Discussion: Product Price Change Timing and Stock Returns

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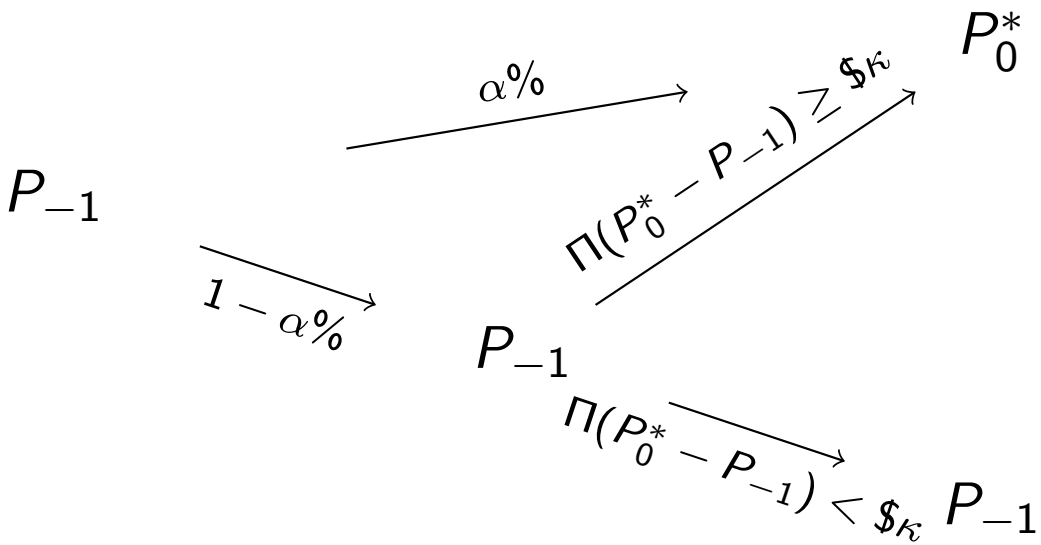
Big Picture

- Contribution: empirical link between price rigidity and risk exposure
- Literature
  - Weber (2014): high price rigidity $\rightarrow$ low price adjustment frequency $\rightarrow$ high risk premium
- This paper:
  - new data set of product prices in supermarkets
  - no relationship between frequency and returns
  - kurtosis: new measure of price rigidity (Alvarez et.al 2016)
  - high price rigidity $\rightarrow$ high kurtosis $\rightarrow$ high risk premium
  - long-short kurtosis portfolio earns an average return of 6%

