross-sectional industry momentum. For each analysis, α represents the intercept, β the slope coefficient, p-val the significance level, and R^2 the coefficient of determination.

In Table 9 (Industry Momentum Results Analysis), our goal is to assess how effective momentum strategies are across different industries and to understand the persistence or reversal of returns within each sector. We explore both time-series and cross-sectional momentum to identify whether returns are sustained over time or tend to revert, providing insights into how past performance might

influence future returns in each sector. This analysis is essential for our projects since it highlights which industries are more likely to experience prolonged gains or mean-reversion dynamics.

For instance, in the time-series analysis, Financials and Consumer Discretionary display strong negative betas (e.g., Financials with a beta of -0.390), suggesting a significant mean-reversion effect. This pattern indicates that periods of high returns in these sectors are often followed by declines, likely due to the cyclical nature of both industries. Financials, influenced by interest rate cycles and economic shifts, tends to see its momentum dissipate as economic conditions change. Similarly, Consumer Discretionary, which is sensitive to consumer spending trends and economic cycles, is prone to reversals as consumer behavior adjusts with changing economic sentiment. This mean-reverting tendency suggests that investors might need to be cautious when applying momentum strategies in these sectors, as recent strong performance could imply upcoming declines.

In the cross-sectional analysis, Consumer Discretionary exhibits particularly pronounced momentum effects, with a strong negative beta of -0.676. This finding implies that, in relative terms, top-performing Consumer Discretionary stocks in one period tend to underperform in the next. Such reversals may stem from the fact that this sector is highly responsive to economic cycles, with peaks in consumer demand often followed by downturns. The relatively high R-squared values in this cross-sectional analysis reinforce the robustness of these momentum effects, suggesting that sector-wide reversals are a reliable pattern rather than isolated occurrences.

Overall, this analysis illustrates that momentum effects are not uniform across sectors; cyclical industries like Financials and Consumer Discretionary exhibit strong mean-reversion tendencies, which can influence the timing and selection of momentum-based investments.

Table 10: Factor momentum Results Analysis

Variable	Time-Series Analysis				Cross-Sectional Analysis			
	α	β	p-val	R^2	α	β	p-val	R^2
Information Technology	0.013	-1.085	0.0000	0.142	0.011	-0.658	0.0000	0.096
Consumer Discretionary	0.014	-0.843	0.0000	0.097	0.012	-0.546	0.0000	0.075
Financials	0.0066	-0.738	0.0000	0.092	0.0051	-0.494	0.0000	0.076
Health Care	0.013	-0.579	0.0000	0.106	0.011	-0.450	0.0000	0.118
Materials	0.0088	-0.521	0.0004	0.049	0.0079	-0.311	0.0043	0.032
Industrials	0.011	-0.562	0.0000	0.069	0.0099	-0.376	0.0001	0.057

Notes: This table presents between the significant alphas of industry returns in Table 5 and time-series and cross-sectional factor momentum. For each analysis, α represents the intercept, β the slope coefficient, p-val the significance level, and R^2 the coefficient of determination.

Table 11: Macroeconomic Determinants of Momentum Returns

Panel A: Time-Series Industry Momentum							
Industry	TED	Term	EMU	CPI	PSR	PPI	MCS
Panel A: Time-Series Industry Momentum							
Information Technology	0.1527***	−0.1084***	−0.0015***	0.0041***	0.0097**	0.0054***	0.0001
Consumer Discretionary	0.1254***	−0.0951***	−0.0005***	−0.0009**	−0.0103***	−0.00100*	0.0059***
Financials	0.1114***	−0.0767***	−0.0004***	−0.0011***	−0.0109***	−0.0013***	0.0056***
Health Care	0.0370	−0.0795***	−0.0011***	0.0044***	0.0151***	0.0057***	0.0016
Materials	0.1224***	−0.0354***	−0.0003**	−0.0027***	−0.0207***	−0.0036***	0.0026***
Industrials	0.0953***	−0.0597***	−0.0006***	0.0001	−0.0068***	0.0000	0.0025***
Panel B: Cross-Sectional Industry Momentum							
Information Technology	0.1723***	−0.10800***	−0.0017***	0.0036***	0.0093*	0.0049***	0.0005
Consumer Discretionary	0.1486***	−0.1026***	−0.0007***	−0.0028***	−0.02100***	−0.0034***	0.0095***
Financials	0.1208***	−0.07300***	−0.0004**	−0.0029***	−0.0191***	−0.0035***	0.0076***
Health Care	0.0166	−0.1001***	−0.0016***	0.0063***	0.0238***	0.0081***	0.0032
Materials	0.2281***	-0.0113	−0.0008***	−0.00400***	−0.0316***	−0.0052***	-0.0013
Industrials	0.13600***	−0.0527***	−0.0012***	0.0004	−0.0078**	0.0005	0.0008
Panel C: Time-Series Factor Momentum							
Information Technology	0.1036**	−0.0997***	0.0001	-0.0003	0.0077	0.0006	0.00800***
Consumer Discretionary	0.1228***	−0.0588***	0.0003*	−0.0045***	−0.0204***	−0.0053***	0.00800***
Financials	0.1022***	−0.0438***	0.0001	−0.0037***	−0.0177***	−0.0043***	0.0061***
Health Care	0.0733***	−0.0575***	-0.0001	−0.0007**	-0.0014	-0.0005	0.0046***
Materials	0.09600***	-0.0070	0.0002**	−0.0036***	−0.0171***	−0.0043***	0.0024***
Industrials	0.08600***	−0.03600***	0.0001	−0.0021***	−0.0092***	−0.0024***	0.0041***

