Inflation Exposure and FOMC Monetary Policy Impact on Companies

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Bogdan Stankovski and Florian Weinlich

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Motivation

- **Inflation** affects firms differently based on factors such as industry, pricing power, debt structure, and financial health
- Some firms face **shrinking** profit margins, while others may **benefit** from rising prices

- The U.S. experienced its **highest** inflation in over 40 years during 2021-2022, which for many firms, was the first **significant** inflationary challenge since the early 1980s

- **Examples**
  - **Consumer firms** faced rising input costs (e.g., raw materials, labor) and struggled to fully pass on these costs to consumers, leading to pressure on profit margins
  - **Oil firms** benefited from higher oil and gas prices, which boosted revenues and profitability, showcasing how inflation can be advantageous for certain sectors

Finance & economics | An expensive issue

2022 has been a year of brutal inflation

Figure 1: The Economist, Dec. 2022.

ECONOMY | U.S. ECONOMY

U.S. Inflation Hits New Four-Decade High of 9.1%

Prices up broadly across the economy, with gasoline far outpacing other categories

Figure 2: WSJ, July 2022.

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Introduction

- **Federal Reserve's Response to Inflation:**
  - In 2022-2023, the Federal Reserve **raised** interest rates to combat the highest inflation in over 40 years
  - Higher interest rates **increase** the cost of borrowing, reduce consumer spending and investment, and ultimately lead to **lower** inflation
- **Firm-Level Impact:**
  - *Inflation Exposure:* Companies react differently to inflation based on industry, pricing power, and financial structure
  - This research aims to verify the **standard mechanism** at the firm level, examining how higher interest rates affect companies based on their inflation exposure

ECONOMY | U.S. ECONOMY

Inflation Fears Drove Larger Fed Rate Increase in June

Officials want to lift interest rates to levels that would slow economic growth; 'an even more restrictive stance' is possible if inflation doesn't ease

Figure 3: Wall Street Journal, July 2022.

Inflation remains elevated, reflecting supply and demand imbalances related to the pandemic… In support of these goals, the Committee decided to raise the target range for the federal funds rate to 3/4 to 1 percent…" **FOMC Announcement, May 2022**

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Research Question

Does Stock Price Reaction to Monetary Policy Announcements Depend on a Company's Inflation Exposure?

- **Contribution:**
  - Firms with **positive inflation exposure** (e.g., oil companies) tend to react **negatively to rising interest rates**, while firms with **negative inflation exposure** (e.g., consumer goods companies) tend to react **positively**
  - This result confirms the standard macroeconomic view that higher interest rates have a **dampening** effect on inflation, which is why companies benefiting from inflation react **negatively** to rising rates

- **Empirical Methodology:**
  - Develop a *proxy for inflation exposure* at the firm level, following the approach of Rubio Cruz et al. (2023)
  - Examine stock price reactions on FOMC announcement dates, focusing on the **interplay** between **inflation exposure** and **monetary surprises**

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Inflation Exposure

- Measure stock reaction to inflation surprise IS_t on the day of the inflation announcement (Period: 2001-2023)
- Follow the regression model of *Rubio Cruz et al. (2023)* to estimate the *inflation beta* for each company i on inflation announcement dates (t):
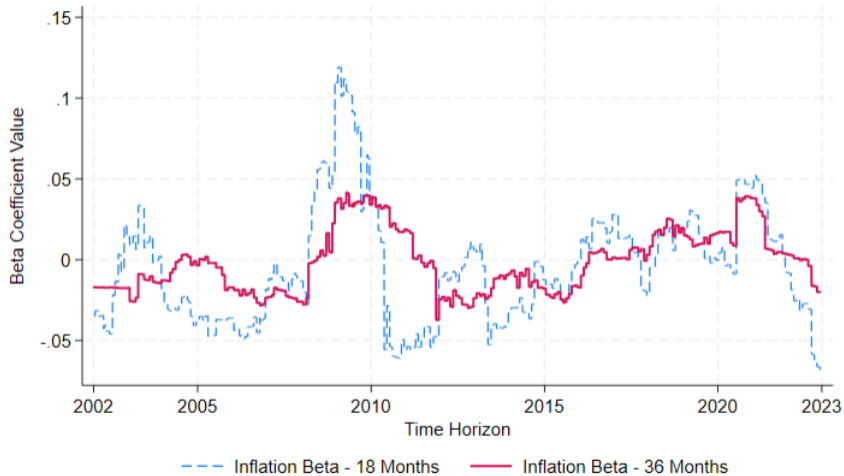
$$\text{Inflation surprise} = (\text{CPI official} - \text{CPI expected})$$

