

Discussion of

Altig, Christiano, Eichenbaum and Linde:

“Firm Specific Capital, Nominal Rigidities and the Business Cycle”

by

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The Paper's Accomplishments

- identification of multiple “structural shocks”
- constructs DSGE model with numerous extensions to earlier work each of which are shown to be important
- estimates key “structural parameters”
- forcefully argues that firm-specific capital may resolve micro-macro price persistence riddle
- shows that proposed model successfully can account for dynamics of key aggregate variables

The Strategy

1. Construct DSGE model with numerous twists and three structural shocks.
2. Estimate VAR(4) model (10 series). Identify 3 structural shocks using model consistent restrictions.
3. Estimate empirical impulse responses to 3 structural shocks.
4. Estimate subset of structural parameters by matching impulse responses of DSGE model with and without firm-specific capital to empirical impulse responses.

They ask the following question:

“How may one account for the conflicting pictures of US price behaviour?”

- macroeconomic data: Inflation is inertial
- microeconomic data: Firms adjust prices frequently

Their answer:

Firm specific capital: implies MC^{SR} increasing which leads to slow price adjustment even if prices are quite flexible

Comments

- 1. Other possible answers to their question?**
- 2. How far can one take firm-specific capital model?**
- 3. Specific comments on the model**
- 4. Implications for optimal monetary policy?**

Other possible answers:

1. Countercyclical optimal mark-ups?
 - Switching costs, dynamic coalitions, 'deep habits'
2. Sticky real wages?
 - Reinforce real rigidities
3. Strategic complementarity?
 - (already included by ACEL)
4. Microeconomic heterogeneity?

Microeconomic Heterogeneity:

Suppose that degree of stickiness varies across sectors. In that case one can show that:

$$\pi_{it} = \beta E_t \pi_{it+1} + \gamma_i mc_{it} + (1 - \alpha_i) \gamma_i (p_t - p_{it})$$

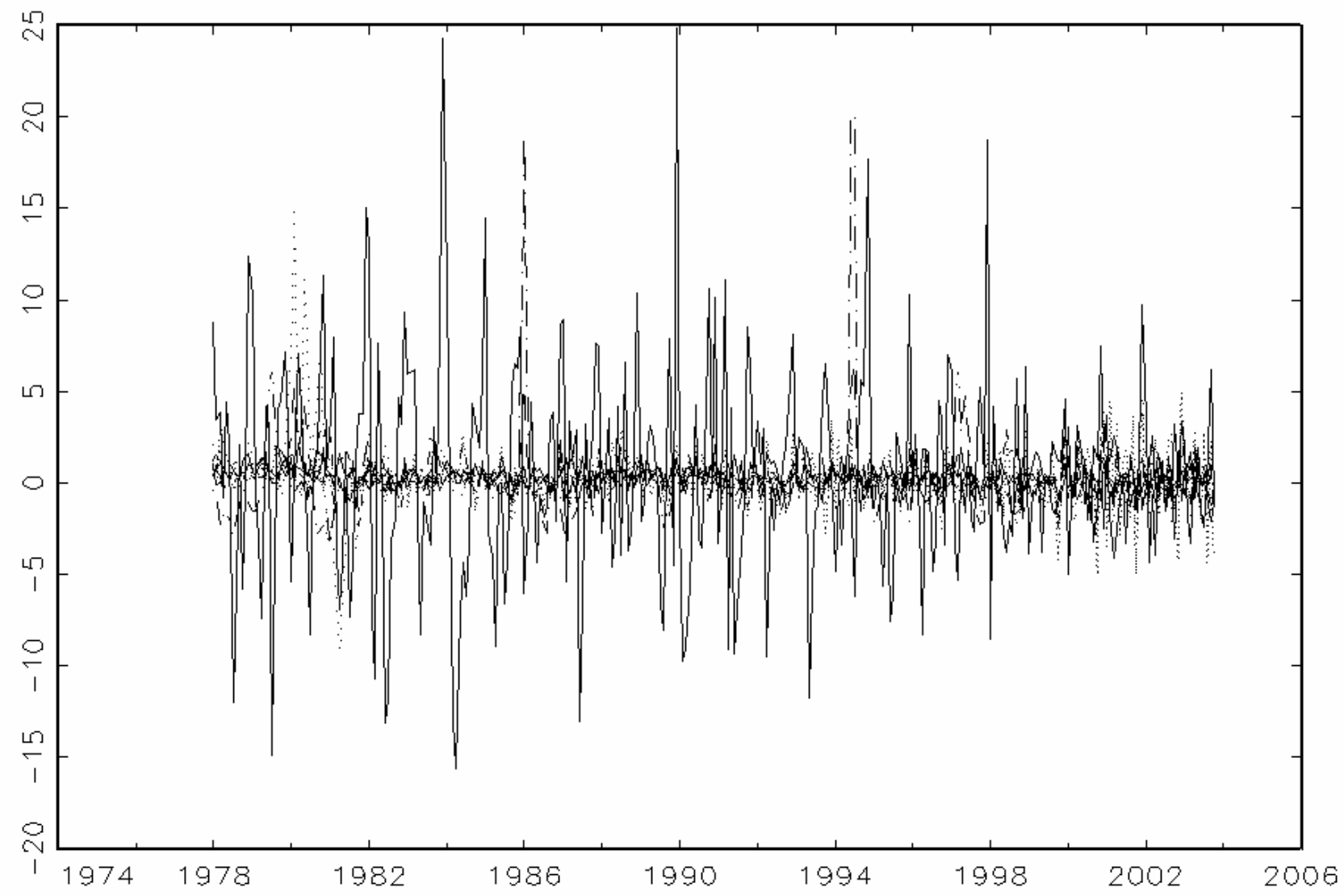
$$\gamma_i = (1 - \beta \alpha_i)(1 - \alpha_i) / \alpha_i$$

