Comments on

Incomplete Cost Pass-through Under Deep Habits
M. Ravn, S. Schmitt-Grohé, M. Uribe

by

Jaime Marquez

Federal Reserve Board

Structure

- Goal: To explain two empirical findings
  - that marginal cost shocks are not fully passed through to prices
  - that prices are substantially less volatile than costs
- Approach: To develop a theoretical model capable of explaining these findings.
- Theoretical model focuses on
  - consumers with deep habits
  - firms that exploit interactions between deep habits and persistence of marginal-cost shocks
- Results
  - No closed-form solution: not surprising given the complexity of model.
  - Incomplete pass-through relies on simulations of calibrated model.

Deep Habits: Demand Side

- CES utility function
  - η>1: Elasticity of substitution
- *s*: Stock of habits
  - θ<0: degree of time non-separability
  - θ =0 means no habit
- Comment 1
  - Why is θ exogenously given and common across products? Being exogenous means that they were solved in a different problem.
- Comment 2
  - The term "habit" conveys the notion of little substitutability: heroin.
  - So, hard time reconciling deep habits with large elasticity of substitution.
- Comment 3
  - Why is it that habit for *jth* person depends on collective habits?
- Comment 4
  - Paper seems a special case of Becker and Murphy (JPE, 1988)

$$x_t^j = \left[\int \left(\frac{c_{it}^j}{s_{i,t-1}^{\theta}} \right)^{1-(1/\eta)} di \right]^{\frac{1}{1-(1/\eta)}}$$

$$s_{it} = \rho \cdot s_{i,t-1} + (1-\rho) \cdot c_{it}$$

"A Theory of Rational Addiction," Becker and Murphy, *JPE*, 1988

$$u(t=0) = \int_0^T e^{-\sigma t} \cdot u[y(t), c(t), S(t)]dt$$

$$\dot{S}_t = c(t) - \delta S(t) - h[D(t)]$$

- Utility depends on
  - y(t) non-habit,
  - c(t) habit
  - S(t): stock of habit
- D(t): expenditures on endogenous depreciation
- Comment 1
  - General utility function
  - Addiction (or habit) is determined endogenously via inter-temporal utility maximization.
- Comment 2
  - Addiction: interaction between persons and goods (p. 682).
- Comment 3
  - Addiction implies that an increase in *c* increases future consumption of *c.*
  - Ravn et. al. have this property but it is assumed rather than determined.

Multiplicative versus Additive Habits

- Paper examines implication of additive habits.
- Authors not enthusiastic about this variant because prices can rise more than marginal cost (p. 16).
- Are we ruling out a priori cases that do not conform with previous empirical studies?
- Are we going to let an arbitrary utility function determine what can happen?

$$x_t^j = \left[\int \left(c_{it}^j - \theta \cdot s_{i,t-1} \right)^{1-(1/\eta)} di \right]^{\frac{1}{1-(1/\eta)}}$$

If so, then why not?

"Habit Formation and Dynamic Demand Functions," Pollak, JPE, 1970

$$U(X_t) = \sum_k a_k \log(x_{kt} - b_{kt})$$

$$b_{kt} = b_k^* + \beta_k x_{k,t-1}$$

or

"Habit Formation and Intertemporal Substitution in Individual Food Consumption," Naik and Moore, *REStat*, 1996

$$U(c_{it}, x_{it}) = \frac{(c_{it} - x_{it})^{\gamma_i}}{\gamma_i}$$

$$x_{it} = x_{i0}e^{-a_i t} + b_i \int_0^t e^{a_i (s-t)} c_{is} ds$$

Evaluation of Strategy

- What is lost?
  - The loss of generality by treating habits as exogenous: changes in prices leave the degree of habit formation unchanged.
- What is gained?
  - The ease to work out the interactions in the market with implications for understanding pass-through.
  - The implementation of numerical simulations of a calibrated model.
  - The interpretation of parameters is crisp.
- But to me, simulations of calibrated models do not translate into inferences about the world.

My two cents on Incomplete Pass-through

- Question: Is there incomplete pass-through in the oil market?