  - **CPI official:** Official month-to-month change in the core CPI
 - **CPI expected:** Expected month-to-month change in the core CPI (based on Reuters Poll)

$$R_{i,t} = \beta_0 + \beta_{1,i,t} \cdot IS_t + \beta_{n,i,t} \cdot X_{n,i,t} + \varepsilon_{i,t} \tag{1}$$

- The inflation beta is calculated using a rolling estimation window of 36 months
- $X_{n,i,t}$ is a vector of control variables, including net leverage, receivables, inventories, net PPE, cash flows, gross margin, market capitalization, book-to-market ratio, and market beta

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Time-varying Inflation Beta of Firms

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Without Controls

Distribution of Average Inflation Beta Values Across Industry Sectors

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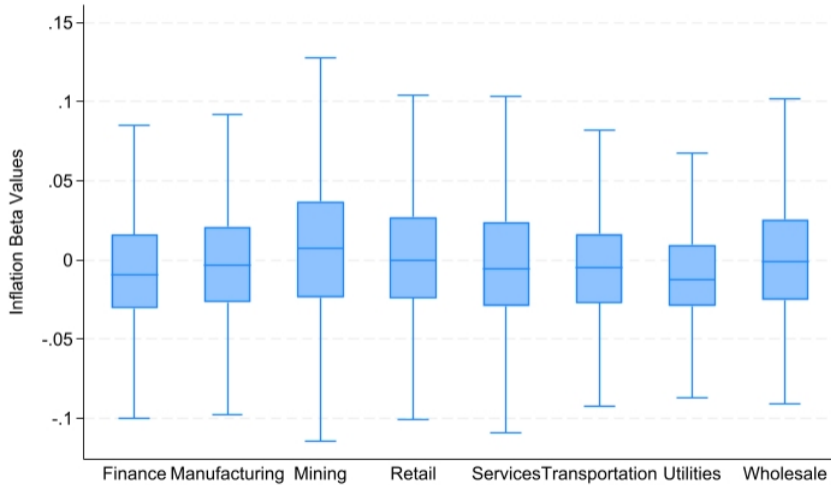
Methodology: Monetary Policy Surprise

- Follow the methodology of *Gürkaynak et al. (2022)* and modify the model to introduce firms' inflation exposure and their interaction with monetary policy surprises

- Analyze FOMC announcements between 2002 and 2023 (t)

- *We empirically analyze how interest rate shocks are transmitted to stock prices based on the inflation exposure of a firm*

$$R_{i,t} = \gamma_0 + \gamma_{1,i,t} \cdot \textbf{target}_t + \gamma_{2,i,t} \cdot \textbf{path}_t + \gamma_{3,i,t} \cdot \widehat{\beta_{1,i,t}}$$
$$+ \gamma_{4,i,t} \cdot \textbf{target}_t \cdot \widehat{\beta_{1,i,t}} + \gamma_{5,i,t} \cdot \textbf{path}_t \cdot \widehat{\beta_{1,i,t}} \tag{2}$$
$$+ \gamma_{n,i,t} \cdot \textbf{X}_{n,i,t} + \varepsilon_{i,t}$$

- $\textbf{X}_{n,i,t}$ is a vector of control variables, including: expected GDP, gross profit margin, EBITDA margin, market capitalization, book-to-market ratio, net PPE, financial slack, retained earnings, net leverage, floating rate debt leverage, floating rate exposure, and short-term debt
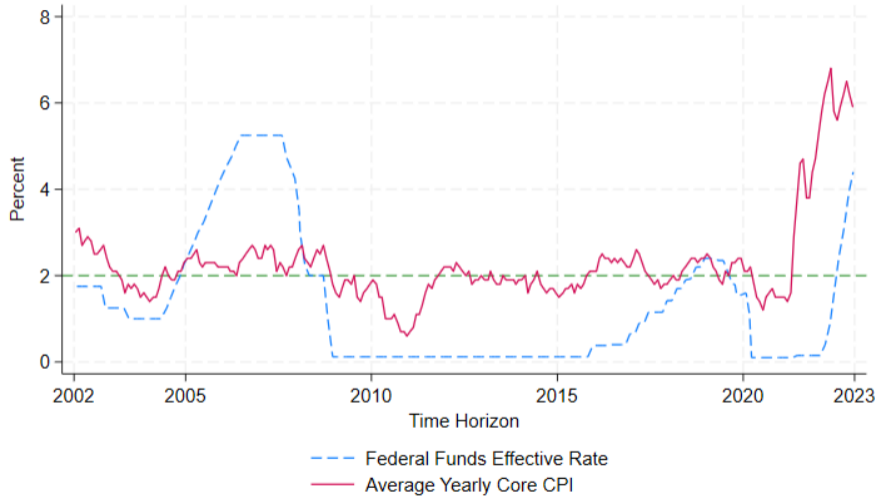
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COVID-19 Period (2020-2023)