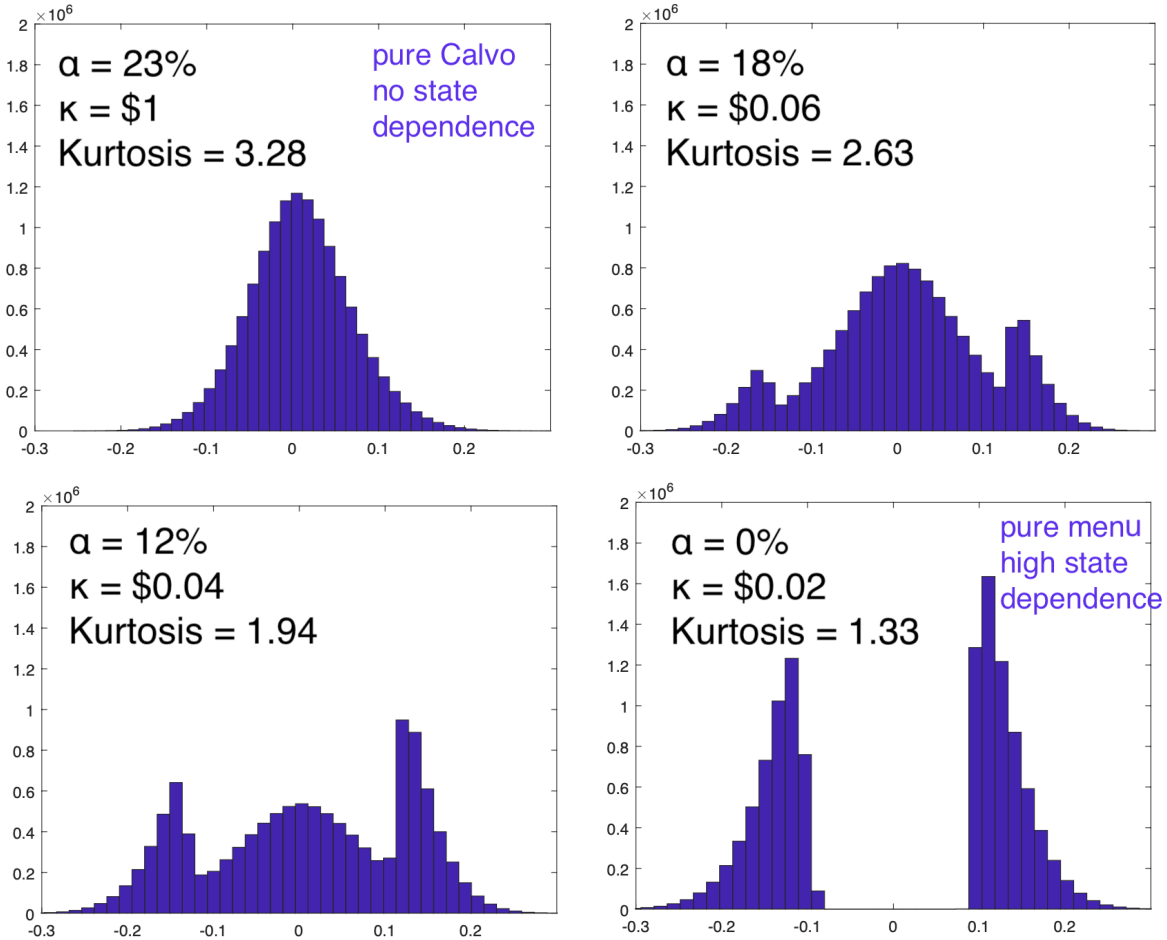
Summary of the Paper: Model Motivated Measure

- New-Keynesian model with two types of price rigidities
  - Calvo: randomly adjust price for free with probability $\alpha\%$
    $\rightarrow$ low state dependence (of aggregate shocks) $\rightarrow$ high price rigidity
  - Menu cost: certainly adjust when profit exceeds the menu cost $\$\kappa$
    $\rightarrow$ high state dependence (of aggregate shocks) $\rightarrow$ low price rigidity



Summary of the Paper: Price Adjustment Distributions

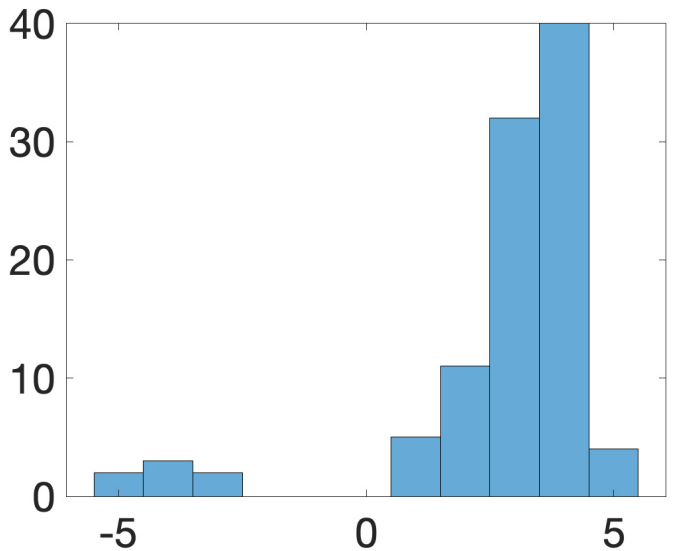
- How to measure the price rigidity (given price adjustment frequency)?