- Why oil?
  - Oil consumption lacks good substitutes and fits the notion of habits.
  - Availability of detailed data.

Multi-country Data

- Eight Countries: G-7+ Spain

- Data on
  - Gasoline prices:
    - Local currency
    - With and without taxes
    - October 2006 to September 2007

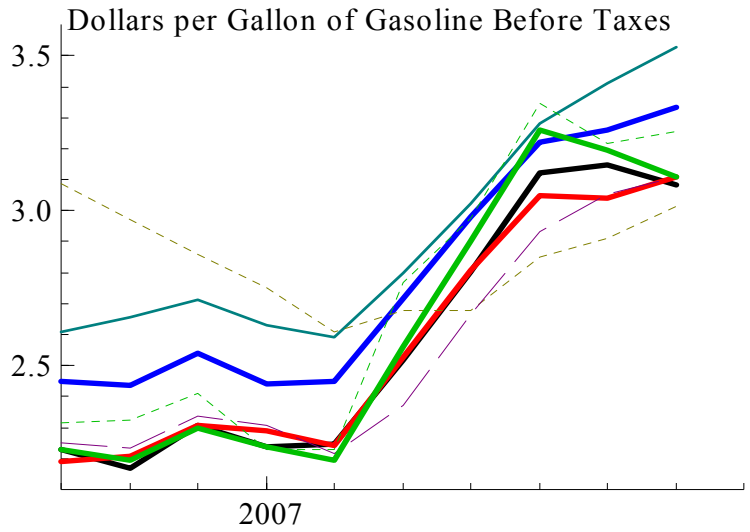
  - Nominal bilateral exchange rates

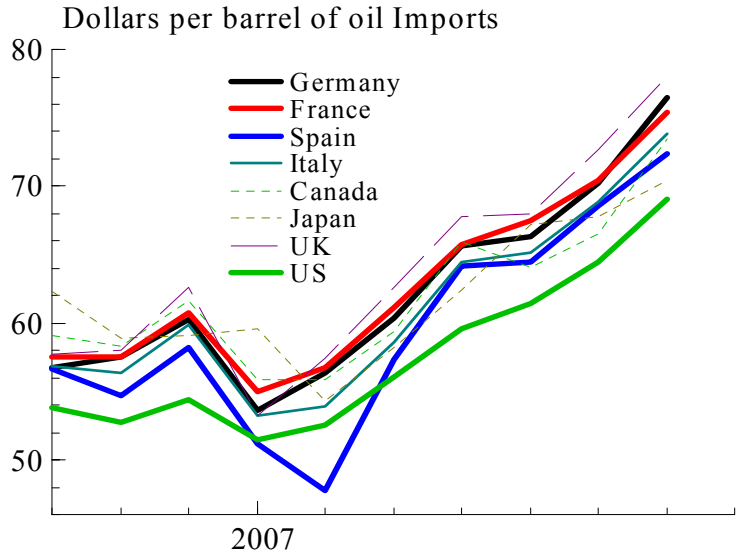
  - "Marginal Cost":
    - Country-specific oil-import price in US$
    - October 2006 to July 2007

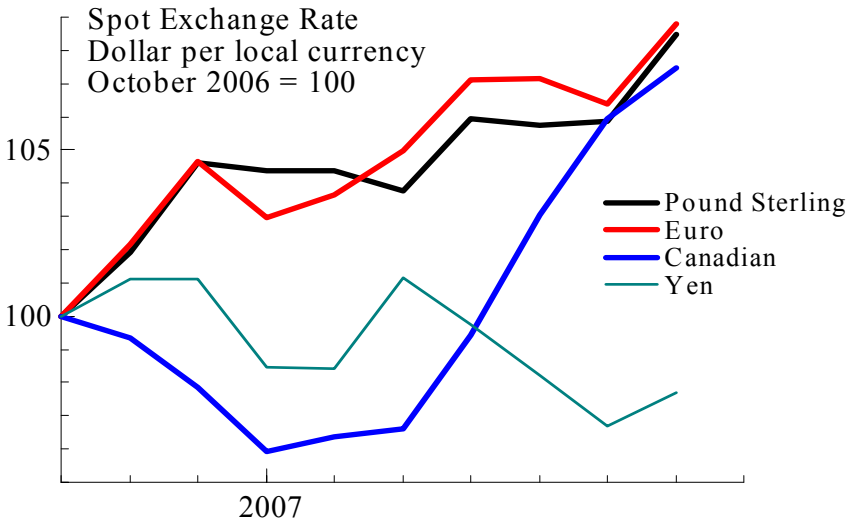
- Sample is short but not without advantages:
  - OK to treat supply of oil as fixed.
  - OK to treat as given other factors affecting the marginal cost (wages).
  - Big Limitation: Sample only for the upswing of marginal costs – longer span is needed.

