Commodity Prices, Pass Through, and Retail Prices

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Agenda

- Two projects:
  - Micro monthly data
  - Micro daily data

- Pass-through
  - Long run pass-through
  - Speed of convergence
  - Monetary policy
Measuring pass-through from commodities

- We have data from
  - European countries (most of them)
    - Price for bread and pasta, not the item level
    - Monthly data for about 10 years
  - Latin American Data
    - Item prices
    - Monthly data for 10 years
- PT to commodity prices is a clear cost shock and we can study the change in relative prices.
Estimation of pass-through

- Simple specification (reduced form)

\[
\Delta P_t = \alpha + \sum_{l=0}^{L} \gamma_l \Delta C_{t-l} + \varepsilon_t
\]

\[
\Delta P_t = \alpha + \sum_{l=0}^{L} \gamma_l \Delta C_{t-l} + \beta (P_{t-1} - \theta C_{t-1}) + \varepsilon_t
\]
Channels

- Transmission mechanisms of international commodity prices into domestic retail prices

- International Commodity Price
- Other products and competition
- Real Exchange Rate
- Fiscal and Monetary Policy

Domestic Retail Price
Channels

- Transmission mechanisms of international commodity prices into domestic retail prices

Diagram:
- International Commodity Price
- Other products and competition
- Real Exchange Rate
- Fiscal and Monetary Policy
- Domestic Retail Price
Channels
Transmission mechanisms of international commodity prices into domestic retail prices

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Diagram:
- International Commodity Price
  - Other products and competition
  - Real Exchange Rate
  - Fiscal and Monetary Policy
  - Domestic Retail Price
Europe PT: Wheat to Bread
Tracking the inflation process

- Price indexes:
  - Bread
  - Bread + cookies
  - Bread + cookies + pasta
  - Basic
  - All food
  - ...
  - ...
  - ...
  - All CPI
Chile

Chile: Wheat

- Bread
- Cereals
- Cookies
- Dairy
- Oil
- Processed Food
- Beverages
- Water
- Gas
- Electricity
- Phone
- Gasoline
- Transportation
- Electrodynamics
- Medicines
- Beauty Products
- Health Services
- Education Products
- Clothing
- Others

0 0.1 0.2 0.3 0.4 0.5 0.6
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Brasil

Brazil: Wheat

- Bread
- Cereals
- Rice
- Cookies
- Maize
- Pastas
- Flour
- OtherCereals
- OtherBasic
- SugarCondiments
- MeatFish
- Vegetables
- RealEstate
- HousingExpenses
- Publictransportation
- PrivateTransportation
- OtherTransportation
- Education
- Electrodomestics
- Medicines
- Beautyproducts
- Healthservices
- Education
- Others
Mexico

Mexico: Wheat

- Bread
- Cereals
- Dairy
- ProcessedFood
- Water
- Gas
- Electricity
- Phone
- PublicTransportation
- PrivateTransportation
- OtherTransportation
- Gasoline
- HouseholdFurniture
- Education
- HealthServices
- BeautyProducts
- Medecines
- Others
- HousingExpenses
PT with Oil: Brasil vs Chile

Gasoline: Response to Oil

- Chile
- Brazil
PT with Oil: Others

Gasoline: Response to Oil

- Peru
- El Salvador
- Guatemala
- Honduras
- Nicaragua
- Costa Rica
Questions

- Differences in Long run PT
  - Explanations:
    - Differences in input use (Bread and Wheat?)
    - Differences in monetary policy response to Wheat
      - Euro countries have a common exchange rate and monetary policy and their responses are significantly different.
      - Similar results are found when the domestic price of wheat is used.
    - Differences in the form and intensity of competition.
      - Markup might respond differently across the countries
  - Differences in the speed of adjustment
    - Explanations?
Degree (form) of competition

- The level of the long run PT is different across countries
- The speed of convergence is also different.
  - Changes in the probability of adjusting
  - Changes in the speed of adjustment
- Monthly data and the aggregates we have is conceivably too coarse to study this question.
Billion Prices Project
Billion Prices Project

- We are collecting data from
  - Supermarkets in 40 countries (roughly 60 supermarkets)
  - Real estate prices from 288 cities (remax and century)
  - Retailers from approximately 15 countries
    - Major retailers such as Walmart, Wallgreens, Carrefour, Costco, Sams.
    - Major internet stores amazon (all sites), etc.
    - Major furniture sales: IKEA, etc.
    - Major apparel: H&M, Gap, etc.
    - Major electronic and electrodomestics: Best buy, circuit city, newegg, apple and other europeans
    - Home Improvement: home depot, equivalent in other countries.
    - Toys, Jewelry, Music (instruments, CD’s), DVD’s
    - Major stores: JC, Maxis, Falabella, etc. (sears maybe)
Billion Prices Project

- We collect everyday ALL the items’ prices they sale.
  - We collect their price table.
  - We collect using the same technology that Google uses.
- These are all public prices (on line).
- We collect information on
  - Stock (when available)
  - Sales
  - Price controls (when available)
- We are starting verification purchases in several Latin American countries (supermarket).
Billion Prices Project: Objectives