And therefore:

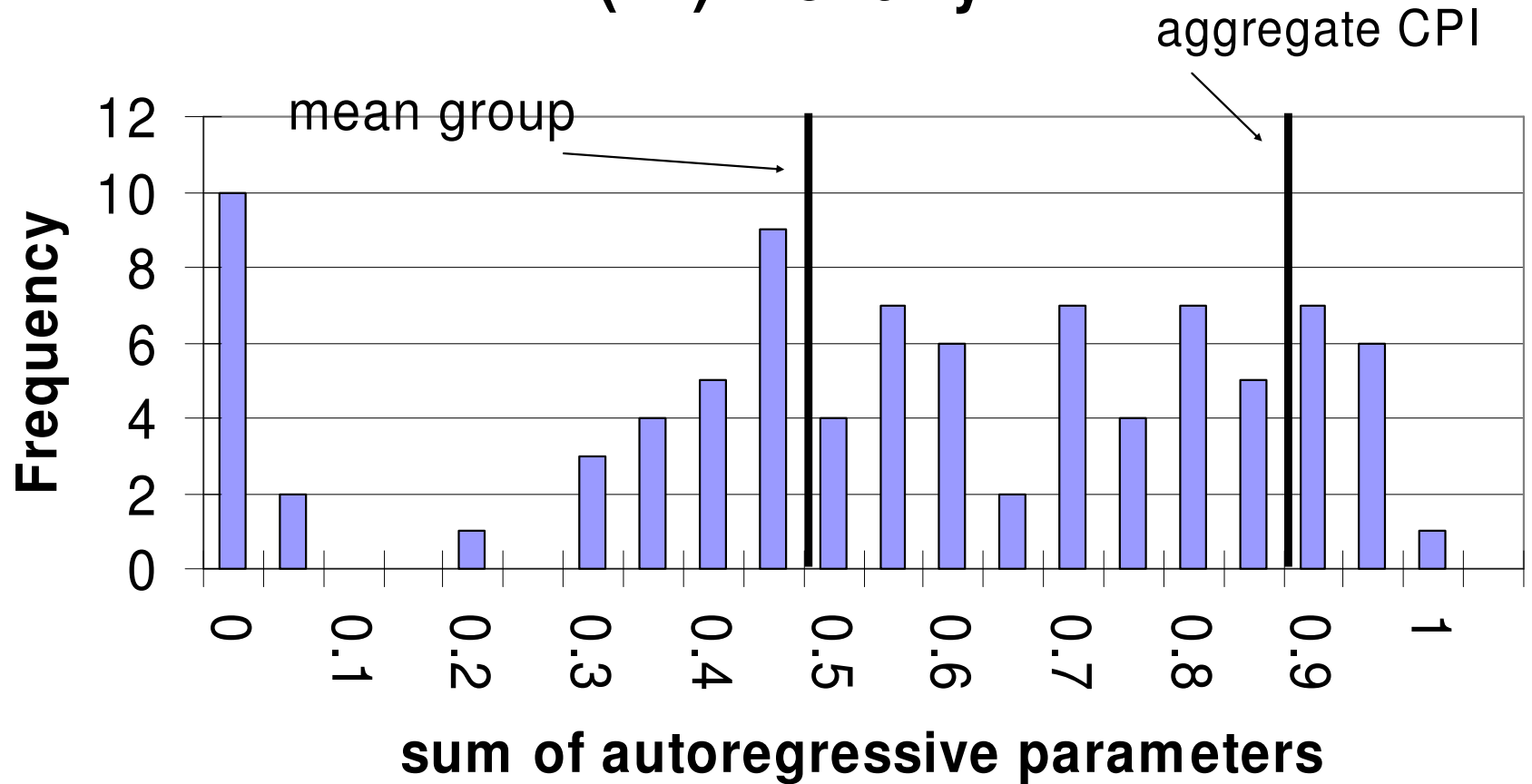
$$\begin{aligned} \pi_t &= \beta E_t \pi_{t+1} + \frac{1}{N} \sum_i \frac{(1 - \beta \alpha_i)(1 - \alpha_i)}{\alpha_i} mc_{it} + \frac{1}{N} \sum_i (1 - \alpha_i) \gamma_i (p_t - p_{it}) \\ &\neq \beta E_t \pi_{t+1} + \frac{(1 - \beta \alpha)(1 - \alpha)}{\alpha} mc_t \end{aligned}$$