Table 11 continued from previous page

Industry	TED	Term	EMU	CPI	PSR	PPI	MCS
Panel D: Cross-Sectional Factor Momentum							
Information Technology	0.0735***	−0.0499***	0.0001	−0.0016***	-0.0034	−0.0015***	0.0051***
Consumer Discretionary	0.0817***	−0.0277***	0.0003**	−0.0041***	−0.0188***	−0.00500***	0.0055***
Financials	0.0732***	−0.0281***	0.0001	−0.0029***	−0.0141***	−0.0035***	0.0044***
Health Care	0.0479***	−0.0357***	0.0001	−0.0014***	−0.0044**	−0.0015***	0.0039***
Materials	0.0731***	-0.0025	0.0001*	−0.00300***	−0.0152***	−0.0037***	0.0017***
Industrials	0.0632***	−0.0203***	0.0001	−0.0023***	−0.0105***	−0.0027***	0.0031***

Notes: This table presents the relationships between macroeconomic variables and momentum returns. For each industry, we first calculate the correlation (beta) between industry alphas and different momentum strategies (time-series industry, cross-sectional industry, time-series factor, and cross-sectional factor momentum). Then, we regress these betas on macroeconomic variables. Reported coefficients indicate how macro variables explain the strength of momentum effects. Macro variables are: TED spread (TED), Term spread (Term), Economic Uncertainty Index (EMU), Consumer Price Index (CPI), Personal Savings Rate (PSR), Producer Price Index (PPI), and Michigan Consumer Sentiment (MCS). *, **, and *** indicate significance at 10%, 5%, and 1% levels respectively.

To conclude with our project, the final table (Macroeconomic Determinants of Momentum Returns), consolidate our analysis by examining how macroeconomic variables impact momentum effects across various industries. Our goal is to identify which economic factors amplify or diminish momentum returns in each sector, providing insights into the conditions under which momentum strategies are most effective or likely to falter. This table underscores the dynamic interplay between market conditions and momentum, highlighting how macroeconomic shifts can strengthen or weaken momentum-driven performance, an essential consideration for developing adaptable, cycle-aware momentum strategies.

For instance, the TED spread ,as shown before,shows a positive correlation with time-series momentum in the Information Technology sector (coefficient of 0.1527, significant at the 1% level). This relationship suggests that during periods of increased economic stress, as indicated by a widening TED spread, momentum effects in Information Technology are reinforced. This may be due to investors seeking perceived growth or innovation-driven stability in tech stocks during uncertain times, which intensifies their performance persistence

Similarly, the term spread, which reflects expectations about economic growth and interest rates, has significant effects on momentum across industries like Consumer Discretionary and Financials. For Consumer Discretionary, the term spread's impact on cross-sectional momentum is notably negative, indicating that a steepening yield curve (often signaling economic expansion) reduces momentum in this sector. This is likely because Consumer Discretionary stocks, which are cyclical, may experience performance reversals as economic conditions improve, causing the top-performing stocks to underperform in subsequent periods.

Additionally, consumer sentiment—a measure of confidence in the economy—plays a critical role in influencing momentum within sectors such as Financials and Industrials. Positive consumer sentiment often correlates with economic optimism, which can create sustained performance in certain sectors while triggering reversals in others. For Financials, increased consumer sentiment appears to reduce momentum returns, potentially due to shifts in interest rate expectations and investor behavior that dampen prolonged performance trends.
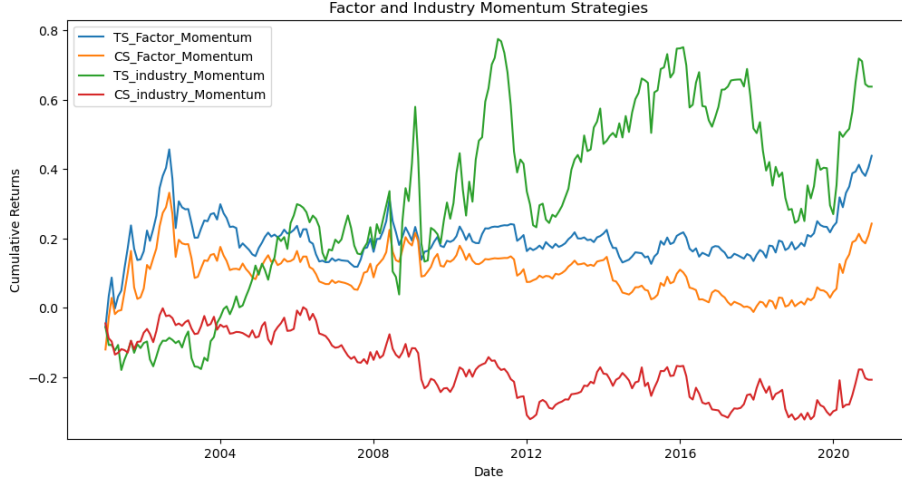
Figure 8: Momentum Strategies

4 Conclusion

Overall, our findings underscore the significant impact that macroeconomic variables have on momentum strategies across various industries. Through our detailed analysis, we observed that factors such as the TED spread, term spread, and consumer sentiment play a substantial role in shaping the strength and direction of momentum effects. The TED spread, in particular, influences Information Technology during periods of economic uncertainty, while the term spread and consumer sentiment affect momentum in Consumer Discretionary and Financial sectors, respectively.

These insights highlight that momentum strategies should not be universally applied; instead, they require careful adjustment according to prevailing economic conditions to maximize returns and manage risk effectively. Additionally, cyclical industries like Financials and Consumer Discretionary demonstrate pronounced mean-reversion tendencies, suggesting that momentum gains in these sectors may be short-lived and sensitive to economic cycles.

