

Reset Price Inflation and the Impact of Monetary Policy Shocks

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Paper overview:

- Compute new object: reset price inflation (RPI)
 - Rate of change of all 'desired' prices
- Study implications of sticky price models for RPI
- Argue TDP and strategic complement. fail to account for RPI
- Argue SDP with strong selection effect more in line with RPI

Reset Price Inflation

- p_{it}^* : 'desired' price of good i (log)
- $p_{it}^* = p_{it}$ if adjust, $p_{it-1}^* + \hat{\pi}_t^*$ otherwise
- $\hat{\pi}_t^* = \text{mean}(p_{it} - p_{it-1}^* | \text{adj})$

Reset vs. Actual inflation

| | $\sigma, \%$ | ρ |
|---------|--------------|--------|
| π | 0.18 | -0.12 |
| π^* | 0.99 | -0.47 |

RPI models vs. data

| | Data | Calvo | GL | GL + SC |
|-----------------|-------|-------|-------|---------|
| $\sigma(\pi^*)$ | 0.99 | 0.49 | 1.79 | 0.52 |
| $\rho(\pi^*)$ | -0.47 | -0.04 | -0.31 | -0.24 |

My first question

- Does RPI provide more info. than π ?
- Failure of TDP/SC to account RPI due to failure π

π models vs. data

| | Data | Calvo | GL | GL + SC |
|---------------|-------|-------|------|---------|
| $\sigma(\pi)$ | 0.18 | 0.12 | 0.28 | 0.11 |
| $\rho(\pi)$ | -0.12 | 0.73 | 0.38 | 0.73 |

RPI vs. π models vs. data

| | Data | Calvo | GL | GL + SC |
|-----------------------------|-------|-------|-------|---------|
| $\sigma(\pi^*)/\sigma(\pi)$ | 5.5 | 4.1 | 6.4 | 4.7 |
| $\rho(\pi^*)-\rho(\pi)$ | -0.35 | -0.77 | -0.69 | -0.97 |

My first question

- Does RPI provide more info. than π ?
- Failure of TDP/SC to account RPI due to failure π
- All models: similar relative volatility π^* vs. π
- All models: too little autocorr. π^* vs. π
- Data favor GL menu costs because little serial correlation

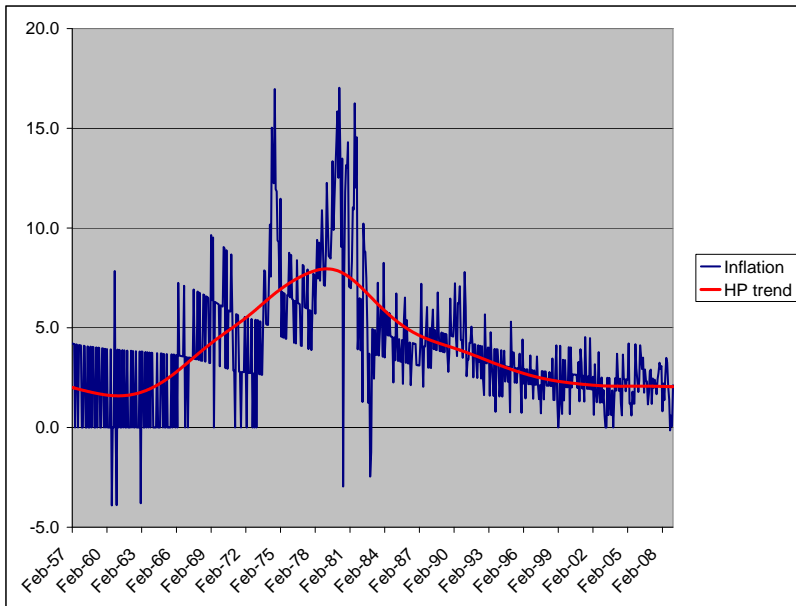
Why does data favor GL menu costs?

