Discussion of "Supermarket Price Setting on the Two Sides ..."
by Karadi, Amann, Bachiller, Seiler, Wursten

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The views expressed here are ours, and they do not necessarily reflect the views of the Bank of Canada

Inflation in standard sticky price models: empirical challenges

$$\pi = \int -x\Lambda(x)f(x)dx$$

$x = p - p^*$ distance from desired price p^* ("price gap")

$\Lambda(x)$ probability of adjusting price

$f(x)$ distribution of price gaps

- Key assumptions: representative firm, single product, no discounts, inf many competitors

1. Price gaps x are unobserved
   - Fit indirectly by matching predicted unconditional moments
   - Fit indirectly by matching conditional moments, e.g., sufficient statistics

2. "Other stuff": discounts, multi-product/-sector, few competitors, strategic behaviour, ...
   - Expand data, extend models

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# New empirical proxy for price gap (Karadi-Schoenle-Wursten, 2022)

$$x_{p,s,t} = p_{p,s,t} - \frac{1}{N_{S_t \setminus s}} \sum_{S_t \setminus s} p_{p,s,t} - \alpha_{cs}$$

$p_{p,s,t}$ log price for product p store s month t

$S_t \setminus s$ other stores that sell product p and changed its price in t

α_{cs} average raw gap in store s category c

- IRi scanner data for US (2001–2012) and EU4 (DE, FR, NE, IT, 2013–2017)
  - Very detailed: product is a barcode, ≈ 2.2 million products
  - Great store coverage: 75% of stores in EU4, 50 major metro areas in US
  - Allows tracking price of identical product across stores
  - Allows filtering/controlling "Other stuff"
  - Quantity weights, careful cleaning

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Price-gap hazard
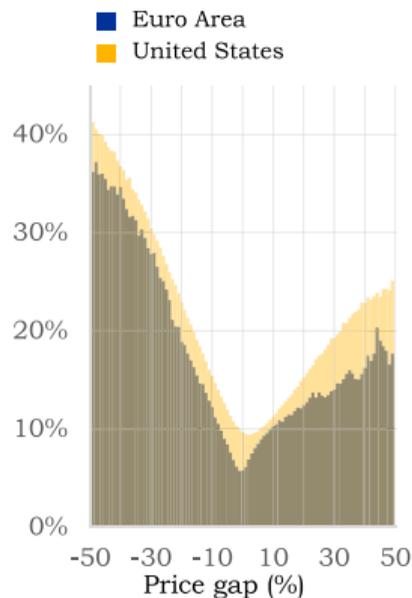
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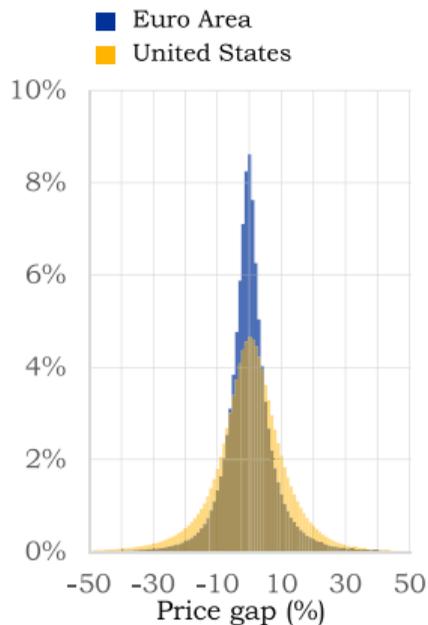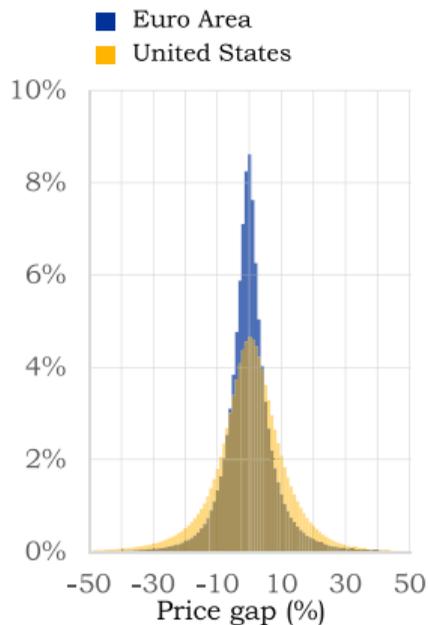
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- Price increases are more likely than decreases (more asymmetry in EU4)

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Significant differences across 5 countries
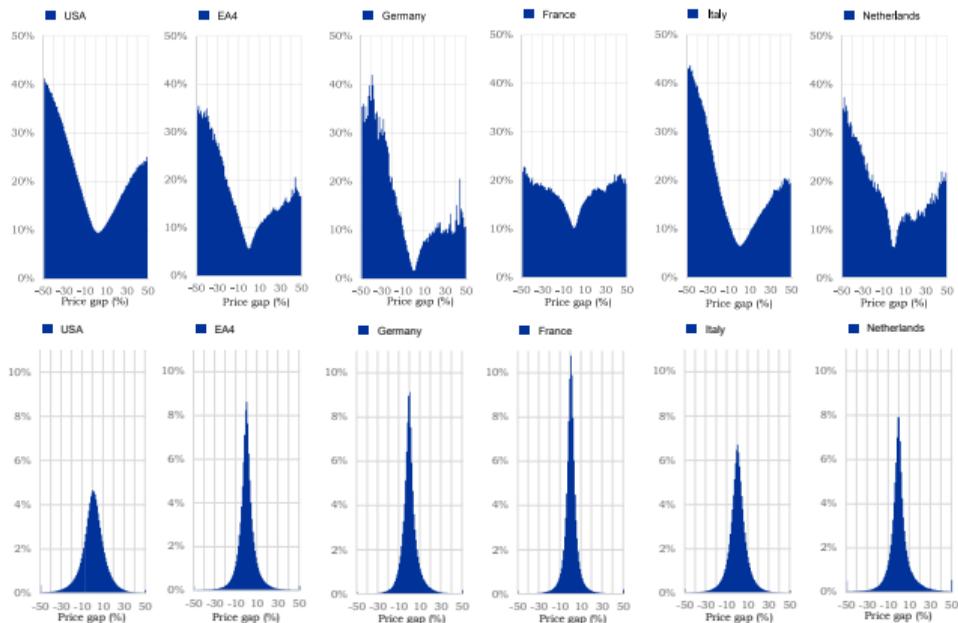
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- Germany is the stickiest and most asymmetric