In summary, our research emphasizes the dynamic interplay between macroeconomic conditions and sector-specific momentum strategies. To achieve consistent performance, it is essential for investors to consider the unique influences of macroeconomic variables on each sector and to adopt a flexible, data-driven approach when implementing momentum-based investment strategies.

A Appendix

A.1 Relationships between macro variables and factor premiums

A.2 Relationships between macro variables and factor exposures

Note on Table Interpretation:

This table series presents the relationships between macroeconomic variables and factor returns. The analysis uses the following notation:

- **Macro Variables:** TED (TED spread), Term (term spread), EMU (Equity Market Uncertainty), CPI (Consumer Price Index), PSR (Personal Saving Rate), PPI (Producer Price Index), MCS (Michigan Consumer Sentiment)

- **Statistical Measures:** α (intercept), β (slope coefficient), t-stat (Newey-West adjusted t-statistics), p-value (statistical significance)

- **Factor Variables:** Include Consumer Discretionary, Quality, Size, Seasonality, and Accruals

All coefficients are estimated using monthly data. Statistical significance is indicated by p-values.

Table 12: Impact of TED on Factor Returns

Factor	α	β	t-stat	p-value
Consumer Discretionary	0.0062	-0.0037	-2.975	0.0029
Financials	0.0046	0.0002	0.184	0.854
Health Care	0.0036	-0.0027	-2.769	0.0056
Technology	-0.0017	-0.0000	-0.050	0.960
Utilities	0.0035	0.0017	2.432	0.015
accruals	-0.0011	-0.0003	-0.683	0.495
debt_issuance	0.0029	0.0004	0.723	0.470
investment	0.0069	-0.0012	-2.021	0.043
low_leverage	-0.0053	0.0009	0.858	0.391
low_risk	0.0070	-0.0008	-0.869	0.385
momentum	0.0011	0.0027	2.586	0.0097
profit_growth	-0.0007	0.0007	2.379	0.017
profitability	0.0079	0.0013	0.842	0.400
quality	0.0056	0.0007	0.765	0.444
seasonality	0.0027	0.0002	1.132	0.257
short_term_reversal	0.0037	-0.0002	-0.365	0.715
size	0.0052	-0.0003	-0.684	0.494
value	0.012	-0.0009	-0.758	0.449

Notes: This table presents regression results for the impact of TED on factor returns. Coefficients are estimated using monthly data with Newey-West adjusted standard errors.

Table 13: Impact of Term on Factor Returns

Factor	α	β	t-stat	p-value
Consumer Discretionary	0.0022	0.0016	3.860	0.0001
Financials	0.0051	−0.0003	−0.409	0.682
Health Care	0.0008	0.0011	3.425	0.0006
Technology	−0.0017	−0.0000	−0.053	0.958
Utilities	0.0056	−0.0009	−1.876	0.061
accruals	−0.0018	0.0004	1.627	0.104
debt_issuance	0.0034	−0.0002	−0.762	0.446
investment	0.0054	0.0007	1.385	0.166
low_leverage	−0.0038	−0.0007	−0.808	0.419
low_risk	0.0063	0.0002	0.275	0.783
momentum	0.0053	−0.0019	−2.883	0.0039
profit_growth	0.0001	−0.0003	−2.164	0.030
profitability	0.0090	−0.0004	−0.453	0.650
quality	0.0062	−0.0002	−0.580	0.562
seasonality	0.0025	0.0002	2.445	0.014
short_term_reversal	0.0032	0.0003	0.720	0.471
size	0.0036	0.0009	3.006	0.0027
value	0.0095	0.0011	1.049	0.294

Notes: This table presents regression results for the impact of Term on factor returns. Coefficients are estimated using monthly data with Newey-West adjusted standard errors.

Table 14: Impact of EMU on Factor Returns

Factor	α	β	t-stat	p-value
Consumer Discretionary	0.0045	0.0000	1.036	0.300
Financials	0.0026	0.0000	2.898	0.0038
Health Care	0.0022	0.0000	1.407	0.159
Technology	−0.0012	−0.0000	−1.335	0.182
Utilities	0.0042	0.0000	0.0001	1.000
accruals	−0.0004	−0.0000	−3.223	0.0013
debt_issuance	0.0026	0.0000	2.223	0.026
investment	0.0052	0.0000	2.707	0.0068
low_leverage	−0.0036	−0.0000	−2.424	0.015
low_risk	0.0050	0.0000	3.077	0.0021
momentum	0.0034	−0.0000	−2.940	0.0033
profit_growth	0.0000	−0.0000	−3.201	0.0014
profitability	0.0055	0.0000	3.348	0.0008
quality	0.0044	0.0000	3.644	0.0003
seasonality	0.0026	0.0000	1.586	0.113
short_term_reversal	0.0020	0.0000	3.610	0.0003
size	0.0045	0.0000	1.610	0.107
value	0.0085	0.0000	2.866	0.0042

Notes: This table presents regression results for the impact of EMU on factor returns. Coefficients are estimated using monthly data with Newey-West adjusted standard errors.

Table 15: Impact of CPI on Factor Returns

Factor	α	β	t-stat	p-value
Consumer Discretionary	0.0055	-0.0000	-0.149	0.882
Financials	0.045	-0.0002	-7.393	0.0000
Health Care	-0.0049	0.0000	1.875	0.061
Technology	-0.012	0.0000	1.408	0.159
Utilities	-0.0002	0.0000	0.732	0.464
accruals	-0.015	0.0001	8.178	0.0000
debt_issuance	0.019	-0.0001	-5.290	0.0000
investment	0.027	-0.0001	-3.602	0.0003
low_leverage	-0.015	0.0000	0.810	0.418
low_risk	0.015	-0.0000	-0.695	0.487
momentum	0.0010	0.0000	0.115	0.909
profit_growth	-0.0053	0.0000	2.607	0.0091
profitability	0.049	-0.0002	-5.154	0.0000
quality	0.028	-0.0001	-6.739	0.0000
seasonality	0.0084	-0.0000	-8.081	0.0000
short_term_reversal	0.024	-0.0001	-5.774	0.0000
size	0.032	-0.0001	-12.138	0.0000
value	0.053	-0.0002	-3.114	0.0018

Notes: This table presents regression results for the impact of CPI on factor returns. Coefficients are estimated using monthly data with Newey-West adjusted standard errors.

