

Marketing Frictions and International Pricing Puzzles by Lukasz Drozd and Jaromir Nosal

Discussant: Virgiliu Midrigan

Federal Reserve Bank of Minneapolis & New York University

January 4, 2007

Summary of results

- Reconciles IRBC theory with:
 - Positive correlation of real import/export prices with RER
 - Terms of trade less volatile than RER
 - Trade elasticities in short-run lower than in long-run
- Two key ingredients:
 - Bargaining: pricing to market
 - Market expansion frictions

Summary of results

- Reconciles IRBC theory with:
 - Positive correlation of real import/export prices with RER
 - Terms of trade less volatile than RER
 - Trade elasticities in short-run lower than in long-run
- Two key ingredients:
 - Bargaining: pricing to market
 - Market expansion frictions

Summary of results

- Reconciles IRBC theory with:
 - Positive correlation of real import/export prices with RER
 - Terms of trade less volatile than RER
 - Trade elasticities in short-run lower than in long-run
- Two key ingredients:
 - Bargaining: pricing to market
 - Market expansion frictions

Summary of results

- Reconciles IRBC theory with:
 - Positive correlation of real import/export prices with RER
 - Terms of trade less volatile than RER
 - Trade elasticities in short-run lower than in long-run

- Two key ingredients:
 - Bargaining: pricing to market
 - Market expansion frictions

Summary of results

- Reconciles IRBC theory with:
 - Positive correlation of real import/export prices with RER
 - Terms of trade less volatile than RER
 - Trade elasticities in short-run lower than in long-run
- Two key ingredients:
 - Bargaining: pricing to market
 - Market expansion frictions

Summary of results

- Reconciles IRBC theory with:
 - Positive correlation of real import/export prices with RER
 - Terms of trade less volatile than RER
 - Trade elasticities in short-run lower than in long-run
- Two key ingredients:
 - Bargaining: pricing to market
 - Market expansion frictions

Summary of results

- Reconciles IRBC theory with:
 - Positive correlation of real import/export prices with RER
 - Terms of trade less volatile than RER
 - Trade elasticities in short-run lower than in long-run
- Two key ingredients:
 - Bargaining: pricing to market
 - Market expansion frictions

Two key ingredients

- Bargaining: pricing to market

- Price of domestic good in Home:

$$p_d = (1 - \theta)v + \theta G_d, \quad G_d \sim \left(\frac{d}{f}\right)^{-1}$$

- Price of domestic good in Foreign:

$$p_x = (1 - \theta)v(s^t) + \theta_x G_d^*, \quad G_d^* \sim \left(\frac{d^*}{f^*}\right)^{-1}$$

- Market expansion frictions: slow down movement in $\frac{d}{f}$, $\frac{d^*}{f^*}$

Two key ingredients

- Bargaining: pricing to market

- Price of domestic good in Home:

$$p_d = (1 - \theta)v + \theta G_d, \quad G_d \sim \left(\frac{d}{f}\right)^{-1}$$

- Price of domestic good in Foreign:

$$p_x = (1 - \theta)v(s^t) + \theta_x G_d^*, \quad G_d^* \sim \left(\frac{d^*}{f^*}\right)^{-1}$$

- Market expansion frictions: slow down movement in $\frac{d}{f}$, $\frac{d^*}{f^*}$

Two key ingredients

- Bargaining: pricing to market

- Price of domestic good in Home:

$$p_d = (1 - \theta)v + \theta G_d, \quad G_d \sim \left(\frac{d}{f}\right)^{-1}$$

- Price of domestic good in Foreign:

$$p_x = (1 - \theta)v(s^t) + \theta_x G_d^*, \quad G_d^* \sim \left(\frac{d^*}{f^*}\right)^{-1}$$

- Market expansion frictions: slow down movement in $\frac{d}{f}$, $\frac{d^*}{f^*}$

