

# Discussion of “Currency Choice and Exchange Rate Pass-Through”

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October 19, 2007

Contributions:

Evidence:

1. Correlation between pass-through and currency of invoicing
  - Dollar-priced : 25% vs. non-dollar priced: 95%
  - Explains a substantial amount of cross-country variation
  - Implies low overall pass-through for the U.S.
2. Long lags in response of prices to exchange rates
  - Medium run pass-through: 0.24 vs. Long-run: 0.5
  - Max occurs after more than 24 months
  - Respond to exchange rate changes *before* last price adjustment
  - Delays arise for dollar-priced goods

## Data

Novel BLS micro-data on import prices (Gopinath+Rigobon, 2007)

- Distinguish between dollar and non-dollar priced goods
- Include only transaction prices, drop intra-firm prices
- Observe time since last price change

Challenges:

- Long-term relationships / bargaining
- Survey data
- Gaps in price series

Contributions:

Theory:

1. Currency invoicing model: Explains pass-through LCP vs. PCP
  - Producer chooses between pricing an export good in own vs. buyer's currency (Engel, 2006; Goldberg and Tille, 2007)
  - Prices are sticky in currency of invoicing: adjust with prob.  $1 - \alpha$
  - Set currency of invoicing to minimize  $|p - p^*|$
  - Price in own currency if  $\frac{\partial p^*}{\partial e}$  large; otherwise buyer's currency
  - Relationship between  $e$  and  $p^*$  depends on: local costs, “pricing to market”, imported inputs etc.

Contributions:

Theory:

2. Strategic complementarities: Explain long delays in pass-through
  - Kimball demand: Firms do not want prices to deviate too much from competitors
  - Conditional on adjusting, firms only adjust partially
  - Prices continue to respond to exchange rate changes long after all prices have adjusted
  - Delayed response  $>$  “contract length”

## My Comments

1. Correlation between pass-through and currency of invoicing
  - Evidence: Measurement error
  - Theory:  $\frac{\partial p^*}{\partial e} \rightarrow$  Invoicing or Invoicing  $\rightarrow \frac{\partial p^*}{\partial e} ?$
2. Long lags in response of prices to exchange rates
  - Evidence: Micro vs. Macro puzzle
  - Theory: Size of price changes

## 1. Pass-Through: Evidence

GIR present evidence of difference in pass-through for PCP vs. LCP  
*conditional* on adjustment

Pass-through Regression:  $\Delta p = \alpha + \beta \Delta E + \epsilon$

Many products not imported in every month  $\rightarrow$  Gaps in price series  
(also within months)

Other potential sources of error in timing of price changes: Survey data, long term contracts

Concern: Measurement error in  $\Delta E$  and  $\Delta p$

## Gaps in Price Series

Month	1	2	3	4	5	6	7	8	9	10
Obs.	X	X	O	O	O	O	O	X	X	X
P	5	5						3	3	3
ER	53	43	37	36	41	39	35	32	30	29
GIR	0	0	0	0	0	0	0	1	0	0
Alt?	0	0	1	0	0	0	0	0	0	0

→  $\Delta P$  and  $\Delta ER$  are observed with error

## 1. Pass-Through: Evidence (cont'd)

Measurement error in timing of price changes implies:

- Underestimate pass-through for LCP goods (attenuation bias)
- Overestimate pass-through for PCP goods (attenuation bias in firm's ability to *stabilize* prices)

### My Simulation

- Actual exchange rate data
- Month of price change observed with error: Uniform on  $[-2,2]$
- True Pass-Through: 0.5 for both LCP and PCP
- Estimated Pass-Through: 0.24 for LCP and 0.76 for PCP

Similar asymmetric effect if data include list prices with lower response to exchange rate (Stigler+Kindahl): LCP ↓ PCP ↑

## 1. Pass-Through: Theory

What explains correlation between pass-through and currency of invoicing?

