Price Setting and Price Stickiness

A Behavioral Foundation of Inaction Bands

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Why interested in price setting?

Important for monetary policy

- Price "stickiness": cornerstone of workhorse models
- Understanding price stickiness $\rightsquigarrow$ size and limits of monetary policy.

What factors account for price stickiness?

Numerous models have been proposed

- Yet question still open

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Workhorse models of price stickiness

- Calvo model
  - Exogenous arrival process of price setting

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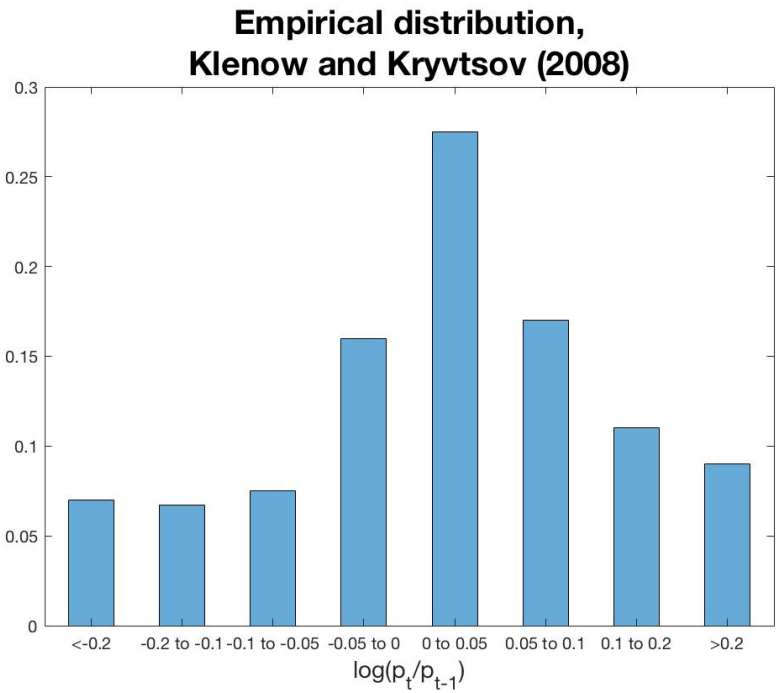
Workhorse models of price stickiness

- Calvo model
  - Exogenous arrival process of price setting
- "Menu" cost models
  - No consensus of what "menu" cost stands for
  - Miss two salient facts of pricing microdata

Coexistence of small and large price changes



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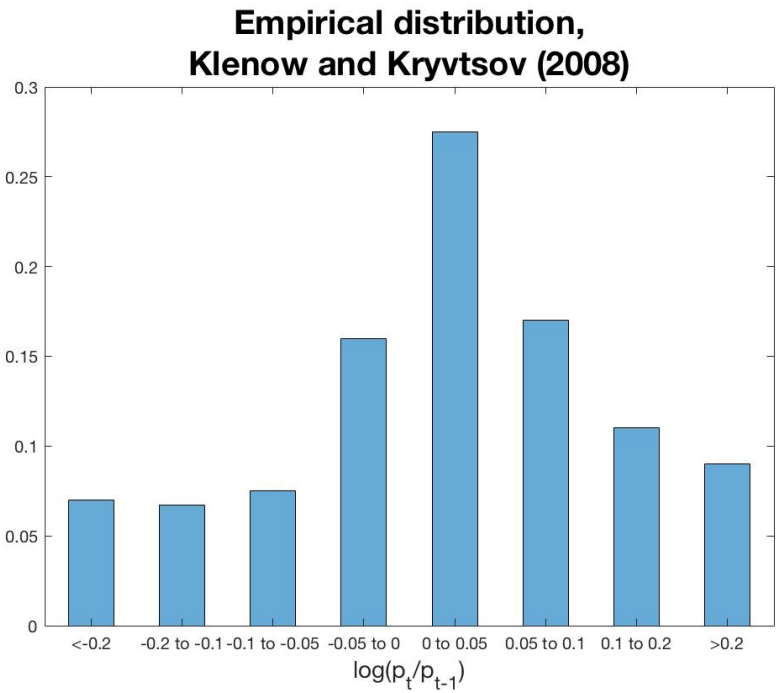
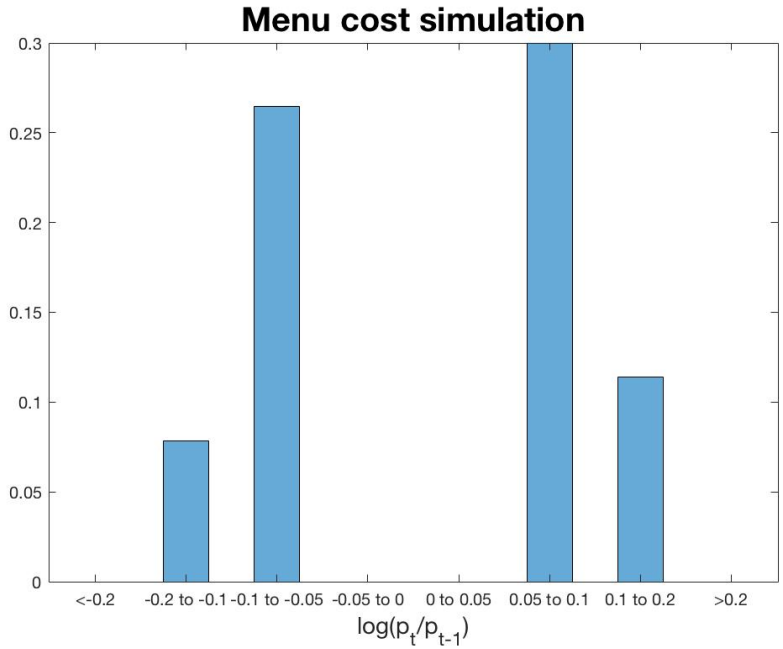
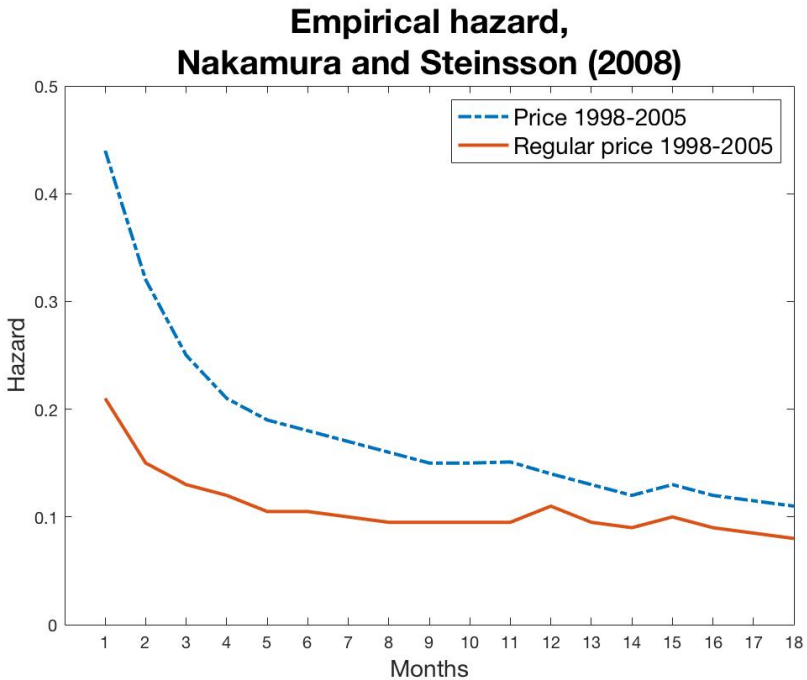