- High kurtosis $\Rightarrow$ low state dependence $\Rightarrow$ high price rigidity
- Sort by kurtosis $=$ sort by price rigidity

Comment 1: Measurement

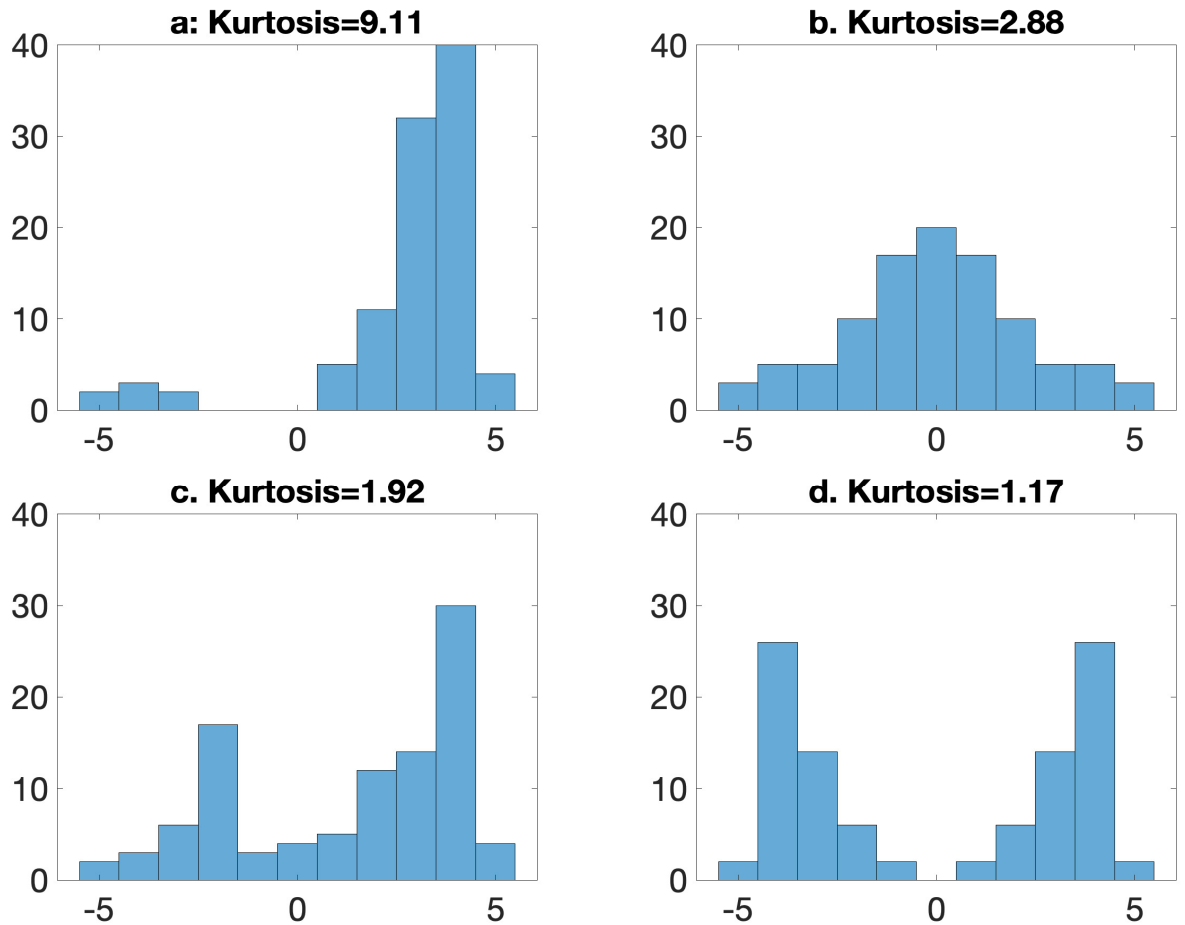
- Compare distribution of price adjustment in the model and data?
- In the model
  - steady state inflation is 0 $\Rightarrow$ price adjustment is symmetric
  - kurtosis is a good measure
- In the data
  - inflation is $\approx 2\%$ (2006-2019) $\Rightarrow$ prices mostly adjust upwards
  - Distribution of price adjustment under menu cost pricing?