GIR: Correlation reflects selection on desired pass-through

Desired pass-through  $\rightarrow$  Currency of Invoicing

- Low desired pass-through  $\rightarrow$  LCP
- High desired pass-through  $\rightarrow$  PCP

Key result: Currency of invoicing has no effect on  $p^*$

## 1. Pass-Through: Theory (cont'd)

Alternative view: Currency of Invoicing → Desired pass-through

### Evidence

- $\frac{\partial p^*}{\partial e}$  likely to be more homogeneous within narrow product groups  
→ Expect smaller diff LCP vs. PCP
- GIR (2007, earlier version): Diff. in pass-through between PCP and LCP firms *does not* decline even within 10 digit prod. categories
- Pass-Through drops dramatically for items that *switch* from PCP to LCP

## 1. Pass-Through: Theory (cont'd)

Suppose firms *choose* whether to set separate export price, or set same price to all customers

- GR (2007): Many exporters set same price for multiple markets
- Suppose prices set in US dollars are mostly unique to the US market, while prices set in foreign currency are mostly shared with consumers in country of origin
- LCP → Low desired pass-through
- US customers care about US\$ price; domestic customers do not

Currency of Invoicing → Desired pass-through

Example: Amazon.com

Amazon.com (starts shipping 1994)

Amazon.co.uk (UK): 1998, Amazon.de (Germany): 1998, Amazon.jp (Japan): 2000, Amazon.fr (France): 2000, Amazon.ca (Canada): 2002,

- Pre 2002: Amazon.com (PCP) prices respond primarily to US demand
- Post 2002: Amazon.ca (LCP) prices respond primarily to Canadian demand

Currency of Invoicing → Desired pass-through

Effect does not arise in currency invoicing model (all firms set separate export prices)

## 1. Pass-Through: Theory (cont'd)

GIR: Price rigidity is central to LCP vs. PCP pass-through

- Commodities: LCP for US, PCP for Europe
- No price rigidity
- Commodity price pass-through much lower in Europe than US (Goldberg and Campa, 2006)
- GR (2007) show flexible priced goods have *lower* pass-through than sticky price goods

Need other ways of thinking about currency choice with flexible prices

Preferences of buyers? Bargaining?

## 2. Lagged Response: Evidence

### Micro vs. Macro Puzzle

- Macro evidence: GIR replicate standard finding that most pass-through occurs in first year; levels off soon after
- Micro evidence: Half of ER response occurs after first 11 months (dollar-priced goods)