Shape of hazard function



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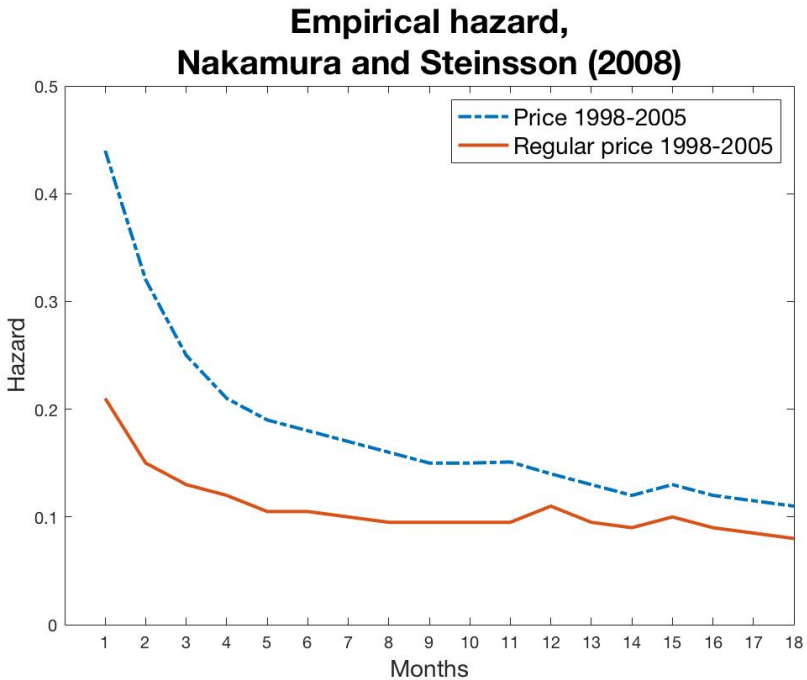

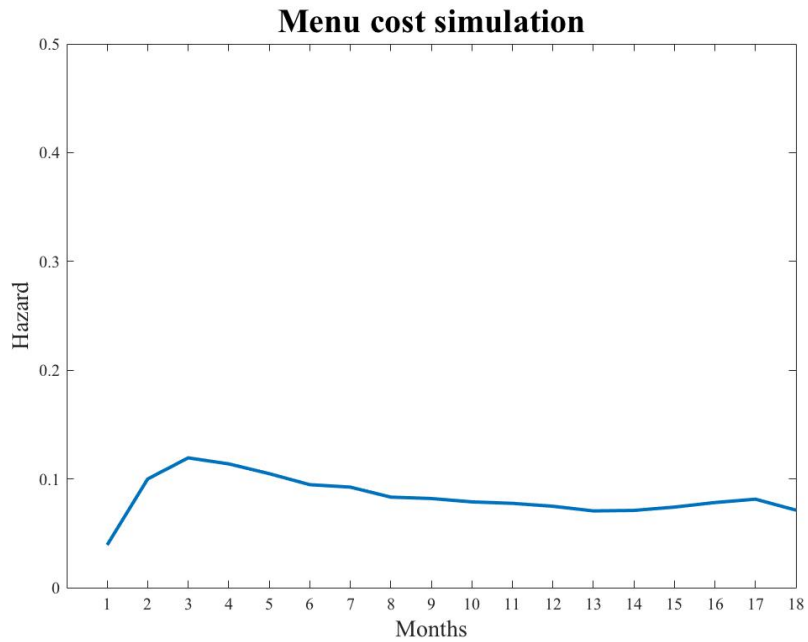

Question

Where should we be looking for sources of price stickiness?

This Paper

Refine way we model price setting decisions.

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Propose model of mental accounting (Thaler, 1985)

- Grounded in realities of business decision-making
- Captures cognitive-psychological biases of decision-makers

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Punchline

- Presence of inaction band (Illustrated analytically in simple static case)
- Parsimonious match of facts (Calibrated dynamic extension)

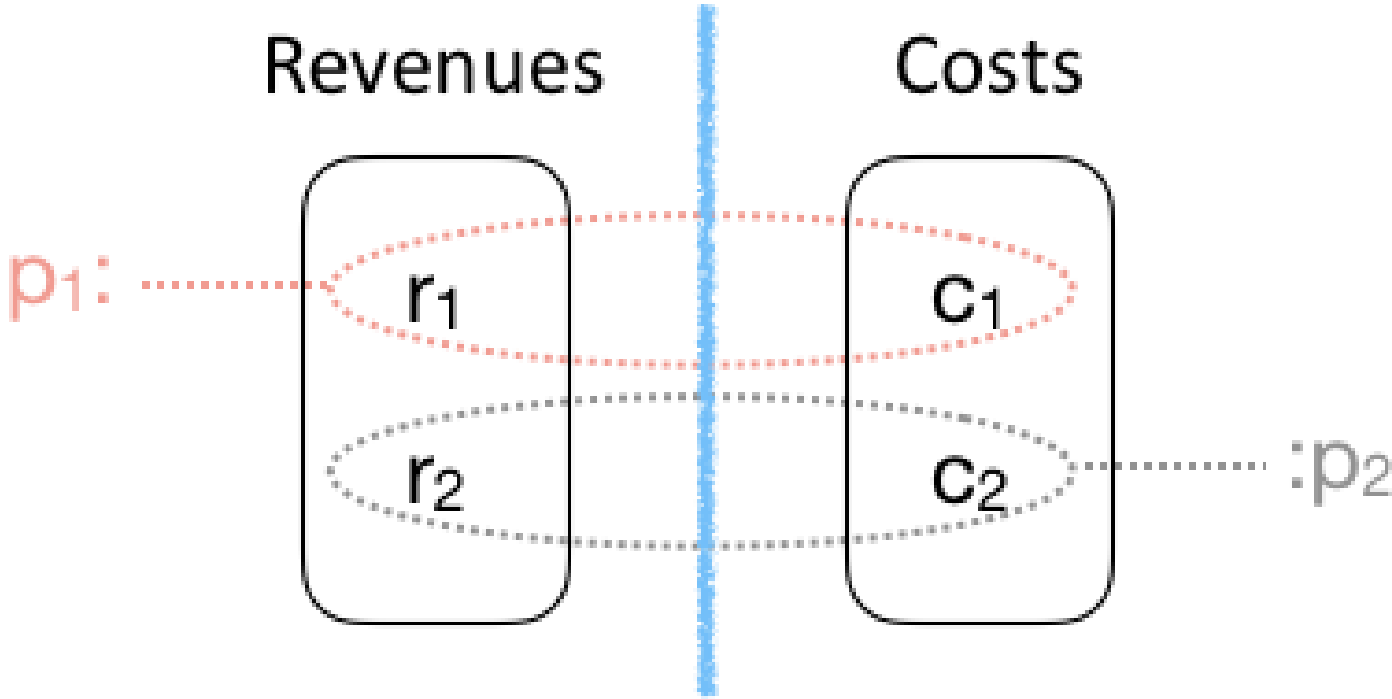
Mental accounting: The manager's objective function