Table 16: Impact of PSR on Factor Returns

Factor	α	β	t-stat	p-value
Consumer Discretionary	0.0048	-0.0000	-0.143	0.887
Financials	0.0092	-0.0007	-3.372	0.0007
Health Care	0.0015	0.0002	2.479	0.013
Technology	-0.0036	0.0003	2.493	0.013
Utilities	0.0042	-0.0000	-0.087	0.931
accruals	-0.0024	0.0002	3.107	0.0019
debt_issuance	0.0046	-0.0002	-3.037	0.0024
investment	0.0088	-0.0004	-3.121	0.0018
low_leverage	-0.0068	0.0003	1.513	0.130
low_risk	0.0076	-0.0001	-0.763	0.445
momentum	0.0023	-0.0000	-0.138	0.890
profit_growth	-0.0008	0.0001	2.257	0.024
profitability	0.012	-0.0005	-3.019	0.0025
quality	0.0074	-0.0003	-2.874	0.0041
seasonality	0.0036	-0.0001	-4.118	0.0000
short_term_reversal	0.0055	-0.0003	-3.069	0.0022
size	0.0081	-0.0005	-3.841	0.0001
value	0.016	-0.0007	-2.948	0.0032

Notes: This table presents regression results for the impact of PSR on factor returns. Coefficients are estimated using monthly data with Newey-West adjusted standard errors.

Table 17: Impact of PPI on Factor Returns

Factor	α	β	t-stat	p-value
Consumer Discretionary	0.0068	-0.0000	-0.514	0.607
Financials	0.044	-0.0002	-8.338	0.0000
Health Care	-0.0037	0.0000	1.821	0.069
Technology	-0.013	0.0001	1.817	0.069
Utilities	0.0001	0.0000	0.830	0.406
accruals	-0.014	0.0001	7.928	0.0000
debt_issuance	0.018	-0.0001	-5.694	0.0000
investment	0.027	-0.0001	-4.361	0.0000
low_leverage	-0.017	0.0001	1.129	0.259
low_risk	0.016	-0.0001	-0.913	0.361
momentum	-0.0004	0.0000	0.307	0.759
profit_growth	-0.0052	0.0000	3.039	0.0024
profitability	0.046	-0.0002	-5.522	0.0000
quality	0.026	-0.0001	-6.619	0.0000
seasonality	0.0083	-0.0000	-9.382	0.0000
short_term_reversal	0.024	-0.0001	-6.488	0.0000
size	0.031	-0.0001	-13.617	0.0000
value	0.052	-0.0002	-3.779	0.0002

Notes: This table presents regression results for the impact of PPI on factor returns. Coefficients are estimated using monthly data with Newey-West adjusted standard errors.

Table 18: Impact of MCS on Factor Returns

Factor	α	β	t-stat	p-value
Consumer Discretionary	0.0089	-0.0000	-1.074	0.283
Financials	-0.0076	0.0001	2.585	0.0097
Health Care	0.0062	-0.0000	-1.070	0.285
Technology	-0.0021	0.0000	0.057	0.955
Utilities	0.0068	-0.0000	-0.536	0.592
accruals	0.0063	-0.0001	-4.851	0.0000
debt_issuance	-0.0054	0.0001	2.839	0.0045
investment	0.0029	0.0000	0.757	0.449
low_leverage	-0.010	0.0001	0.488	0.625
low_risk	0.0057	0.0000	0.104	0.917
momentum	-0.0088	0.0001	1.285	0.199
profit_growth	-0.0009	0.0000	0.394	0.694
profitability	-0.0048	0.0002	1.959	0.050
quality	-0.0038	0.0001	2.954	0.0031
seasonality	0.0033	-0.0000	-0.965	0.335
short_term_reversal	0.0001	0.0000	1.265	0.206
size	0.0009	0.0000	1.761	0.078
value	0.0083	0.0000	0.274	0.784

Notes: This table presents regression results for the impact of MCS on factor returns. Coefficients are estimated using monthly data with Newey-West adjusted standard errors.

Table 19: Macroeconomic Determinants of Industry and Factor Returns

Panel A: First Set of Macro Variables

Variables	TED	Term	EMU
Information Technology			
S&P500	-0.0173	-0.0605^{***}	0.0004^*
accruals	0.5305^{***}	0.0311	-0.0018
debt issuance	-0.0026	-0.0901	-0.0055^{***}
investment	-0.5012^{***}	0.0338	-0.0001
low leverage	-0.5862^{***}	-0.0576	-0.0026^{**}
low risk	0.1300	-0.0224	0.0003
momentum	-0.1928^{***}	-0.0561^{***}	0.0003
profit growth	0.21400^*	-0.1389^{***}	0.0039^{***}
profitability	-0.3783^{**}	-0.3688^{***}	-0.0011
quality	0.4731^{***}	0.2278^{***}	0.0012
seasonality	-0.6455^{***}	0.0593	0.0002
short term reversal	0.1452^{**}	-0.0094	0.0000
size	0.1831^{**}	-0.0934^{***}	0.0018^{***}
value	-0.1325	-0.16400^{***}	-0.00200^*
const	0.0023^{***}	-0.0004^{**}	-0.0000000^*
Variables	TED	Term	EMU
Communication Services			
S&P500	0.0723^*	0.0588^{***}	-0.0007^{**}
accruals	-0.3997^{**}	0.2395^{***}	0.0025^{**}
debt issuance	-0.4486	-0.3026^{**}	0.0047^{**}
investment	-0.1432	-0.0270	-0.0052^{***}