  - Negative skewness $\Rightarrow$ need more sophisticated measures

Comment 1: Measurement

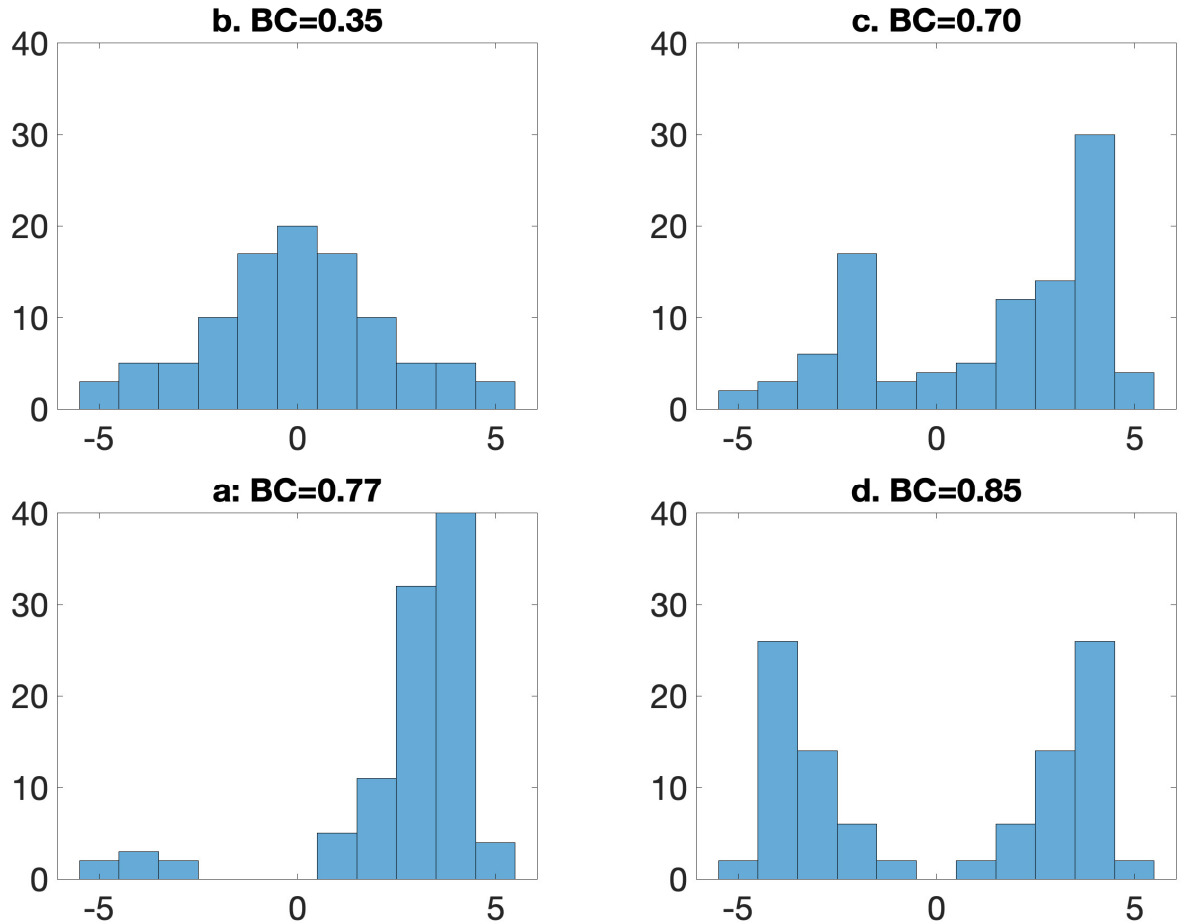
- Sort by kurtosis $\neq$ sort by price rigidity