Aggregate Phillips curve may not give median estimate of degree of price stickiness

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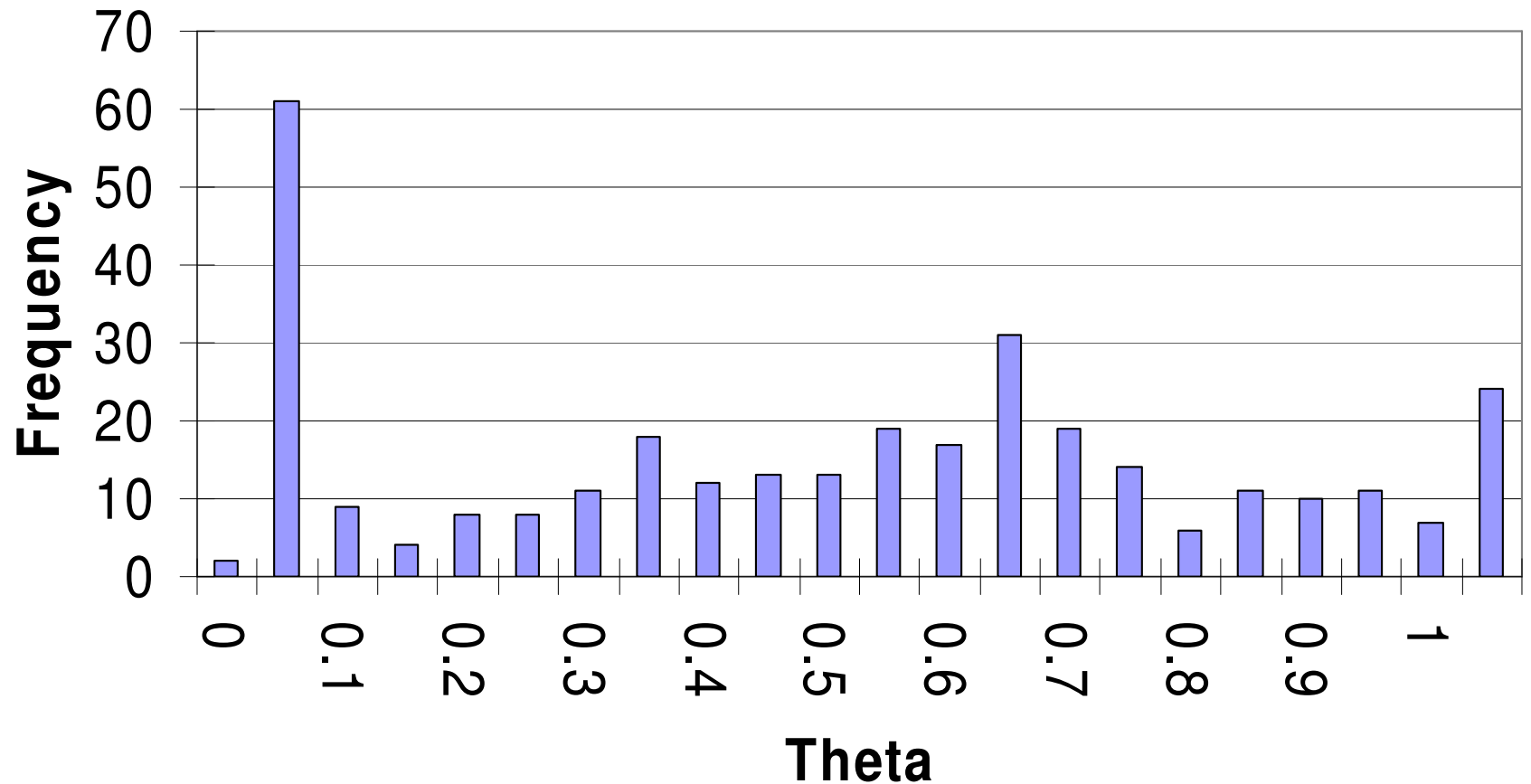