Two key ingredients

- Bargaining: pricing to market

- Price of domestic good in Home:

$$p_d = (1 - \theta)v + \theta G_d, \quad G_d \sim \left(\frac{d}{f}\right)^{-1}$$

- Price of domestic good in Foreign:

$$p_x = (1 - \theta)v(s^t) + \theta_x G_d^*, \quad G_d^* \sim \left(\frac{d^*}{f^*}\right)^{-1}$$

- Market expansion frictions: slow down movement in $\frac{d}{f}$, $\frac{d^*}{f^*}$

Two key ingredients

- Bargaining: pricing to market

- Price of domestic good in Home:

$$p_d = (1 - \theta)v + \theta G_d, \quad G_d \sim \left(\frac{d}{f}\right)^{-1}$$

- Price of domestic good in Foreign:

$$p_x = (1 - \theta)v(s^t) + \theta_x G_d^*, \quad G_d^* \sim \left(\frac{d^*}{f^*}\right)^{-1}$$

- Market expansion frictions: slow down movement in $\frac{d}{f}, \frac{d^*}{f^*}$

Two key ingredients

- Bargaining: pricing to market

- Price of domestic good in Home:

$$p_d = (1 - \theta)v + \theta G_d, \quad G_d \sim \left(\frac{d}{f}\right)^{-1}$$

- Price of domestic good in Foreign:

$$p_x = (1 - \theta)v(s^t) + \theta_x G_d^*, \quad G_d^* \sim \left(\frac{d^*}{f^*}\right)^{-1}$$

- Market expansion frictions: slow down movement in $\frac{d}{f}$, $\frac{d^*}{f^*}$

Market expansion frictions

$$p_d = (1 - \theta)v + \theta G_d, \quad G_d \sim \left(\frac{d}{f}\right)^{-1}$$

$$p_d^* = (1 - \theta)v(s^t) + \theta x G_d^*, \quad G_d^* \sim \left(\frac{d^*}{f^*}\right)^{-1}$$

- Selling the good requires marketing capital: $d \leq \frac{m_d}{\bar{m}_d + \bar{m}_f} h$
- Expanding market capital is costly: $m_d = m_{d,-1}^\phi a^{1-\phi}$

$$p_d = (1 - \theta)v + \theta G_d, \quad G_d \sim \left(\frac{d}{f}\right)^{-1}$$

$$p_d^* = (1 - \theta)v(s^t) + \theta x G_d^*, \quad G_d^* \sim \left(\frac{d^*}{f^*}\right)^{-1}$$

- Selling the good requires marketing capital: $d \leq \frac{m_d}{\bar{m}_d + \bar{m}_f} h$
- Expanding market capital is costly: $m_d = m_{d,-1}^\phi a^{1-\phi}$

$$p_d = (1 - \theta)v + \theta G_d, \quad G_d \sim \left(\frac{d}{f}\right)^{-1}$$

$$p_d^* = (1 - \theta)v(s^t) + \theta x G_d^*, \quad G_d^* \sim \left(\frac{d^*}{f^*}\right)^{-1}$$

- Selling the good requires marketing capital: $d \leq \frac{m_d}{\bar{m}_d + \bar{m}_f} h$
- Expanding market capital is costly: $m_d = m_{d,-1}^\phi a^{1-\phi}$

- Excellent paper
- Reconciles both pricing and quantity puzzles
- Shows pricing puzzles can be resolved if one gets response of quantities right
- Introduces novel friction that can potentially address other issues

- Excellent paper
- Reconciles both pricing and quantity puzzles
- Shows pricing puzzles can be resolved if one gets response of quantities right
- Introduces novel friction that can potentially address other issues

- Excellent paper
- Reconciles both pricing and quantity puzzles
- Shows pricing puzzles can be resolved if one gets response of quantities right
- Introduces novel friction that can potentially address other issues

- Excellent paper
- Reconciles both pricing and quantity puzzles
- Shows pricing puzzles can be resolved if one gets response of quantities right
- Introduces novel friction that can potentially address other issues