Narrow bracketing 1/2

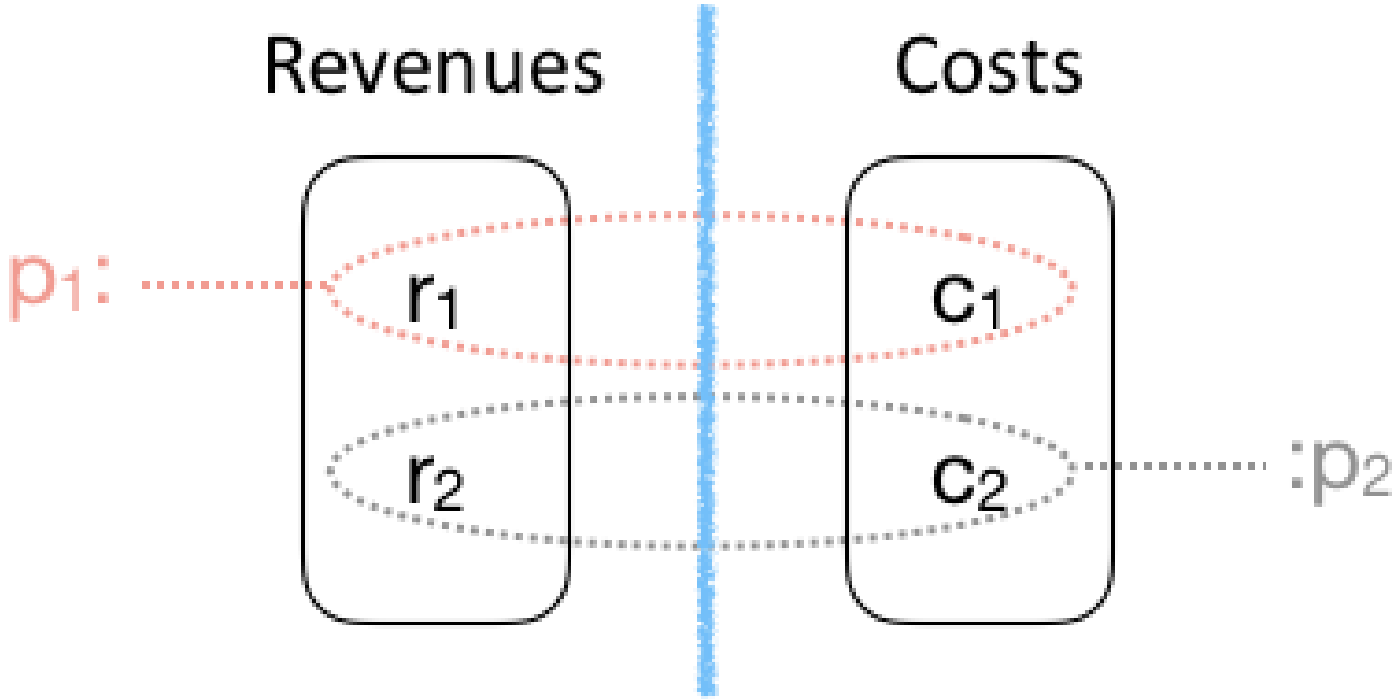
"[P]eople set up mental accounts for outcomes that are psychologically separate, as much as financial accountants lump expenses and revenues into separated accounts to guide managerial attention."

– Camerer, Lowenstein, Rabin (2004)

Narrow bracketing 2/2



Narrow bracketing 2/2



Narrow bracketing in the literature:

- Baucells et al. (2024), Emami-Namini and Kapoor (2023), Gathergood and Olafsson (2023), Bordalo et al. (2019), Aghion and Stein (2008), Barberis et al. (2001), Camerer et al. (1999)

Prospect theory

Reference dependence:

Loss aversion:

Prospect theory

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"[...] our perceptual apparatus is attuned to the evaluation of changes or differences rather than to the evaluation of absolute magnitudes."

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Loss aversion:
"[T]he aggravation that one experiences in losing a sum of money appears to be greater than the pleasure associated with gaining the same amount."

– Kahneman and Tversky (1979)

Reference point: revenues and costs of inaction

Loss aversion: overweigh losses to gains

Price stickiness analytically

Manager chooses price to maximize

$$v\big(r(p) - r(\tilde{p})\big) + v\big(c(\tilde{p}) - c(p)\big)$$

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Under canonical assumptions

- Isoelastic demand
- linear production function; labor only input

$\rightsquigarrow r, c$ decreasing in price

The manager's objective function

$$\Pi(p) = \begin{cases} r - \tilde{r} - \lambda(c - \tilde{c}) & \text{if } p \leq \tilde{p} \\ (\tilde{c} - c) - \lambda(\tilde{r} - r) & \text{if } p > \tilde{p} \end{cases}$$