- Data: π serially uncorrelated 1988-2008
- Given iid money growth process inflation is:

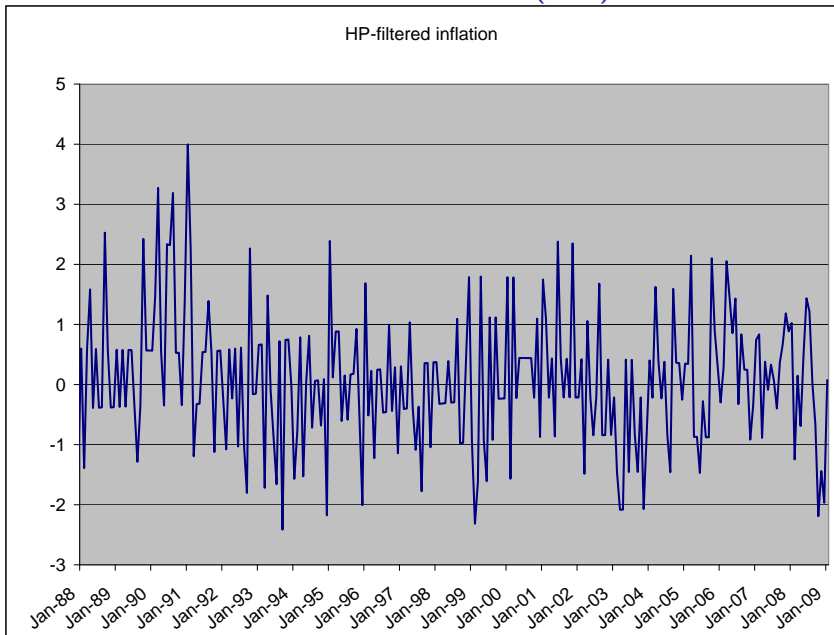
$$\pi_t = \lambda\pi_{t-1} + (1 - \lambda)\mu_t$$

- Data favors $\lambda = 0$

US inflation: 1957-2008

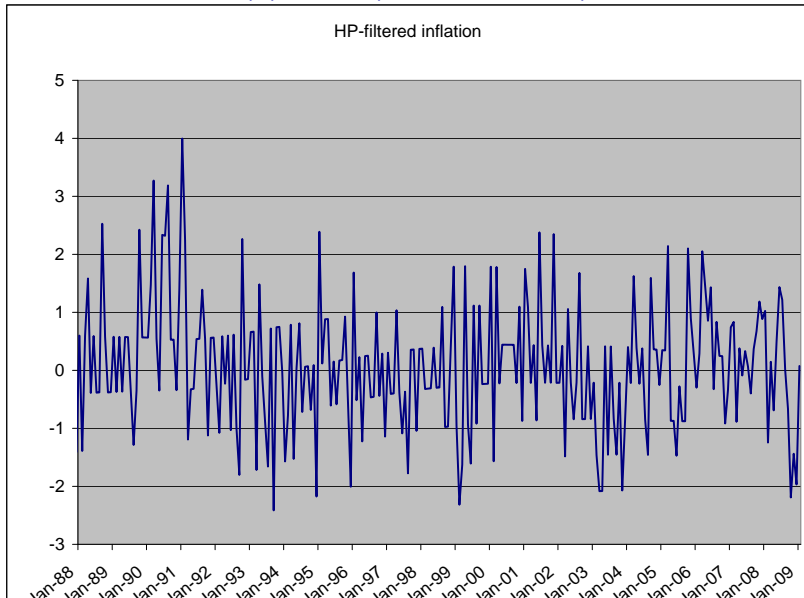


US inflation: 1988-2008, HP(10^6)-filtered



$\sigma(\pi) = 0.09\%$ (0.18% in CPI-RDB)

$\rho(\pi) = 0.06$ (-0.12 in CPI-RDB)