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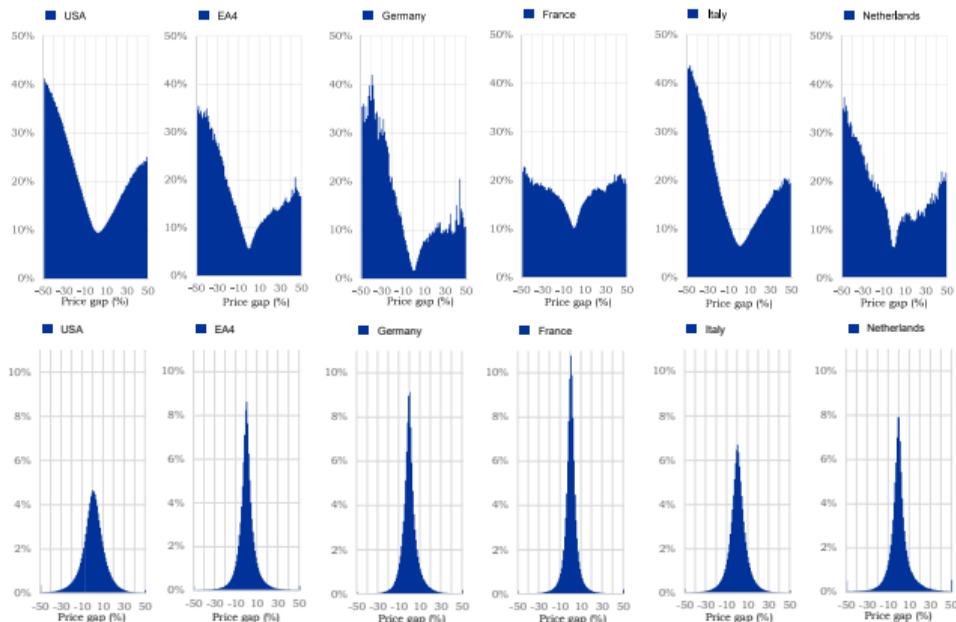
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Comment 1. Account for empirical $\Lambda(x)$ and $f(x)$ using standard model

- Stylized example:
    - i.i.d. zero-mean cost shocks c with c.d.f. $F(c)$
    - adjustment bounds: s, S
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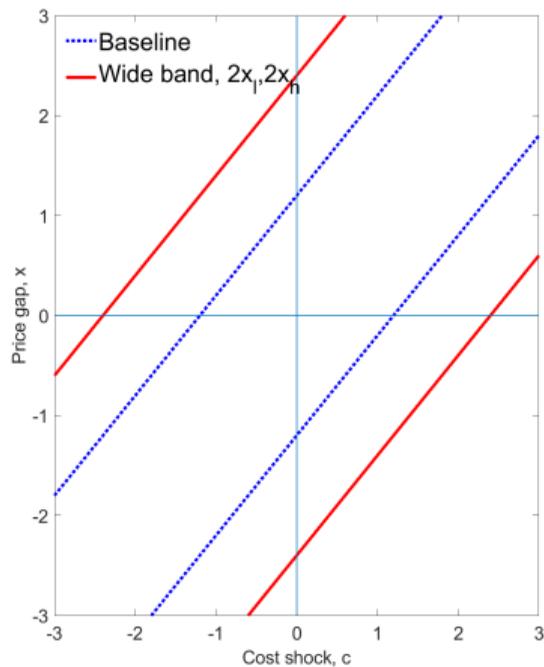
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$$\Lambda(x) = \int I(x, c) dF(c) = 1 - F(x - s) + F(x - S)$$

