

Discussion of “Sales and the Real Effects of  
Monetary Policy”

by Kehoe and Midrigan

Emi Nakamura

Federal Reserve Bank of NY, Columbia University, NBER

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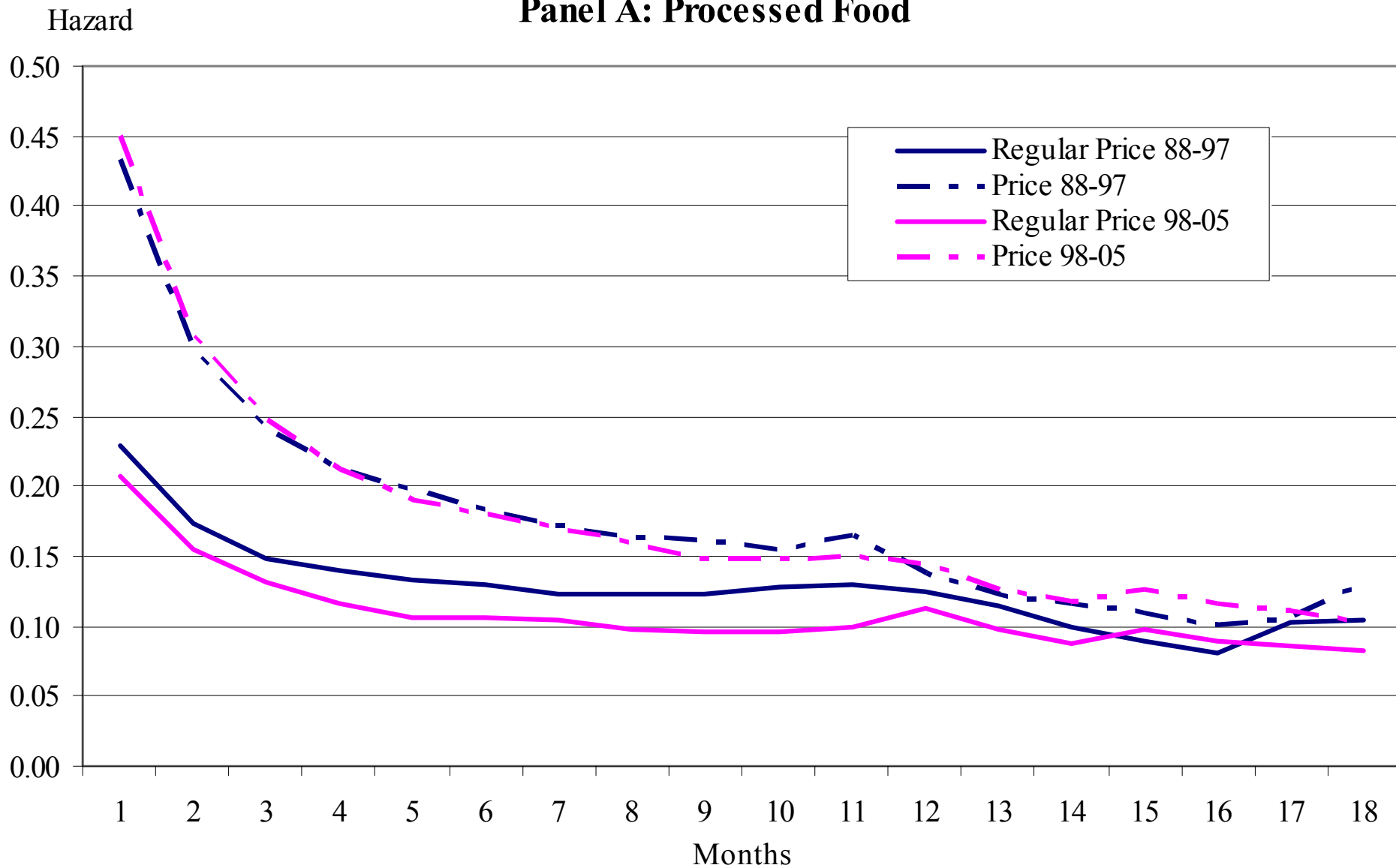
Contributions:

