Inflation and the Relative Price Premium

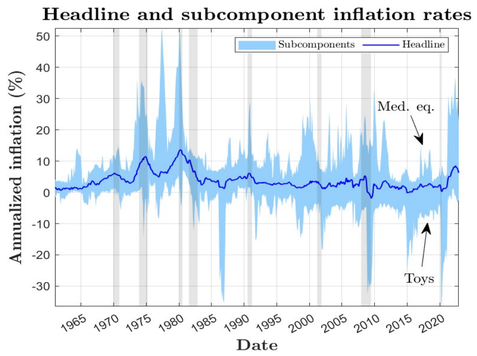
Yun Joo An[1] Fotis Grigoris[2]
Christian Heyerdahl-Larsen[3] Preetesh Kantak[1]

1. Indiana University Bloomington 2. University of Iowa 3. BI Norwegian Business School
yunjooan@iu.edu fgrigoris@uiowa.edu christian.heyerdahl-larsen@bi.no pkantak@iu.edu

Paper

Website

Motivation



- Headline inflation *vs* Cross-sectional dispersion of CPI subcomponents
  - E.g. food, housing, medical care…

Data and Portfolio Formation

- Relative Prices (*RP*)

$$RP_{k,t,\tau} = \left(\log\frac{CPI_{k,t}}{CPI_{k,t-\tau}}\right) - \left(\log\frac{CPI_{H,t}}{CPI_{H,t-\tau}}\right)$$

  - Inflation rate of subcomponent k minus the headline inflation rate
  - t: month, τ = 3, Jan 2000-Dec 2022

- Portfolio formation on *RP*
  - BLS ~ CRSP via SIC codes

- Stocks with high RP earn higher returns than stocks with low RP

Portfolio Characteristics

- No typical characteristic sorted portfolio aligns with RP premium
  - Price rigidity, size, value…

- Unrelated to inflation spread of
  - Boons et al. (2020)
  - Fang et al. (2022)

Research Question

1. Are relative prices informative about cross-section of asset prices?
2. Are changes in price dispersion good or bad for investors?

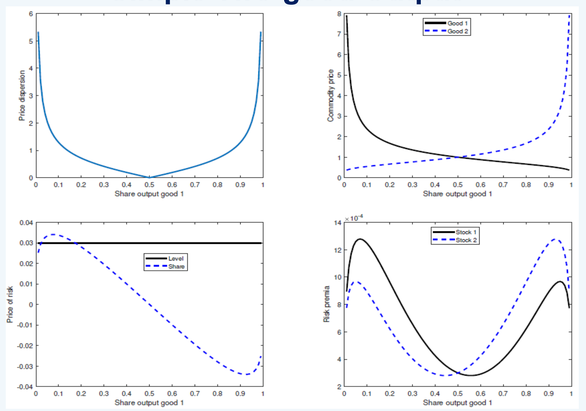
Empirical Findings

1. Relative Price Premium of 0.88% per month
   - Firms with high (low) relative prices earn 1.14% (0.26%) per month
   - Large and significant alphas
2. High price dispersion → bad state of world (high marginal utility)
   - Increases in price dispersion carry a negative market price of risk

	$E[R]$	$\sigma(R)$	N(Firms)
Low (L)	0.26	6.07	170
Medium	0.84	4.69	898
High (H)	1.14	5.17	134
Spread	0.88	5.01	
(H-L)	(3.27)		

	CAPM	FF3F	FF4F	FF5F	FF6F	q^5
α	1.03	0.99	0.89	0.94	0.90	0.71
	(4.02)	(3.64)	(3.18)	(3.32)	(3.19)	(2.13)

<Simple Two-good Output>



Theoretical Model and Intuition

1. Rationalize via a consumption-based asset-pricing model
   - Shocks to the size and composition of the consumption basket
   - Shocks to composition of consumption drive relative price changes
     - These shocks carry a negative market price of risk
2. High relative price goods more exposed to composition shocks if baskets are substitutes (empirically verified)
3. → High relative price goods command a risk premium.

Consumption-based Model

1. Rep. investor's CRRA utility over aggregate consumption C_t
   - Economy w/ two goods $C_{1,t}, C_{2,t}$

$$U_{C_t} = E_t\left[\int_t^\infty e^{-\rho u}\frac{\hat{C}_u^{1-\Upsilon}}{1-\Upsilon}du\right]$$

     - $\hat{C}_t$ from CES aggregator

$$\hat{C}_t = \left[\alpha^{\frac{1}{\eta}}C_{1,t}^{\frac{1-\eta}{\eta}} + (1-\alpha)^{\frac{1}{\eta}}C_{2,t}^{\frac{1-\eta}{\eta}}\right]^{\frac{\eta}{1-\eta}}$$

       - η: elasticity of substitution
       - α: distribution parameter

   - Geometric Brownian motion for C_t

$$\frac{dC_t}{C_t} = \mu_C dt + \sigma_C dW_t^C$$

     - dW_t^C shock to the level of consumption

   - Consumption share s_t follows
     - $ds_t = \kappa(\bar{s} - s_t)dt + s_t(1-s_t)\sigma_s dW_t^s$
     - dW_t^s: shock to the composition of consumption

2. SDF and Prices of Risk

$$M_t = \hat{C}_t^{-\Upsilon} = (C_t X_t)^{-\Upsilon}, where\ X_t = f(s_t)$$

   - Marginal utility depends on:
     - ① How much we consume?
     - ② What types of good/services?

Market Prices of risk (GMM)

$$E\left[\left(1 - b^{MKTRF}MKTRF_t - b^{\Delta RP}\Delta RP_t\right)R_{i,t}^e\right] = 0$$

- High excess mkt returns (good times)
- High price dispersion (bad times)

	RP portfolios	
b^{MKTRF}	0.16	0.29
	(2.13)	(1.62)
$b^{\Delta RP}$		-2.39
		(-1.71)
MAE	0.20	0.12