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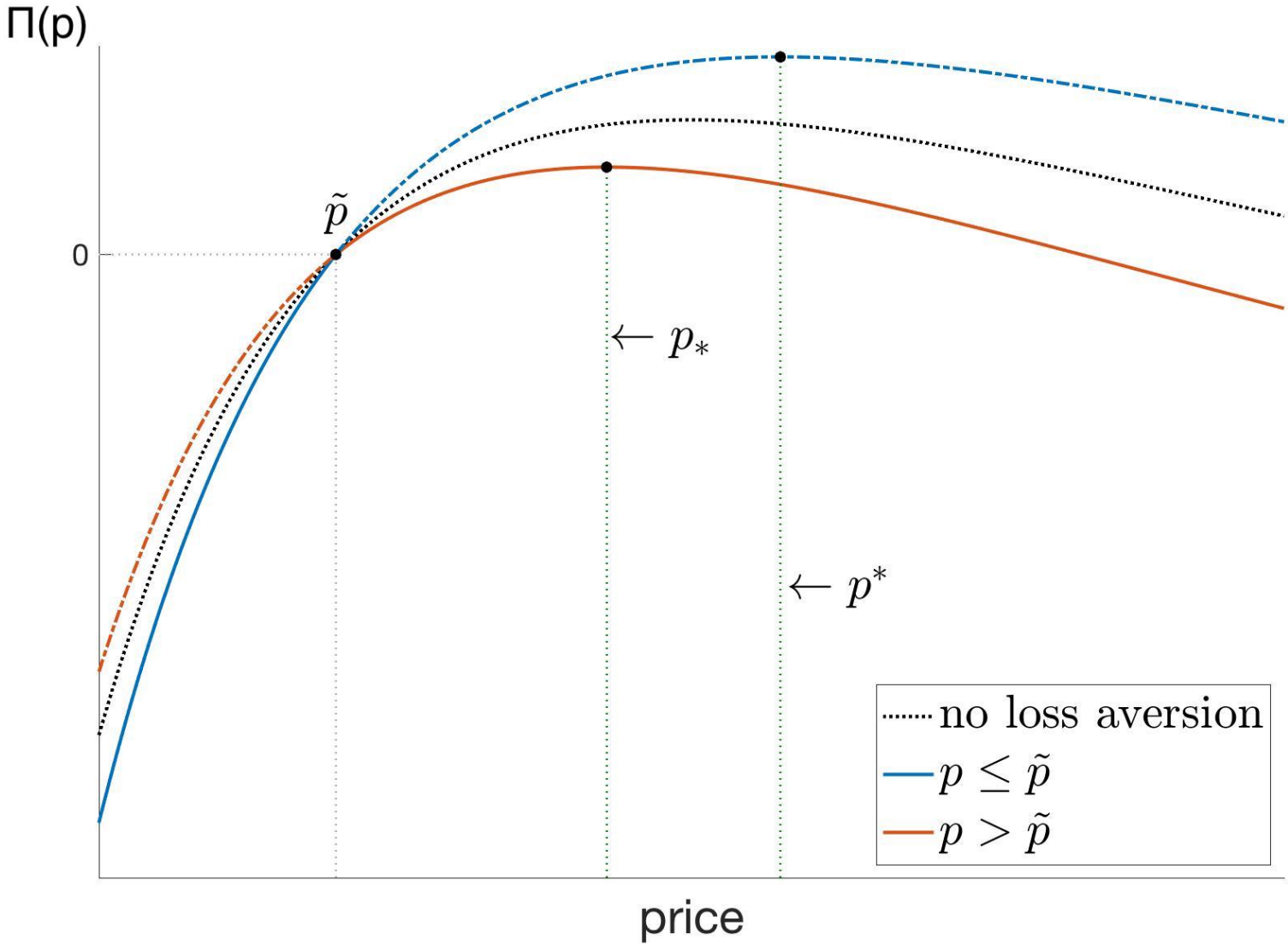
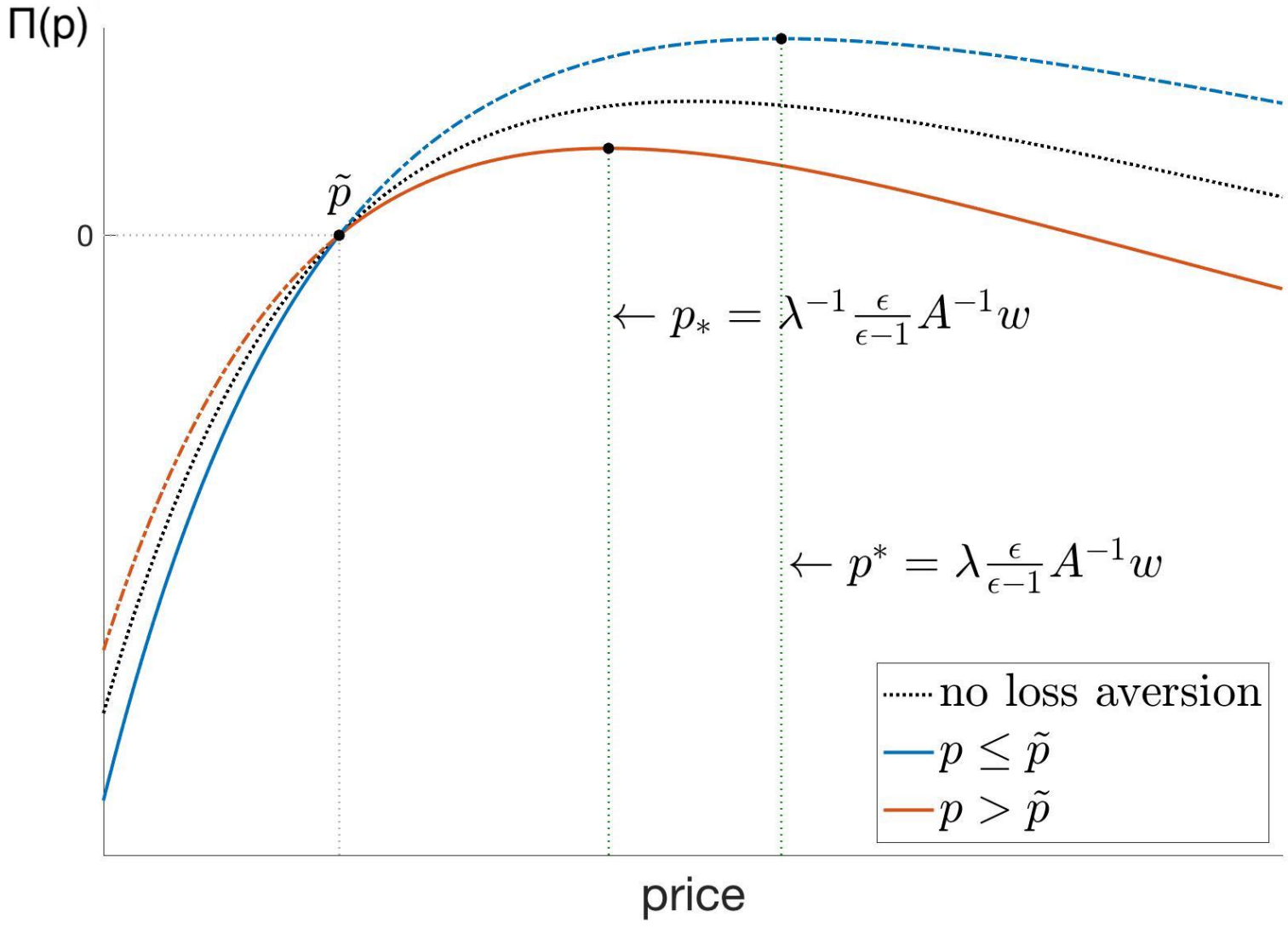
Or

