Show me the money: The monetary policy risk premium

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JFE 2020 (2)

Abstract

- We create a parsimonious monetary policy exposure (MPE) index based on observable firm characteristics that previous studies link to how stocks react to monetary policy. Our index successfully captures stocks' responses to both conventional and unconventional monetary policy.
- Stocks whose prices react more positively to expansionary monetary policy (high MPE stocks) earn lower average returns. This result is consistent with the notion that highMPE stocks provide a hedge against bad economic shocks, to which the Federal Reserve responds with expansionary monetary policy.
- A long-short trading strategy designed to exploit this effect achieves an annualized Sharpe Ratio of 0.77.

Background

- A large body of literature in macroeconomics and finance studies the effects of monetary policy on asset prices.
  - In a recent seminal contribution, Bernanke and Kuttner (2005) show that a surprise 25-basis-point cut in the federal funds target rate is associated with an increase of about 1% in broad stock indexes.
- Overall, the academic research and practitioners agree that monetary policy affects stock prices significantly and that stock prices of firms with different characteristics react differently to monetary policy.

Background

- However, the effect of monetary policy on the cross-section of equity risk premiums is not as well understood.
- While several classes of theoretical models imply that monetary policy is an important source of risk in the stock market, they differ widely in their predictions regarding the relation between monetary policy exposure and the risk premium.

The sign of the monetary policy risk premium

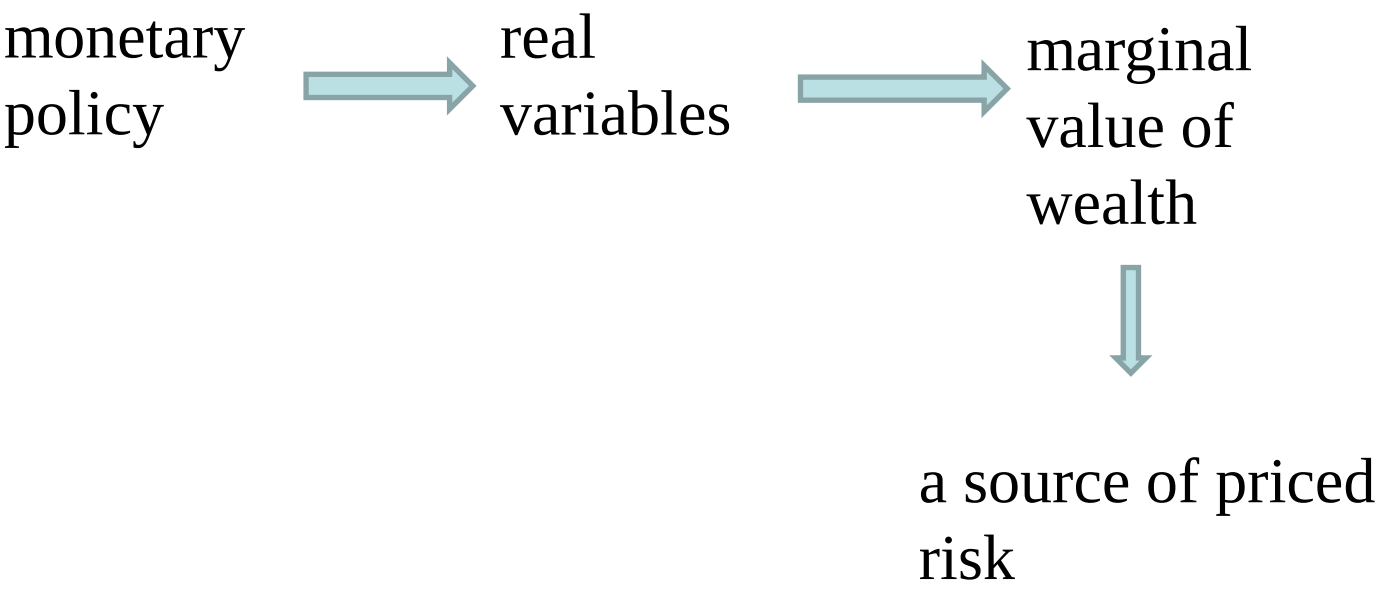
New-Keynesian monetary models (incorporate nominal and real rigidities)
Li and Palomino (2014) Weber (2015)

real money supply ⇧

- an expansionary policy surprise increases consumption growth; reduces the marginal utility of consumption
- stocks that react more positively to an expansionary policy surprise should command a higher risk premium.

