Market Structure and Cost Pass-Through: Evidence from retail

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This paper

- Simple model of pricing: horizontal market power and vertical integration → implications for cost pass-through (Spengler (1950), Atkeson and Burstein (2008))
- Heterogeneous product pass-through and market structure
  - **horizontal**: product and firm market share
  - theory: higher market share should lower pass-through [Dixit-Stiglitz with big firms]
  - **vertical**: control of production chain by retailer
  - theory: more integration should raise pass-through [lowers double-marginalization/pricing externality]
  - Which forces dominate?
- Retail scanner data (price and quantity): estimate pass-through from commodity → wholesale → retail prices for thousands of UPCs in different categories (both multi-retailer and single-retailer data) for three different vertical structures

Contributions

- **Identification** of vertical/horizontal structure effects:
  - Three precisely defined vertical regimes
  - "Internal" prices not needed to test model (i.e. allocative cost $\rightarrow$ allocative price)
  - Precisely defined products and markets with product and firm market shares
- **Interaction**: direct effect of vertical integration (lower markups and *raise pass-through*) vs. indirect horizontal effect (lower price $\rightarrow$ greater market share $\rightarrow$ *lower pass-through*)
  - address a classic omitted variable bias in regressions that omit either vertical or horizontal variables
  - if the rise in intra-firm trade is taken in isolation, would be at odds with decline in pass-through for industrialized and emerging-market countries in recent years (Bailliu and Bouakez (2004), Gagnon and Ihrig(2002), and Frankel et al. (2005))

Preview of findings

- Horizontal: going from 0 to 1 product (brand) market share lowers 12 month pass-through by 71% (38%)
- Vertical: retailer manufactured private labels have 40% higher pass-through (13% higher for private labels manufactured externally)
- Interaction (omitted variable): this falls to 31% when not controlling for indirect effect of integration that increases market share
- Interaction: PL market share increase from 0 to 50% at the expense of atomistic national brands *lowers* pass-through by 4% (=31%-[0.5*71%])
- Macro implication: counter-cyclical commodity to retail price pass-through, but effect small (1.2% lower) because short-run time-series variation in private label share is small (vs. cross-sectional, long-run variation)
- Macro implication: more vertical integration in Europe/US imports may not lead to higher cost pass-through!

Related literature

1. Decompositions of incomplete pass-through: menu costs/local non-traded costs/markup adjustment (Goldberg and Hellerstein (2011), Nakamura and Zerom (2010)); retail/wholesale adjustment (Nakamura (2008), Gopinath et al. (2011))
2. Horizontal market structure: Atkeson and Burstein (2008), Berman et al. (2011), Auer and Schoenle (2012)
3. Vertical market structure: Spengler (1950), Bernard et al. (2006), Neiman (2010,2011), Hellerstein and Villas-Boas (2010)
4. Private labels: marketing literature (Hoch and Banerji (1993), Chintagunta and Bonfrer (2004))

Private labels (store brands)

- National brands: manufactured and marketed (sometimes distributed) outside retailer
- Potentially gives rise to double-marginalization
- Private labels: degree of "vertical integration" with retailer varies
  - Retailer manufactured
  - Retailer branded but externally manufactured
  - A continuum of increasing control of value chain by retailer (product = materials + manufacture + marketing + retail)
  - Similar (identical?) physical attributes but typically lower prices
  - Lower perceived (actual) quality? We will look at market shares (capture effects of quality through demand shifters in Dixit-Stiglitz framework)