Market expansion frictions can address other issues

- Critics may argue:
 - Model generates too little RER volatility.
 - Silent on positive NER/RER correlation
 - Need nominal frictions, e.g. menu costs
- Midrigan (2006): nominal frictions alone can't account for positive corr. between NER and RER volatility
 - Need frictions that dampen response of quantities to relative price movements

Market expansion frictions can address other issues

- Critics may argue:
 - Model generates too little RER volatility.
 - Silent on positive NER/RER correlation
 - Need nominal frictions, e.g. menu costs
- Midrigan (2006): nominal frictions alone can't account for positive corr. between NER and RER volatility
 - Need frictions that dampen response of quantities to relative price movements

Market expansion frictions can address other issues

- Critics may argue:
 - Model generates too little RER volatility.
 - Silent on positive NER/RER correlation
 - Need nominal frictions, e.g. menu costs
- Midrigan (2006): nominal frictions alone can't account for positive corr. between NER and RER volatility
 - Need frictions that dampen response of quantities to relative price movements

Market expansion frictions can address other issues

- Critics may argue:
 - Model generates too little RER volatility.
 - Silent on positive NER/RER correlation
 - Need nominal frictions, e.g. menu costs
- Midrigan (2006): nominal frictions alone can't account for positive corr. between NER and RER volatility
 - Need frictions that dampen response of quantities to relative price movements

Market expansion frictions can address other issues

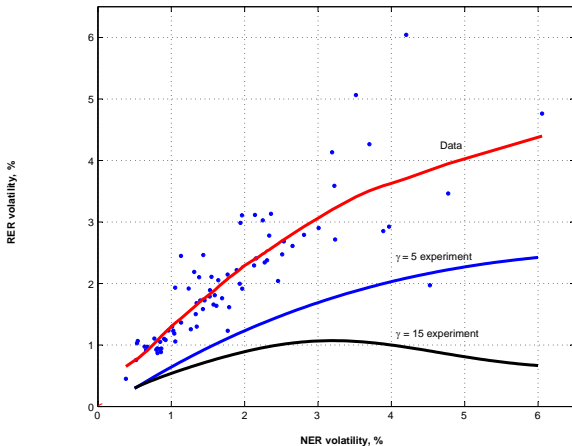
- Critics may argue:
 - Model generates too little RER volatility.
 - Silent on positive NER/RER correlation
 - Need nominal frictions, e.g. menu costs
- Midrigan (2006): nominal frictions alone can't account for positive corr. between NER and RER volatility
 - Need frictions that dampen response of quantities to relative price movements

Market expansion frictions can address other issues

- Critics may argue:
 - Model generates too little RER volatility.
 - Silent on positive NER/RER correlation
 - Need nominal frictions, e.g. menu costs
- Midrigan (2006): nominal frictions alone can't account for positive corr. between NER and RER volatility
 - Need frictions that dampen response of quantities to relative price movements

Model with nominal frictions need trade frictions as well

Figure 9: Real vs. Nominal Exchange Rates
Model vs. Data



Similar issues in retail markets

- Price elasticities of demand are low
 - Nevo 2001, cereals: -3
 - Chevalier et. al 2003, cheese: -1.2, tuna: -2.2, crackers: -1.9, cookies: -3.6, beer: -5.7
 - Dominicks' experiment: 10% price increase → 3% fall in quantities
- Price-cost margins too low

Similar issues in retail markets

- Price elasticities of demand are low
 - Nevo 2001, cereals: -3
 - Chevalier et. al 2003, cheese: -1.2, tuna: -2.2, crackers: -1.9, cookies: -3.6, beer: -5.7
 - Dominicks' experiment: 10% price increase → 3% fall in quantities
- Price-cost margins too low

