

# Could Intra-Firm Misalignment Explain Price-Setting Patters?

Inspere

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## Introduction

**Goal:** Propose a simple model for large firm's pricing decision, based on the interplay between communication within the firm and the provision of incentives.

### Theoretical Contributions:

- Derive a new Phillips curve where the misalignment of incentives and the number of divisions of a given firm drive the slope of the Phillips curve;
- Show that within-firm misalignment in the communication generates price stickiness and non-neutrality of money;

### Empirical Contributions:

- Our intra-firm mechanism fits the small changes on prices and heterogeneity on price-setting;
- Our communication mechanism illustrates the gathering information-misalignment.

## Data-Set

- We collected daily data from 2018 onwards from the six major supermarket chains;
- Our dataset covers supermarkets goods as well as appliances and durable goods in Brazil;
- Average products per day in each retailer on the range of 6,000 to 28,000;
- We implement a textual supervised learning algorithm method that matches the names of the products with the CPI structure as a **fuzzy string matching algorithm**;
- We have an hierarchy of 19 categories and 4 sectors across the retailers.

## Within Firm Environment

**Firm structure** - Suppose a company with two sales departments, division A and division B, and a headquarters that decides the optimal price given the information provided by the departments a la Dessein et al (2009) as:

$$\text{Max } E_t \left[ \sum_{t=0}^{\infty} \beta^t \pi_i (P_{it}, P_t, Y_t, Z_{it} | M_i) \right] \quad (1)$$

**Optimal Price Equation** - From that, price dynamic depends on:

$$p_{it} = p_t + \frac{\pi_{13}}{|\pi_{11}|} (1 + t_i)(1 + h)^{t_i} + \frac{\pi_{14}}{|\pi_{11}|} (1 + t)(1 + k)^t \quad (2)$$

- The Aggregate Misalignment  $\frac{\pi_{13}}{|\pi_{11}|}$  and the Aggregate Partition  $t$ .
- The Idiosyncratic Misalignment  $\frac{\pi_{14}}{|\pi_{11}|}$  and the Idiosyncratic Partition  $t_i$ .

## The Phillips Curve

The dynamics of the sectoral Phillips curve illustrates that how revelation of the information matters to the firms when taking their pricing decisions:

$$\pi_{kt}^* = \alpha_j \pi_t - (1 - \alpha_j) E_t \pi_{t+1} + \gamma_j \Delta E_t y_{t+1} + \chi_j \pi_{kt} + E_t (\pi_{k,t+1}^* - \pi_{t+1}) \quad (3)$$

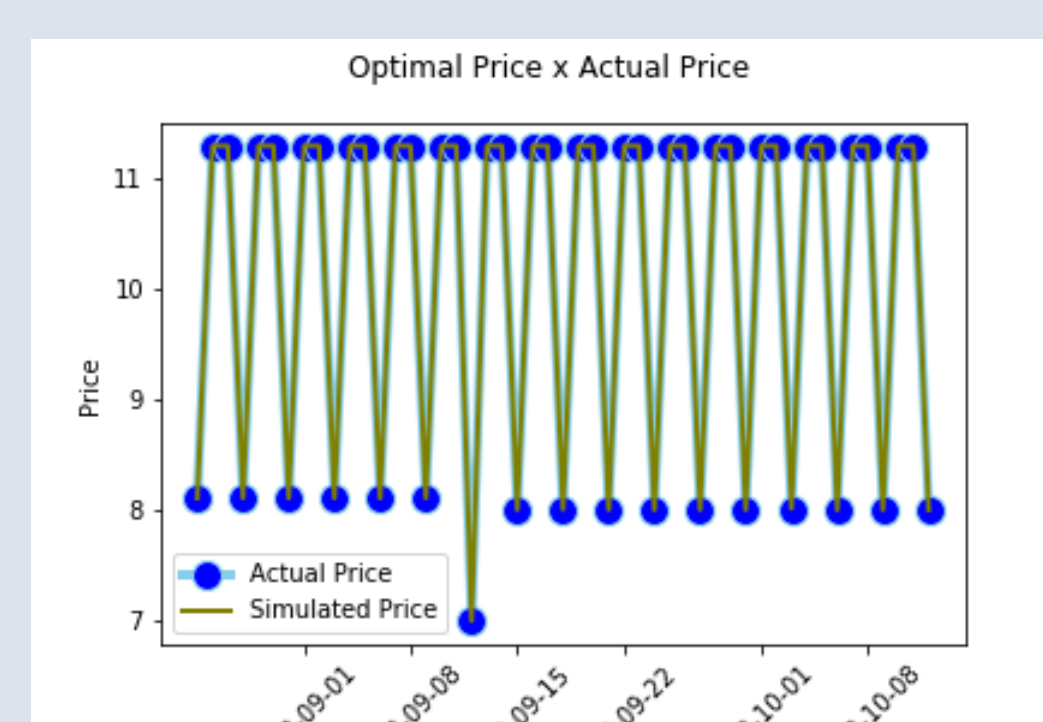
Where:  $\alpha = \frac{\pi_{12}}{|\pi_{11}|}$ ,  $\gamma = \frac{\pi_{13}}{|\pi_{11}|}$ ,  $\chi = \frac{\pi_{15}}{|\pi_{11}|}$ .