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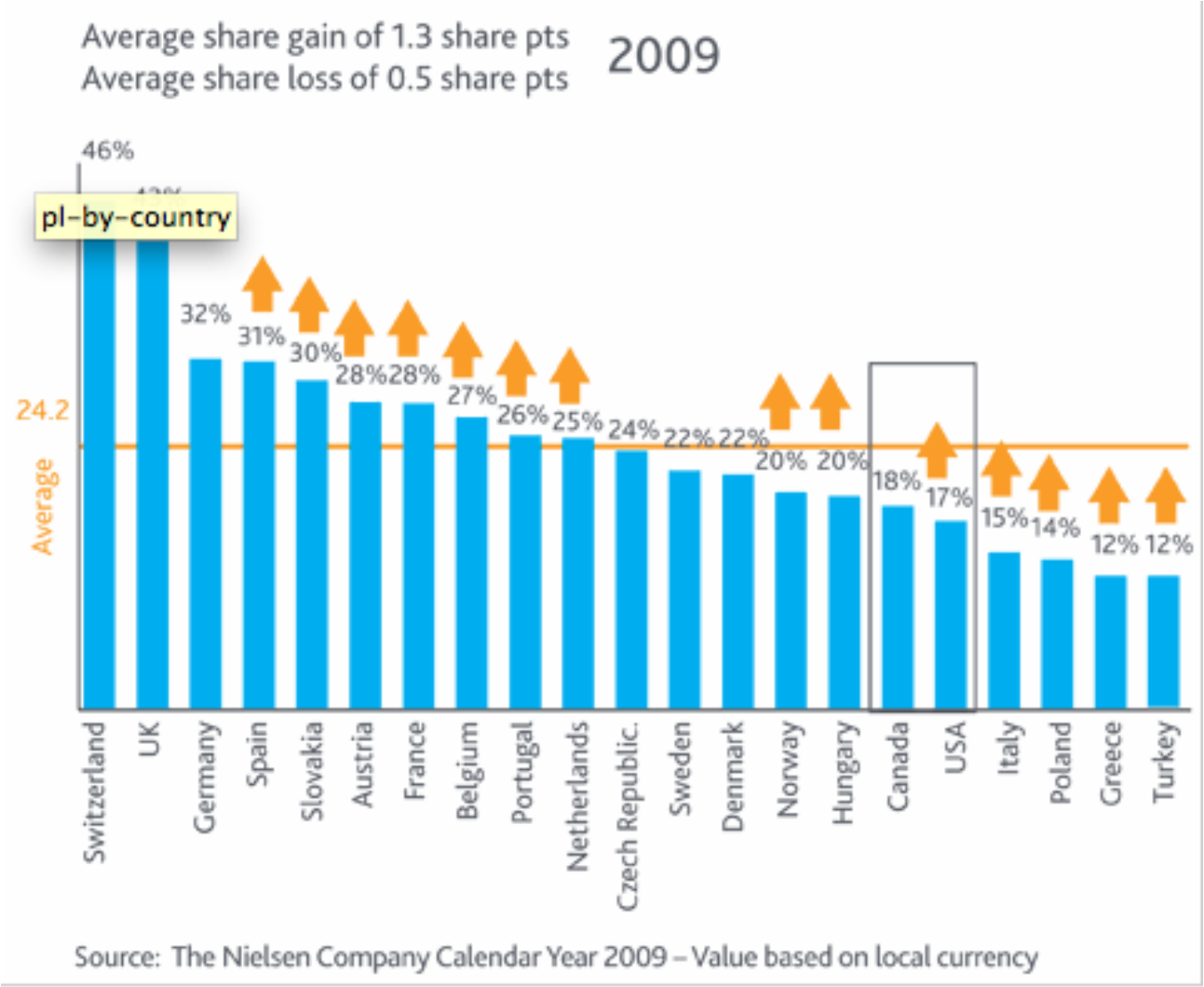
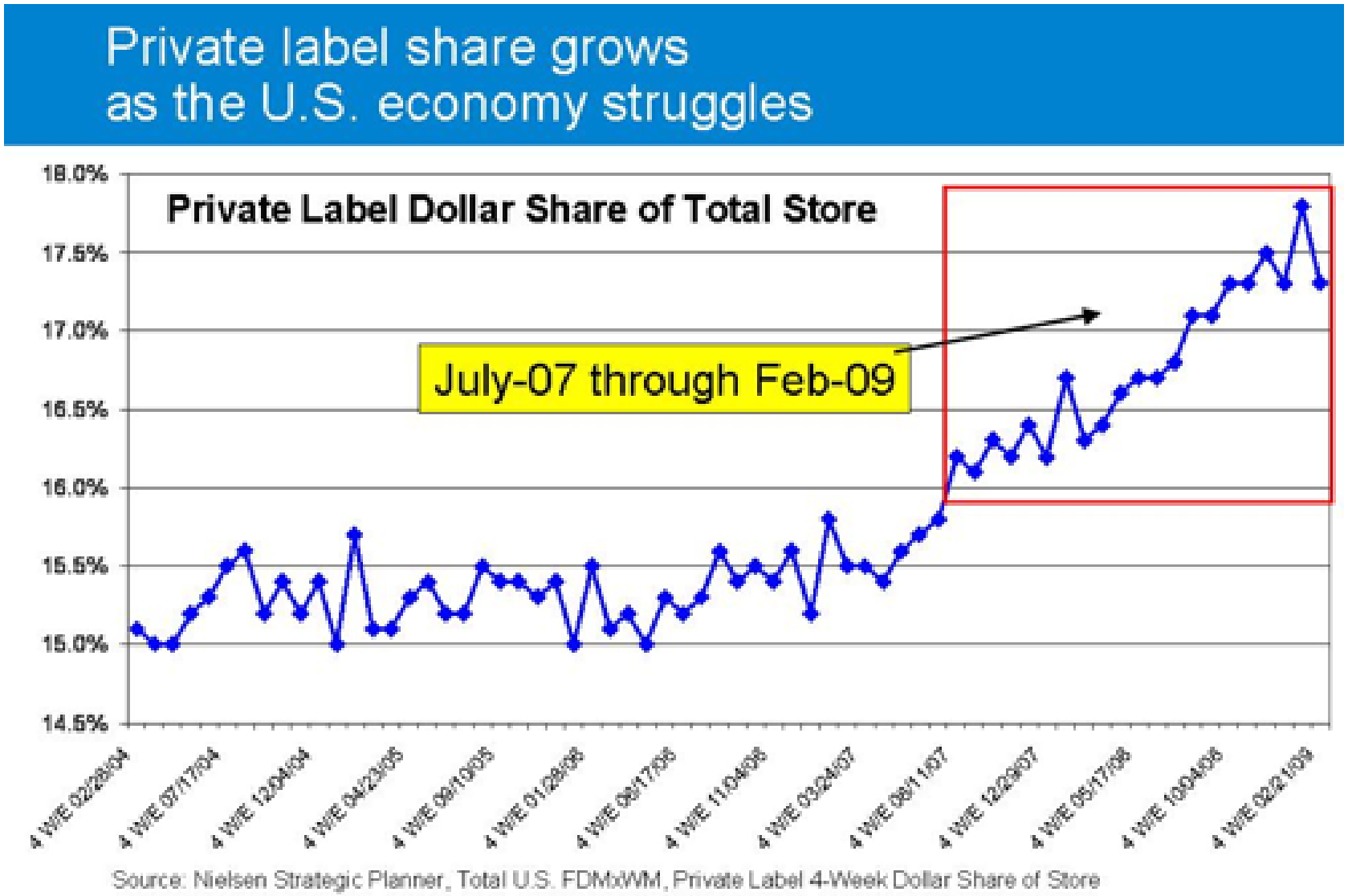
