

Monetary Policy and Business Cycles with Endogenous Entry and Product Variety

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This paper

- Endogenize producer entry in sticky price model
 - Study optimal monetary policy
 - Study business cycle fluctuations
- Finds:
 - Optimal to stabilize producer, not consumer price index
 - Modified NKPC: inflation decreases w/ # varieties
 - I-rate moves more than 1-for-1 w/ inflation for determinacy
 - Business cycle fluctuations

Optimal to stabilize producer prices

- Inflation costly because
 - more resources to changing prices
 - distorts entry decisions away from flexible-price first-best
- Questions unanswered:
 - How costly is it to distort entry decisions?
 - What if flex.-price economy inefficient? commitment vs. discretion?
 - How does endog. entry Δ output-inflation stabilization trade-off?
 - How do rules that are optimal in standard models do w/ entry?

Modified NKPC: inflation decreases w/ # varieties

- Inflation equation

$$\pi_t = \beta(1 - \delta)E_t\pi_{t+1} + \frac{\theta-1}{\kappa}(W_t - p_t)$$

- Here p_t = producer price, not consumer price index

- Consumer price index: $P_t = p_t - \frac{1}{\theta-1}N_t$

- Modified inflation equation:

$$\pi_t = \beta(1 - \delta)E_t\pi_{t+1} + \frac{\theta-1}{\kappa}(W_t - P_t) - \frac{1}{\kappa}N_t$$

- Question: how important is additional term quantitatively

Taylor principle restored: i-rate moves more than 1-for-1 w/ inflation for determinacy

- Standard model w/o capital

$$\pi_t = \beta\pi_{t+1} + \frac{\theta-1}{\kappa}(W_t - P_t)$$

$$c_{t+1} - c_t = R_t - \pi_{t+1}$$

$$W_t - P_t = \psi_c c_t + \psi_l l_t$$

- Determinacy with forward-looking i-rate rules $R_t = \gamma\pi_{t+1}$
 - Requires $\gamma > 1$
 - Higher exp. inflation increases real interest rate, lowers cons, marg. cost

$$\pi_{t+1} \uparrow \rightarrow c_t \downarrow, W_t - P_t \downarrow \rightarrow \pi_t < \pi_{t+1} < \pi_{t+2} \dots$$

Taylor principle restored: i-rate moves more than 1-for-1 w/ inflation for determinacy

- Standard model w/ capital

$$\pi_t = \beta\pi_{t+1} + \frac{\theta-1}{\kappa}(\alpha(W_t - P_t) + (1 - \alpha)r_t)$$

$$c_{t+1} - c_t = R_t - \pi_{t+1} = \psi_k r_{t+1}$$

$$W_t - P_t = \alpha c_t + \psi l_t$$

- $\gamma > 1$ no longer achieves determinacy
- Does not ensure marg. cost \downarrow with higher exp. inflation

Taylor principle restored: i-rate moves more than 1-for-1 w/ inflation for determinacy

- This paper: capital = new production lines
- But doesn't affect marginal cost directly:

$$\pi_t = \beta(1 - \delta)E_t\pi_{t+1} + \frac{\theta-1}{\kappa}(W_t - P_t) - \frac{1}{\kappa}N_t$$

- Determinacy conditions similar to model w/o capital
- Result can be applied to models w/ traditional capital:
 - sunk capital investments
- Caveat: Broda-Weinstein (2007):
 - Large sampling error in CPI (large variability in prices)
 - 65% of time in last 10 years cannot distinguish quarterly π \uparrow or \downarrow

Business cycle fluctuations

- BC fluctuations in economy subject to productivity shocks similar to flexible price economy
 - Simple interest rules that only respond to inflation
 - Keep economy close to $\pi = 0$ first-best
- But,
 - empirical i-rate rules respond to output
 - No monetary policy shocks
 - No inflation-output stabilization tradeoff