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low leverage	−0.6582**	-0.0797	−0.0118***
low risk	0.4497***	0.1032**	−0.0038***
momentum	−0.3754***	0.0069	0.0006
profit growth	−1.2846***	0.3716***	−0.00400***
profitability	0.8684***	-0.0216	0.0013
quality	-0.2276	0.4163***	0.0010
seasonality	1.3615***	−0.2464***	−0.0072***
short term reversal	0.2382**	-0.0532	0.0017**
size	0.5197***	0.30300***	-0.0001
value	−1.3074***	0.2504**	−0.0046**
const	−0.0015*	-0.0002	0.0000

Variables	TED	Term	EMU
Consumer Discretionary			
S&P500	-0.0342	−0.0574***	0.0000
accruals	1.1523***	−0.4321***	0.0049***
debt issuance	−1.0231***	−0.310000***	−0.0037**
investment	1.16900***	0.6676***	-0.0013
low leverage	-0.0521	−0.1506**	0.0035***
low risk	−0.3722***	−0.2143***	0.0004
momentum	−0.3386***	0.060000**	0.0014***
profit growth	0.4613***	−0.1628***	0.00200*
profitability	1.0864***	0.2198**	0.0069***
quality	-0.1513	0.2782***	−0.0061***
seasonality	−2.0778***	-0.0291	0.0028
short term reversal	0.2517***	0.1725***	-0.0002
size	0.3533***	0.15900***	0.0021***

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value	-0.0251	−0.2128***	0.0033**
const	-0.0011	0.0016***	0.0000

Variables	TED	Term	EMU
Financials			
S&P500	-0.0292	0.0193**	0.0004**
accruals	0.68700***	0.2635***	0.0047***
debt issuance	−0.4431**	−0.5173***	0.0035**
investment	0.5941***	0.5818***	−0.0046***
low leverage	0.8235***	-0.0406	0.0022
low risk	0.0965	−0.3164***	0.0023***
momentum	0.1374***	−0.0481***	0.0012***
profit growth	0.6602***	0.14100***	-0.0006
profitability	0.5175***	0.3438***	0.0023*
quality	-0.2027	−0.1306**	−0.0036***
seasonality	−0.5372***	-0.0976	0.0024**
short term reversal	0.3983***	-0.0033	0.0004
size	−0.1326**	0.1271***	0.0000
value	0.3412**	−0.1777***	0.0031***
const	−0.0035***	0.0004	0.0000

Variables	TED	Term	EMU
Health Care			
S&P500	-0.0079	−0.0887***	0.0000
accruals	0.1091	-0.0389	0.0009
debt issuance	−0.90300***	0.1534*	0.0038**
investment	0.9341***	0.1006	0.0053***

Table 19 continued from previous page

low leverage	0.8606***	0.0062	0.0021*
low risk	0.1195	−0.35200***	-0.0012
momentum	−0.2825***	0.1028***	−0.0013***
profit growth	0.3948***	0.2158***	−0.0047***
profitability	0.2958	0.16600**	0.0065***
quality	-0.2596	−0.11500**	−0.0046***
seasonality	0.3399**	0.4912***	-0.0016
short term reversal	0.2383***	0.0368	-0.0003
size	−0.1202*	−0.0556**	−0.00100**
value	−0.4514**	0.4736***	-0.0004
const	−0.0015*	0.0017***	−0.0000000***

Variables	TED	Term	EMU
Energy			
S&P500	−0.1349***	0.0266	0.0016***
accruals	−0.7257***	0.2592***	0.0042***
debt issuance	-0.3149	0.1034	0.0081***
investment	−1.9447***	−0.9598***	0.0009
low leverage	-0.3650	-0.0679	0.0022
low risk	0.2059	0.3767***	0.0033***
momentum	0.26700**	0.0881**	−0.0013*
profit growth	-0.3179	−0.5179***	0.0038**
profitability	0.2119	0.1551	−0.0065**
quality	0.5684*	-0.0202	0.0016
seasonality	0.8244***	-0.1416	0.0007
short term reversal	-0.1297	0.1537***	-0.0016
size	0.8878***	-0.0443	0.0002

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value	1.0705***	0.0591	0.0029
const	−0.0041***	0.0002	−0.0000000*

Variables	TED	Term	EMU
Consumer Staples			
S&P500	−0.1407***	0.0463***	-0.0001
accruals	−0.2813**	0.3389***	0.0032***
debt issuance	0.6111**	0.0277	-0.0023
investment	-0.1409	−0.3292***	0.0022*
low leverage	−0.3414**	0.0875	−0.0037***
low risk	-0.0959	0.2383***	−0.0014***
momentum	0.1616***	0.0879***	−0.0013***
profit growth	-0.1024	0.0543	−0.0021**
profitability	-0.1718	0.2519***	0.0038***
quality	0.0481	−0.0982***	0.0010
seasonality	−0.2821*	−0.51200***	−0.0049***
short term reversal	0.2854***	−0.0697***	0.0002
size	0.0639	0.2662***	0.0003
value	-0.2120	0.2251***	−0.0033***
const	-0.0007	0.0002	-0.0000

Variables	TED	Term	EMU
Materials			
S&P500	−0.1437***	−0.0629***	−0.0009***
accruals	-0.1252	-0.0327	0.0012
debt issuance	-0.2297	0.2536**	-0.0017
investment	-0.1386	-0.0664	-0.0003