The sign of the monetary policy risk premium

- The view: monetary policy is a “driver” of business cycles.



The sign of the monetary policy risk premium

- monetary policy: “stabilizer” of business cycles, consistent with the role of the Federal Reserve in the economy.
- monetary policy is more likely to be expansionary (contractionary) following negative (positive) macroeconomic news (Gürkaynak et al., 2005b).
- Since negative economic shocks increase the marginal value of wealth, assets that are more likely to pay off after an expansionary monetary policy are precisely those that provide investors with additional funds in times of need and therefore have lower expected returns (a lower risk premium).

In This Paper

- “driver” OR “stabilizer”channels of monetary policy?

Both channels play important roles that offset each other, and hence the net effect of monetary policy on risk premiums is an empirical question.

- create a parsimonious monetary policy exposure (MPE) index based on **observable firm characteristics** that previous studies link to how stocks react to monetary policy.

Transmission channels of monetary policy

- Financial constraints (Credit channel):
- Ozdagli (2018) finds that more constrained firms can be less responsive to monetary policy because these firms rely less on external finance, and hence are less affected by the changes in the cost of external finance.
- financial constraint index created by Whited and Wu (2006) as our financial constraints proxy.

Transmission channels of monetary policy

- Cash and short-term investments (Liquidity effect):

• firms with a higher amount of cash can react more negatively to a policy rate increase because the interest rate is the opportunity cost of holding cash

• corporate cash reserves can dampen the effect of monetary policy by making investment less sensitive to policy (Gao et al., 2018).

Transmission channels of monetary policy

- Cash flow duration (Discount rate effect):
- Ozdagli (2018) finds that stocks of firms that expect to have cash flows farther in the future, and therefore have greater equity duration, are more affected by monetary policy,
- consistent with the notion that the present value of later cash flows are more affected by the changes in discount rate.

Transmission channels of monetary policy

- Cash flow volatility:

- higher cash flow volatility may imply that the firm needs to rely on external financing more often, which increases the importance of the cost of external financing which in turn is directly affected by monetary policy.

Transmission channels of monetary policy

- Operating profitability (Nominal rigidities):
- Nominal rigidities in the form of sticky prices and wages are an important ingredient in New-Keynesian macroeconomic models.
- if input prices, e.g., wages, are sticky, an expansionary monetary policy will have a large effect on the firms' revenues without changing the total cost of inputs as much, driving stock prices up.
- ticky leverage to increase the policy sensitivity of stock prices of less profitable firms.

Monetary policy exposure estimation

- we use federal funds futures to measure the surprise component of the federal funds target rate changes announced on the days of FOMC meetings.
- We focus on 116 scheduled FOMC meetings between February 1994 and June 2008.
- For an FOMC meeting taking place on day d of month m, with the public announcement at 2:15 pm, the surprise change in the federal funds rate is given by

$$\Delta i_{GSS,tight} = \frac{D}{D-d}\left(f^{0}_{m,d,\text{Post 2:35 pm}} - f^{0}_{m,d,\text{Pre 2:05 pm}}\right) \qquad (1)$$

Monetary policy exposure estimation

- Our main specification is

$$r_{it}^{ID} = \alpha + \Sigma_{k=1}^{n} \beta_k x_{it}^k + \Sigma_{k=1}^{n} \gamma_k MPS_t \times x_{it}^k + \text{Controls}_{it} + \varepsilon_{it}, \quad (2)$$

$MPS_t = -\Delta i_{GSS,tight}$

x_{it}^k is the kth firm characteristic

- Using the coefficient estimates, $\hat{\gamma}_k$, from this regression, our MPE index captures the cross-sectional differences in policy sensitivity,

$$MPE_{it} = \Sigma_{k=1}^{n} \hat{\gamma}_k \times x_{it}^k. \quad (3)$$

Table 1 Monetary policy exposure estimation

MPS	2.39					
	[3.43]					
MPS × Whited–Wu		−1.64				−1.60
		[−3.04]				[−2.47]
MPS × Cash			−0.90			−0.87
			[−2.34]			[−2.12]
MPS × CF duration				0.94		0.63
				[3.21]		[2.56]
MPS × CF volatility					4.08	4.36
					[2.55]	[2.58]
MPS × Operating profitability					−8.29	−5.74
					[−2.63]	[−2.02]

$$\begin{aligned}\text{MPE} = &-1.60 \times \text{Whited –Wu} - 0.87 \times \text{Cash} \\ &+ 0.63 \times \text{CF Duration} \\ &+ 4.36 \times \text{CF Volatility} - 5.74 \\ &\times \text{Operating Profitability.}\end{aligned}$$