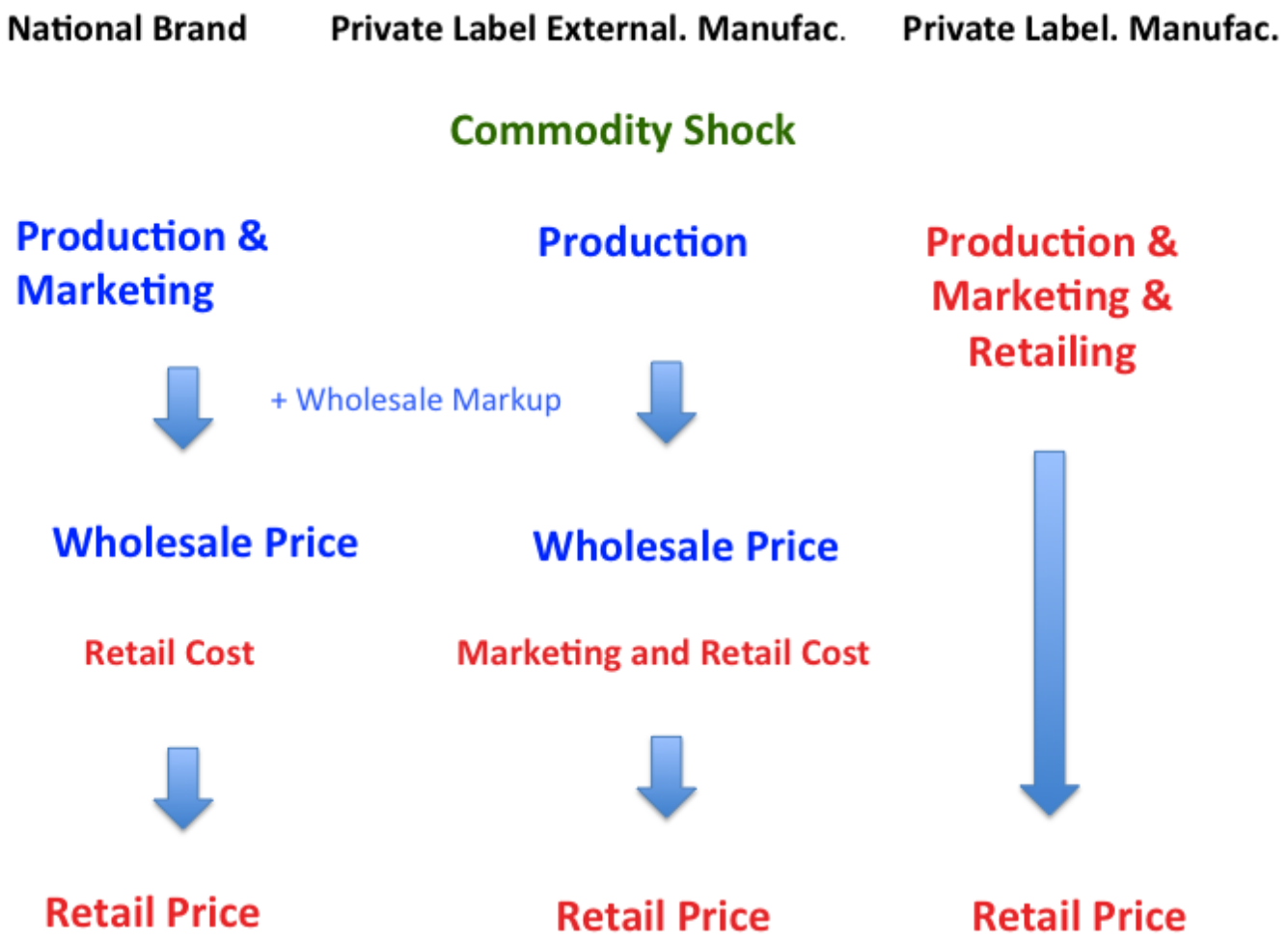

