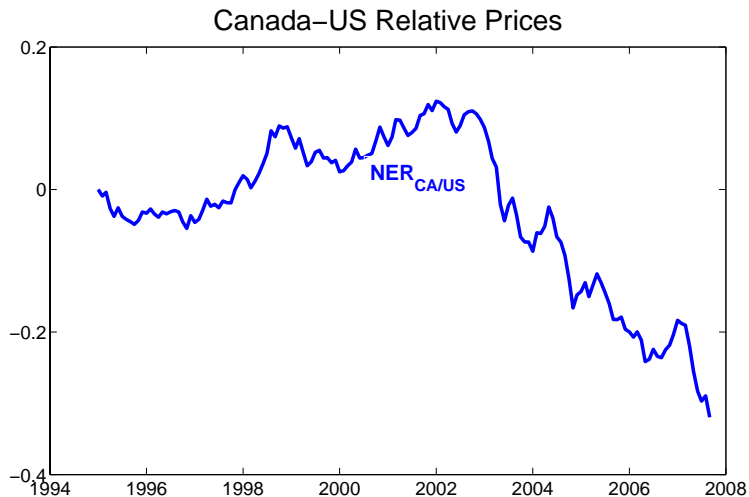


Understanding International Price Differences Using Barcode Data

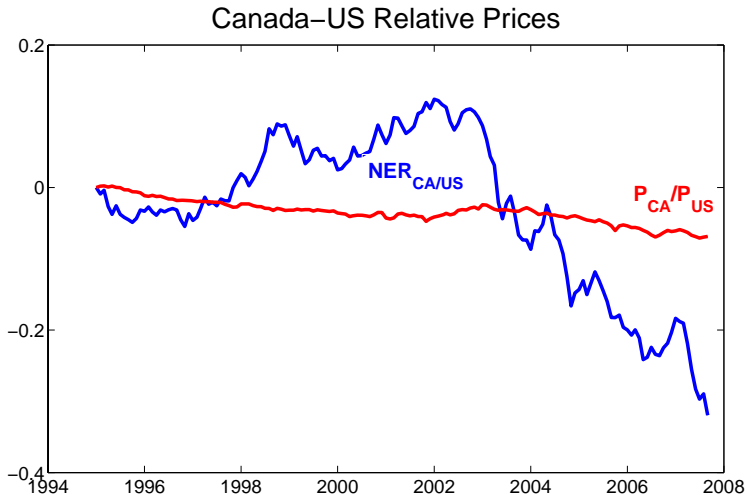
Discussant: Virgiliu Midrigan, NYU

April 23, 2008

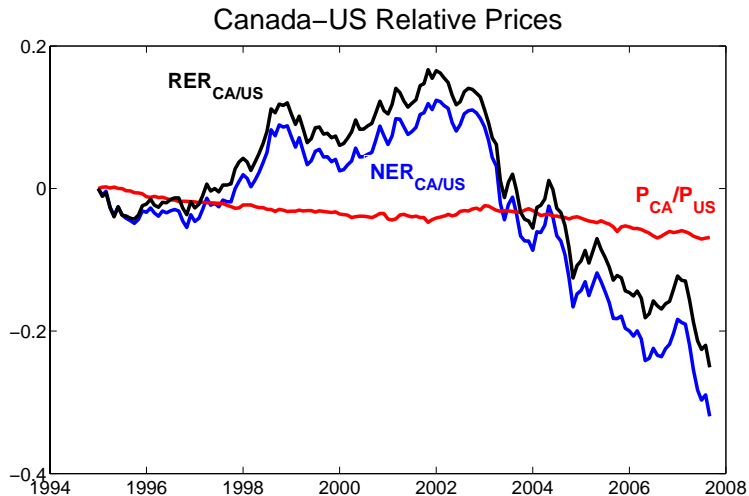
Old puzzle: why don't P-levels move with E?



Old puzzle: why don't P-levels move with E?



Old puzzle: why don't P-levels move with E?