Asset pricing implications of monetary policy exposure

- 4.1. Returns to MPE-sorted portfolios
  - Table 3 Full-sample portfolio performance.

Panel A: Excess returns and alphas on MPE-sorted portfolios

	(L)	(2)	(3)	(4)	(H)	(L-H)
r^e	1.30	1.03	0.87	0.69	0.53	0.76
	[5.08]	[4.22]	[3.84]	[3.37]	[2.58]	[4.91]
α^{CAPM}	0.59	0.32	0.19	0.07	−0.11	0.69
	[4.56]	[3.12]	[2.39]	[1.03]	[−1.98]	[4.46]
α^{FF3}	0.37	0.18	0.11	0.04	0.01	0.36
	[4.42]	[2.13]	[1.41]	[0.58]	[0.17]	[3.73]
$\alpha^{FF3+UMD}$	0.53	0.30	0.18	0.06	−0.01	0.54
	[6.96]	[3.63]	[2.42]	[0.86]	[−0.11]	[5.97]
α^{FF5}	0.36	0.15	0.04	−0.04	−0.03	0.39
	[4.27]	[1.72]	[0.55]	[−0.66]	[−0.69]	[4.00]

- This result suggests that the stabilizer channel is the main driving force behind the riskiness of different MPE portfolios.

4.2. Additional evidence on the stabilizer channel: the response of the MPE-sorted portfolio to inflation and employment news

- the long/short MPE portfolio should react more positively to news about employment (non-farm payroll) and consumer price index (CPI) that leads to an expectation of tighter monetary policy (positive CPI and employment surprises)

- the low-minus-high MPE portfolio to employment and CPI news should largely disappear once we control for the expected changes in future policy rates.

- Table 4 Portfolio response to employment and inflation announcements

The regressions take the following form: $r_t^{(L-H)} = \beta' \mathbf{x_t} + \varepsilon_t$

	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.031	0.031	0.031	0.031	0.031	0.031
	[3.71]	[3.79]	[3.71]	[3.81]	[3.71]	[3.71]
Change in policy expectations	−0.091			−0.091	−0.089	−0.088
	[−2.46]			[−2.44]	[−2.33]	[−2.31]
Inflation surprise		0.013		0.008		0.008
		[1.63]		[0.89]		[0.91]
Employment surprise			0.028		0.015	0.015
			[3.18]		[1.40]	[1.41]
Drop in non-policy coefficients (p-value)				0.08	0.02	0.08
n	7250	7250	7250	7250	7250	7250
R^2	0.02	0.01	0.02	0.02	0.02	0.02

4.3. Trading on the MPE strategy: expanding window results and comparison with an alternative strategy

- Table 5 Expanding-window portfolio performance
- MPE is estimated similar to Eq. (4) from the text, but using coefficients from regressions using only historically available

Panel A: Excess returns and alphas on MPE-sorted portfolios

	(L)	(2)	(3)	(4)	(H)	(L-H)
r^e	1.16	0.97	0.93	0.78	0.28	0.87
	[3.10]	[2.78]	[2.92]	[2.76]	[0.81]	[2.93]
α^{CAPM}	0.56	0.40	0.38	0.28	−0.32	0.88
	[2.75]	[2.21]	[2.81]	[2.57]	[−2.27]	[2.93]
α^{FF3}	0.38	0.26	0.29	0.27	−0.22	0.61
	[2.43]	[1.74]	[2.53]	[2.52]	[−2.34]	[2.81]
$\alpha^{FF3+UMD}$	0.56	0.37	0.33	0.28	−0.27	0.83
	[4.08]	[2.67]	[2.82]	[2.60]	[−2.85]	[4.29]
α^{FF5}	0.28	0.04	0.12	0.04	−0.15	0.42
	[1.73]	[0.26]	[1.05]	[0.38]	[−1.48]	[1.92]

Robustness tests

- 5.1. Fama–MacBeth regressions
  - Table 6 Fama–MacBeth regressions.