Facts (Dominick's Data)

1. Frequent Price Changes
2. Prices spend most time at mode
3. Prices much more likely below mode than above mode
4. Most price changes due to sales (approx. 80%)
5. Price often reverts to original after sale
6. Sales highly transitory
7. Price changes clustered

Note: Use sale filter from AC Nielsen ERIM database

### Panel A: Processed Food



Contributions:

Theory: Implications for Monetary Non-Neutrality

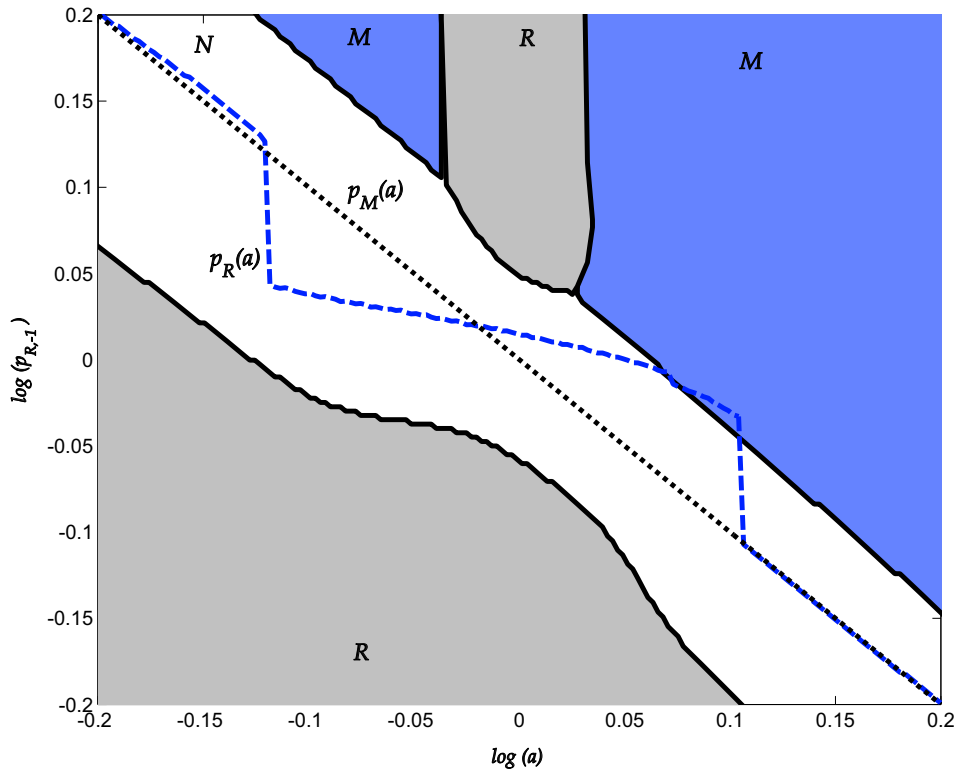
- Standard model cannot explain these facts
- New model: Firms can either set new “regular” price or “rent” temporary price
- Different menu costs for permanent vs. temporary price changes
- Otherwise standard menu cost model
  - Dixit-Stiglitz demand: constant mark-up
  - Idiosyncratic variation in desired prices: “productivity” shocks
  - Leptokurtic shocks: Muted selection effect → Output response comparable to Calvo

Contributions:

Theory (cont'd)

- Parameters chosen to fit 13 moments on price change
- Model fits frac. of sales that revert to orig. price
- Generates temporary markdowns, steeply downward sloping hazard
- Sales occur when firm's desired price is temporarily low (i.e. Prod. shock temporarily high)

Figure 4: Optimal policy rules: model with markdowns



Contributions:

## Theory (cont'd)

What is the impact of money shock on output?

- Permanent price changes imply greater aggregate price flex. than temporary markdowns

How does model w/ sales compare to standard model?

- More monetary non-neutrality than standard model w/ freq. including sales
- Less monetary non-neutrality than standard model w/ freq. excluding sales

→ Neither model provides good approx.

