Macro-Factor Sensitivity Analysis for Financial Firms

Abstract

This study investigates the macroeconomic factor sensitivities of 316 publicly traded U.S. financial and banking firms using the first stage of the Fama-MacBeth two-step asset pricing framework. Firm-level quarterly returns (2001–2025) were regressed against a set of standardized macroeconomic variables, including inflation, credit spreads, and GDP growth. The estimated factor loadings (betas) were then used to construct a custom macro-resilience score designed to identify firms better positioned to withstand adverse macroeconomic conditions, particularly in the context of the April 2025 environment characterized by heightened inflationary pressures, widening credit spreads, and slowing economic growth. The results highlight the heterogeneity of macro exposures across firms and offer a quantitative framework for macro-aware investment screening. All code and data used in this project can be found in this GitHub repository.[1]

Introduction and Motivation

The imposition of broad-based tariffs by the U.S. government in early April 2025 has contributed to elevated volatility and systemic risk within financial markets. Major equity indices have experienced significant drawdowns, with financial firms among the most adversely affected. Given the evolving macroeconomic landscape—defined by rising inflation expectations, deteriorating credit conditions, and a weakening growth outlook—this analysis aims to identify which firms exhibit return profiles that are relatively robust or vulnerable to current macroeconomic shocks.

This research contributes to ongoing efforts in empirical asset pricing and macro-finance by offering a granular, firm-level perspective on macroeconomic exposure within the financial sector.

Data and Methodology

Sample Construction

- Universe: 316 U.S. financial and banking firms, identified via SIC codes 6000–6300
- Frequency: Quarterly observations
- Time Horizon: January 2001 to January 2025
- Data Sources:
    - Firm-level returns from WRDS (CRSP and Compustat)
    - Macroeconomic series obtained via the FRED API (Federal Reserve Bank of St. Louis)

Variable	Proxy
Credit Conditions	BBB-AAA Credit Spread
Economic Growth	U.S. Real GDP YoY (%)
Inflation	Consumer Price Index (CPI) YoY (%)
Firm Controls	Leverage, Return on Equity, Market-to-Book

[1] https://github.com/erobertson753/macro-sensitivity-financials

All factors were standardized.

Estimation Procedure

Each firm's return series was regressed on the full set of explanatory variables using the following specification:

$$R_{it} = \beta_0 + \beta_1 \cdot \text{Leverage}_{it} + \beta_2 \cdot \text{ROE}_{it} + \beta_3 \cdot \text{MTB}_{it} + \beta_4 \cdot \text{CreditSpread}_t + \beta_5 \cdot \text{GDPGrowth}_t + \beta_6 \cdot \text{CPI}_t + \epsilon_{it}$$

- Standardization renders each coefficient interpretable as a partial correlation.
- Firm-level regressions were estimated independently.
- Missing data were addressed via polynomial interpolation using zoo::na.spline in R.

Construction of Macro-Resilience Score

Model Design

To assess firm-level resilience to the prevailing macroeconomic environment, we developed a weighted scoring model emphasizing penalization for sensitivity to inflation and credit risk, and reward for positive growth sensitivity:

$$\text{Score}_i = -0.6 \cdot \beta_i^{CPI} - 0.4 \cdot \beta_i^{Credit} + 0.5 \cdot \beta_i^{GDP}$$

Only coefficients statistically significant at the 5% level ($p < 0.05$) were incorporated into the score to ensure robustness.

Economic Rationale

- Positive CPI beta: Interpreted as vulnerability to inflation-driven margin compression.
- Positive Credit beta: Suggests fragility in adverse credit conditions.
- Positive GDP beta: Indicates pro-cyclicality, which may be beneficial in recovery scenarios.

Empirical Results

Highest Resilience Score:

Cadence Bank (CADE): 0.376

CADE possessed an inflation risk of -0.42 and a credit risk of -0.30, indicating that it has the potential to succeed in today's turbulent market. With an average quarterly return of 7.23% since 2001, CADE represents an attractive investment opportunity, or at the very lease, one that merits a closer look.

Discussion and Strategic Implications

The current macroeconomic environment—marked by tariff-induced cost pressures, rising risk premia, and slowing real activity—favors firms that exhibit minimal inflation and credit exposure. The scoring model provides a systematic framework for macro-aware screening of equities, particularly within sectors highly sensitive to economic cycles such as finance.

This approach is particularly relevant for portfolio managers seeking to construct defensive sector baskets or implement factor-based rotation strategies.

Technical Architecture

- Languages: Python (macro data extraction), R (data cleaning, analysis, and scoring)
- Key Scripts: fred_data.py, wrds.R, clean_data.R, data_analysis.R, scoring.R
- Missing Data Strategy: Polynomial interpolation using zoo::na.spline

Future Research Directions

- Stage 2 Fama-MacBeth Regression: Explore time-varying risk premia across firms using cross-sectional regression of returns on betas.
- Dynamic Model Extension: Develop a quarterly-updated screening tool for real-time investment applications.
- Cross-Sector Comparison: Apply methodology to additional industries (e.g., technology, industrials) to assess relative macro-sensitivity.