General comments

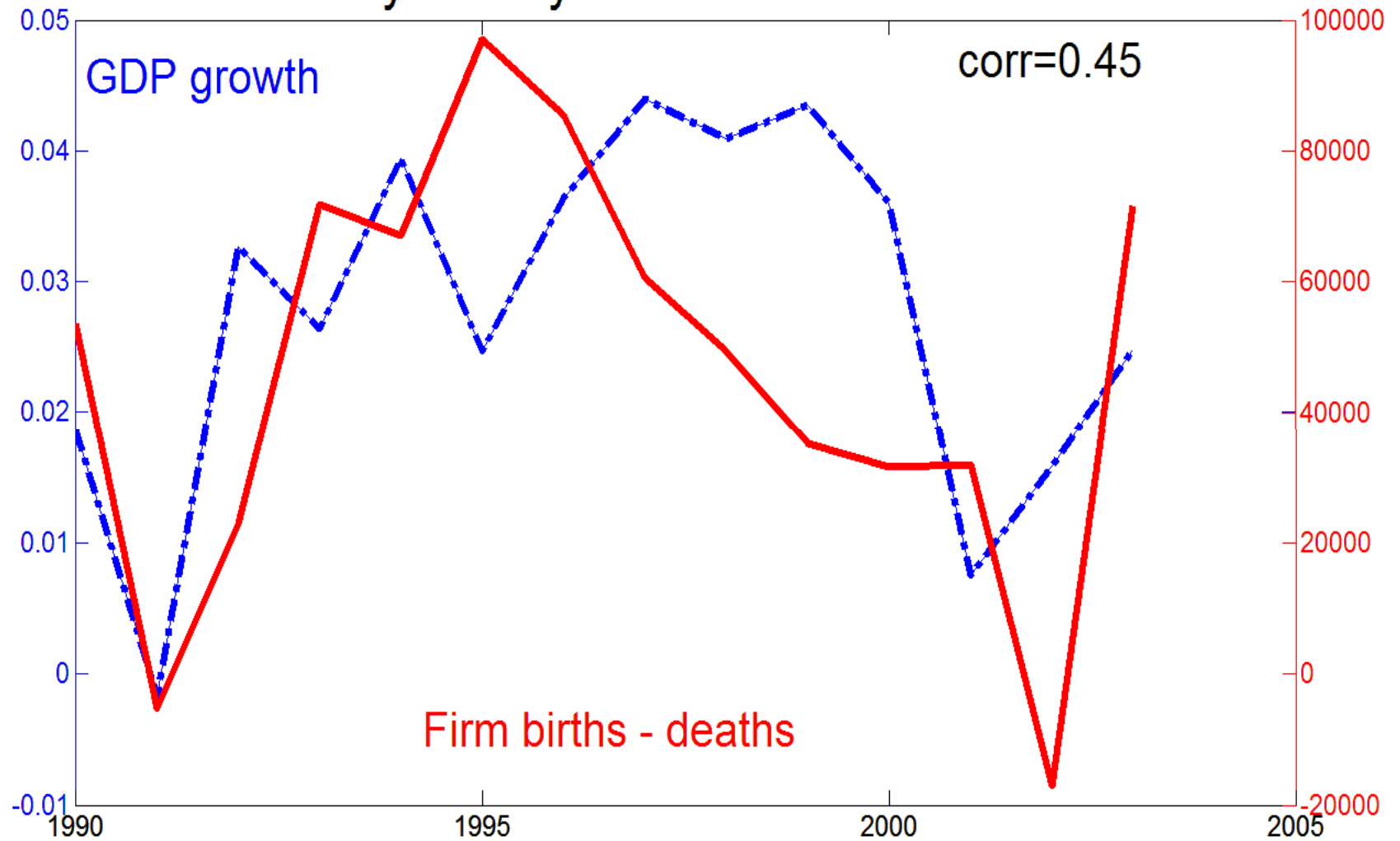
- Authors study monetary policy in environment where there is little monetary policy can do
 - Difficult to isolate role of endogenous producer entry

General comments

- Model abstracts from firm-level heterogeneity
 - Small/unproductive firms/varieties would enter/exit
 - Difficult to compare model (no heterogeneity) w/ data (heterogeneity)