- Baseline: F normal with st.dev. $\sigma = 1$, bounds $s = -1.2$, $S = 1.2$

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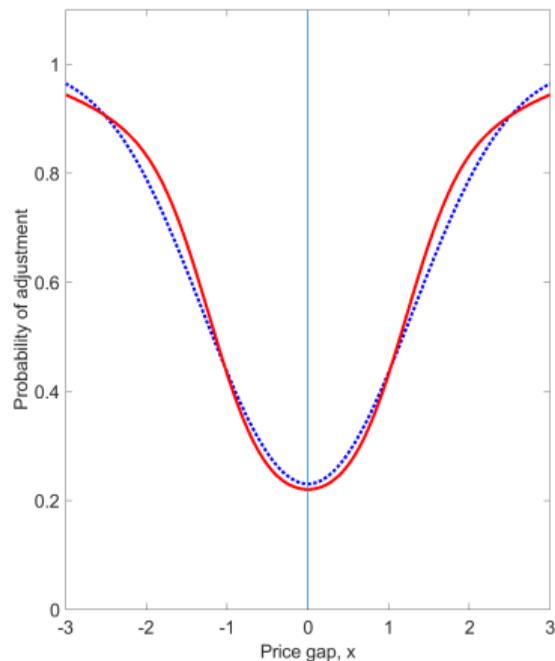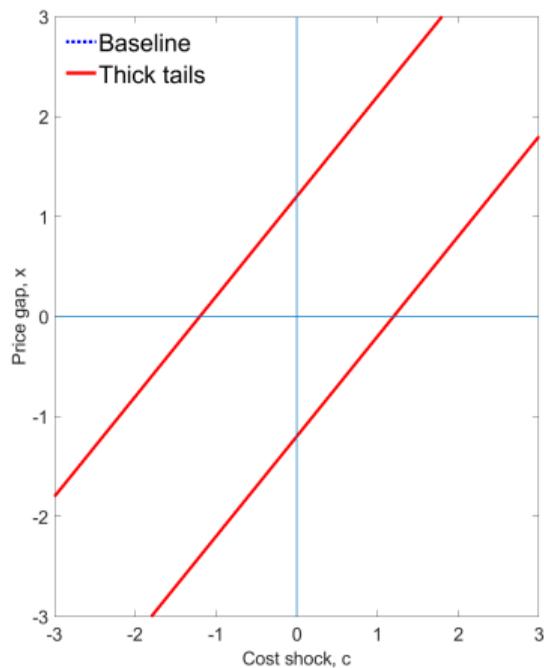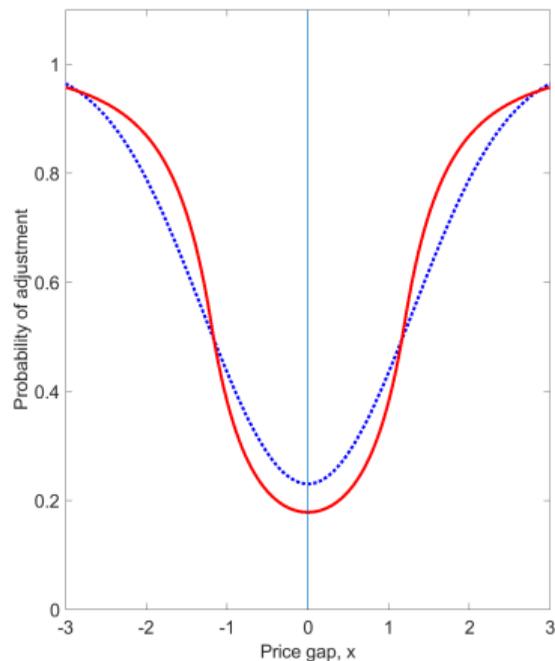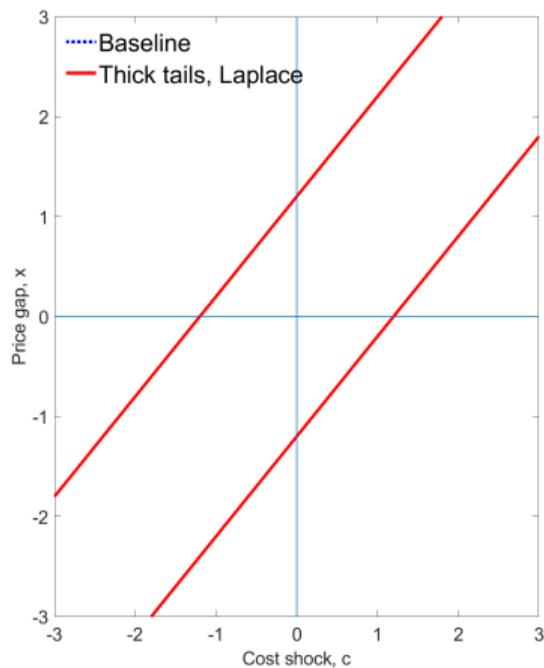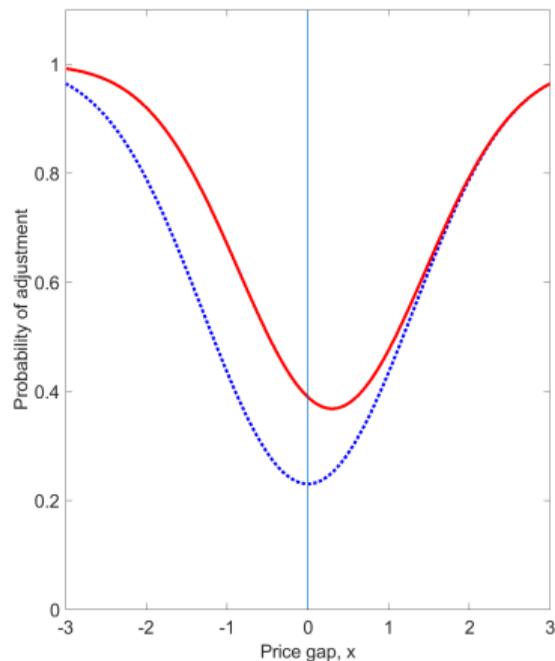
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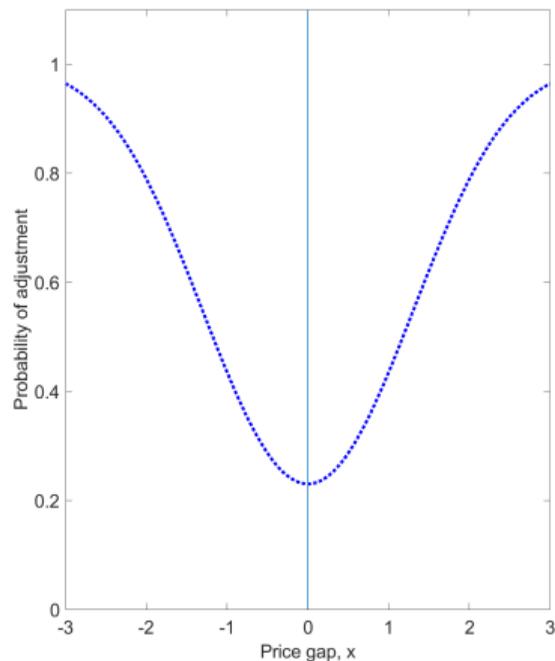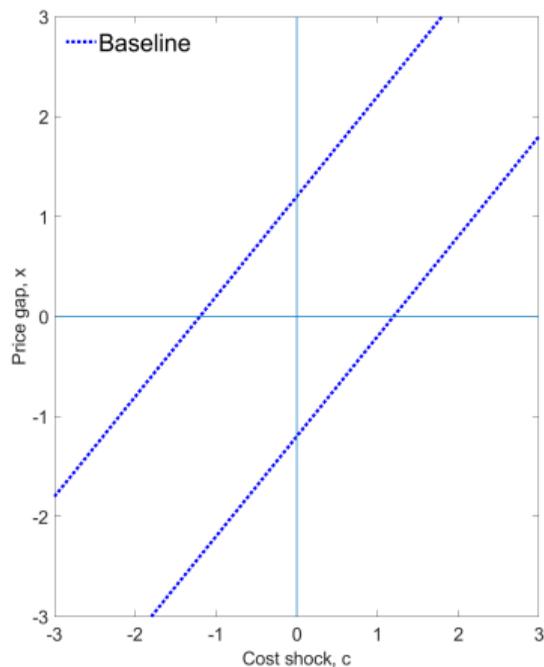