Table 1: COVID Pandemic - Intersection of Monetary Policy and Inflation Exposure

	(1) Stock Return	(2) Stock Return	(3) Stock Return	(4) Stock Return	(5) Stock Return
Inflation Beta	-0.0213	0.0250	0.0460	0.0390	0.0247
	(-0.18)	(0.35)	(0.39)	(0.34)	(0.39)
Path	-0.0029	0.0268**	0.0256**	0.0300**	0.0253**
	(-0.69)	(2.70)	(2.44)	(2.76)	(2.43)
Inflation Beta*Path	0.0510	-0.0706***	-0.0671**	-0.0805**	-0.0262
	(1.16)	(-3.06)	(-2.35)	(-2.74)	(-1.13)
Target	-0.0094	-0.0195**	-0.0177**	-0.0198**	-0.0179**
	(-1.21)	(-2.80)	(-2.72)	(-2.53)	(-2.74)
Inflation Beta*Target	-0.2521***	-0.0764	-0.0854*	-0.1021**	0.0064
	(-3.00)	(-1.58)	(-1.93)	(-2.13)	(0.20)
Constant	0.0070	0.0275	0.0299	0.0131	0.0287
	(1.60)	(1.50)	(0.85)	(0.37)	(0.82)
Controls & FE	No	Yes	Yes	Yes	Yes

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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Inflation Levels and Interest Rate Changes - US (2002-2023)

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Global Financial Crisis (2007-2009)

Table 2: GFC Period - Intersection of Monetary Policy and Inflation Exposure

	(1) Stock Return	(2) Stock Return	(3) Stock Return	(4) Stock Return	(5) Stock Return
Inflation Beta	0.1185*	0.1157**	0.0393	0.1432*	-0.0270
	(1.88)	(2.57)	(0.51)	(2.06)	(-1.35)
Path	-0.0054	0.0206**	0.0204**	0.0234**	0.0204**
	(-0.72)	(2.38)	(2.63)	(2.47)	(2.59)
Inflation Beta*Path	-0.1151**	-0.0599**	-0.0875**	-0.0445	-0.0266**
	(-2.33)	(-2.27)	(-2.67)	(-1.50)	(-2.41)
Target	0.0007	-0.0010	-0.0004	0.0034	-0.0000
	(0.21)	(-0.19)	(-0.07)	(0.62)	(-0.01)
Inflation Beta*Target	-0.0054	0.0047	-0.0016	-0.0074	-0.0030
	(-0.23)	(0.26)	(-0.11)	(-0.45)	(-0.54)
Constant	0.0128**	-0.0348*	0.0006	-0.0063	0.0115
	(2.67)	(-1.79)	(0.03)	(-0.30)	(0.58)
Controls & FE	No	Yes	Yes	Yes	Yes

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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Zero Lower Bound (2009-2015)

- The ZLB period (2009-2016) featured historically **low interest rates** post-GFC
- Firms with **positive inflation exposure preferred** rate hikes during the ZLB to counteract **deflation risks**

- During **stable** economic periods (and stable inflation levels) of the early 2000s and post-ZLB period inflation exposure **does not play a** significant role in explaining firms' reaction to monetary policy changes

Table 3: ZLB Period - Intersection of Monetary Policy and Inflation Exposure

	(1) Stock Return	(2) Stock Return	(3) Stock Return	(4) Stock Return	(5) Stock Return
Inflation Beta	0.0230	0.0204	0.0626	0.0632	0.0116
	(1.67)	(1.46)	(1.65)	(1.66)	(1.43)
Path	-0.0051	-0.0104***	-0.0095**	-0.0092*	-0.0090**
	(-1.35)	(-2.85)	(-2.44)	(-1.99)	(-2.47)
Inflation Beta*Path	0.0429*	0.0332*	0.0346	0.0375	0.0280**
	(2.00)	(1.76)	(1.56)	(1.58)	(2.10)
Target	0.0016	-0.0104	-0.0101	-0.0109	-0.0090
	(0.30)	(-0.80)	(-0.73)	(-0.80)	(-0.69)
Inflation Beta*Target	-0.0483	-0.0098	-0.0080	-0.0084	0.0261
	(-0.69)	(-0.24)	(-0.18)	(-0.16)	(1.41)
Constant	0.0025*	0.0011	-0.0075	-0.0035	-0.0064
	(1.72)	(0.18)	(-0.36)	(-0.18)	(-0.30)
Controls & FE	No	Yes	Yes	Yes	Yes