Source: International Energy Agency, International Monetary Fund.

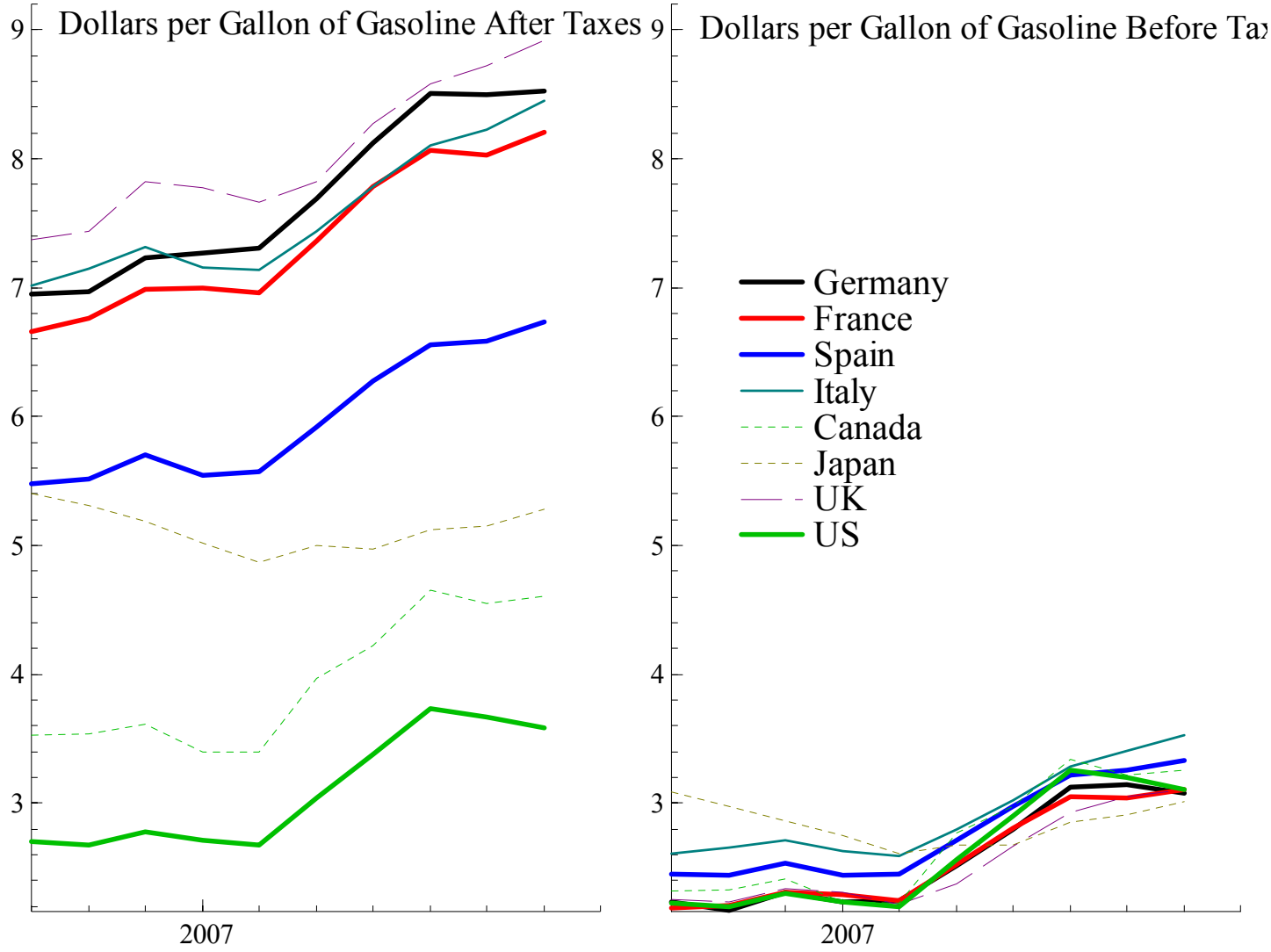
Gasoline Prices and Oil-import Prices







Taxes are important



Empirical Modeling

$$\ln P_t^{lc} = \alpha + \beta \ln(P_{t-1}^{lc}) + \lambda \ln\left(\frac{PoilM_t^{\$}}{E_t^{\$/lc}}\right) + u_t$$

$$\ln P_t^{lc} = \alpha + \beta \ln P_{t-1}^{lc} + \lambda \ln PoilM_t^{\$} + \varphi \ln E_t^{\$/lc} + u_t$$