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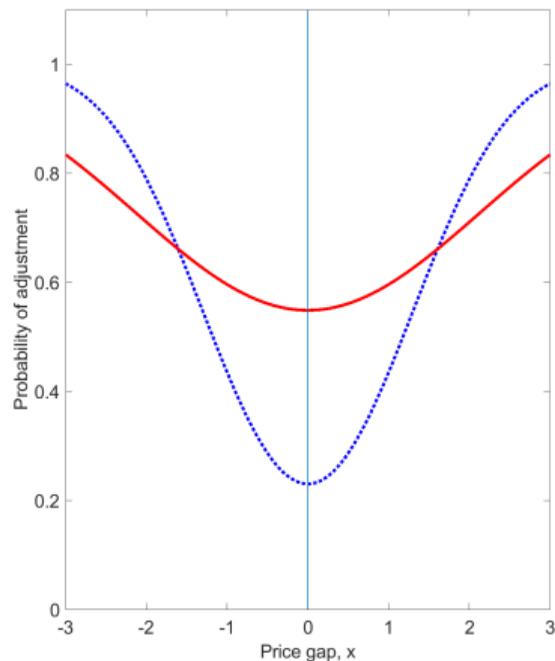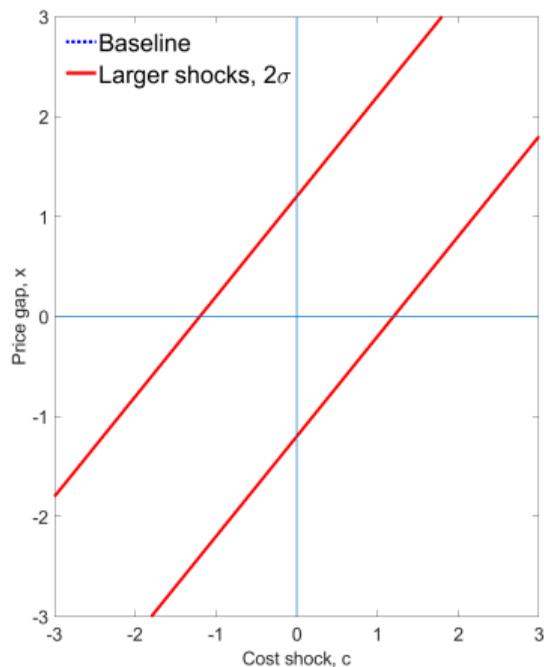
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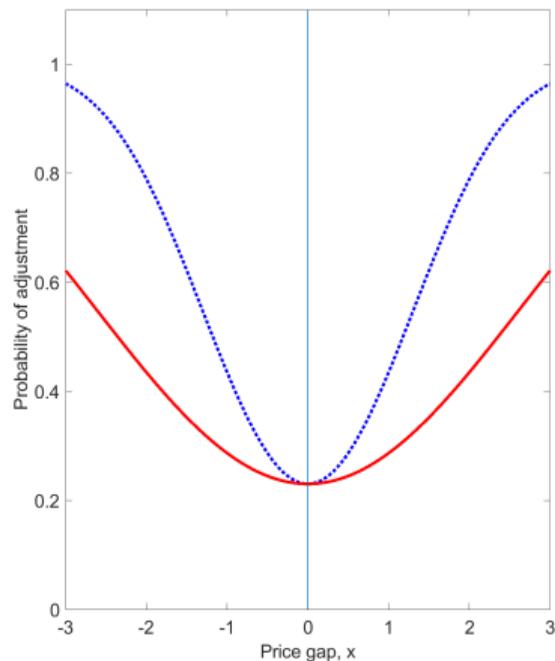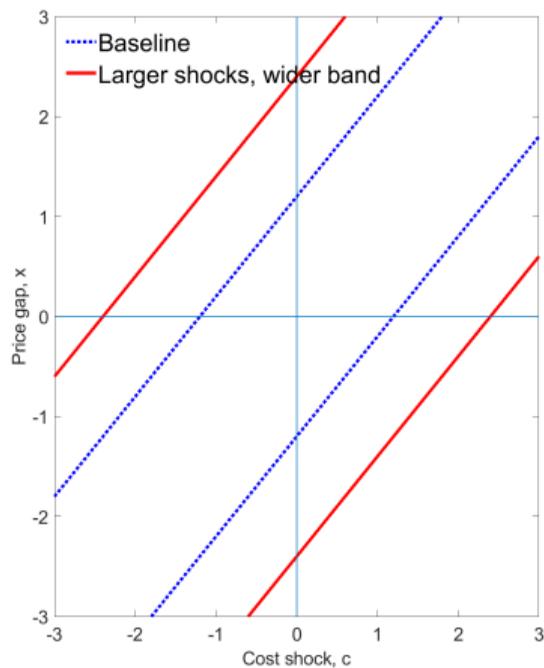
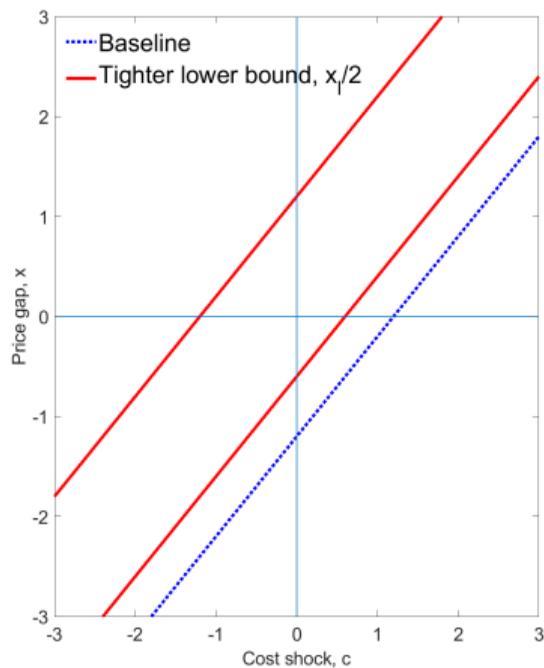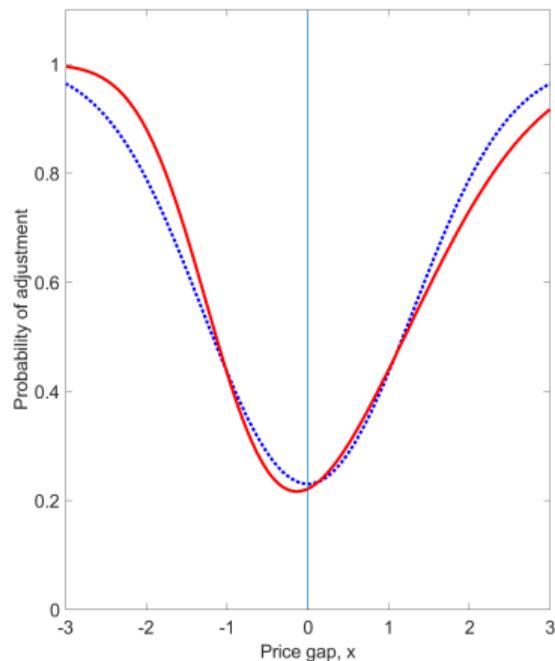# Inaction bands and adjustment probabilities in stylized model