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Stable Economy

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Conclusion

- **Impact of Inflation Exposure on Firms:**
  - Firms' stock **price reactions** to monetary policy announcements are **significantly** influenced by their **exposure to inflation**
  - Firms with **positive inflation exposure** tend to react **negatively** to rising interest rates, while those with **negative inflation exposure react positively**
- **Validation of the Standard Mechanism:**
  - The findings confirm the **standard macroeconomic view** that higher interest rates help reduce inflation, leading to adverse effects on companies that benefit from inflation
  - By introducing a **firm-level inflation exposure** proxy and analyzing **interactions with FOMC surprises**, this research provides new insights into how monetary policy impacts different sectors
- **Implications for Policymakers:**
  - Policymakers should account for the **diverse** impacts of interest rate changes **across industries** when designing measures to **curb inflation as firms respond differently**

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Thank you.

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Stable Economic Periods

Table 4: Expansionary Phase - Intersection of Monetary Policy and Inflation Exposure

| | (1) | (2) 2002-2007 | (3) | (4) | (5) 2016-2020 | (6) |
	Stock Return	Stock Return	Stock Return	Stock Return	Stock Return	Stock Return
Inflation Beta	-0.0003	-0.0027	0.0100	0.0269*	0.0111	0.0265
	(-0.03)	(-0.28)	(0.49)	(1.83)	(0.90)	(1.16)
Path	-0.0026**	-0.0021	-0.0022	-0.0027**	-0.0049	-0.0049
	(-2.18)	(-0.74)	(-0.74)	(-2.40)	(-0.98)	(-0.96)
Inflation Beta*Path	0.0064	0.0071	0.0059	-0.0060	0.0021	0.0003
	(0.94)	(1.25)	(1.01)	(-0.70)	(0.23)	(0.03)
Target	-0.0051***	0.0016	0.0010	-0.0068*	-0.0000	-0.0012
	(-5.88)	(0.78)	(0.44)	(-1.85)	(-0.01)	(-0.20)
Inflation Beta*Target	0.0042	0.0011	0.0035	-0.0341*	-0.0223	-0.0320
	(1.37)	(0.24)	(0.58)	(-1.97)	(-1.30)	(-1.62)
Constant	0.0032**	0.0010	-0.0067	-0.0011	-0.0006	-0.0115
	(2.65)	(0.14)	(-0.58)	(-0.91)	(-0.08)	(-0.97)
Controls & FE	No	Yes	Yes	No	Yes	Yes

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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Time-varying Inflation Beta - With and Without Controls

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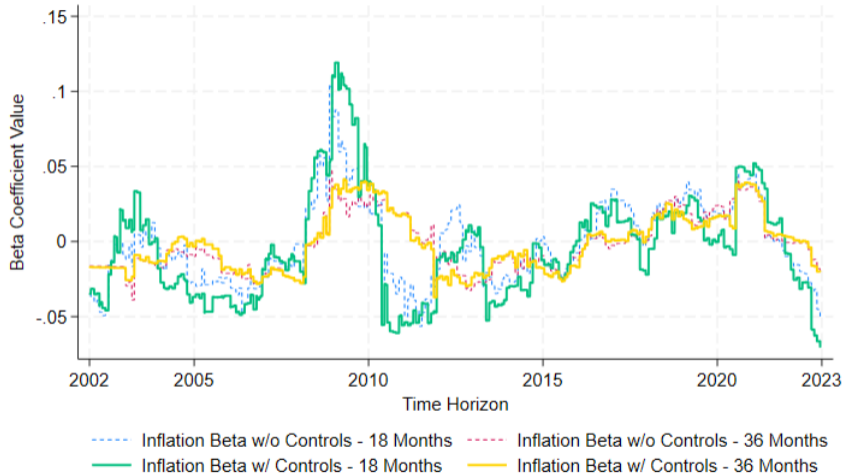
Time-varying Inflation Beta of Firms for Some Industry Sectors

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