$$\lambda > 0, \varphi < 0$$

Homegeneity

$$\lambda = -\varphi$$

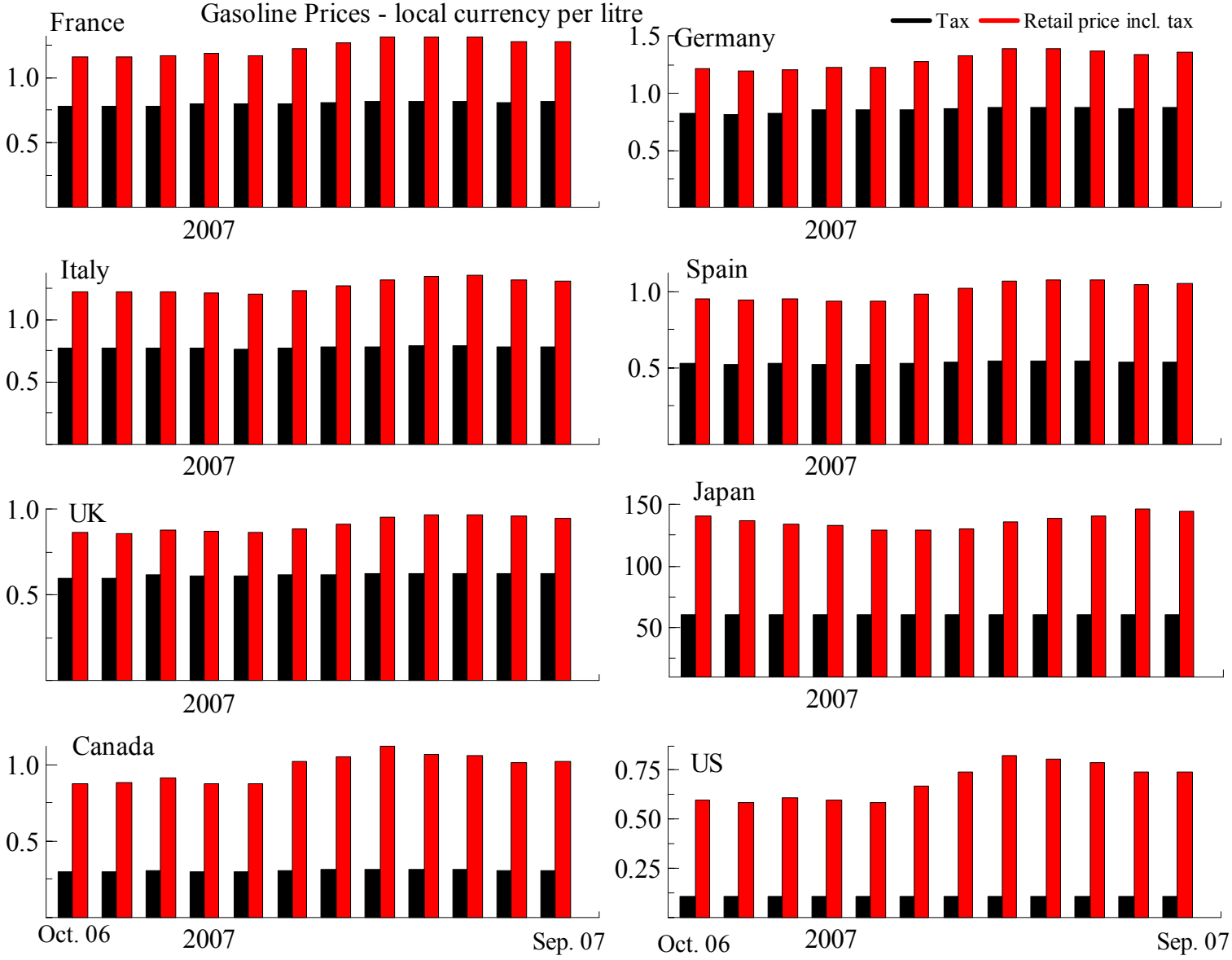
Incomplete Pass – through

$$\frac{\varphi}{1-\beta} < -1$$

Estimated Pass-through, Dynamic-Panel Estimation*

	Excl. Taxes	Inc. Taxes
Lagged Price of Gas (local currency)	0.785	0.969
SE	0.045	0.004
Bilateral Exchange Rate ($/local)	-0.213	-0.027
SE	0.045	0.004
Price oil imports ($)	0.295	0.072
SE	0.043	0.021
Implied long-run values:		
Exchange rate	-0.990	-0.860
Price of oil imports	1.373	2.301
Rsqrd	0.990	0.990
Serial Independence	0.646	0.134
No. observations	72	72

* Arellano-Bond method; robust standard errors
Eight countries; monthly observations from October 2006 to July 2007


Gasoline Prices - local currency per litre
Tax
Retail price incl. tax
France
Germany
Italy
Spain
UK
Japan
Canada
US
1.0
0.5
1.5
150
100
50
0.75
0.50
0.25
2007
Oct. 06
Sep. 07

U.S. data

- Marginal cost
  - Refiner's acquisition of oil imports.

- Price:
  - Retail gasoline price for regular, U.S. average.
  - Excluding all taxes (federal, state, local).