Table 19 continued from previous page

	TED	Term	EMU
low leverage	-0.8539***	0.0333	0.0058***
low risk	0.1914**	-0.0342	0.0004
momentum	-0.3272***	-0.0290	0.0003
profit growth	0.4781**	-0.2354***	-0.0026**
profitability	-0.3595	-0.3987***	0.0054***
quality	0.1318	0.1856**	-0.00700***
seasonality	-0.5263	0.3444***	-0.0055**
short term reversal	0.2828**	0.16400***	-0.0008
size	0.3571***	-0.2308***	-0.0010
value	-1.0572***	0.1868**	0.0006
const	0.0035***	0.0027***	0.0000
Variables	TED	Term	EMU
Industrials			
S&P500	-0.2167***	-0.0106	0.0001
accruals	0.1027	0.1095*	-0.0015
debt issuance	0.4347*	-0.1609*	0.0016
investment	-0.0705	0.1064**	-0.0037***
low leverage	0.0062	0.1844***	-0.0039***
low risk	-0.2196***	0.10600***	0.0013***
momentum	-0.0576	0.1052***	-0.0012***
profit growth	0.5625***	0.3769***	0.0001
profitability	-0.1637	-0.4896***	0.0003
quality	0.2069	0.2224***	-0.0006
seasonality	-1.2775***	-0.0150	-0.0023
short term reversal	0.0682	0.29500***	0.0011*
size	-0.22100***	-0.1314***	0.0004

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value	0.0902	0.4695***	−0.0039***
const	0.0028***	0.0005**	0.0000000**

Variables	TED	Term	EMU
Utilities			
S&P500	-0.0379	0.1443***	0.0009***
accruals	−0.4721*	0.3722***	−0.0037**
debt issuance	0.1460	0.9877***	−0.0064**
investment	0.5547*	−0.6391***	0.0058***
low leverage	−1.0962***	−0.5468***	0.0018
low risk	−0.45500*	0.2012**	-0.0010
momentum	−0.550000***	-0.0528	-0.0006
profit growth	-0.1031	-0.0717	0.0004
profitability	1.0433***	−0.17700*	0.00700***
quality	−0.3258*	0.0099	−0.0021*
seasonality	0.5496**	0.1259	0.0044***
short term reversal	−0.3859***	−0.1405***	0.0001
size	0.2842**	−0.1521***	0.0014*
value	−1.7269***	−0.4462***	-0.0029
const	0.0015	−0.0006*	-0.0000

Variables	TED	Term	EMU
Real Estate			
S&P500	0.2938***	0.0397	0.0003
accruals	-0.0183	-0.0318	−0.0052**
debt issuance	−1.3615***	0.62600***	−0.0091***
investment	1.2607***	−0.3125***	0.0057***

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low leverage	-0.4829	-0.3149^{***}	0.0020
low risk	-0.2518	-0.2501^{***}	-0.0004
momentum	-0.6277^{***}	0.1799^{***}	0.0006
profit growth	0.42300^{**}	0.1801^{***}	0.0001
profitability	1.9113^{***}	-0.1973	-0.0057^{**}
quality	-0.3453	0.0691	0.0013
seasonality	-0.6777	0.2867^{*}	0.0081^{***}
short term reversal	0.0423	0.1701^{***}	-0.0004
size	0.9168^{***}	-0.2678^{***}	-0.0010
value	-1.6611^{***}	0.1308	0.0021
const	0.0008	-0.0001	-0.0000

Notes: This table presents regressions of beta between each industry and factor returns on macroeconomic variables. Each coefficient represents the sensitivity of time-varying beta to macro variables: TED spread (TED), Term spread (Term), Economic Uncertainty Index (EMU), Consumer Price Index (CPI), Personal Savings Rate (PSR), Producer Price Index (PPI), and Michigan Consumer Sentiment (MCS). *, **, and *** indicate significance at 10%, 5%, and 1% levels respectively.

Macroeconomic Determinants (continued)

Panel B: Second Set of Macro Variables				
Variables	CPI	PSR	PPI	MCS
Information Technology				
S&P500	0.0063^{***}	0.0226^{***}	0.0074^{***}	0.0034^{***}
accruals	-0.0235^{***}	-0.1282^{***}	-0.0289^{***}	-0.0162^{***}
debt issuance	-0.0207^{***}	-0.0977^{***}	-0.0254^{***}	-0.0015

Variables	CPI	PSR	PPI	MCS
investment	0.0104***	0.03500**	0.0134***	0.0057
low leverage	0.01300***	0.0313	0.0166***	-0.0027
low risk	0.0232***	0.0826***	0.0278***	−0.0094**
momentum	-0.0000	0.0047	-0.0001	0.0128***
profit growth	0.0066***	0.0473***	0.0073***	0.0031
profitability	0.00600**	-0.0059	0.0068**	0.0281***
quality	−0.0181***	−0.0634***	−0.0219***	−0.0147***
seasonality	0.0020	0.0361*	0.0033	0.0137**
short term reversal	0.0034***	0.0060	0.0039***	−0.00400**
size	-0.0005	0.0001	-0.0010	0.0083***
value	−0.0155***	−0.0675***	−0.01900***	0.0159***
const	−0.0000000***	-0.0001	−0.0000000***	-0.0000