This paper: use micro-data to compute P-differences

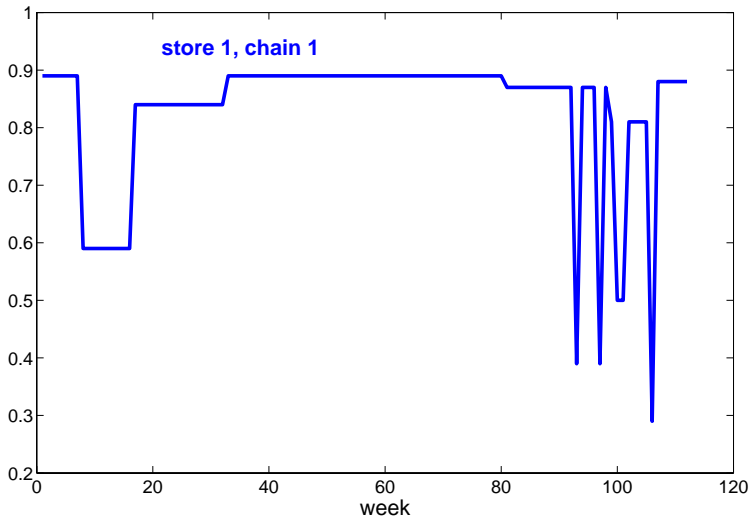
- Conclude: puzzle not as big as previously thought
 - Micro-data: lots of idiosyncratic price variation
- Related work:
 - Crucini-Telmer '07: EIU data: 80% of good-level relative price fluctuations due to good-specific shocks
 - Klenow-Kryvtsov, Golosov-Lucas

This paper: use micro-data to compute P-differences

- Conclude: puzzle not as big as previously thought
 - Micro-data: lots of idiosyncratic price variation
- Related work:
 - Crucini-Telmer '07: EIU data: 80% of good-level relative price fluctuations due to good-specific shocks
 - Klenow-Kryvtsov, Golosov-Lucas

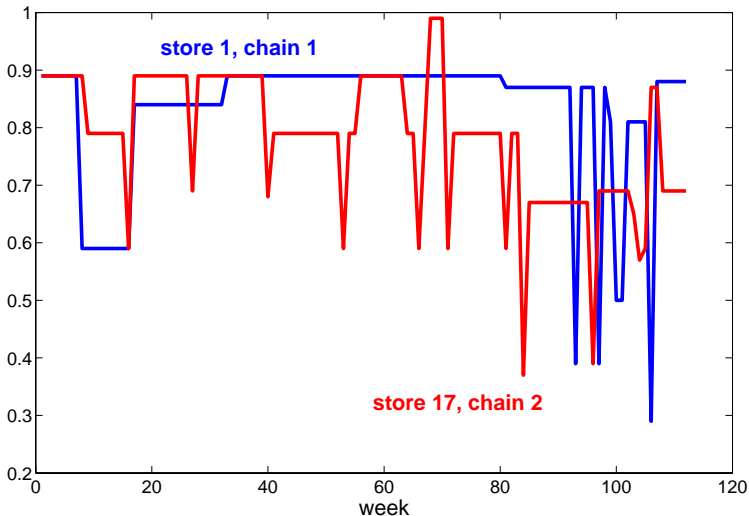
Examples from AC Nielsen Erim database @ Chicago GSB

**Chicken of the Sea Chunk Light Tuna in Oil, 6.5 oz, 1985–1987
Springfield, MO**



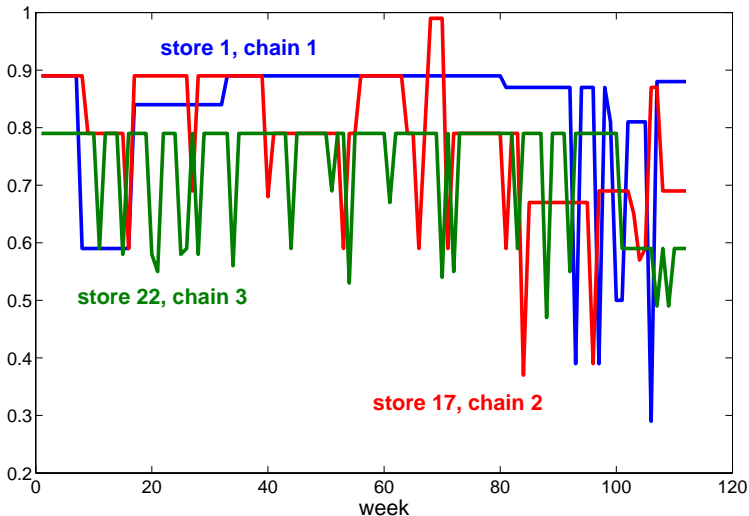
Examples from AC Nielsen Erim database @ Chicago GSB