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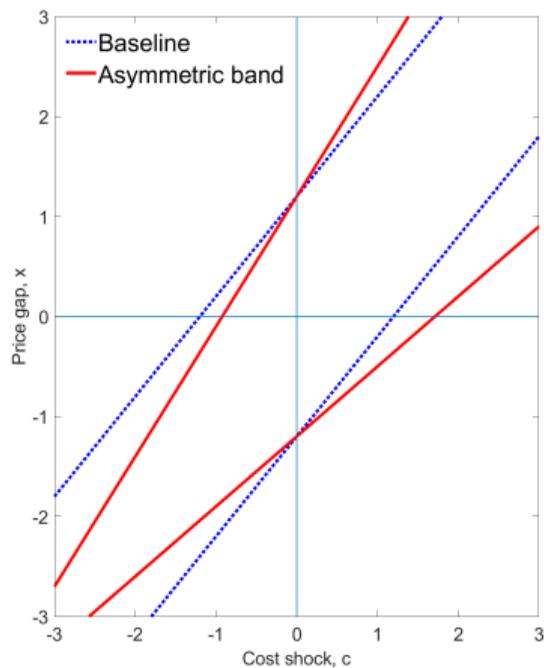
Comment 1. Account for empirical $\Lambda(x)$ and $f(x)$ using standard model

- Establish mapping between $\Lambda(x)$ and $f(x)$ and fundamentals

- Which fundamentals account for differences: US vs EU4, within EU4?

- Are prices in Europe more constrained?
  - Wider sS band or smaller c shocks?