Time- vs. State-Dependent Pricing

- TDP: exogenous adjustment hazard f , $\lambda = 1 - f$

$$\pi_t = \lambda\pi_{t-1} + (1 - \lambda)\mu_t$$

- SDP: adjustment hazard endogenous (selection)
- But under mild approximations: dynamics similar to Calvo:

$$\pi_t = \alpha\pi_{t-1} + (1 - \alpha)\mu_t$$

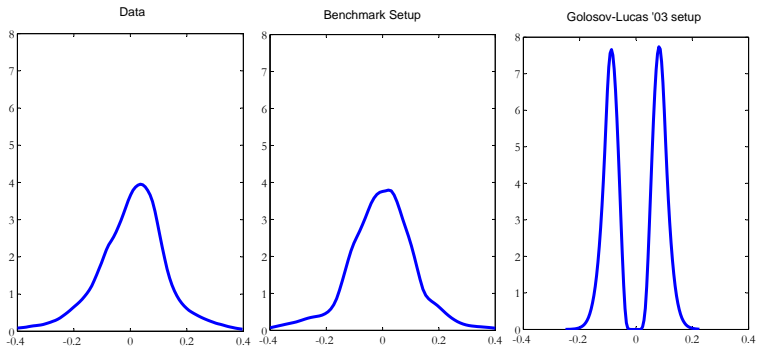
- Caballero-Engel: $\alpha = 1 - 3f$
- Gertler-Leahy: $\alpha = 1 - \left(1 - \frac{s-s}{a_{\max} - a_{\min}}\right)^{-1} f$

Time- vs. State-Dependent Pricing

- Bottomline: TDP behave much like SDP
- With lower frequency of price adjustment
- So can reinterpret BKM result as: inflation data suggests prices flexible (in the aggregate)
- Question: why not Calvo vs. GL vs. Flex-price model?
Flex-price would do better.
- Inconsistent with micro-facts on freq. p. adjust.
But GL also misses important micro-facts

GL misses distribution price changes in data

Figure 4: Distribution of non-zero price changes: Model vs. Data



Strategic Complementarities

- Act much like additional price stickiness
- E.g., New Keynesian inflation equation:

- $$\pi_t = \frac{(1-\lambda)(1-\lambda\beta)}{\lambda} \psi + \beta E_t \pi_{t+1}$$

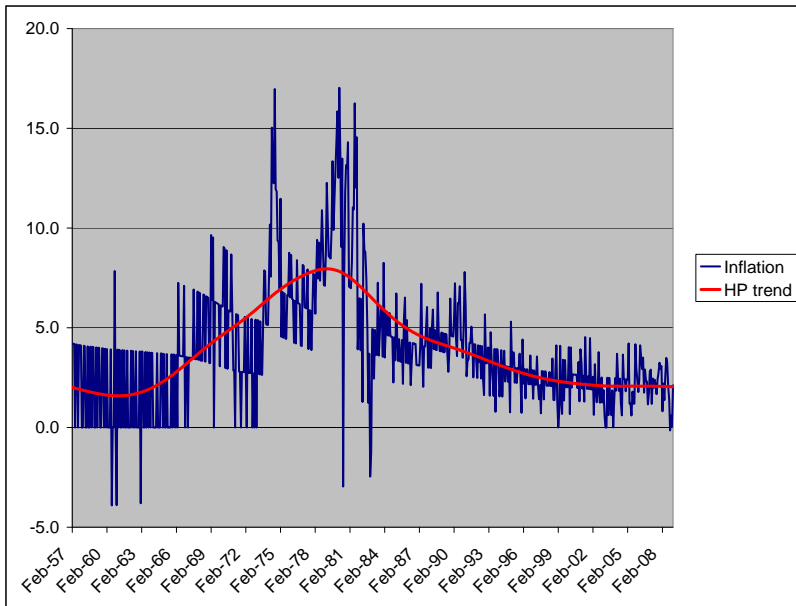
Possible resolutions (sticky prices vs. π_t):