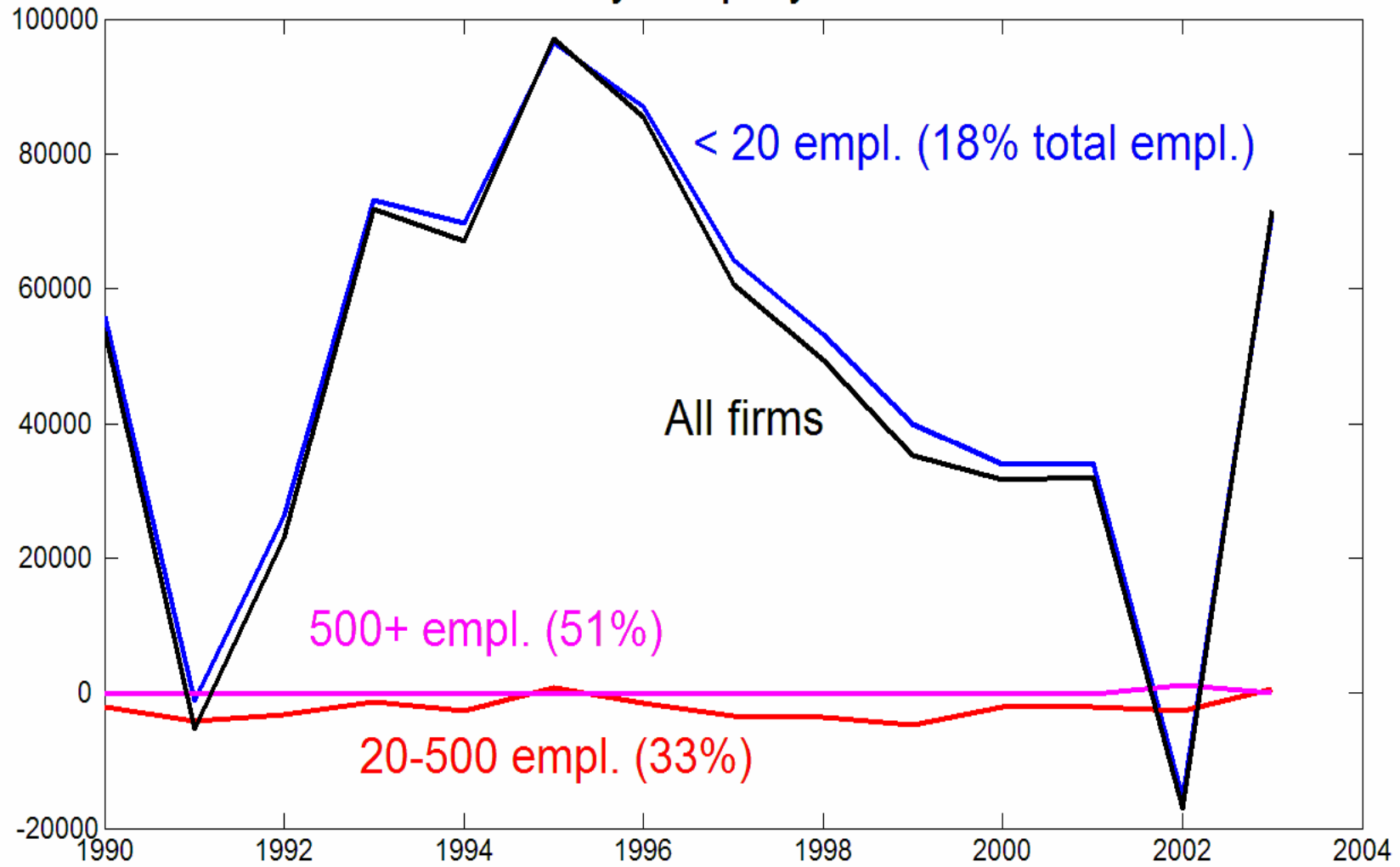
Net Business Formation in US data

Cyclicality of net firm creation



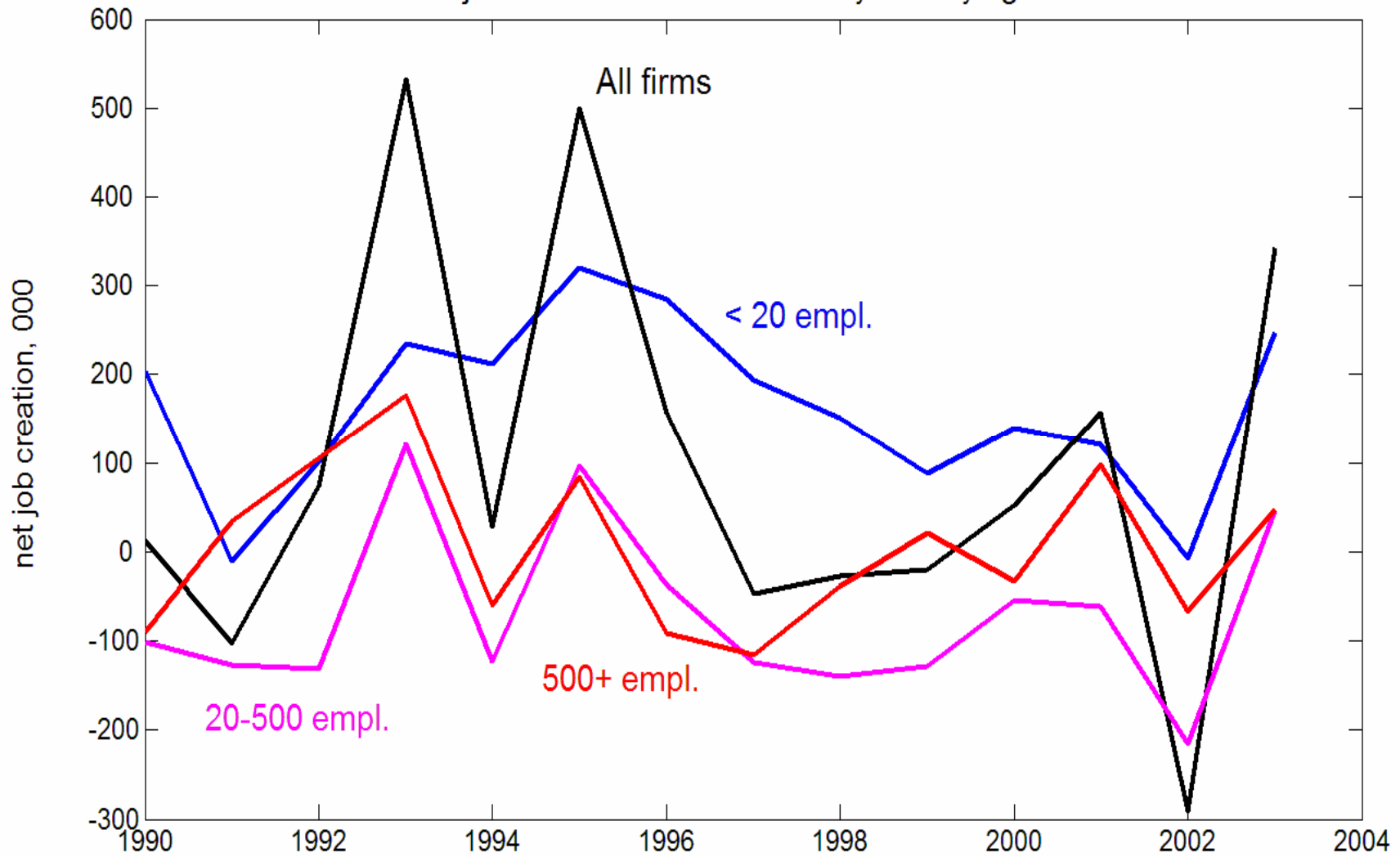
Net Business Formation in US data