$$\Pi(\cdot) = \text{Gains} - \lambda \text{Losses}$$

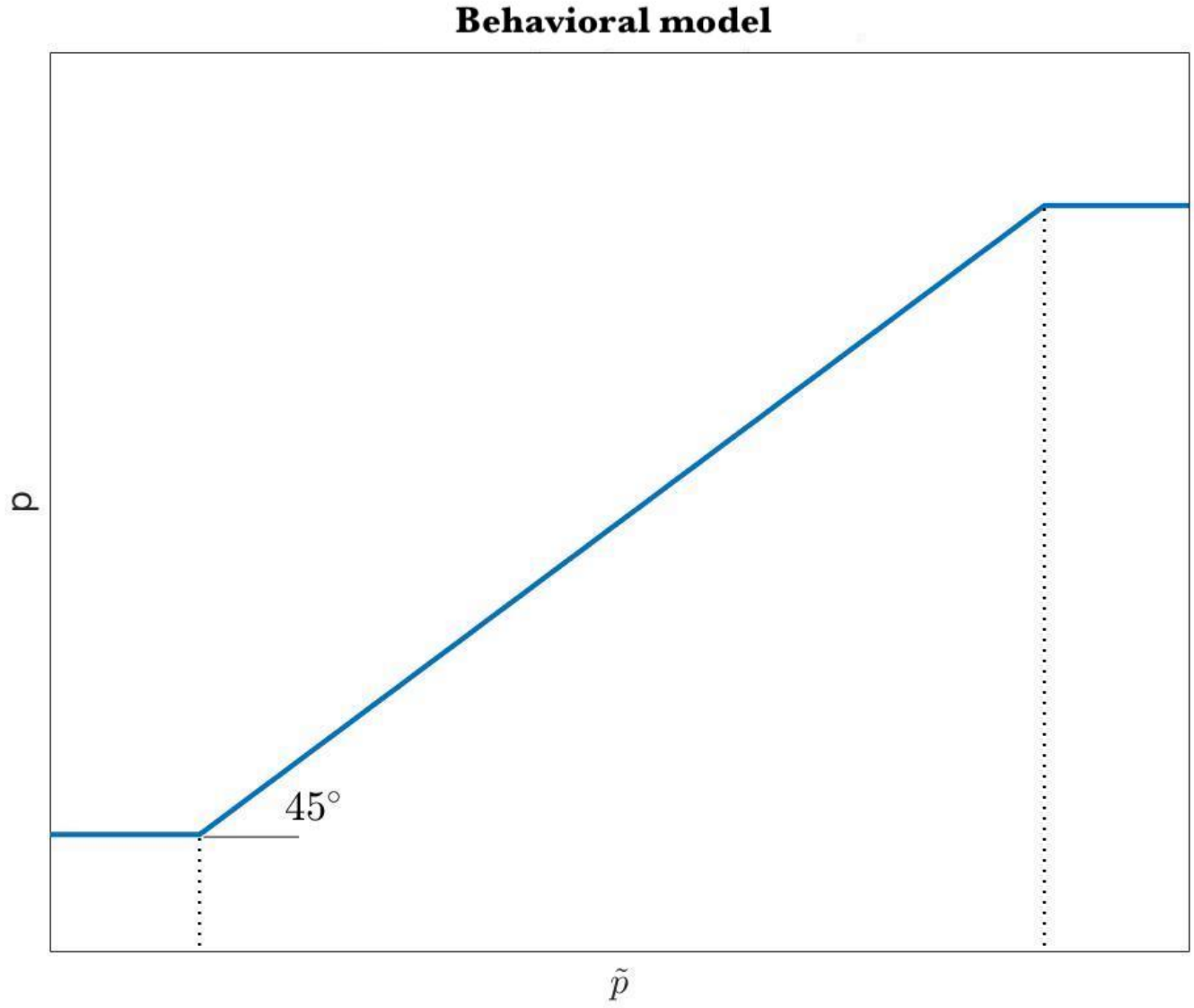
The manager's objective function, graphically



The manager's objective function, graphically



The main result: Pricing rule



Price stickiness: Intuition

$$\Pi(p) = \begin{cases} r - \tilde{r} - \lambda(c - \tilde{c}) & \text{if } p \leq \tilde{p} \\ (\tilde{c} - c) - \lambda(\tilde{r} - r) & \text{if } p > \tilde{p} \end{cases}$$

Simulation results
(Dynamic extension & calibration)

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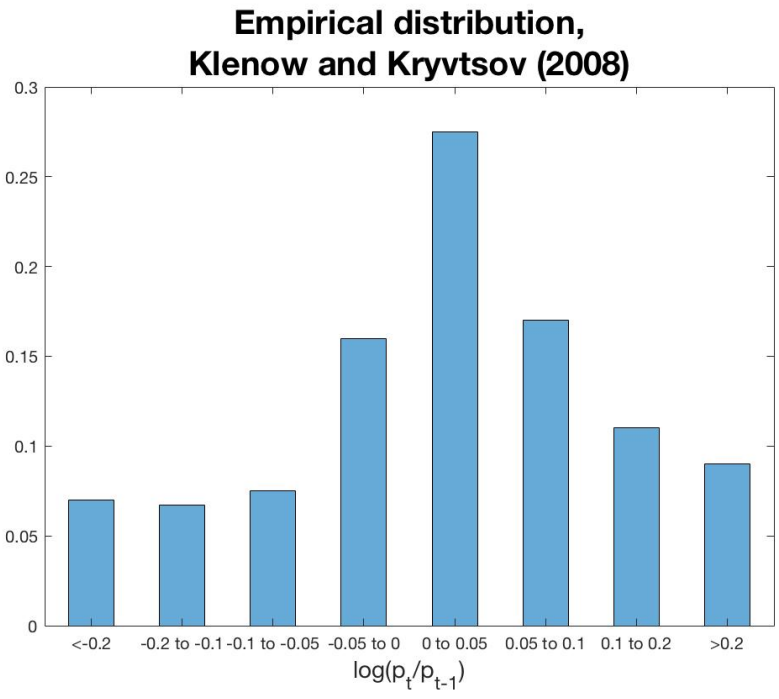