- Models with flexible prices
- Sampling error
 - Broda-Weinstein'07, This paper
- Other transitory shocks (e.g., markups, velocity)
 - Conditional (on monetary shocks) inflation moments?
- Difficult to attribute noise in π to mon. policy (even w/ flexible prices): mon. policy much more inertia

My second comment: monetary policy rule

- Simple money growth rule useful to eval. model's real effects
- But probably less convincing to evaluate implication for π_t
- Why not use a Taylor-type interest rate rule?
- If μ_t iid: inflation inertia pre-90s due to more price stickiness
- Another interpretation: post-Volcker monet. policy more aggressive and dampens persistent shocks

US inflation: 1957-2008



Add'l questions

- Can model account ARMA(1,1) inflation
- Heterogeneity in frequency of p. adjustment
 - Different response to shocks if sticky vs. flexible
 - Do you extrapolate desired price change of more sticky good from less sticky good?
 - Maybe more useful to compute RPI sector by sector
- Reset price inflation vs. inflation?

Selection in Data, Midrigan '2007

- 4-digit sectoral inflation rates, π_{it} and TFP shocks, ε_{it}

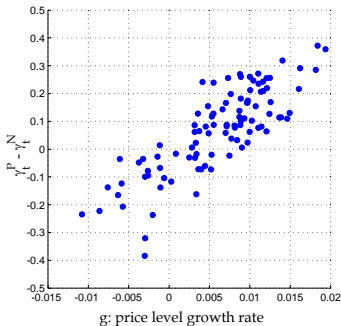
$$\pi_{it} = \gamma_t^N \min(0, \varepsilon_{it}) + \gamma_t^P \max(0, \varepsilon_{it}) + u_{it}$$

Model: sectors with negative shocks more responsive if aggregate inflation

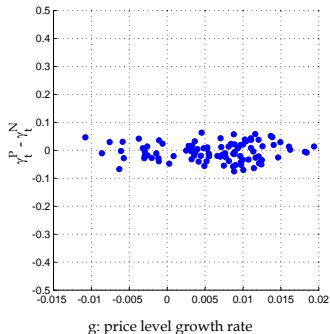
Effect of Aggregate Shocks on the Difference in (+,-) elasticities:

□ □ Model

State-Dependent Pricing



Time-Dependent Pricing



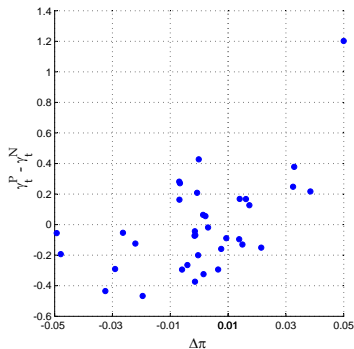
Data

Effect of Aggregate Shocks on the Difference in (+,-) elasticities:

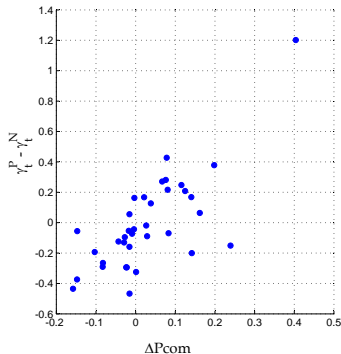


US Manufacturing, 1958-1996

First-Differenced Inflation



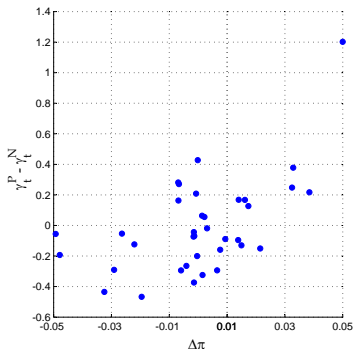
Commodity Price Changes



Data: US inflation 50% more responsive to shocks because of selection

Effect of Aggregate Shocks on the Difference in (+,-) elasticities:
□ US Manufacturing, 1958-1996

First-Differenced Inflation



Commodity Price Changes