Variables	CPI	PSR	PPI	MCS
Communication Services				
S&P500	0.0016**	0.0004	0.0022***	−0.0078***
accruals	0.0109***	0.0697***	0.0134***	−0.0153***
debt issuance	-0.0038	0.0404	-0.0073	0.0255**
investment	0.0159***	0.0129	0.0193***	0.0103
low leverage	−0.0096*	−0.1182***	-0.0104	0.0643***
low risk	0.0054**	−0.0325**	0.00700***	-0.0065
momentum	0.0002	0.0264***	0.0007	0.0064***
profit growth	0.0043	0.0053	0.0081**	0.0119**
profitability	0.0035	0.0041	0.0020	-0.0086
quality	0.0082*	0.0463*	0.01200**	−0.0363***
seasonality	−0.0198***	−0.1568***	−0.0248***	−0.02500***
short term reversal	0.0022	0.0028	0.0015	0.0096***
size	-0.0014	-0.0118	-0.0014	−0.0403***
value	−0.0232***	−0.06300*	−0.0249***	0.02700***

const	-0.0000000*	-0.0002**	-0.0000000*	0.0002***
Variables	**CPI**	**PSR**	**PPI**	**MCS**
Consumer Discretionary				
S&P500	-0.0002	-0.0022	-0.0004	0.0095***
accruals	-0.0005	0.0033	-0.0031	0.0133**
debt issuance	0.01300***	0.0196	0.0157***	0.0599***
investment	-0.0076*	-0.0614**	-0.0076	-0.0699***
low leverage	-0.0106***	-0.0467**	-0.0136***	0.0241***
low risk	0.01100***	0.0358***	0.0134***	0.0184***
momentum	-0.0048***	0.0040	-0.0057***	0.0108***
profit growth	0.0123***	0.0383**	0.0139***	0.0187***
profitability	0.0026	0.0210	0.0021	-0.0142
quality	-0.0106***	-0.0617***	-0.0115***	-0.0221***
seasonality	0.0254***	0.1489***	0.03200***	0.0862***
short term reversal	-0.0034**	0.0023	-0.0034*	-0.0264***
size	-0.0066***	-0.01900*	-0.00800***	-0.0099***
value	-0.0217***	-0.0578**	-0.0278***	0.0252***
const	-0.0000000***	-0.0002**	-0.0001***	-0.0001***
Variables	**CPI**	**PSR**	**PPI**	**MCS**
Financials				
S&P500	0.0005	0.0053*	0.0006	0.0021**
accruals	-0.0146***	-0.0219	-0.0184***	-0.0272***
debt issuance	0.0088**	0.0712***	0.0098**	0.0383***
investment	-0.0198***	-0.1282***	-0.0227***	-0.0349***
low leverage	-0.0037	-0.0195	-0.0065	-0.0224***
low risk	0.0058***	0.0393***	0.0059***	0.0071***
momentum	-0.0000	0.00800*	-0.0005	-0.0007
profit growth	-0.0073***	-0.0493***	-0.0095***	-0.0281***

Variables	CPI	PSR	PPI	MCS
profitability	−0.0316***	−0.1047***	−0.0388***	−0.0239***
quality	0.0152***	0.0283	0.0192***	0.0233***
seasonality	-0.0009	0.0356*	-0.0014	0.0455***
short term reversal	−0.0056***	−0.0224***	−0.0073***	−0.00600***
size	−0.0039***	-0.0035	−0.0042***	−0.00600***
value	0.0183***	0.0866***	0.0209***	-0.0037
const	-0.0000	-0.0001	-0.0000	-0.0000

Variables	CPI	PSR	PPI	MCS
Health Care				
S&P500	0.00200***	0.0051	0.0022***	0.0001
accruals	−0.0151***	−0.0498***	−0.0182***	0.0212***
debt issuance	−0.0199***	−0.0429*	−0.0224***	0.0189**
investment	0.0226***	0.1252***	0.0255***	−0.0225***
low leverage	−0.0188***	-0.0202	−0.0234***	−0.0379***
low risk	−0.0137***	−0.06400***	−0.0174***	-0.0023
momentum	−0.0071***	−0.0237***	−0.00800***	-0.0003
profit growth	−0.0107***	−0.080000***	−0.0123***	−0.0263***
profitability	0.010000**	0.0884***	0.0115**	0.0195**
quality	0.0118***	0.0104	0.0148***	-0.0016
seasonality	-0.0019	0.0078	-0.0018	−0.0303***
short term reversal	−0.0057***	−0.0235***	−0.0072***	−0.0049**
size	0.0054***	0.0090	0.0068***	0.0123***
value	−0.0146***	-0.0097	−0.0154***	−0.0302***
const	−0.0001***	−0.0006***	−0.0001***	0.0000

Variables	CPI	PSR	PPI	MCS
Energy				
S&P500	0.0052***	0.0337***	0.0065***	−0.0077***
accruals	−0.0208***	0.0453*	−0.0246***	-0.0055

debt issuance	0.0353***	0.1347***	0.04200***	-0.0135
investment	0.0484***	0.2264***	0.0568***	0.0763***
low leverage	−0.01700***	0.0249	−0.0216***	0.0285**
low risk	−0.0101***	-0.0238	−0.0118***	−0.0357***
momentum	−0.0144***	−0.0755***	−0.0174***	0.0132***
profit growth	0.0019	0.0539**	0.0011	0.0241***
profitability	0.0355***	0.0668	0.04400***	0.0216
quality	−0.0324***	−0.10500***	−0.03900***	−0.0532***
seasonality	−0.0311***	−0.1144***	−0.0397***	−0.0367***
short term reversal	−0.0213***	−0.0479***	−0.0257***	-0.0024
size	0.0073***	-0.0148	0.0086***	-0.0036
value	−0.0517***	−0.1418***	−0.0637***	-0.0075
const	0.0000000**	−0.0002**	0.0001***	0.0002***