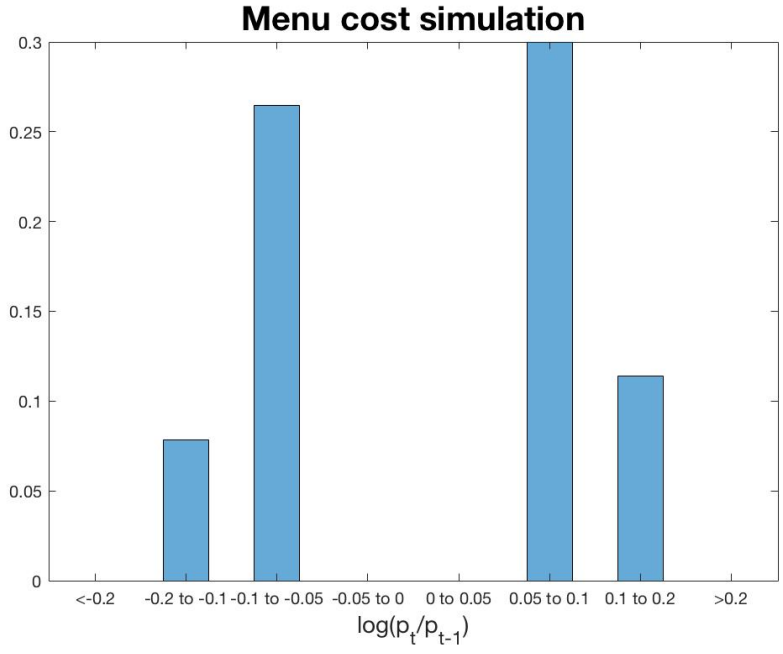

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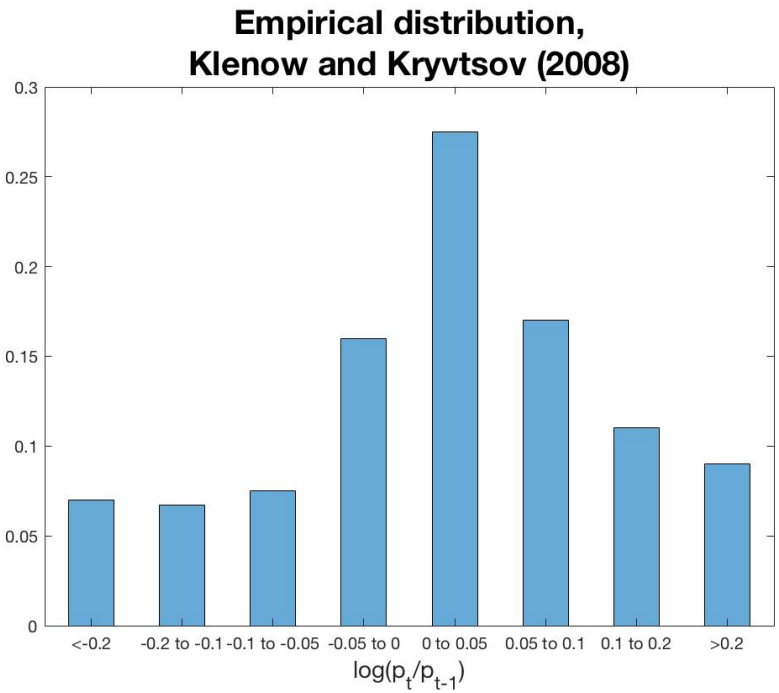
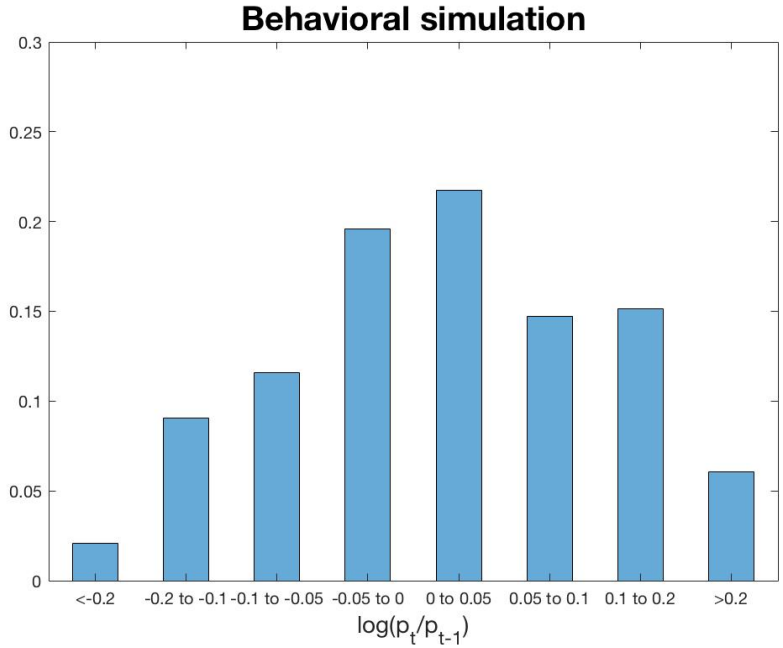
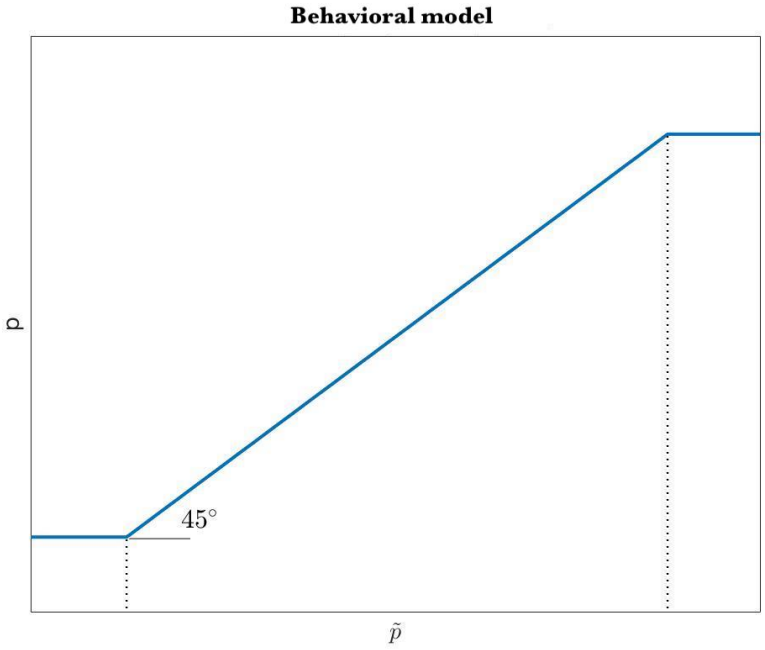
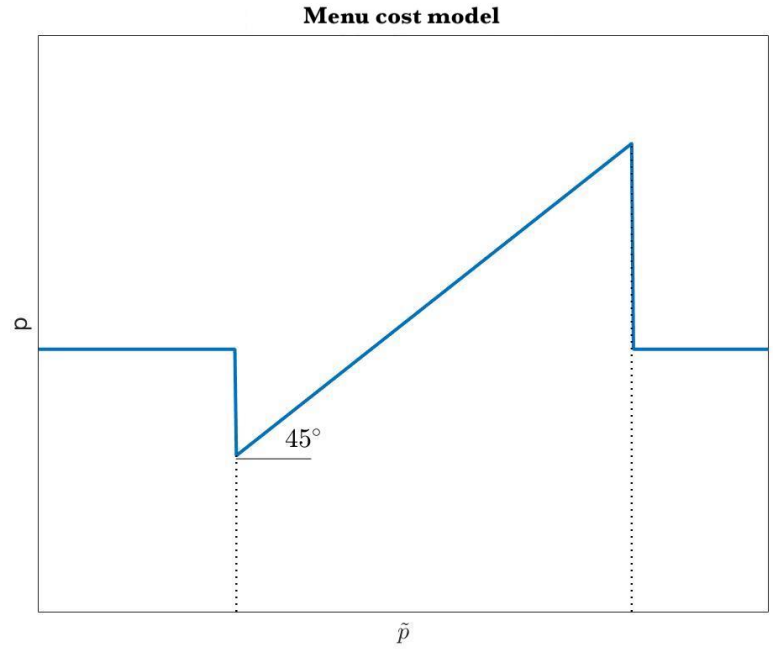