Similar issues in retail markets

- Price elasticities of demand are low
 - Nevo 2001, cereals: -3
 - Chevalier et. al 2003, cheese: -1.2, tuna: -2.2, crackers: -1.9, cookies: -3.6, beer: -5.7
 - Dominicks' experiment: 10% price increase → 3% fall in quantities
- Price-cost margins too low

Similar issues in retail markets

- Price elasticities of demand are low
 - Nevo 2001, cereals: -3
 - Chevalier et. al 2003, cheese: -1.2, tuna: -2.2, crackers: -1.9, cookies: -3.6, beer: -5.7
 - Dominicks' experiment: 10% price increase → 3% fall in quantities

- Price-cost margins too low

Similar issues in retail markets

- Price elasticities of demand are low
 - Nevo 2001, cereals: -3
 - Chevalier et. al 2003, cheese: -1.2, tuna: -2.2, crackers: -1.9, cookies: -3.6, beer: -5.7
 - Dominicks' experiment: 10% price increase \rightarrow 3% fall in quantities

- Price-cost margins too low

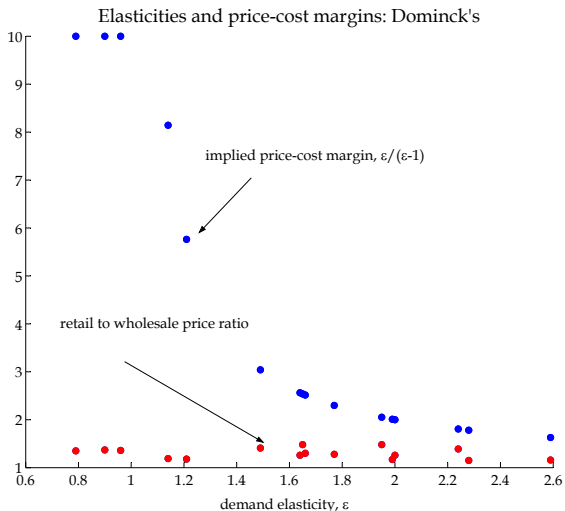
Table 1
CATEGORY AGGREGATES AND ELASTICITY ESTIMATES

Category	Number of UPCs	Number of Items	Basis of Aggregation	Average Category Elasticity	Standard Deviation	Average Own Elasticity
<i>Food Items</i>						
Soft Drinks	619	10	4 manufacturers and 2 size aggregates	-3.18	.39	-2.59
Canned Seafood	180	12	4 brands by water/oil, 4 price tier aggregates	-1.79	.47	-.96
Canned Soup	89	18	13 Campbell's flavor/size aggregates, 5 misc. aggregates	-1.62	.22	-1.66
Cookies	637	13	8 brands (all sizes), 5 manufacturer aggregates	-1.60	.25	-.90
Grahams/Saltines	230	10	5 brands (all flavors) by 2 types	-1.01	.57	-1.46
Snack Crackers	197	15	11 brands (all flavors, sizes), 4 manufacturer aggregates	-.86	.36	-.79
Frozen Entrees	500	12	11 brands (all flavors), 1 miscellaneous aggregate	-.77	.46	-1.65
Refrigerated Juice	108	12	5 orange juice brands by 1-2 sizes, 4 flavor aggregates	-.74	.51	-2.24
Dairy Cheese	367	17	5 brands by 2-5 types, 1 miscellaneous aggregate	-.72	.35	-1.44
Frozen Juice	105	14	9 orange juice brands, 5 flavor aggregates	-.55	.32	-1.95
Cereal	298	21	19 brands (all sizes), 5 type aggregates	-.20	.22	-1.14
Bottled Juice	242	21	10 brands by 1-4 sizes, 1 miscellaneous aggregate	-.09	.26	-1.49
<i>Nonfood Items</i>						
Bath Tissue	57	9	8 brands, 1 aggregate	-2.42	.19	-2.28
Laundry Detergent	303	10	4 brands (all sizes) by 2 forms, 2 form aggregates	-1.58	.21	-1.99
Fabric Softener	140	8	3 brands (all sizes) by 2 forms, 2 form aggregates	-.79	.06	-1.77
Liquid Dish Detergent	178	13	6 brands by sizes, 2 size aggregates	-.74	.29	-1.64
Toothpaste	296	11	4 brands (all flavors) by 2 sizes, 2 size aggregates, kids	-.45	.37	-2.00
Paper Towels	90	12	7 brands by 2 sizes, 2 size aggregates	.05	.52	-1.21