Average share gain of 1.3 share pts
Average share loss of 0.5 share pts
2009
46%
pl-by-country
32%
31%
30%
28%
28%
27%
26%
25%
24%
22%
22%
20%
20%
18%
17%
15%
14%
12%
12%
24.2
Average
Switzerland
UK
Germany
Spain
Slovakia
Austria
France
Belgium
Portugal
Netherlands
Czech Republic
Sweden
Denmark
Norway
Hungary
Canada
USA
Italy
Poland
Greece
Turkey
Source: The Nielsen Company Calendar Year 2009 – Value based on local currency


Private label share grows
as the U.S. economy struggles
Private Label Dollar Share of Total Store
July-07 through Feb-09
18.0%
17.5%
17.0%
16.5%
16.0%
15.5%
15.0%
14.5%
Source: Nielsen Strategic Planner, Total U.S. FDMxWM, Private Label 4-Week Dollar Share of Store

Model setup

- CES/small firms: constant markups and full pass-through
- Dixit-Stiglitz with large firms and incomplete pass-through (Dornbusch (1987), Atkeson and Burstein (2008), Auer and Schoenle (2012), Spingler (1950))
- Add vertical dimension: retailer and manufacturer are large so doubly incomplete pass-through
- Allow for non-commodity marginal costs (production, marketing, retail) split between retailer and manufacturer – "degree" of double-marginalization
- Key insight: increased retailer control of value chain raises pass-through via vertical channel but lowers pass-through via horizontal channel


National Brand
Private Label External. Manufac.
Private Label. Manufac.
Commodity Shock
Production & Marketing
Production
Production & Marketing & Retailing
+ Wholesale Markup
Wholesale Price
Wholesale Price
Retail Cost
Marketing and Retail Cost
Retail Price
Retail Price
Retail Price

Retailer

- Retail demand: $Q = \left(d_i^{1/\sigma} q_i^{\frac{\sigma-1}{\sigma}} + z^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}}$
- Retailer i demand elasticity: $\epsilon_i = \sigma(1 - S_i) + S_i$
- Intuition: does increasing p_i raise the denominator?
  $p_i q_i = Y \frac{d_i p_i^{1-\sigma}}{d_i p_i^{1-\sigma} + p_z^{1-\sigma}}$
- Price: $p_i = \frac{\epsilon_i}{\epsilon_i - 1}(w_i + \theta_r)$ with w wholesale cost and θ_r marginal retail cost
- $w \to p$ pass-through:
  $\frac{\partial p_i}{\partial w_i} \frac{w_i}{p_i} = \left(\frac{1}{1 + \frac{\partial \epsilon_i}{\partial p_i} \frac{p_i}{\epsilon_i} \frac{1}{(\epsilon - 1)}} \right) \frac{w_i}{w_i + \theta_i^r} = \left(\frac{\sigma(1 - S_i) + S_i}{\sigma} \right) \frac{w_i}{w_i + \theta_i^r}$

Manufacturer

- Takes account of how setting w affects retail p and hence q
- Manufacturer elasticity of demand:
  $\mu = -\frac{\partial q_i}{\partial w_i}\frac{w_i}{q_i} = \left(\frac{\partial q_i}{\partial p_i}\frac{p_i}{q_i}\right)\left(\frac{\partial p_i}{\partial w_i}\frac{w_i}{p_i}\right)$
- Manufacturer faces lower elasticity of demand $\mu < \epsilon$ due to incomplete retail pass-through; this is the pricing externality
- $w_i = \frac{\mu_i}{\mu_i - 1}(\theta_m + c)$ with c commodity cost and θ_m marginal production cost
- $c \to w$ pass-through: $\frac{\partial w_i}{\partial c}\frac{c}{w_i} = \left(\frac{1}{1+\frac{\partial \mu_i}{\partial w_i}\frac{w_i}{\mu_i}\frac{1}{(\mu-1)}}\right)\frac{c}{c+\theta_i^m}$

Integration: prices and quantities

- Arm's-length: $p_i = \frac{\epsilon_i}{\epsilon_i - 1}\left(\theta_i^r + \frac{\mu_i}{\mu_i - 1}[c + \theta_i^m]\right)$
- Vertical integration: $p_i^{VI} = \frac{\epsilon^{VI}}{\epsilon^{VI} - 1}[c + \theta_i^r + \theta_i^m]$
- $p_i^{VI} < p_i$ holding d constant (higher total VI profits)
- Arm's-length p_i is decreasing in θ_r holding $\theta_r + \theta_m$ constant
- Ceteris paribus, a decrease in p_i will lead to higher S_i, which lowers pass-through!