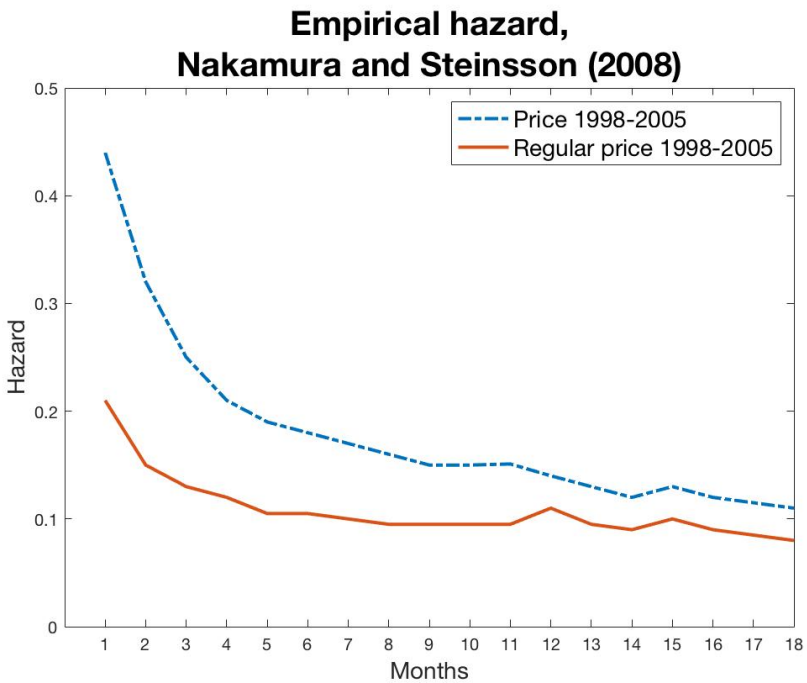


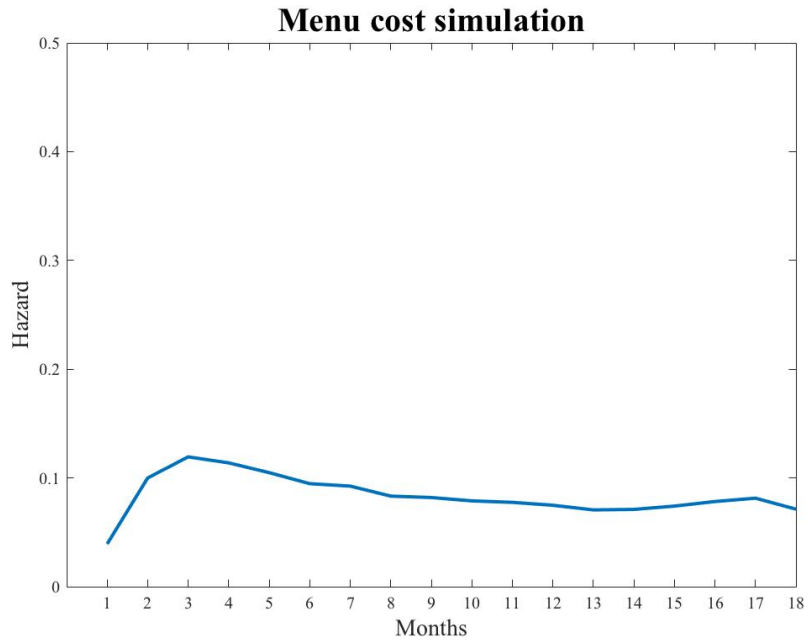
Why?





Hazard function





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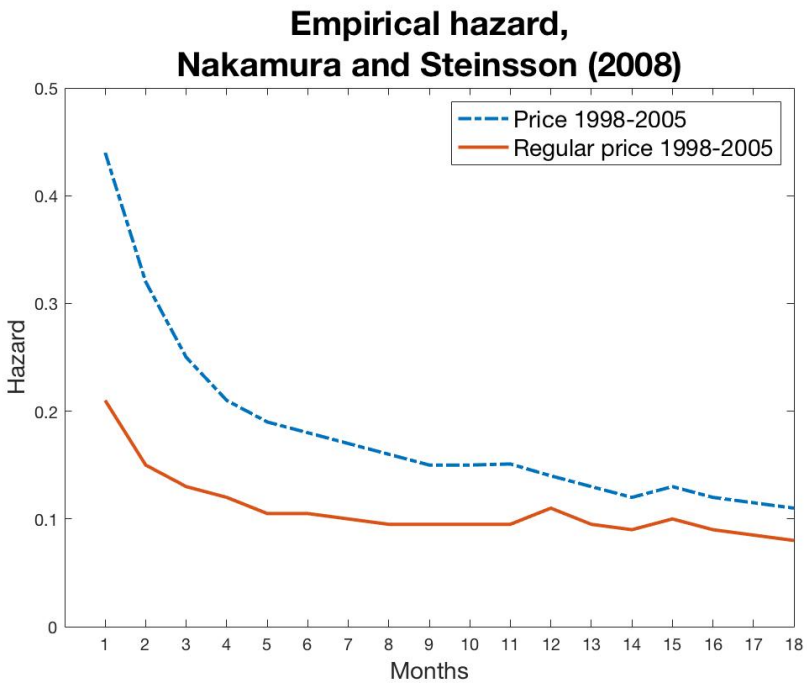