- Less informative communication (higher misalignment) induces higher inflation (through the distortions in the prices of the goods);
- Higher misalignment demands a hawkish Central Bank (in an environment with higher inflation cost);
- Misalignment enhances the persistence and size of monetary policy and disinflation output cost.

## Do Retailers Match our Optimal Prices?

- Estimating optimal price equation we fit the following facts:

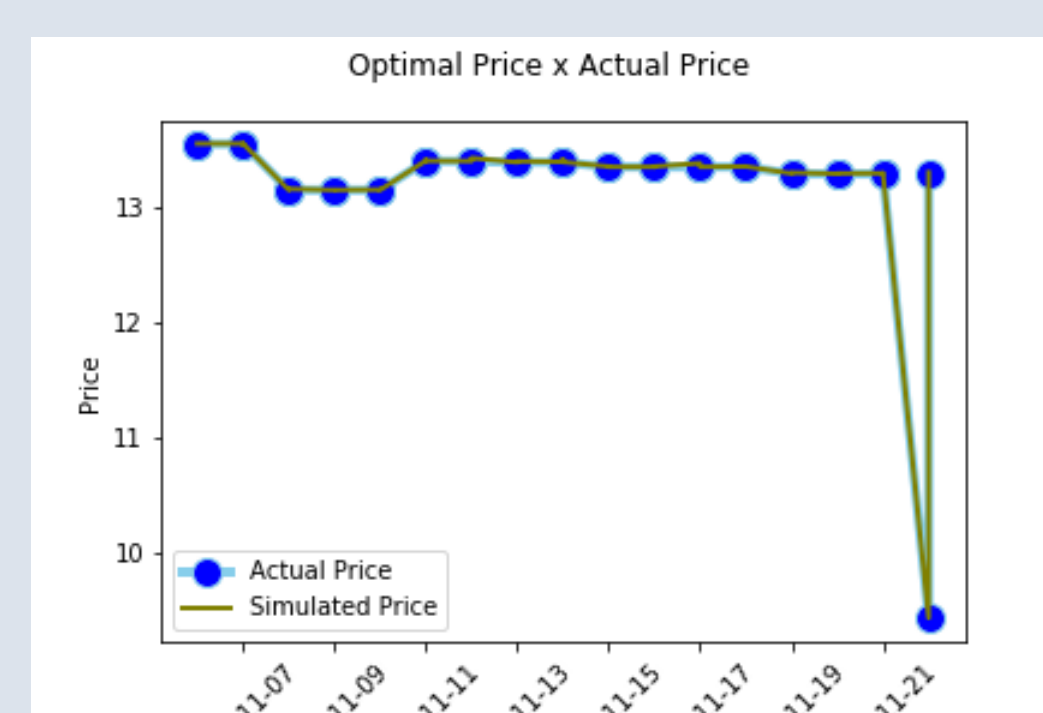
1. Small changes in prices
2. (Changes) Reference Price
3. Length of Price Spell
4. Sales Behavior
5. Temporal Stickiness