Source: The Authors. Data from

As. Some weighted averages of the 16 categories with the same

Price-cost margins in retail stores



Questions for future research:

- Micro-evidence on marketing technology
 - Marketing technology calibrated to match long-run vs. short-run trade elasticities
 - Other frictions, e.g., fixed costs of export may account for the difference
 - E.g. AC Nielsen panel of households' advertising viewing and purchases

Questions for future research:

- Micro-evidence on marketing technology
 - Marketing technology calibrated to match long-run vs. short-run trade elasticities
 - Other frictions, e.g., fixed costs of export may account for the difference
 - E.g. AC Nielsen panel of households' advertising viewing and purchases

Questions for future research:

- Micro-evidence on marketing technology
 - Marketing technology calibrated to match long-run vs. short-run trade elasticities
 - Other frictions, e.g., fixed costs of export may account for the difference
 - E.g. AC Nielsen panel of households' advertising viewing and purchases

Questions for future research:

- Micro-evidence on marketing technology
 - Marketing technology calibrated to match long-run vs. short-run trade elasticities
 - Other frictions, e.g., fixed costs of export may account for the difference
 - E.g. AC Nielsen panel of households' advertising viewing and purchases

Questions for future research:

- Bargain power of producer, θ , determines extent of pricing-to-market.
 - Calibrated to match relative volatility of Real Export Price to RER
 - Additional, micro-evidence?

Questions for future research:

- Bargain power of producer, θ , determines extent of pricing-to-market.
 - Calibrated to match relative volatility of Real Export Price to RER
 - Additional, micro-evidence?

Questions for future research:

- Bargain power of producer, θ , determines extent of pricing-to-market.
 - Calibrated to match relative volatility of Real Export Price to RER
 - Additional, micro-evidence?

Alternative calibration of θ

S. Dutta et al. / *Journal of Economic Dynamics & Control* 26 (2002) 1845–1900

1867

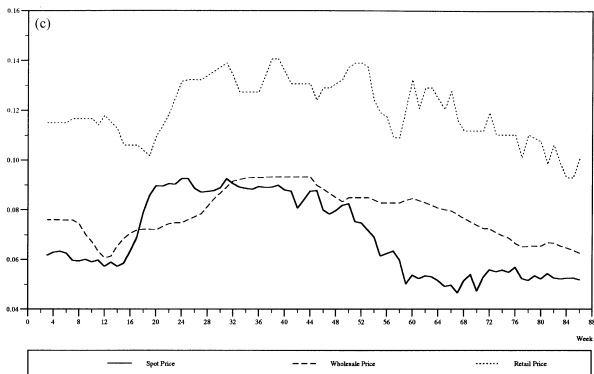


Fig. 1c. Cost and price series of frozen Heritage House, 12oz, moving averages (dollars/oz).

- Impressive paper, rich model, numerous testable implications
- Introduces a novel set of frictions that can simultaneously address both pricing and quantity puzzles
- Need micro-evidence to discipline this and other popular stories of pricing-to-market/real rigidities

- Impressive paper, rich model, numerous testable implications
- Introduces a novel set of frictions that can simultaneously address both pricing and quantity puzzles
- Need micro-evidence to discipline this and other popular stories of pricing-to-market/real rigidities

- Impressive paper, rich model, numerous testable implications
- Introduces a novel set of frictions that can simultaneously address both pricing and quantity puzzles
- Need micro-evidence to discipline this and other popular stories of pricing-to-market/real rigidities