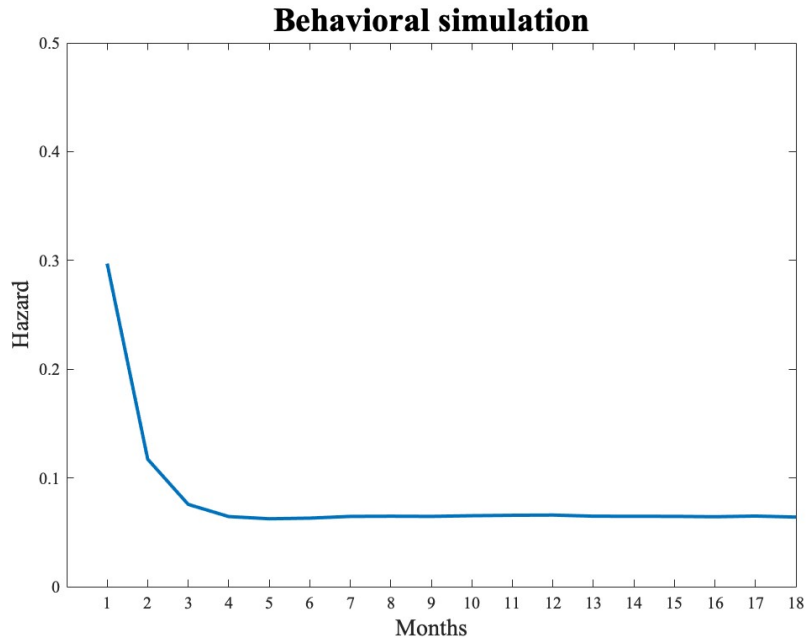

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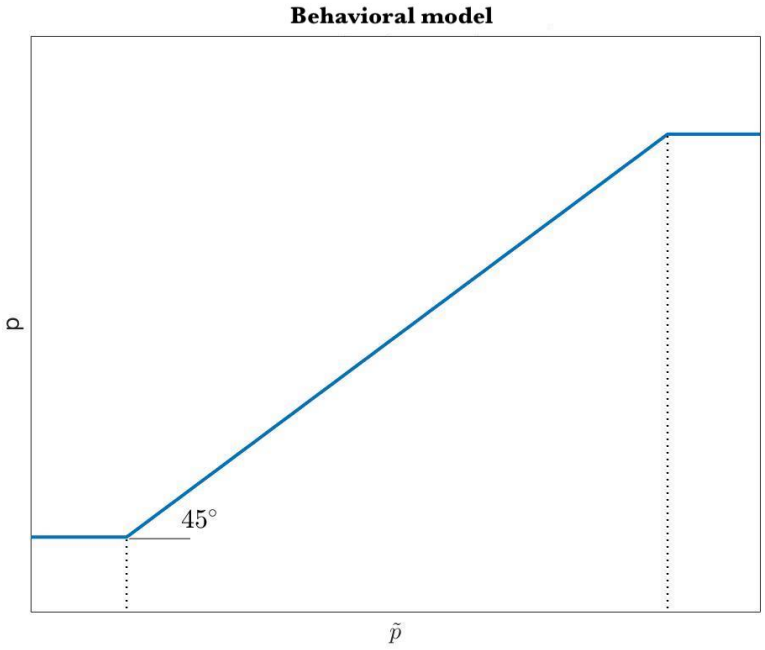

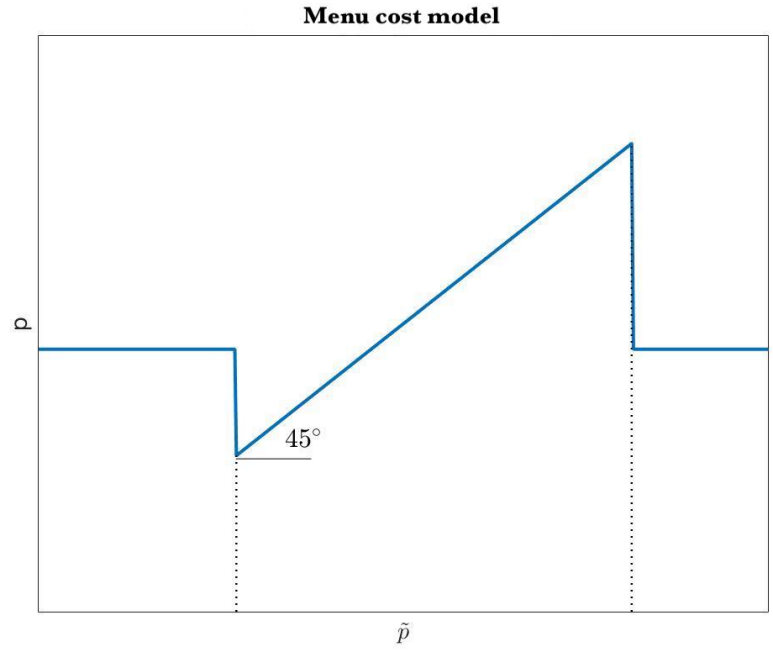

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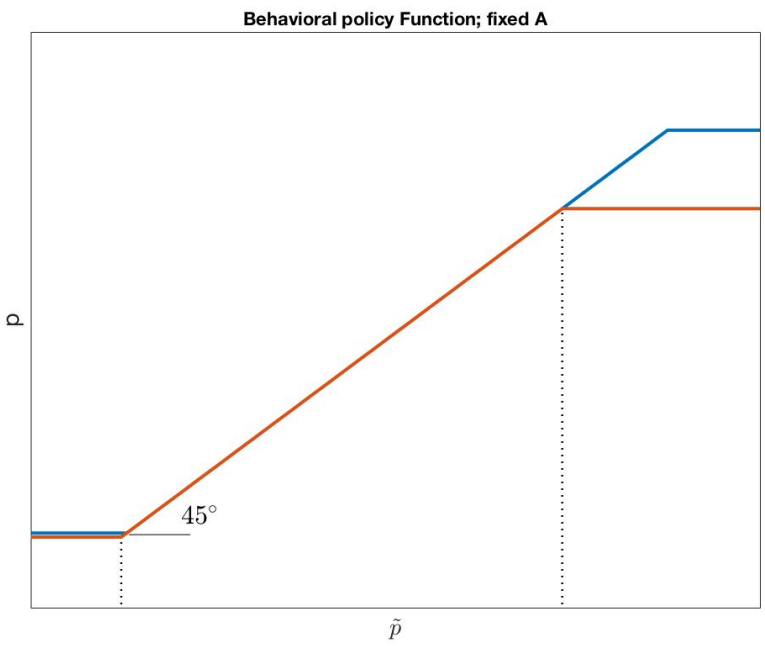
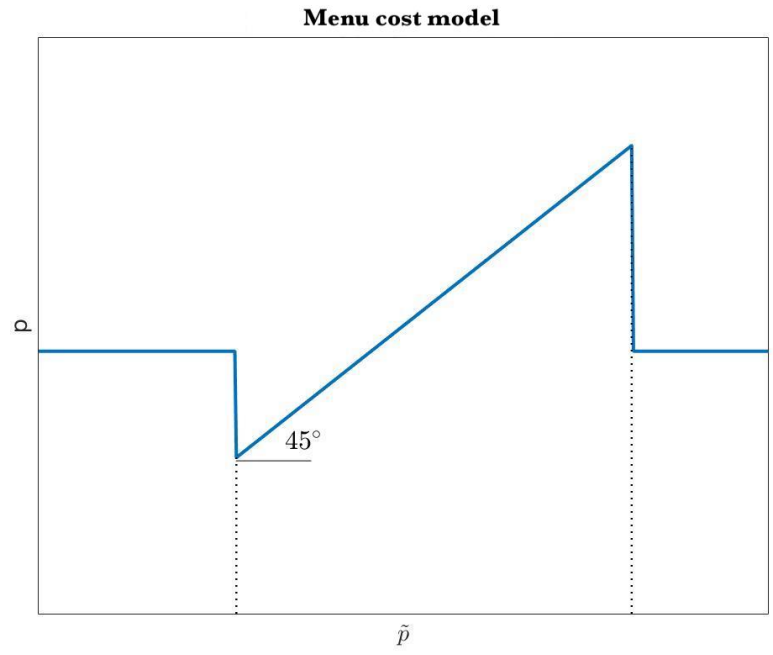

Behavioral policy Function; fixed A
p
45°
$\tilde{p}$


Menu cost model
p
45°
$\tilde{p}$

Concluding remarks

Taking stock

What we have gained

- Parsimonious theory matching facts of microdata
- Assumptions
  - grounded in realities of business decision making
  - reflecting evidence of peoples' systematic biases
- Applicability and relevance of behavioral paradigm in new context

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What's next

- Further evidence of biases in firm decision making?
  - Experiments
  - Surveys
- How could such biases be counter-acted?
- Macro implications of new pricing rule?