Comment 2. Revisit implications for monetary non-neutrality

$$\frac{\partial \pi}{\partial m} = \underbrace{\int \Lambda(x)f(x)dx}_{\text{intensive}} + \underbrace{\int x\Lambda'(x)f(x)dx}_{\text{extensive (dominant)}}$$

Extensive margin adjustments amplify price response
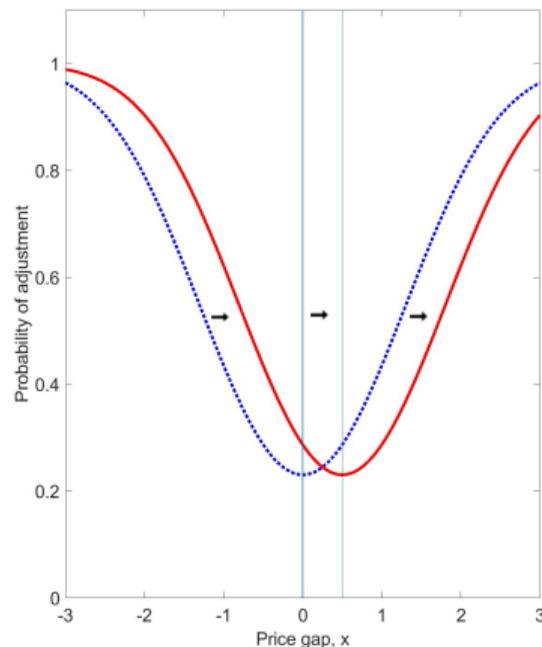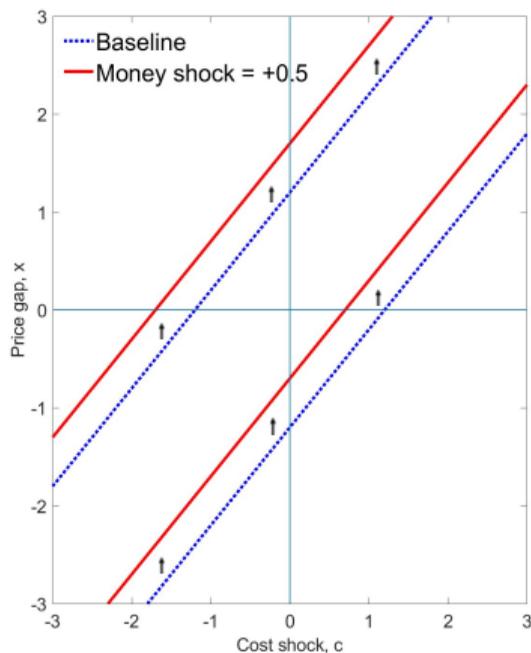
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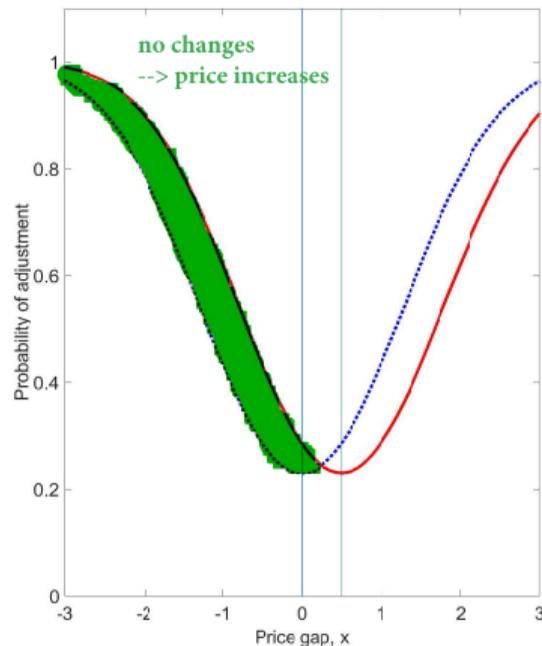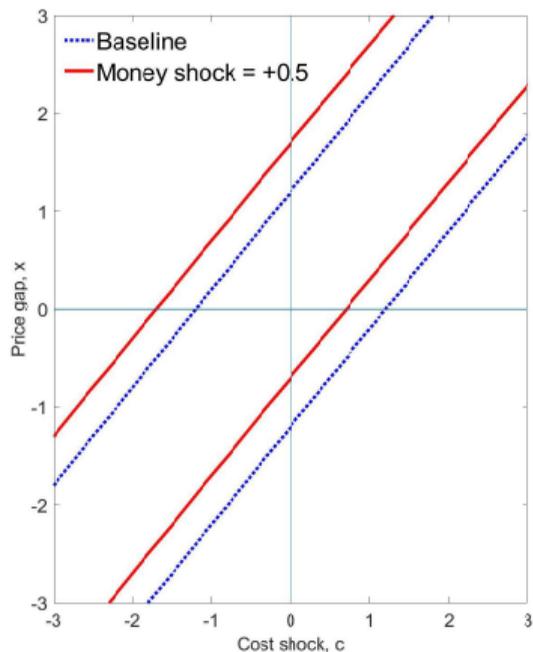# Extensive margin adjustments amplify price response