Kehoe+Midrigan: Use annual frac. of prices at mode

## Std. of Consumption in Kehoe-Midrigan Model

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	Model w/ Markdowns
Std(c)	0.45

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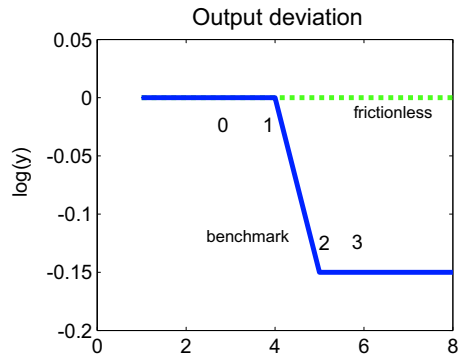
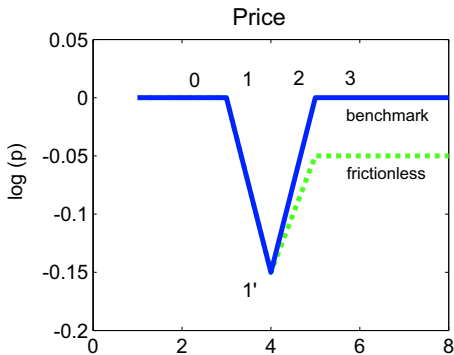
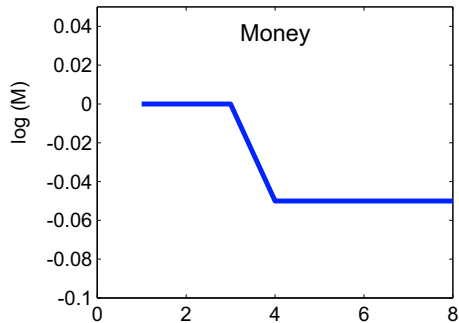
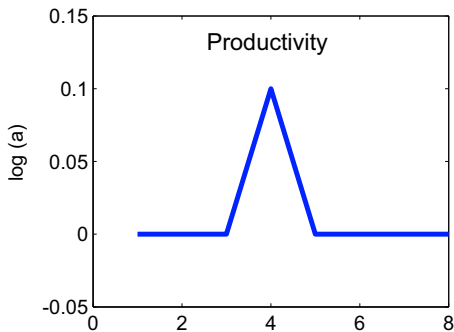
## Approximations using Standard Models (No Markdowns)

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	Match Freq. w/ Sales	Match Freq. No Sales	Match Freq at Mode
Std(c)	0.10	0.59	0.44

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Figure 13: response to productivity and money shock:  
model with markdowns



## My Comments

1. How general is the argument?
  - Clearance sales in durable goods
  - Other “mechanical” explanations for sales
2. Static vs. dynamic models of sales
3. Sale filter: Importance of 13 moments

## 1. Temporary vs. Permanent price changes

Kehoe and Midrigan: Focus on sales that often return to orig. price

Sectoral heterogeneity:

- Clearance sales common in durable goods
- e.g. Clothing
- Clearance sales often precede product turnover
- Price doesn't return to original

Can we apply Kehoe-Midrigan intuition?

Table: Clearance Sales by Major Group 1998-2005

Major Group	weight	Clearance Sales		Sales	Price Changes		
		Frac. Sale Spells	Frac. Price Ch	Frac. Price Ch.	Freq.	Freq.Reg.	Freq. Reg+Clear
Processed Food	8.2	2.7	0.5	57.7	25.9	10.5	10.7
Unprocessed Food	5.9	2.3	0.3	40.4	37.3	25.0	25.5
Household Furnishing	5.0	15.8	3.5	67.3	19.4	6.0	8.6
Apparel	6.5	30.6	14.7	87.9	31.0	3.6	13.3
Transportation Goods	8.3	0.0	0.0	0.0	31.3	31.3	31.3
Recreation Goods	3.6	21.4	2.6	50.0	11.9	6.0	6.2
Other Goods	5.4	6.5	0.4	31.0	15.5	15.0	15.0
Utilities	5.3	0.0	0.0	0.0	38.1	38.1	38.1
Vehicle Fuel	5.1	1.8	0.0	0.0	87.6	87.6	87.6
Travel	5.5	5.7	0.1	2.4	42.8	41.7	41.8
Services (excl. Travel)	38.5	0.0	0.0	0.0	6.6	6.1	6.1
All Sectors	100.0	1.8	0.0	2.4	19.4	8.7	10.7