Variables	CPI	PSR	PPI	MCS
Consumer Staples				
S&P500	0.0021***	0.0118***	0.0028***	0.0014*
accruals	-0.0005	0.0469***	-0.0001	−0.0189***
debt issuance	−0.0504***	−0.2207***	−0.0623***	−0.0264***
investment	0.0364***	0.15100***	0.0433***	0.0325***
low leverage	−0.0154***	−0.0782***	−0.0179***	0.0099*
low risk	−0.0044***	−0.0232***	−0.0045***	−0.0092***
momentum	−0.00800***	−0.0498***	−0.0094***	−0.0059***
profit growth	0.0146***	0.03800**	0.0185***	0.0159***
profitability	0.00600**	0.0849***	0.0072**	−0.0296***
quality	0.0108***	0.0424***	0.0132***	0.0082**
seasonality	0.0139***	-0.0261	0.0156***	0.0439***
short term reversal	-0.0011	−0.01700***	-0.0017	0.0017
size	0.0027*	0.0236**	0.0039**	−0.0225***

Variables	CPI	PSR	PPI	MCS
value	−0.0213***	−0.1076***	−0.0244***	-0.0046
const	−0.0000000***	−0.0003***	−0.0001***	0.0000

Variables	CPI	PSR	PPI	MCS
Materials				
S&P500	0.00200***	0.0004	0.0025***	0.0025*
accruals	−0.0146***	−0.0499***	−0.0176***	0.03200***
debt issuance	−0.0506***	−0.19300***	−0.06100***	-0.0030
investment	0.040000***	0.1272***	0.0482***	0.0129*
low leverage	0.0321***	0.1732***	0.0397***	0.0046
low risk	−0.01200***	−0.0523***	−0.0145***	-0.0032
momentum	-0.0006	0.0097	-0.0003	-0.0014
profit growth	0.0013	−0.0586***	0.0013	0.0405***
profitability	0.0234***	0.1313***	0.0275***	−0.0287***
quality	−0.0098***	−0.0972***	−0.0113***	0.0213***
seasonality	0.0296***	0.0527	0.0384***	−0.0279**
short term reversal	0.0030	0.0136	0.0041*	−0.0134***
size	−0.0043**	−0.0471***	−0.0057***	−0.0064*
value	−0.0101**	-0.0088	−0.0105**	0.03100***
const	−0.0000000**	−0.0003**	−0.0000000**	−0.0001***

Variables	CPI	PSR	PPI	MCS
Industrials				
S&P500	−0.00100*	0.0035	-0.0010	0.0003
accruals	−0.0313***	−0.1418***	−0.0381***	-0.0042
debt issuance	−0.0303***	−0.1204***	−0.0383***	0.0022
investment	0.0076***	-0.0112	0.0102***	-0.0034
low leverage	0.0114***	-0.0135	0.01500***	0.0049
low risk	−0.0071***	0.0026	−0.0084***	-0.0007
momentum	0.0015	−0.0102*	0.0022**	−0.0073***

Variables	CPI	PSR	PPI	MCS
profit growth	0.0003	0.0180	0.0010	−0.0356***
profitability	0.0131***	0.0259	0.01500***	0.0231***
quality	−0.0186***	−0.0553***	−0.0219***	−0.02300***
seasonality	0.0314***	0.1194***	0.040000***	0.0058
short term reversal	0.0005	0.0162	0.0016	−0.0194***
size	0.0002	0.0083	0.0002	0.0055**
value	−0.0107***	−0.0741***	−0.0112***	−0.030000***
const	-0.0000	-0.0001	−0.0000000*	-0.0000

Variables	CPI	PSR	PPI	MCS
Utilities				
S&P500	0.0041***	0.02500***	0.0053***	−0.00500***
accruals	0.0201***	0.0131	0.0265***	0.0012
debt issuance	−0.0268***	−0.1493***	−0.0286***	−0.0353**
investment	0.0158***	0.0868***	0.0159***	0.0020
low leverage	0.0307***	0.1007***	0.0368***	0.0395***
low risk	0.0452***	0.1559***	0.0555***	-0.0086
momentum	−0.0033**	−0.0188*	−0.0036*	0.0266***
profit growth	0.0287***	0.1219***	0.0342***	-0.0005
profitability	−0.03300***	−0.1032***	−0.0407***	−0.0174*
quality	0.0262***	0.1033***	0.0315***	0.01300**
seasonality	0.0014	0.0219	0.0006	0.0028
short term reversal	−0.0099***	-0.0202	−0.01200***	0.0218***
size	0.0009	0.0017	0.0005	0.0196***
value	0.0177***	0.0349	0.0218***	0.0771***
const	−0.0001***	−0.0003**	−0.0001***	−0.0001***

Variables	CPI	PSR	PPI	MCS
Real Estate				
S&P500	0.0103***	0.0314***	0.0122***	−0.0091***

accruals	0.0007	−0.0695*	0.0027	0.0503***
debt issuance	−0.0269***	−0.1632***	−0.02800***	0.0675***
investment	0.0067	0.07800**	0.0052	−0.0443***
low leverage	0.020000***	0.12800***	0.0244***	-0.0030
low risk	0.0348***	0.1148***	0.0417***	0.0409***
momentum	-0.0017	0.0180	-0.0011	−0.0122***
profit growth	−0.0071**	-0.0222	−0.0087**	−0.0483***
profitability	−0.0531***	−0.2722***	−0.0651***	-0.0112
quality	0.0332***	0.1299***	0.0394***	0.0061
seasonality	0.0679***	0.3544***	0.0818***	0.0205
short term reversal	0.0032	0.0131	0.0046	−0.0143***
size	−0.0124***	−0.0816***	−0.0168***	0.0023
value	0.0058	0.0918**	0.0085	−0.0235*
const	−0.0003***	−0.0011***	−0.0003***	−0.0001***