**Chicken of the Sea Chunk Light Tuna in Oil, 6.5 oz, 1985–1987
Springfield, MO**



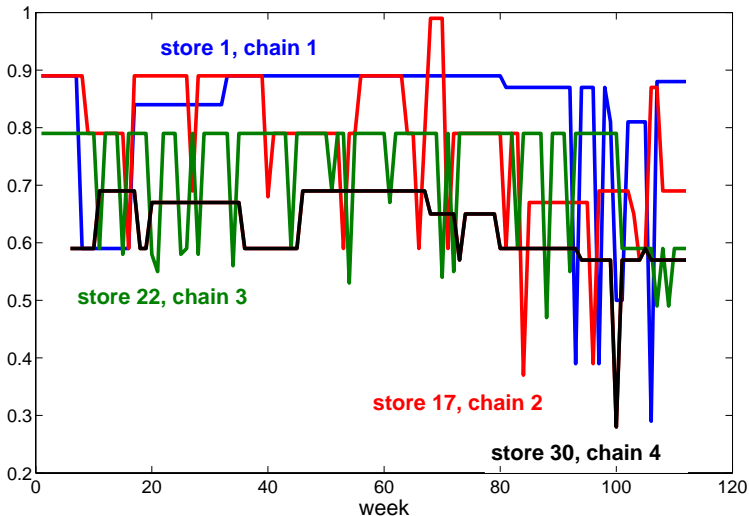
Examples from AC Nielsen Erim database @ Chicago GSB

**Chicken of the Sea Chunk Light Tuna in Oil, 6.5 oz, 1985–1987
Springfield, MO**



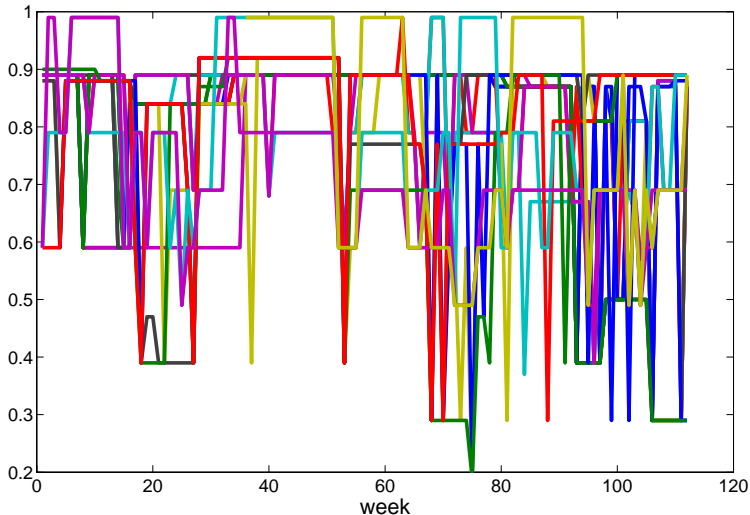
Examples from AC Nielsen Erim database @ Chicago GSB

**Chicken of the Sea Chunk Light Tuna in Oil, 6.5 oz, 1985–1987
Springfield, MO**



Examples from AC Nielsen Erim database @ Chicago GSB

Chicken of the Sea Chunk Light Tuna in Oil, 6.5 oz, 1985–1987
Springfield, MO: all stores/chains



This paper: use micro-data to compute P-differences

- Micro-data: lots of idiosyncratic price variation
- Relative price fluctuations large
 - Much larger than exchange rate movements
- Relative price fluctuations highly transitory

Data quibbles

- Sample selection
 - Mostly groceries, drugs, mass merchandise sectors
 - Tradable goods
 - Larger, more frequent, more transitory price changes
- Why is upc relevant level of disaggregation?
 - 2500002650: Minute Maid Lemonade, 16 oz
 - 2500002648: Minute Maid Lemonade, 64 oz
 - 2500005764: Minute Maid Lemonade, 2 LTR Bottle
 - 2500005813: Minute Maid Lemonade, 1.5 LTR Bottle
- Differences in measurement system? Manufacturers?
- Group goods by degree of substitutability? By store?