Apple



Rice

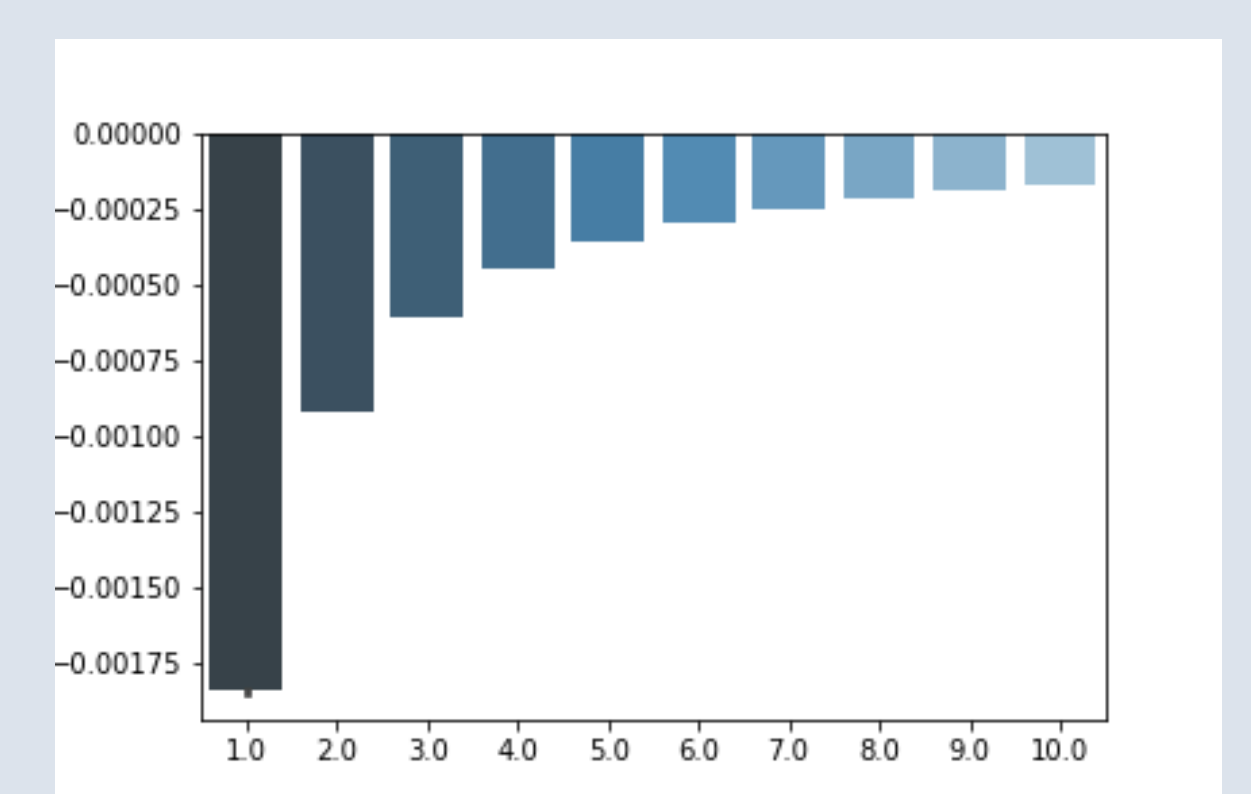


Soap Powder



Tomato Sauce

## Misalignment x Partition



- The higher the number of partitions of a given good the lower is its misalignment, because:
  - $\downarrow$  Misalignment  $\rightarrow$   $\downarrow$  noise in the communication  $\rightarrow$   $\uparrow$  informative is the communication  $\rightarrow$   $\downarrow$  intervals of each partition  $\rightarrow$   $\downarrow$  stickiness.

## Main Take-Ways

- The endogenous communication mechanism, when empirically evaluated, matches the empirical prices and the gathering information-misalignment (both through the interplay partition-misalignment).
- Through the incentives provision of the firms we address the heterogeneity of price distribution; the reference/sales price behavior and the small changes on prices
- Through the Phillips curve, the within firm misalignment matters to fit the macro stylized facts as:
  - The inflation behavior;
  - The real effects of monetary policy;
  - Its interplay with both the number of sectors and the level of misalignment.

## References

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