Distribution of sum of autoregressive parameters, US CPI components, AR(12) monthly



Distribution of Theta Estimates

median = 0.34, mean = 0.48



Structural estimate from micro data

Figure 2
Distribution of Times Between Regular Price Changes



Source: Klenow & Kryvtsov, 2005

Heterogeneity

- clear signs of heterogeneity in US data
- many sectors with low inflation persistence and relatively flexible prices; a few with high persistence and very sticky prices
- heterogeneity may bias upwards estimate of “mean” price stickiness derived from aggregate data
- but: ACEL provide firm evidence in favor of their hypothesis. The heterogeneity story has as yet no such evidence.

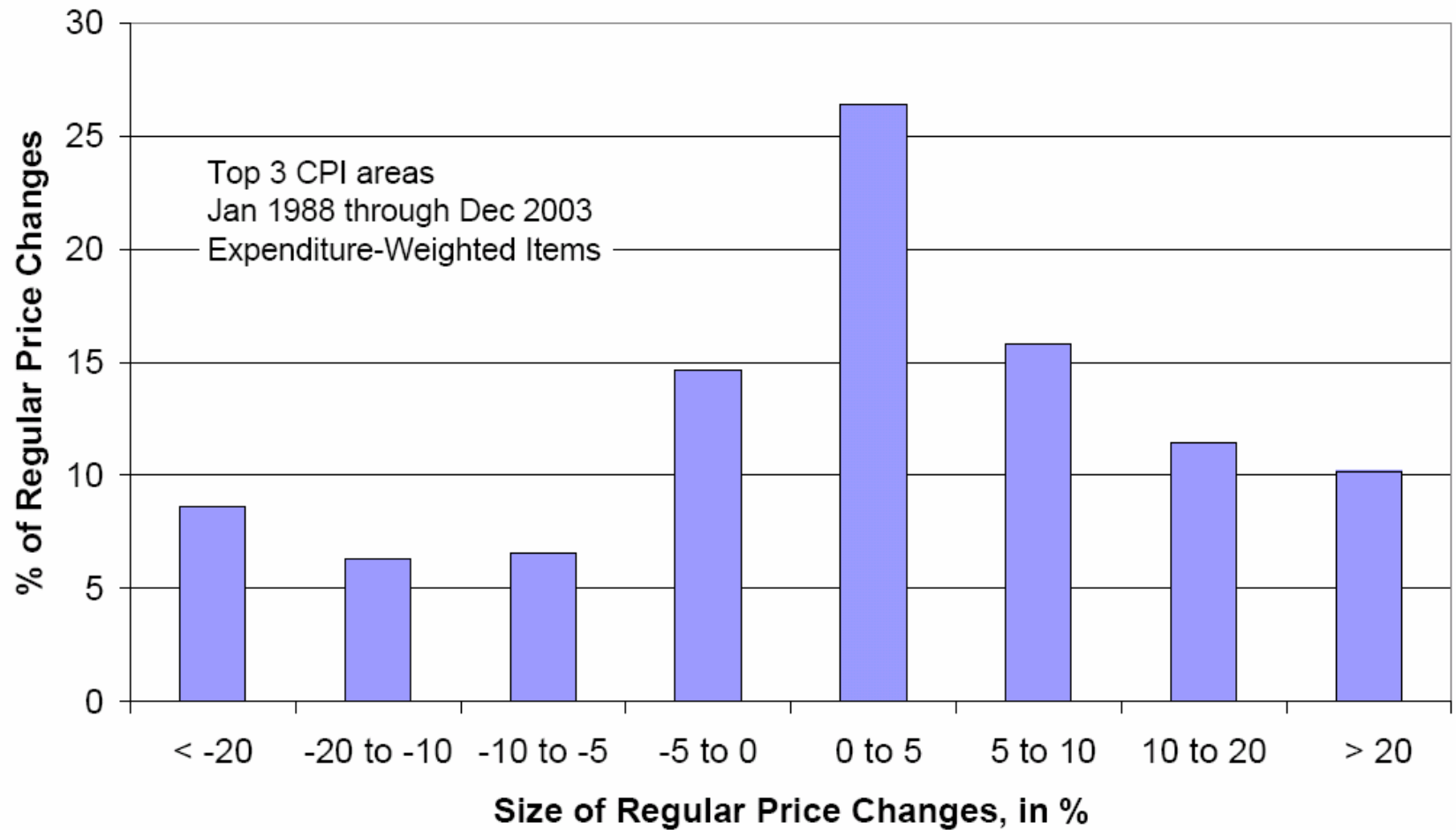
How far can we take Firm-Specific capital explanation?

A. ACEL's explanation: MC^{SR} increasing at the firm level. Implies that firms that are given opportunity to adjust choose to adjust prices by less than in "homogeneous capital model".

Potential problem: Bils & Klenow, Klenow & Kryvtsov find that mean rate of adjustment of prices is fast **and** relatively large price changes.

Would be interesting to check the model's implications for size of price changes – if consistent with evidence, would be very convincing

Figure 4
Distribution of Regular Price Changes



Source: Klenow & Kryvtsov, 2005

B. Results depend on estimate of λ_f : ACEL
“assume” (boundary binds) that λ_f close to 1.
This implies that producers face very elastic demand

- Therefore choose not to adjust prices much
- Lower elasticity implies higher estimates of stickiness even in firm-specific capital model
- In state-contingent pricing set-up: High elasticity implies firms adjust prices only in response to very large shocks:

$$\lim_{\lambda_f \rightarrow 1} x^* = \sqrt{\frac{2(1 + (\gamma - 1)\lambda_f / (\lambda_f - 1))z}{(\gamma - 1)^2 / (\lambda_f - 1)}} = \infty$$

C. Firm-specific capital or firm-specific labor?
Might be just as hard to adjust employment quickly.

- Does it matter for the results?
- perhaps a combination would be interesting?
- In particular, since elasticity of MC to hours is quite high, this mechanism might lower estimate on elasticity of costs of varying capital utilization