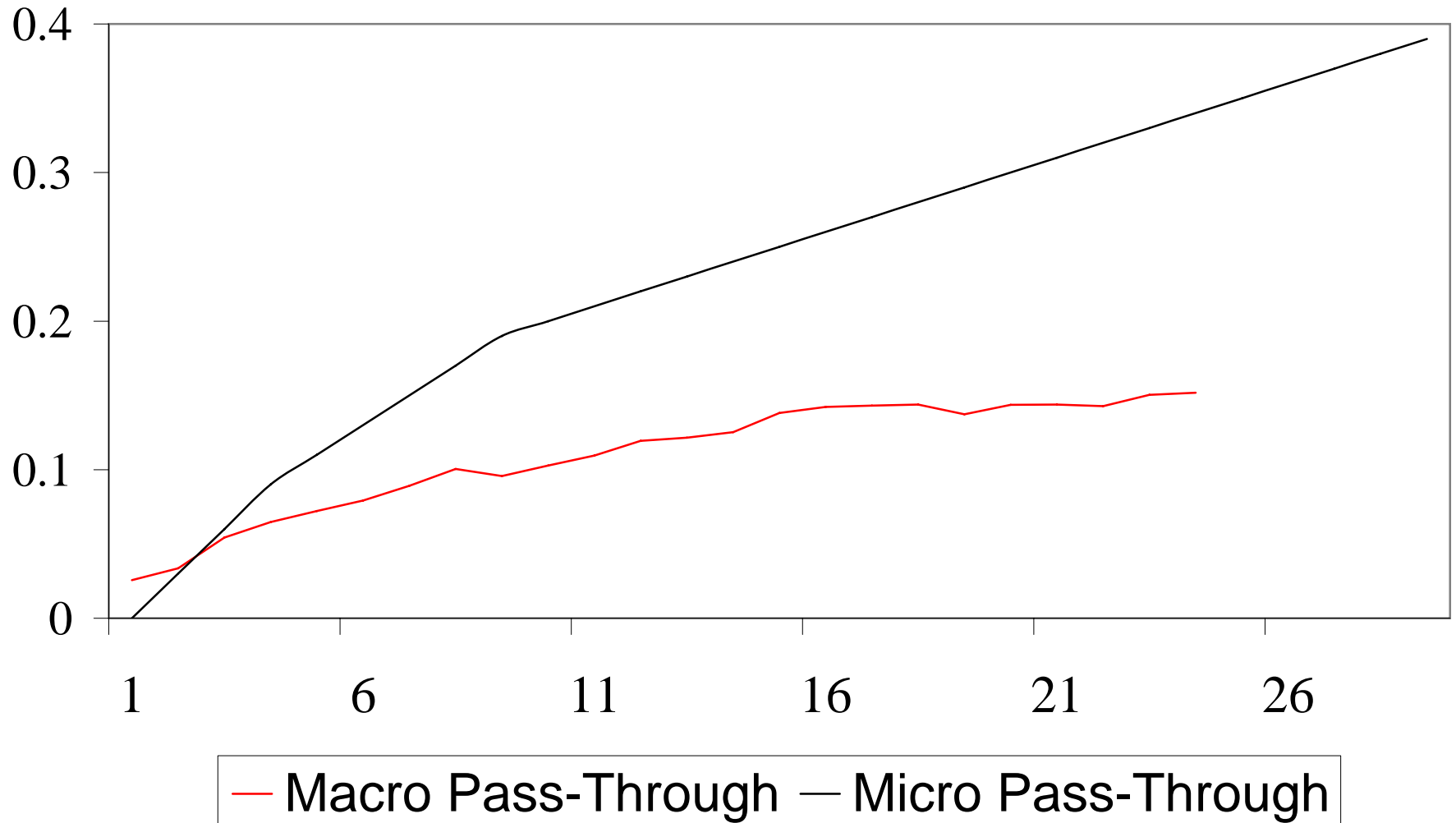
### Pass-Through Regressions for Dollar Priced goods

$\Delta p$  on  $\Delta e_{t-1}$  (since last adj): 0.25

$\Delta p$  on  $\Delta e_{t-1}$   $\Delta e_{t-2}$ : 0.46

$\Delta p$  on  $\Delta e$  over obs. period: 0.51

# Micro vs. Macro Evidence (\$ Invoiced)



## 2. Lagged Response: Evidence (cont'd)

Micro regression:  $\Delta p$  for identical items only

Macro regression: Index sets  $\Delta p = 0$  during product substitutions  
→ downward bias

Could substitutions explain micro vs. macro puzzle?

- Kimball model implies prices respond to lagged ER via sluggish response of aggregate index (also other models strat. comp.)
- Implies that even new products respond to old ER shocks
- e.g. New car introduced  $t=15$  still responds to  $t=1$  exchange rate shock (via aggregate index)

Treatment of substitutions doesn't seem to resolve puzzle

## 2. Lagged Response: Theory

### Kimball strategic complementarity

- Implies small price changes (Klenow and Willis, 2006)
- Firms do not want prices to deviate much from competitors
- Hard to reconcile with empirical evidence: Average size is 6-7% (GR, 2007)
- Monetary policy literature: “Aggregate” mechanisms for strategic complementarity more consistent with large price changes (Nakamura and Steinsson, 2007; Burstein and Hellwig, 2007)

## Conclusion

Important new evidence on relationship between pass-through and currency of invoicing

### Evidence

- Pass-Through: How important is measurement error?
- Delayed Response: How to reconcile micro and macro evidence?

### Theory

- Pass-Through: Are there important effects of currency of invoicing on desired pass-through, e.g. due to price discrimination?
- Is price rigidity key to correlation between invoicing currency and pass-through?
- How to reconcile Kimball demand model with large price changes?