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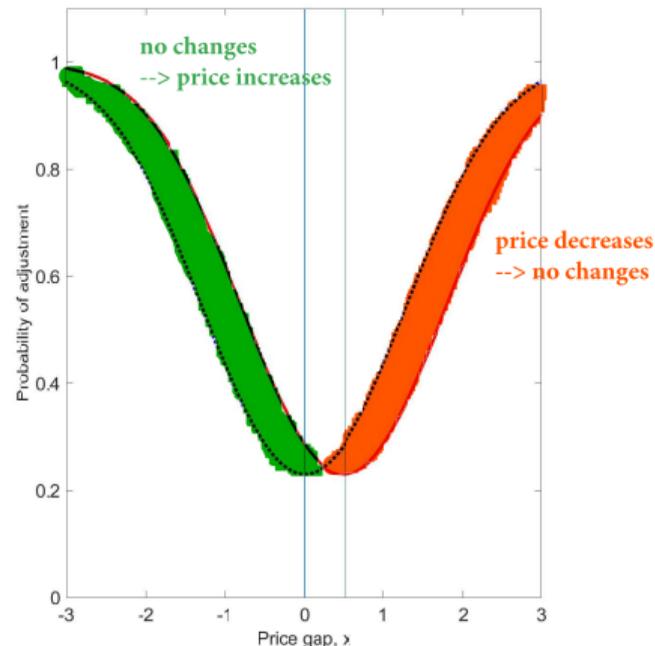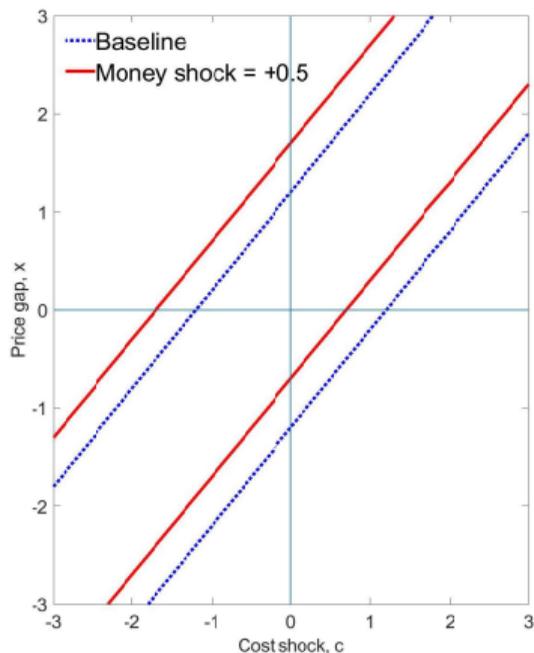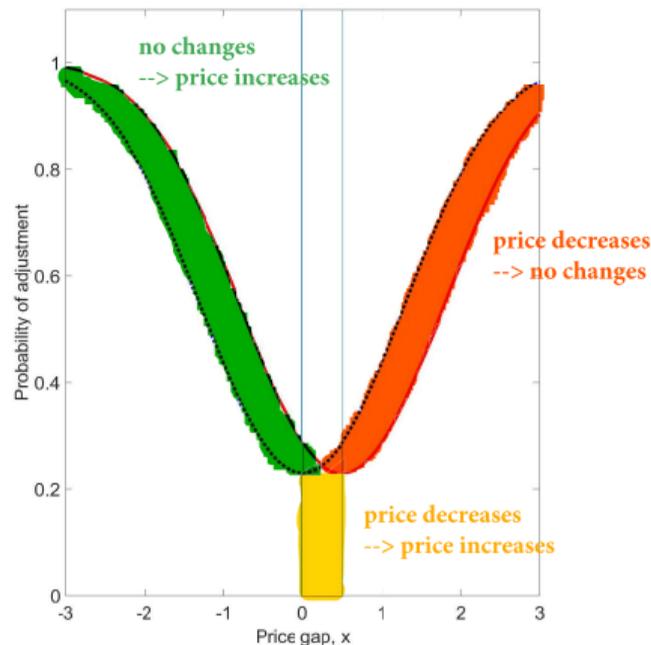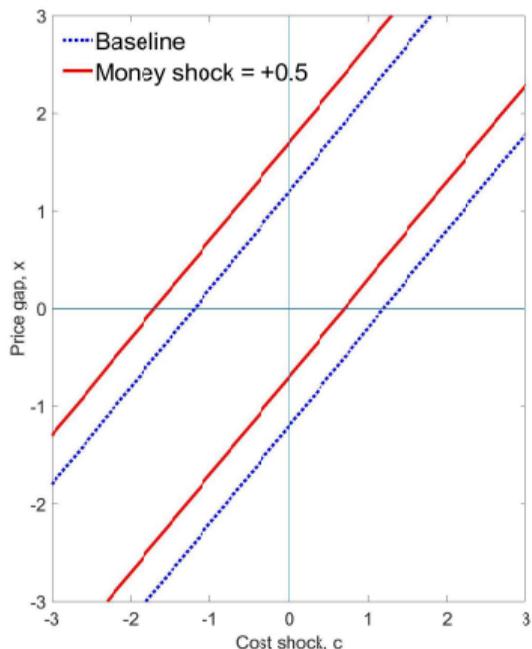
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  - Clarify what is added by matching hazard by age
  - Richer than Alvarez-Lippi-Le Bihan (ALL) sufficient statistic ($\sim$ Frequency/Kurtosis)