Suggestion 1: Alternative Measurement

- Bimodality Coefficient (Freeman-Dale, 2013; Pfister,et.al, 2013)

$$BC = \frac{skewness^2 + 1}{kurtosis} \in (0, 1)$$



- Suggestion 1: measurement adjusts for skewness, e.g., sort by BC

Comment 2: Economic Mechanism of Risk Premium

- Main result: sticky price firms are riskier
- However, risk exposure must be sensitivity to certain types of shocks
- This model has two shocks: productivity and monetary policy
  - sticky price firms are less sensitive to monetary policy shocks
  - sticky price firms are more sensitive to productivity shocks?
- Suggestion 2: Disentangle risk exposures to two types of shocks.
  - What is model's economic mechanism?
  - Does your result depend on certain calibrations?

Comment 2: Economic Mechanism of Risk Premium

- Sticky price firms are less sensitive to monetary policy shocks
- Suppose expansionary monetary policy shocks raise inflation
- Sticky price firms:
  - cannot adjust price, but aggregate price increases
  - markup goes down
  - profit drops
- Profits are negatively correlated with monetary policy shocks
  $\Rightarrow$ less risky $\Rightarrow$ require a lower premium

Comment 2: Economic Mechanism of Risk Premium

- Flexible price firms are more sensitive to monetary policy shocks
- Suppose expansionary monetary policy shocks raise inflation
- Flexible price firms:
  - adjust price upwards
  - markup stays at the optimal level
  - profit increases
- Profits are positively correlated with monetary policy shocks
  $\Rightarrow$ more risky $\Rightarrow$ require a higher risk premium

Comment 2: Economic Mechanism of Risk Premium

- Suggestion 2: use the model to illustrate why sticky price firms are more sensitive to productivity shocks
  - Are they always riskier w.r.t productivity shocks?
  - Or this is specific to the calibration?

Minor Comments

- The model-implied mean return spread is only 0.5%, much lower than the data of 6%.

Table 3: State Dependence and Returns in the Model

α_k	κ_k	Frequency	Kurtosis	Mean Annual Return
0.23	1	0.2300	3.2745	3.6333
		(0.0000)	(0.0000)	(0.0000)
0.18	0.067	0.2218	2.6336	3.3790
		(0.0000)	(0.0000)	(0.0000)
0.12	0.042	0.2103	1.9426	3.2594
		(0.0000)	(0.0000)	(0.0000)
0.00	0.021	0.2084	1.3321	3.1168
		(0.0000)	(0.0000)	(0.0000)
		0.0215	1.9423	0.5166
		(0.0000)	(0.0000)	(0.0002)

- Suggestion 3: model does not have a volatile enough pricing kernel to generate equity premium (add Habit, LRR, disaster?)
- Suggestion 4: simulate firm-level returns from model, and sort portfolios in the same way as in the data

Conclusion

- Extremely interesting paper
- Important in understanding sticky prices and risk premium
- Better measurement to reflect the data
- Explain economic mechanism of risk premium

Appendix

- Flexible price firms are more sensitive to monetary shocks
- The profit of a flexible price firm:

$$\Pi_{flexible} = \left[\frac{p^*}{P} - \frac{w(\pi)}{A}\right] y = \left[\chi(\pi) - \frac{w(\pi)}{A}\right] y,$$

where

$$\chi(\pi) = \left\{\frac{1}{\alpha}\left[1 - (1-\alpha)\pi^{\eta-1}\right]\right\}^{\frac{1}{1-\eta}}$$

and $d\chi(\pi)/d\pi > 0$

- inflation $\pi \uparrow \Rightarrow$ markup stays at optimal level and profit goes up
- inflation is a good shock to consumption, high risk premium

Appendix

- Sticky price firms are less sensitive to monetary shocks
- The profit for a sticky price firm:

$$\Pi_{sticky} = \left[\frac{\bar{p}}{P_{-1}\pi} - \frac{w(\pi)}{A} \right] y$$

- inflation $\pi \uparrow \Rightarrow$ markup goes down and profit goes down
- Insurance against inflation shocks, lower risk premium