Commodity pass-through

Vertical integration:

$$\left(\frac{1}{1+\frac{\partial \epsilon^{VI}}{\partial p^{VI}}\frac{p^{VI}}{\epsilon^{VI}}\frac{1}{\epsilon^{VI}-1}}\right)\frac{c}{c+\theta_i^m+\theta_i^r} \tag{1}$$

Arm's length:

$$\underbrace{\left(\frac{1}{1+\frac{\partial \epsilon}{\partial p}\frac{p}{\epsilon}\frac{1}{(\epsilon-1)}}\right)\frac{w_i}{w_i+\theta_i^r}}_{retail}\underbrace{\left(\frac{1}{1+\frac{\partial \mu_i}{\partial w_i}\frac{w_i}{\mu_i}\frac{1}{(\mu-1)}}\right)\frac{c}{c+\theta_i^m}}_{wholesale}= \tag{2}$$

$$\frac{1}{1+\frac{\partial \epsilon}{\partial p}\frac{p}{\epsilon}\frac{1}{(\epsilon-1)}}\frac{1}{1+\frac{\partial \mu_i}{\partial w_i}\frac{w_i}{\mu_i}\frac{1}{(\mu-1)}}\frac{c}{c+\theta_i^m+\frac{\mu_i-1}{\mu_i}\theta_i^r} \tag{3}$$

Direct effect vs. indirect effect (through S)

Commodity Pass-Through

1. **markup-adjustment channel by manufacturers** $(\frac{\partial \mu_i}{\partial w_i}\frac{w_i}{\mu_i})$ can provide an additional source of incomplete pass-through compared to the vertically integrated case
2. **cost channel** $(\frac{\mu_i - 1}{\mu_i})$ shows how shifting aspects of production from manufacturers to retailers could 'increase' pass-through in the arm's length case.
3. **market power channel** highlights the interaction between the horizontal and vertical effects of the model and can generate feedback effects on mark-up and markup elasticity

Simulation

To illustrate the quantitative effects of each channel at commodity-wholesale-retail pass-through, we simulate scenarios each with five cases (p_z equal to 50, 25, and 10):

1. National brand (NB): the arm's-length pricing case where $\frac{\theta_r}{\theta_r+\theta_m} = \frac{1}{6}$ and $d_i = 4$
2. Private-label not vertically-integrated (PL-NVI): the arm's-length case where $\frac{\theta_r}{\theta_r+\theta_m} = \frac{1}{2}$ and $d_i = 4$ (so compared to the first case the retailer has a higher share of the non-commodity cost)
3. Private-label vertically-integrated (PL-VI): VI pricing and $d_i = 4$
4. Constant-market share PL-NVI: similar to case 2, but we vary d_i such that the initial market share is exactly equal to case (1)
5. Constant-market share PL-VI: similar to case 3, but we vary d_i such that the initial market share is exactly equal to case (1)

Simulation results

Scenario: 0.1% increase in the commodity price

Case	Price	Share	$\frac{\partial p}{\partial w}\frac{w}{p}$	$\frac{\partial p}{\partial c}\frac{c}{p}$
Scenario 1: $p_z = 50$				
NB	79.59	0.554	0.559	0.021
PL-NVI	76.57	0.582	0.484	0.024
PL-VI	45.70	0.868	0.302	0.027
Constant market share				
PL-NVI	60.63	0.554	0.484	0.030
PL-VI	22.71	0.554	0.495	0.045
Scenario 2: $p_z = 25$				
NB	43.52	0.431	0.627	0.037
PL-NVI	41.06	0.475	0.490	0.044
PL-VI	28.74	0.725	0.386	0.035
Constant market share				
PL-NVI	35.88	0.431	0.497	0.050
PL-VI	20.62	0.431	0.573	0.052
Scenario 3: $p_z = 10$				
NB	26.60	0.175	0.777	0.070
PL-NVI	24.68	0.210	0.551	0.079
PL-VI	19.63	0.346	0.627	0.057
Constant market share				
PL-NVI	23.82	0.175	0.561	0.083
PL-VI	18.25	0.175	0.735	0.067