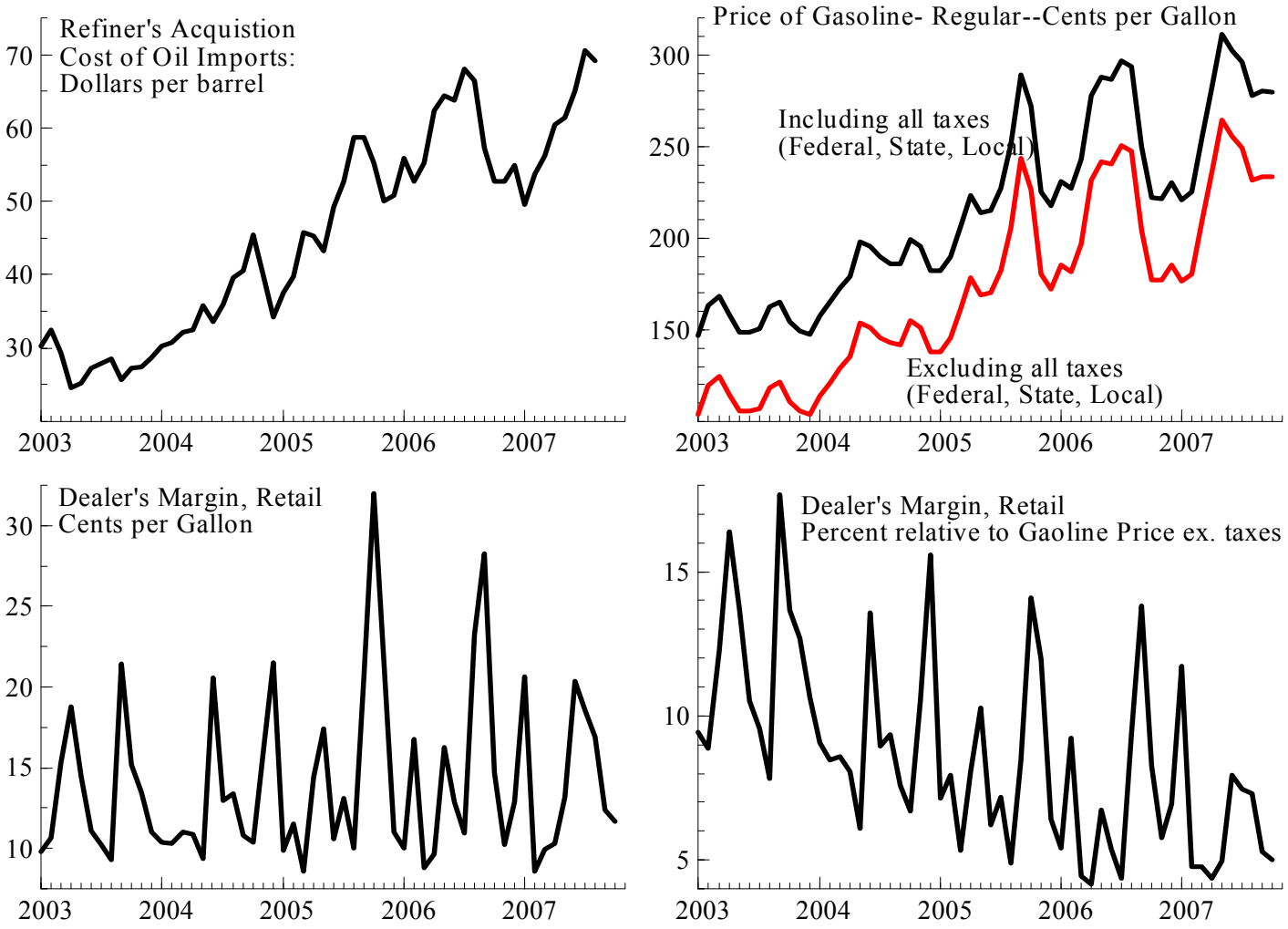
- Before-tax dealer's margin at the retail level.

- Monthly data: January 2003 to October 2007.

- Observations capture only the upswing in oil prices: longer span is needed.

Sources: Energy Information Administration; Retail Fuel Watch from the Oil Price Information Service.

Prices, Marginal Costs, and Margins: U.S. Gasoline Market



Empirical Framework

$$\ln P_t = \alpha + \beta(L)\ln P_{t-1} + \lambda(L)\ln PoilM_t + seasonals + katrina + u_t$$