- Can outline empirical "reach" of ALL's sufficient statistic
  - Alvarez et al. (2021): ALL sufficient statistic is validated in French micro data
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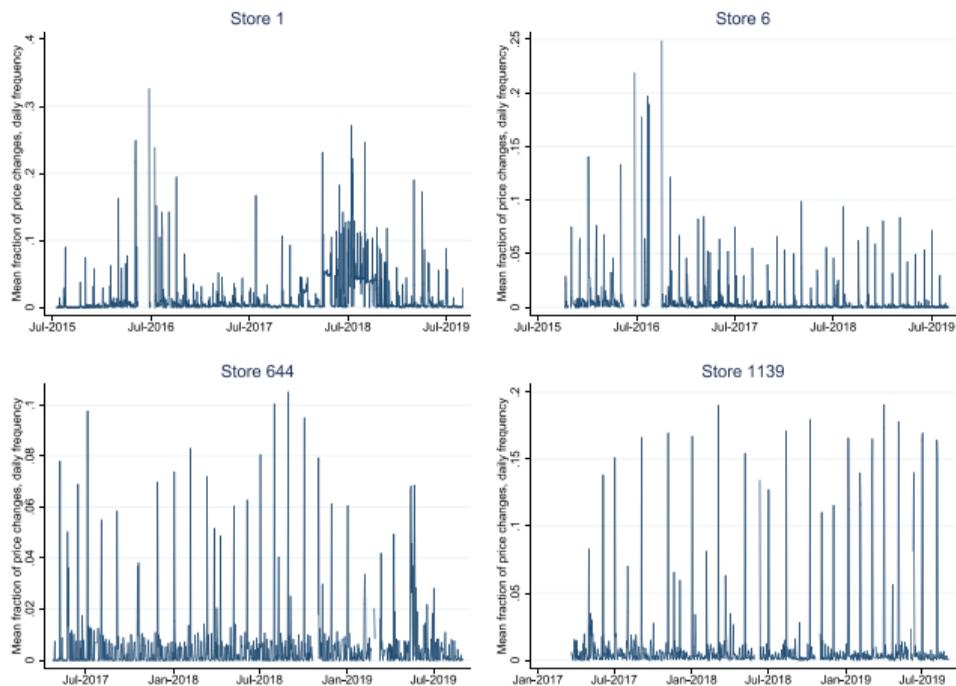
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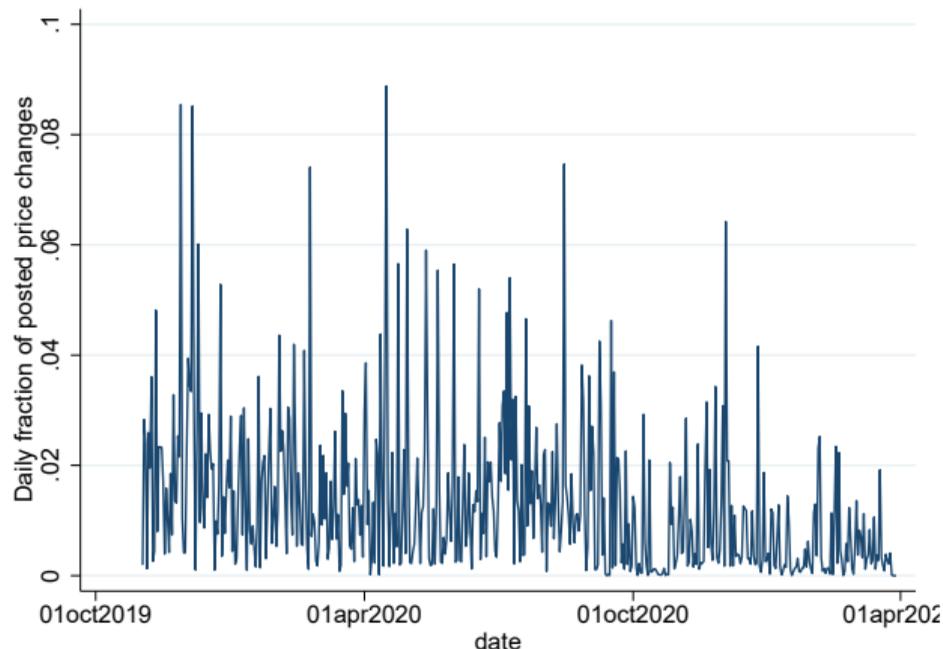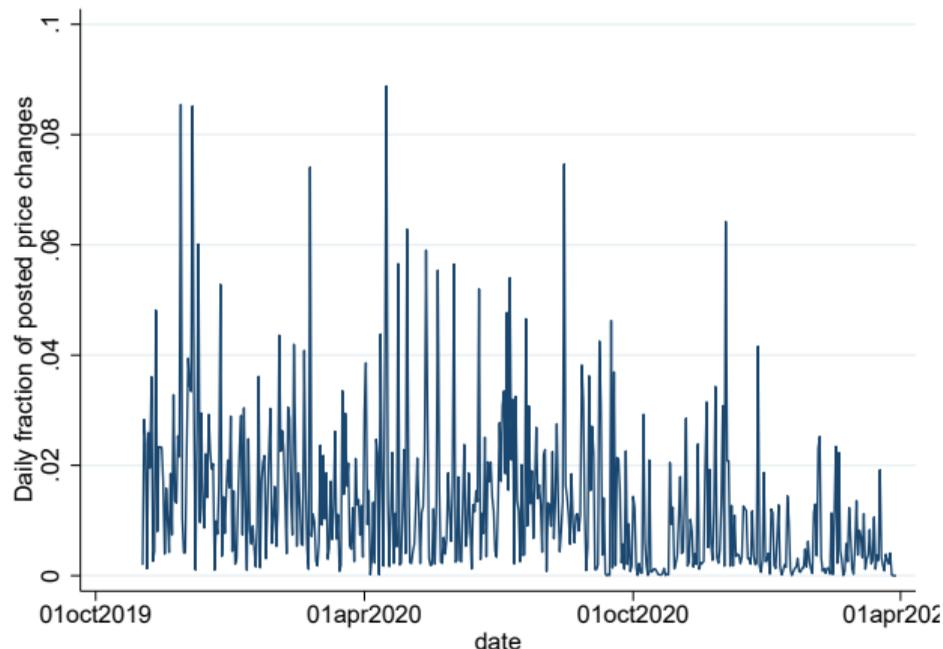
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Comment 3. Unaccounted heterogeneity *across stores* (same product)

- Stores compete locally: need to incorporate location in price gap definition

- Small number of competitors implies strategic pricing
  - Dynamic oligopoly: Wang and Werning (2022, AER), Mongey (2022, R&R Econometrica)
  - Larger monetary non-neutrality, market concentration matters

Summary

- Important questions, excellent paper!
  - ▶ New measure of price gaps
  - ▶ Accounting for differences in pricing behaviors in US and EU4

- Comments/suggestions:
  - ▶ Account for empirical $\Lambda(x)$ and $f(x)$ using standard model
  - ▶ Revisit implications for monetary non-neutrality, build on ALL and recent empirical work
  - ▶ Control for unaccounted heterogeneity within/across stores