Comments on

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

by

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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
  - $\eta > 1$: Elasticity of substitution

- $s$: Stock of habits
  - $\theta < 0$: degree of time non-separability
  - $\theta = 0$ means no habit

- Comment 1
  - Why is $\theta$ 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 $j^{th}$ person depends on collective habits?

- Comment 4
  - Paper seems a special case of Becker and Murphy (JPE, 1988)

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

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

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

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

- 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?

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


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

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

Gasoline Prices and Oil-import Prices

- **Dollars per Gallon of Gasoline Before Taxes**
- **Dollars per barrel of Oil Imports**
- **Spot Exchange Rate**
  - Dollar per local currency
  - October 2006 = 100

Graphs showing trends in gasoline prices and oil-import prices, along with spot exchange rates.
Taxes are important

Dollars per Gallon of Gasoline After Taxes

Dollars per Gallon of Gasoline Before Tax

- Germany
- France
- Spain
- Italy
- Canada
- Japan
- UK
- US
Empirical Modeling

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

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

\[
\lambda > 0, \varphi < 0
\]

**Homegeneity**

\[
\lambda = -\varphi
\]

**Incomplete Pass–through**

\[
\frac{\varphi}{1-\beta} < -1
\]
### Estimated Pass-through, Dynamic-Panel Estimation*

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

* Arellano-Bond method; robust standard errors
Eight countries; monthly observations from October 2006 to July 2007
Gasoline Prices - local currency per litre

France

Germany

Italy

Spain

UK

Japan

Canada

US

Oct. 06
2007
Sep. 07
Oct. 06
2007
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

Refiner's Acquisition Cost of Oil Imports: Dollars per barrel

Price of Gasoline- Regular--Cents per Gallon
- Including all taxes (Federal, State, Local)
- Excluding all taxes (Federal, State, Local)

Dealer's Margin, Retail - Cents per Gallon
- Percent relative to Gasoline Price ex. taxes
Empirical Framework

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

\[ \beta(L) = \beta_1 + \beta_2 \cdot L \]

\[ \beta(1) = \text{Persistence} \]

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

\[ \text{Pass-through} = \frac{\lambda(1)}{1 - \beta(1)} \]
Pass-Through in U.S. Gasoline Market
OLS, Monthly data: July 2003--Ocotber 2007

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

Rolling Unconditional Coefficient of Variation (Std Dev/Mean)
Window: 12 months

Refiner's Cost of Oil Imports
Pgas excluding taxes
Pgas with Taxes

Katrina
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.