$$\beta(L) = \beta_1 + \beta_2 \cdot L$$

$$\beta(1) = Persistence$$

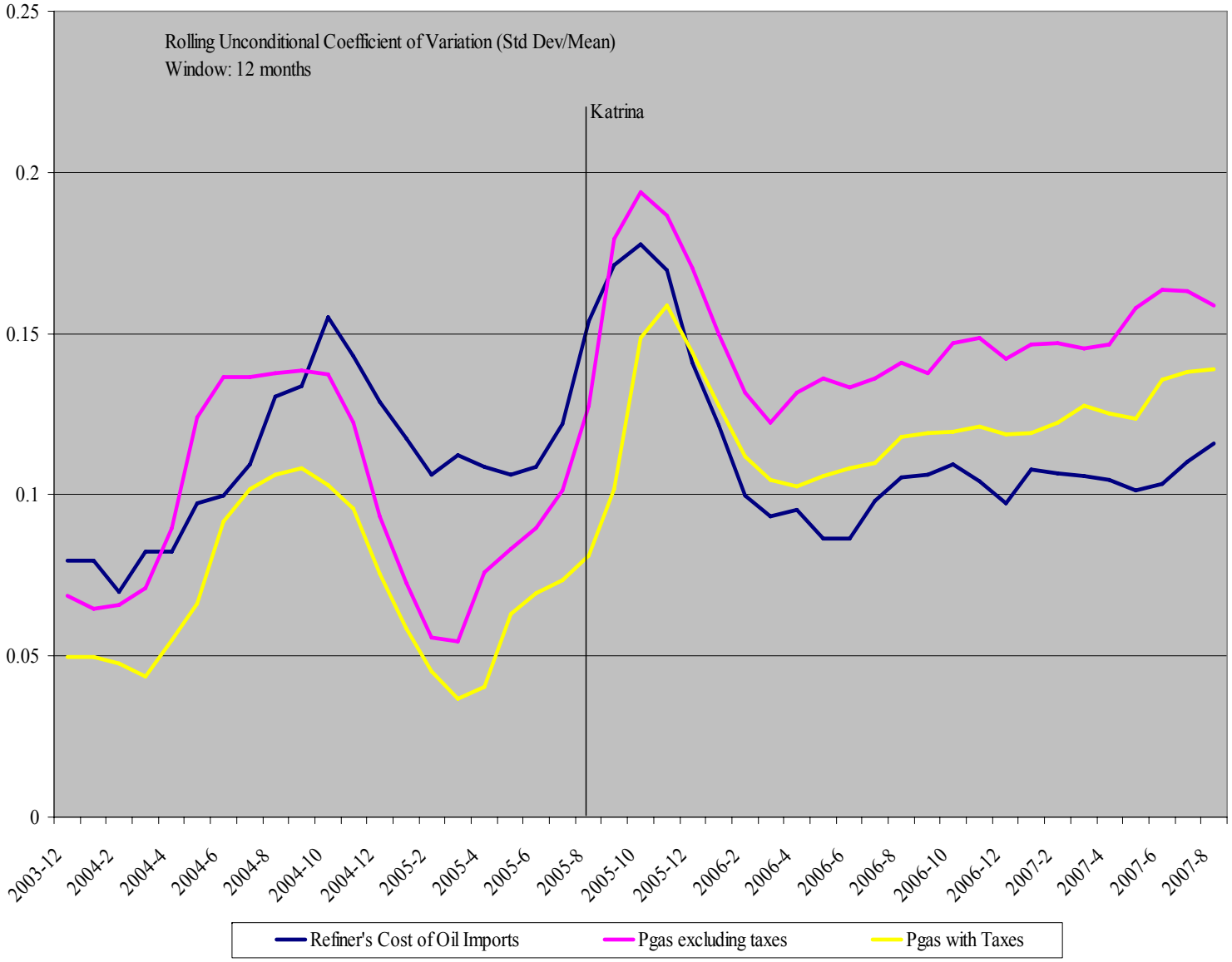
$$\lambda(L) = \lambda_0 + \lambda_1 \cdot L + \lambda_2 \cdot L^2$$

$$Pass - through = \frac{\lambda(1)}{1 - \beta(1)}$$

Pass-Through in U.S. Gasoline Market
OLS, Monthly data: July 2003--Ocotber 2007

	Excl. Taxes	Incl. Taxes
Pass-through: $\lambda/(1-\beta)$	0.83	0.66
SE	0.03	0.02
Persistence	0.36	0.40
SE	0.12	0.11
Radj^2	0.98	0.98
Test (p. values)		
Chow(2005:6)	0.70	0.50
Chow(2007:3)	0.18	0.15
Normality test	0.35	0.29
Serial Independence	0.87	0.97
Homoskedasticity	0.86	0.77

Unconditional Coefficient of Variation



Conclusions

- Well written and quite informative paper.
- Numerical simulations highlight importance of theoretical issues in modeling the interaction between preferences (habits) and dynamic-price setting.
- By the standard of stimulating curiosity in others, the paper is great.
- Three points:
  - The paper needs to relate to the existing literature.
  - The paper needs to include statistical evidence to be persuasive.
  - My truly preliminary results suggest that incomplete pass-through is potentially more sensitive to the handling of taxes than to the presence of habits.