Relevant metric for size of border price differentials?

$$\text{std}(\Delta q_{u,cc',t}) = \alpha_c + \beta \ln(\text{dist}_{cc'}) + \gamma \text{Border}_{cc'} + \epsilon_{u,cc'}$$

- Large dispersion within city by store type, neighborhood, time
- β independent of unit of measurement (km vs. miles vs. in)
- Border width may \uparrow because β drops: e.g. 2.7 mi to 1097 mi because $\beta = 0.012$ to $.0002$ and $\gamma = .012$ to $.014$
- Gorodnichenko & Tesar: border effect not identified separately from cross-country heterogeneity in relative price variability

Relevant metric for size of border price differentials?

$$\text{std}(\Delta q_{u,cc',t}) = \alpha_c + \beta \ln(\text{dist}_{cc'}) + \gamma \text{Border}_{cc'} + \epsilon_{u,cc'}$$

- Large dispersion within city by store type, neighborhood, time
- β independent of unit of measurement (km vs. miles vs. in)
- Border width may \uparrow because β drops: e.g. 2.7 mi to 1097 mi because $\beta = 0.012$ to $.0002$ and $\gamma = .012$ to $.014$
- Gorodnichenko & Tesar: border effect not identified separately from cross-country heterogeneity in relative price variability

Rate of convergence with $T=16$?

- Suppose $q_{it} = x_{it} + c_t$
- $x_{it} = \rho x_{i,t-1} + \epsilon_{x,it}$
- $c_t = c_{t-1} + \epsilon_{c,t}$
- $\sigma_x^2 \gg \sigma_c^2$
- Regression of q_{it} on $q_{i,t-1}$: fast convergence if T and ρ small.
 x dominates in small samples
- Small sample vs. non-linear convergence?

Aggregation in Border Regressions

- Authors recover large border effects when aggregating into product groups
- Another interpretation: averaging washes out idiosyncratic volatility
- Larger # goods: less important x_{it} and more important c_t is
- Need to keep number goods same, otherwise spurious correlation between distance/border may emerge, solely because # goods used to construct indices varies with border, distance

Lessons from this paper:

- Large relative price fluctuations within and across countries
- International relative prices co-move with NER
 - absolute PPP deviations vary from 15 % to 2 % due to NER
- But NER-induced fluctuations small relative to (larger and more transitory) idiosyncratic fluctuations

Intepreting the results

- Authors conclude:
 - 'LOP and PPP hold in their absolute forms as well across borders as they do within countries'
 - 'our work supportive of simple pricing models in which the degree of market segmentation across the border is similar to that within borders'
- Question: do models that generate intranational price dispersion also generate international relative price fluctuations?

What accounts for these facts?

1. What sustains price differentials?
2. What generates price dispersion?
3. Why are NER & RER fluctuations correlated?

What sustains price differentials?

- Search frictions
- Transportation, switching costs
- Rationing

What generates price dispersion?

- Dispersion in costs, consumer preferences
- Search frictions + heterogeneity in consumer info
- Heterogeneity in consumer switching costs
- Demand uncertainty
- Inventory frictions
- Intertemporal price discrimination

Why are NER & RER fluctuations correlated?

- One view: nominal shocks & nominal frictions
 - Menu costs
 - Informational frictions
 - Asset market frictions
 - Need large nominal frictions
- May need smaller frictions if match intranational p. dispersion
 - E.g. search costs \rightarrow kinked demand curves
 - But not aware of any quantitative results
 - In fact, Dotsey-King '05 & Klenow-Willis '06 suggest opposite

Why are NER & RER fluctuations correlated?

- One view: nominal shocks & nominal frictions
 - Menu costs
 - Informational frictions
 - Asset market frictions
 - Need large nominal frictions

- May need smaller frictions if match intranational p. dispersion
 - E.g. search costs \rightarrow kinked demand curves
 - But not aware of any quantitative results
 - In fact, Dotsey-King '05 & Klenow-Willis '06 suggest opposite

Why are NER & RER fluctuations correlated?