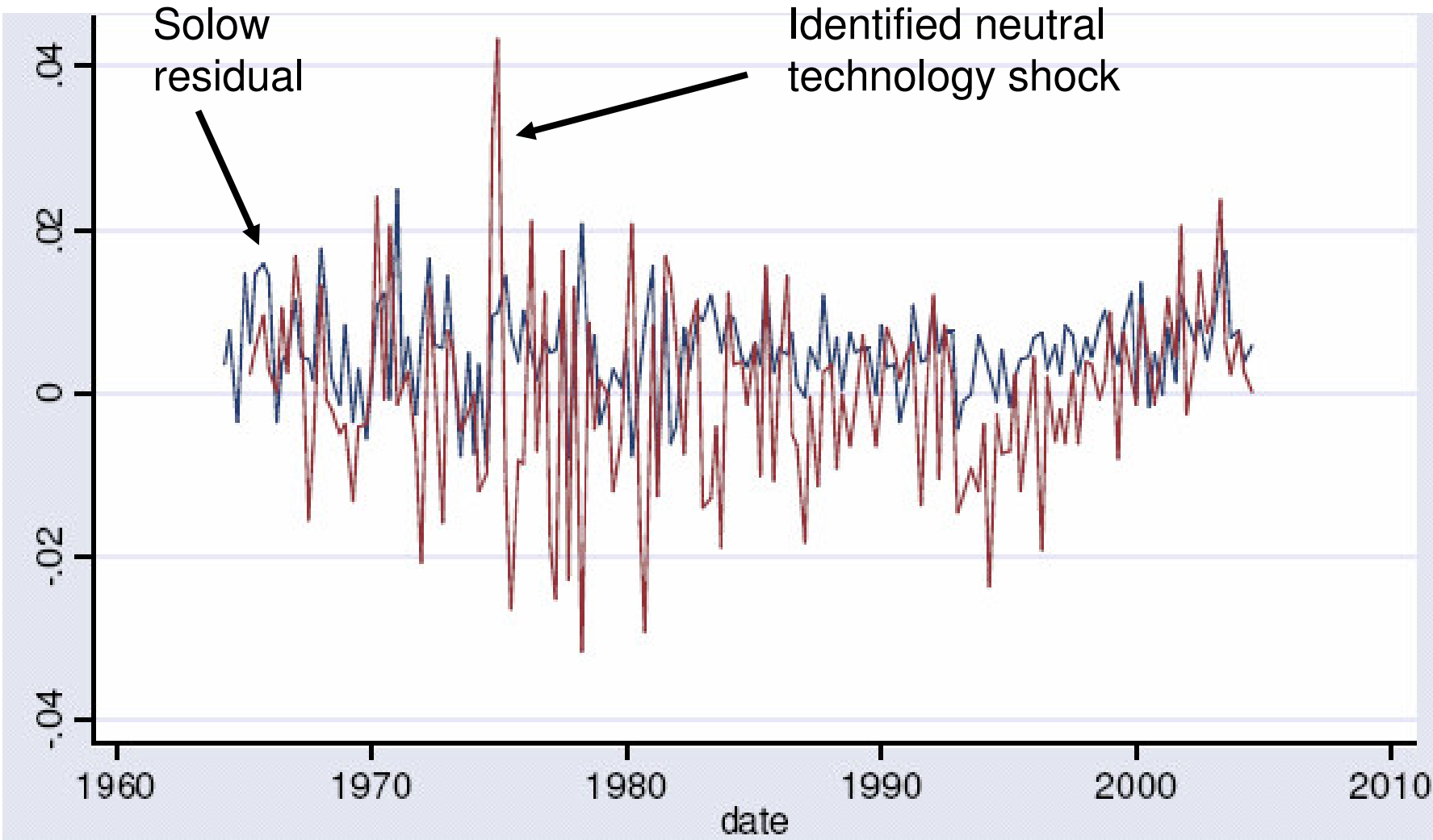
Specific Comments on the Model / Results

A. Estimates imply very persistent growth rate of neutral technology shocks (autoregressive coefficient of 0.9 for growth rate of neutral shocks)

Appears very large – how come? Probably not implausible but much larger than standard estimates.

A plot of the identified innovations would be informative

Estimated Innovations



B. Standard errors of impulse responses to monetary policy shock seems significantly lower than responses to two other identified shocks

- how come that monetary policy shock effects seem more precisely estimated?
- does this imply that structural parameters mainly fitted to monetary policy shocks?
- short run vs. long run identification?

Implications for Optimal Monetary Policy

In state-contingent pricing models with large real rigidities:

“Private costs” of nominal shocks very large due to high elasticity of demand

Social costs would be approximately proportional to menu costs times “private costs”

- implications for optimal monetary policy?
- would imply large costs of following Taylor rule?

In summary:

- This is a truly great paper!
 - major accomplishments in terms of modelling, estimation, and computation
- Important question, very insightful answer
- Will without much doubt stimulate lots of further research
- I enjoyed reading it, learned a lot, and am sure that many others will too