	Regressions of the form $r_{tj} = \beta' \mathbf{x}_{t-1,j} + \varepsilon_{tj}$								
Coef.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
MPE	−0.68	−0.82	−0.68	−0.67	−0.63	−0.71	−0.65		−0.89
	[−8.76]	[−7.10]	[−7.95]	[−8.37]	[−8.51]	[−8.55]	[−8.92]		[−6.14]
log(ME)		0.03						−0.12	0.06
		[0.49]						[−2.76]	[1.26]
log(B/M)			0.08					0.26	−0.01
			[1.00]					[3.91]	[−0.18]
GP/A				−0.05				0.58	−0.27
				[−0.28]				[4.01]	[−1.90]
Investment					−0.69			v0.68	−0.54
					[−5.51]			[−8.82]	[−6.01]
$r_{12,1}$						0.61		0.32	0.52
						[3.18]		[1.81]	[2.93]
$r_{1,0}$							−4.58	−5.41	−5.36
							[−9.25]	[−12.68]	[−12.82]
R^2	0.50	1.71	1.11	0.87	0.74	1.54	1.43	3.35	4.12
n	492	492	492	492	492	492	492	492	492

- 5.2. Robustness to excluding returns around FOMC dates

- Table 7 Excluding FOMC meetings.

Panel A: Excess returns and alphas on MPE-sorted portfolios

	(L)	(2)	(3)	(4)	(H)	(L-H)
r^e	1.11	0.84	0.66	0.47	0.32	0.79
	[4.52]	[3.52]	[2.99]	[2.34]	[1.60]	[5.36]
α^{CAPM}	0.44	0.16	0.02	−0.12	−0.28	0.73
	[3.36]	[1.44]	[0.16]	[−1.51]	[−4.01]	[4.92]
α^{FF3}	0.22	0.02	−0.07	−0.16	−0.19	0.42
	[2.36]	[0.19]	[−0.83]	[−2.00]	[−2.88]	[4.41]
$\alpha^{FF3+UMD}$	0.35	0.12	−0.01	−0.15	−0.22	0.57
	[3.85]	[1.21]	[−0.13]	[−1.85]	[−3.17]	[6.34]
α^{FF5}	0.20	−0.03	−0.14	−0.25	−0.23	0.43
	[2.05]	[−0.26]	[−1.56]	[−3.06]	[−3.36]	[4.51]

- 5.3. Robustness to betting-against-beta effect

  - Table 8 Conditional double sort on beta and MPE.

		MPE quintiles					
		(L)	(2)	(3)	(4)	(H)	(L-H)
Beta quintiles	(L)	1.89	1.34	1.07	0.88	0.41	1.49 [5.86]
	(2)	1.43	1.31	0.80	0.78	0.63	0.80 [4.03]
	(3)	1.43	1.10	1.02	0.78	0.59	0.84 [4.52]
	(4)	1.61	1.22	0.92	0.84	0.48	1.13 [5.45]
	(H)	1.36	1.14	0.73	0.80	0.58	0.79 [2.90]

- 5.4. Further robustness tests
  - alternative portfolio construction methods;
  - additional double sorts, spanning tests,
  - Fama–MacBeth regressions to control for the underlying characteristics and to show that the premium is not another anomaly in disguise;
  - studying the effects of different levels of economic activity and the consequences of excluding different fixed effects in the estimation of the MPE index.

Conclusion

- We generate a monetary policy exposure index based on observable firm characteristics that are likely to capture how stocks react to monetary policy according to previous literature.
- Using this index, we find that stocks that react more positively to expansionary monetary policy surprises earn lower average returns.
- We also provide evidence that this pattern is consistent with the fact that the central bank aims to stabilize the economy after economic shocks so that firms with higher monetary policy exposure provide a hedge against these shocks.

Conclusion

- Our approach builds a bridge between the literature that connects firm characteristics to expected returns and the literature that studies macroeconomic aggregates as a predictor of asset returns.

- While we derive our monetary policy exposure index to study its implications for asset pricing, our index can also be useful in future research about how firms' financing and investment decisions are related to monetary policy.

Thank You!