Net firm births by employment size of firms



Net Business Formation in US data

Net job creation accounted for by new/dying firms

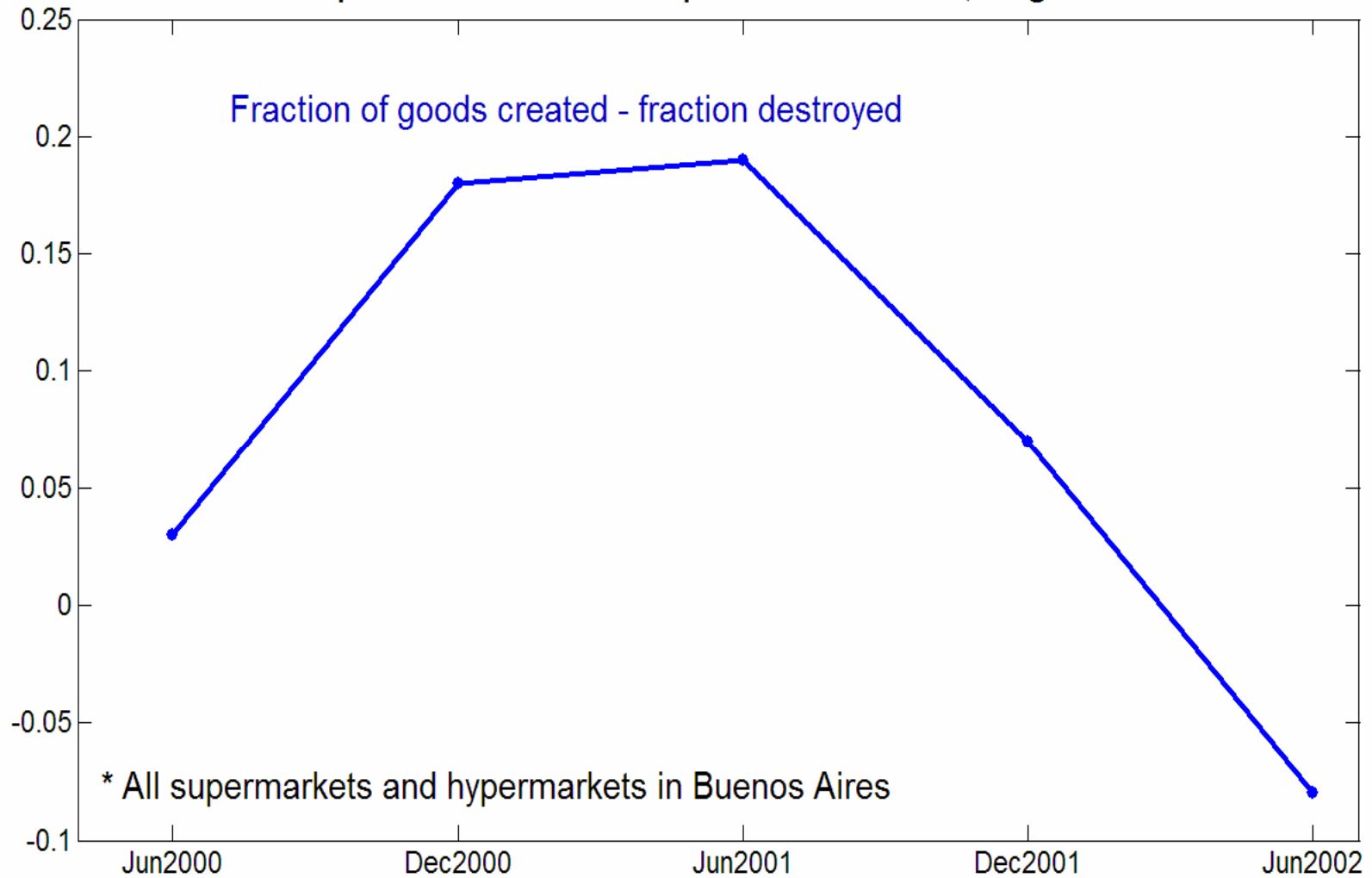


Evidence from scanner-price data: Broda-Weinstein ('07)

- Unweighted:
 - 19% of UPCs are new in a typical quarter
 - 18% of UPCs disappear
- Weighted:
 - - 3% of total value due to new UPCs
 - 2% of total value due to dying UPCs