- Pricing Behavior
  - Frequency of Adjustment, Synchronization of price changes, Distribution of price changes
  - Factors affecting price behavior: Inflation, Recessions, Varieties, and Competition
  - Price Controls, Sales (Description of sales behavior, Factors determining sales)
- International Pricing
- Aggregate Analysis
  - Daily Inflation, Comparison to official statistics, Impact of monetary policy shocks, Aggregate pass-through analysis.
- Daily Real Estate Prices and Daily Real Exchange Rate
  - Impact of monetary policy shocks, Macro outcomes and housing prices
- Asset pricing and retail prices
  - Bankruptcy, mergers, channels of aggregate demand booms.
- New Product Introduction and Price Discrimination
  - Pecking order of product introduction (electronics)
- Green Premium
  - Premium for environmentally friendly items, factors affecting premium.
Data for this presentation

- Daily data from Supermarkets
- Four countries but I’ll concentrate mostly in Argentina and Brasil.
- One year: October 07 – October 08.
- All food and beverages data
  - Argentina we have 29k
  - Brasil we have 14k
- Only Bread
  - Argentina has 226 different types of bread from 2 supermarkets.
  - Brasil has 166 different types of bread from one supermarket.
- Index on agricultural commodities (wheat) collected from data stream.
Argentina vs. Brasil

- We have one year of data from only 4 countries (colombia and chile).
- Both have similar histories of inflation, crisis, etc.
- Argentina is actively controlling prices and pressuring retailers – especially products in the basic basket.
- Interesting to observe how their behavior is affected.
Agenda

- **Aggregate**
  - Compare our Inflation with official statistics
  - Inflation in bread and comparison to wheat prices
  - Degree of stickiness in the sector
    - Evolution.
    - Relationship between stickiness and wheat prices.
  - Aggregate PT

- **Micro evidence**
  - Micro PT
    - First, second, ... nth adjustment
  - Micro stickiness
    - First, second, ... nth adjustment
Argentina

![Graph showing the currency rate of Argentina from Oct 07 to Oct 08. The graph includes two lines, one for SM and one for Agg, indicating the trend of the currency rate over the specified period. The currency rate is on the y-axis, ranging from 1.0 to 1.25, while the x-axis represents dates from Oct 07 to Oct 08. The graph shows a consistent upward trend for both SM and Agg lines.]
Behavior of Bread

- Let us now concentrate on bread.
- We only use Argentina and Brasil.
- We have two supermarkets in Argentina and One in Brasil, and there are just a little bit more than 120 different types of bread.
Inflation of bread (smoothed)
Aggregate Bread Pass-Through

\[ \Delta P_t = \alpha + \sum_{l=0}^{L} \gamma_l \Delta C_{t-l} + \varepsilon_t \]

\[ \Delta P_t = \alpha + \sum_{l=0}^{L} \gamma_l \Delta C_{t-l} + \beta(P_{t-1} - \theta C_{t-1}) + \varepsilon_t \]
Aggregate Bread Pass-Through
Items

- Product introductions and discontinuations
  - Argentina is putting a lot of pressure on supermarkets and controlling prices.
  - Its inflation is larger than the inflation from Brasil.
  - How our supermarkets keeping up?
    - Repackaging of products?
    - Discontinuation and introductions?
Number of brands
New Items

[Bar chart with 'Bra(new)' and 'Arg(new)']
Items

- Despite the fact that prices are controlled in Argentina,
  - There are no more discontinuation of items (change the grams, for instance) than in Brasil.
  - And there is no proliferation of new brands
  - Clearly, they have been able to change prices accordingly.
Stickiness

• After having evaluated the aggregate inflation and the item introduction and discontinuation, the next questions are related to the degree of stickiness.
  • What has been the pattern of price changes in the sample?
  • Does a price increase in wheat increases the probability of changing prices?
  • To what horizon?
Aggregate Stickiness (smooth)
Aggregate Stickiness Regressions

- Estimate a simple regression relating the degree of stickiness to the change in the wheat price at different horizons.
Aggregate Stickiness Regressions
Aggregate Stickiness Regressions

• Argentina
  • There does not seem to be a relationship between the probability of price changes and the price of wheat.
  • Firms make decisions to change prices mainly on aggregate inflation and other firms behavior.

• Brasil
  • Close relationship between wheat prices and price changes.
Aggregate Stickiness

- Argentina has the largest inflation but the least change
  - i.e. prices are stickier in Argentina.
  - Average stickiness: Arg 0.87% and Bra 3.31% probability that a price changes any given day.
- Clustering?
Micro Pass-Through

- Micro regressions need to deal with the stickiness problem
- We follow Gopinath, Itskhoki, Rigobon (2008)
- Estimate pass-through regressions conditional on price adjustment.
Micro Pass-Through

- Estimate conditional on price change
Micro Pass-Through

- Estimate conditional on price change
Micro Pass-Through

- Estimate conditional on price change
Micro Pass-Through

- Estimate conditional on price change
Micro Pass-Through

- Estimate conditional on price change

\[ dP_1 = \alpha + \gamma_1 dC_1 + \gamma_2 dC_2 + \ldots + \varepsilon_{tt} \]
## Estimates of Micro Regressions

### Argentina

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<th>dC</th>
<th>dC-1</th>
<th>dC-2</th>
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## Estimates of Micro Regressions

### Brasil

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Micro Pass-Through

- Confirms findings from Aggregate regression
  - Brasil has larger pass-through than Argentina
  - However, Argentina does have an effect – not found in aggregate regressions.
- Timing?
  - Brasil tends to move faster, but here speed of adjustment is conditional on price change, therefore, it is hard to assess.