## Simple model of clearance sales

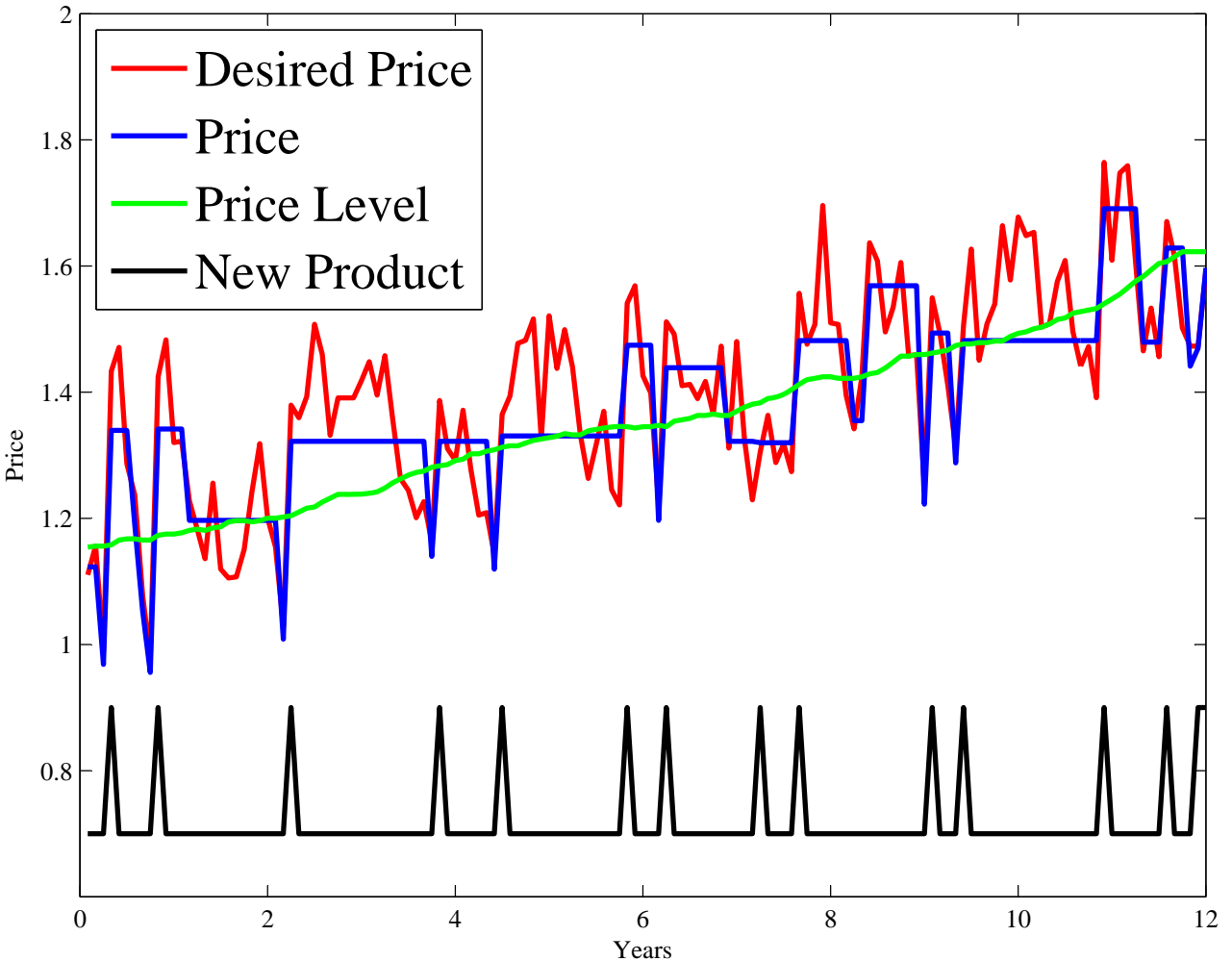
- Firms can choose to either change reg. price or do temporary markdown at lower menu costs (as in Kehoe-Midrigan)
- Products are replaced when desired price (marginal cost) falls below a certain threshold
- New products have marginal cost drawn from unconditional distribution
- New prices are chosen “for free” when new products introduced