- One view: nominal shocks & nominal frictions
 - Menu costs
 - Informational frictions
 - Asset market frictions
 - Need large nominal frictions

- May need smaller frictions if match intranational p. dispersion
 - E.g. search costs → kinked demand curves
 - But not aware of any quantitative results
 - In fact, Dotsey-King '05 & Klenow-Willis '06 suggest opposite

Why are NER & RER fluctuations correlated?

- One view: nominal shocks & nominal frictions
 - Menu costs
 - Informational frictions
 - Asset market frictions
 - Need large nominal frictions

- May need smaller frictions if match intranational p. dispersion
 - E.g. search costs \rightarrow kinked demand curves
 - But not aware of any quantitative results
 - In fact, Dotsey-King '05 & Klenow-Willis '06 suggest opposite

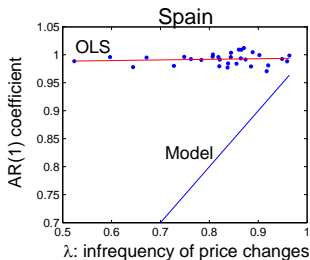
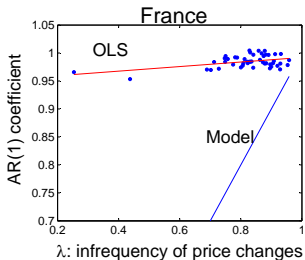
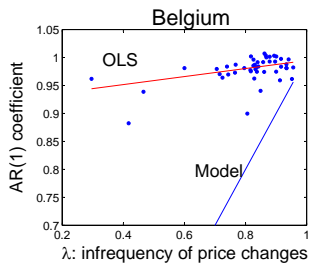
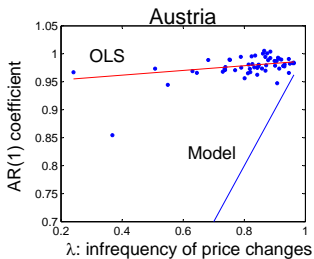
Why are NER & RER fluctuations correlated?

- One view: nominal shocks & nominal frictions
 - Menu costs
 - Informational frictions
 - Asset market frictions
 - Need large nominal frictions

- May need smaller frictions if match intranational p. dispersion
 - E.g. search costs → kinked demand curves
 - But not aware of any quantitative results
 - In fact, Dotsey-King '05 & Klenow-Willis '06 suggest opposite

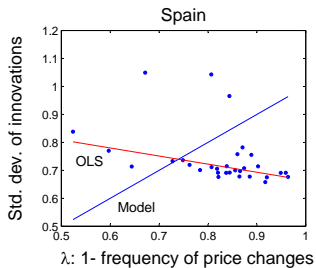
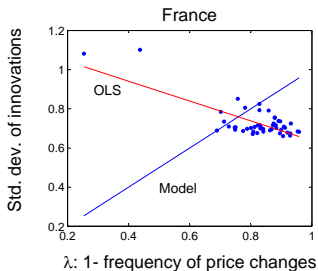
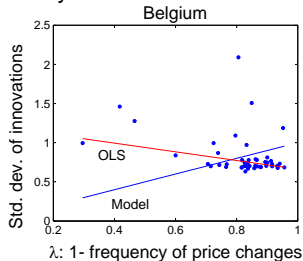
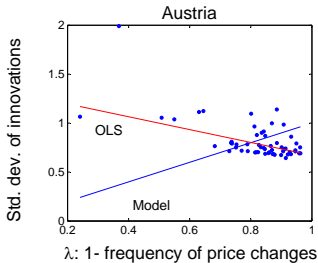
Kehoe-Midrigan:

Stickiness vs. Persistence: 1996-2006



Kehoe-Midrigan:

Stickiness vs. Volatility: 1996-2006



Why are NER & RER fluctuations correlated?

- Alternative view: real shocks & p-level targeting
- Difficult to explain volatility of RER
 - Frictions that generate intranational dispersion magnify effect of real shocks on international relative prices
 - Alessandria '04, '05

Why are NER & RER fluctuations correlated?

- Alternative view: real shocks & p-level targeting
- Difficult to explain volatility of RER
 - Frictions that generate intranational dispersion magnify effect of real shocks on international relative prices
 - Alessandria '04, '05

Conclusions

- Impressive dataset and empirical study
- NER-associated int'l relative price fluctuations puzzling
 - More persistent
 - Common across all goods