Testable implications

1. Unconditional commodity pass-through can be higher or lower for national brands depending on the differing strength of the forces of each channel.
2. Conditioning on S could raise the commodity pass-through of private labels relative to national brands, because vertical integration/private label should lead to higher market share which can lower pass-through.
3. Private labels: commodity pass-through to retail is increasing in θ_r holding constant $\theta_r + \theta_m$, so PL acts "more vertically-integrated" even when manufactured externally
4. Private labels: could have lower pass-through from w to p because (conditional on S) $\propto \frac{w^{PL}}{\theta_r^{PL}+w^{PL}}$ ($w^{PL} < w^{NB}$ and potentially $\theta_r^{PL} > \theta_r^{NB}$)
5. Differences in quality/demand (d) or marginal cost shares could confound estimation, so looking at similar goods (sold to similar customers) is important.

Retail data

- Weekly product-level data from 250 stores in 178 weeks from January 2004 to June 2007 on retail and wholesale list prices and quantities
- Identify private labels manufactured and not manufactured by retailer using product names, upc codes and information from parent and manufacturing division web-site
- 155 "categories" with national brands and $> 1\%$ revenue share of private labels (20 of these have retailer-manufactured PL)
- Monthly average of retail and wholesale list price across stores/weeks
- Products that appear in every month – estimation sample 9,000-12,000 UPCs
- Product and firm/brand market shares averaged over all stores and weeks (note: some measurement error in brand shares – we use first-five digits of UPCs – but less severe within narrow categories)

Classification

UPC description: Northern lights milk 2%

- Category: Mainstream white milk
- Class: Reduced fat 2%
- Subclass, subsubclass: 64 ounce reduced fat 2% milk

UPC description: Hersheys chocolate milk

- Category: Mainstream white milk
- Class: Flavored milk/milk substitute
- Subclass: Chocolate flavored milk/milk substitute
- Subsubclass: Quart chocolate milk/milk substitutes

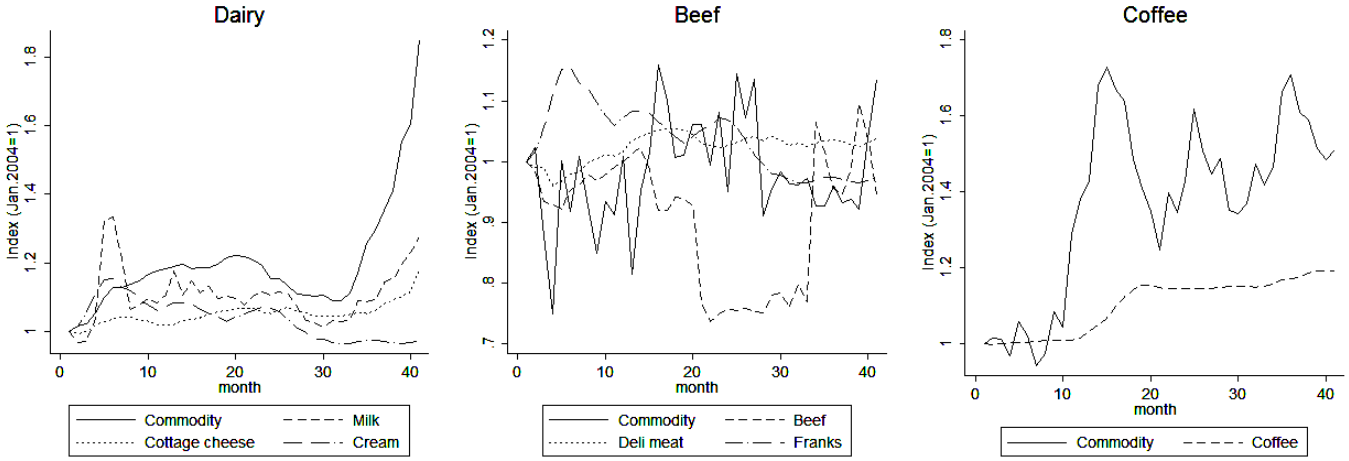
Typically at subsubclass level products differentiated by dimension, premium/non-premium, diet/fat-free/health/organic, flavor modifiers