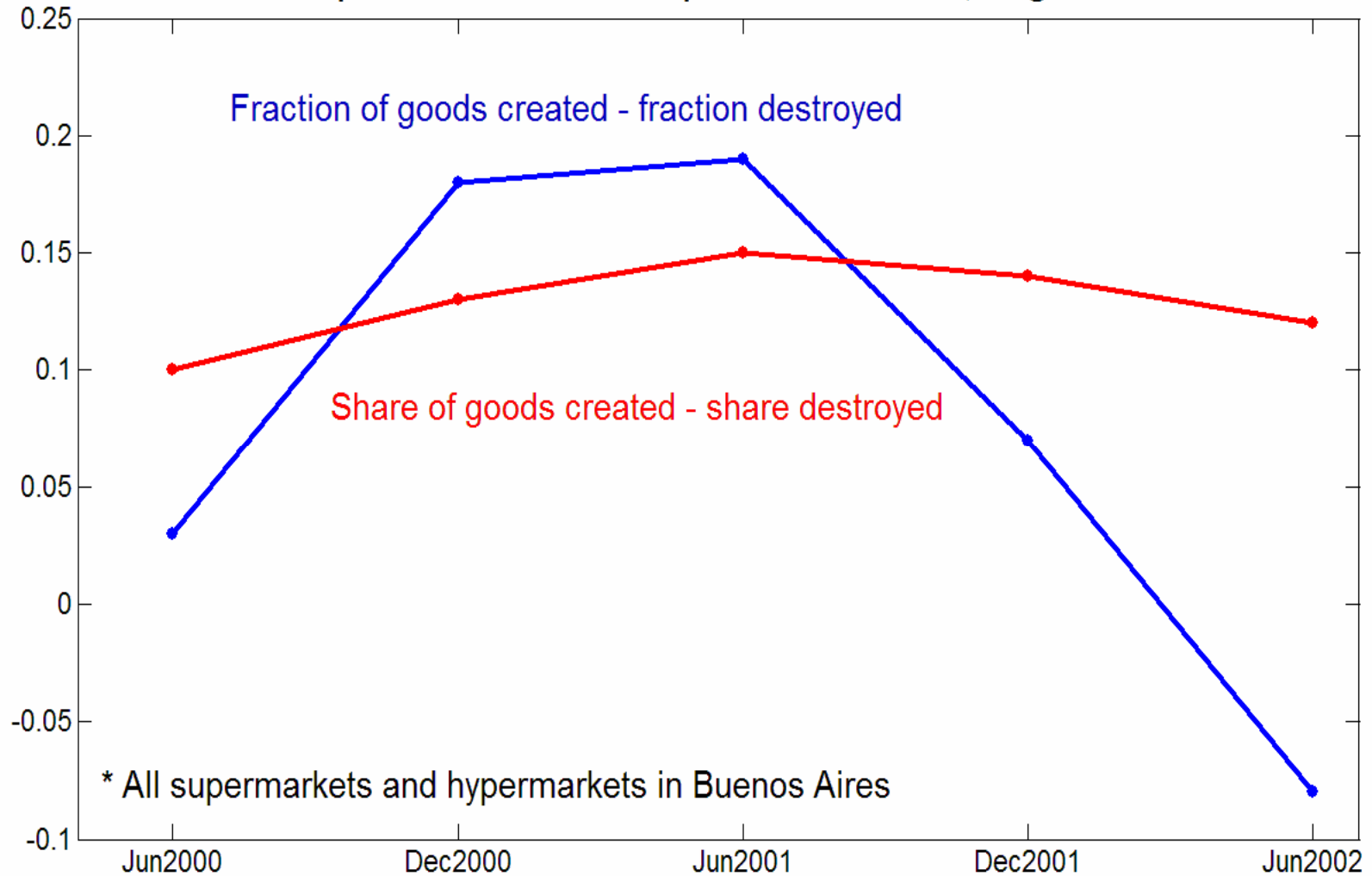
Scanner prices in Argentina during crisis, courtesy of Ariel Burstein & BER (2005)

Net product creation in past 12 months, Argentina*



Scanner prices in Argentina during crisis, courtesy of Ariel Burstein & BER (2005)

Net product creation in past 12 months, Argentina*



General comments

- Firm vs. product
 - Model: no distinction
 - Data: most new varieties introduced by existing firms

New firms vs. new products

- Broda-Weinstein (07):
 - 92% of new products accounted for by existing firms:
 - 97% of product destruction within firms
 - elasticity of subst. within brands: 11.5

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 - UPC 2500002813: MIN. MAID LEMONADE, 6 packs, 8oz
 - UPC 2500002652: MIN. MAID LEMONADE, 128oz
 - UPC 2500002650: MIN. MAID LEMONADE, 16oz
 - UPC 2500002648: MIN. MAID PINK LEMONADE, 64oz

General comments

- Firm vs. product
 - Model: no distinction
 - Data: most new varieties introduced by existing firms
 - Distinction matters for choice of substitution elasticity
 - Data: 11.5
 - Model 3.8

$$P_t = p_t - \frac{1}{\theta-1} N_t$$

General comments

- Individual households purchase small # varieties
 - An average store in US sells 30,000 different UPCs
 - Do the frictions that prevent consumers from purchasing all 30,000 UPCs affect elasticity of consumer price index w.r.t. # goods?

$$P_t = p_t - \frac{1}{\theta-1} N_t$$

- Is Dixit-Stiglitz CES setup a useful approximation?
 - Aggregation results?

Conclusions

- Rich model, many interesting implications
- Possible extensions:
 - Firm heterogeneity
 - Firm vs. products
 - Richer framework to study optimal monetary policy
 - Evidence/micro-foundations of love-for-variety