## Simple model of clearance sales (cont'd)

### Model implications

- Firms approaching cutoff for replacement avoid reg. price changes
- Choose markdowns when price change is intended to be temporary (as in Kehoe-Midrigan)
- Model generates “clearance sales” before prod. substitutions

Nominal Price and Nominal Costs



## Simple model of clearance sales (cont'd)

- No sales:
  - Freq = 0.10: Std(c) = 2.5
  - Freq. = 0.22: Std(c) = 1.5
- Include sales:  
Freq. = 0.22, Reg. = 0.10: Std(c) = 2

Models without sales do not provide good approx. to model w/  
clearance sales

## Simple model of clearance sales (cont'd)

Key insight: In standard menu cost model, price changes allocated very “efficiently” in raising agg. inflation

- Extreme case: Caplin-Spulber → No monetary non-neutrality
- Sale price changes may be allocated less efficiently

Concern: Alternative “mechanical” models of temp. price changes would yield different results

- V-shaped cost shocks generate “sales” → Similar agg. implications to standard menu cost model?
- No need to distinguish between sale and non-sale price changes?

## Analogy to Seasonal Adjustment

Two ways of interpreting seasonality of price changes:

1. Seasonality in timing of pricing decisions → Taylor model
  - Timing of price changes exogenous → Much greater effects of monetary shocks
2. Seasonal shocks to costs
  - No fundamental difference in pricing model
  - Monetary non-neutrality similar to standard model?

## 2. Static vs. Dynamic pricing models

- Kehoe and Midrigan: Timing of sales arises from permanent vs. temporary movements in “desired prices”
- Dixit-Stiglitz demand → Desired price is constant mark-up over marginal cost
- Variation in prices  $\approx$  variation in marginal costs
- “Productivity” is highly transitory:  $\rho = 0.3$  at weekly frequency

## Static vs. Dynamic pricing models (cont'd)

Is this a reasonable model of desired prices?

I studied comovement of prices across retailers within a city for identical UPC's:

- Individual price series are close to serially uncorrelated
- Low correlation across retailers within a city

→ Dixit-Stiglitz model requires highly transient shocks to productivity / elasticity

Shocks must be uncorrelated across retailers for same UPC (don't reflect production costs)

## Static vs. Dynamic pricing models (cont'd)

### Dynamic pricing models

- Price Discrimination at the retail level (Sobel, 1984)
- Mixed strategy price equilibrium due to search (Varian, 1980)
- Inventory Management (Lazear, 1986)
  - Due to unpredictable shifts in taste (fashion)
  - Due to changes in aggregate demand

Diff. pricing model → Diff. aggregate implications?

### 3. Sale filter

Kehoe+Midrigan: Consider sale filter similar to filter from AC Nielsen ERIM database

Advantages: Elegant, generates intuitive “regular” price series

Disadvantages: Hard to interpret without fitting several moments

- Not “conservative” in identifying sales
- Filter generates substantial fraction of sales when prices are perfectly flexible

## Conclusion

Important new work on how to interpret micro price flexibility

- Temporary sales → diff. real effects of monetary shocks even if sales are chosen “optimally”
- Similar intuition for clearance sales

## Challenges

- Different “mechanical” model of sales may have different agg. implications e.g. V-shaped costs
- Dixit-Stiglitz model for desired prices → Implies highly transient costs, uncorrelated across retailers
- What are these cost shocks?
- Dynamic pricing models may be more plausible: Diff conclusions for monetary policy?