Table : Summary Statistics: Private Label Goods, National Brands

Number of Private Label	Manufactured	674	
	Branded	2,314	
Number of National Brand	NB	15,953	
		Median	Mean
RevShare of Private Label in a subsubclass	Manufactured	0.068	0.179
	Branded	0.046	0.119
RevShare of National Brand in a subsubclass	NB	0.028	0.105
Brand RevShare of Private Label in a subsubclass	Manufactured	0.624	0.629
	Branded	0.352	0.445
Brand RevShare of National Brand in a subsubclass	NB	0.29	0.353
Ratio of regular price (Private Label/National Brand) in a subsubclass	Manufactured	0.733	0.729
	Branded	0.787	0.837
Ratio of wholesale cost(Private Label/National Brand) in a subsubclass	Manufactured	0.518	0.58
	Branded	0.583	0.942
Ratio of markup(Private Label/National Brand) in a subsubclass	Manufactured	1.24	1.32

Commodity prices

- Match a subset of products (at the category level – 80/155 potential categories) to monthly commodity price indexes from the FAO and S&P Goldman-Sachs Commodity Index
- 6 Commodities: wheat (bread), milk (yogurt), beef (franks), corn (syrup, soft drinks), coffee and sugar
- Alternative: fixed weight "wholesale cost" index at the category level



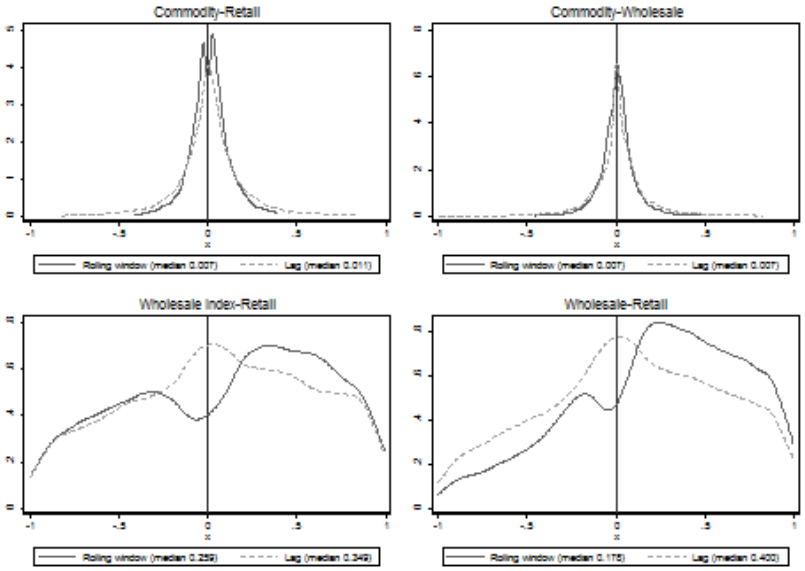
First-step: Product-level pass-through

Two specifications

- Rolling window: $\Delta^K logP_t^i = \alpha^i + \beta^{Ki} \Delta^K logC_t^i + error_t^i$
- K is a time-difference over 4 and 12 months – estimate each $\hat{\beta}^{Ki}$
- Lags: $\Delta logP_t^i = \alpha^i + \sum_{k=1}^{K} \beta^{ki} \Delta logC_{t-k+1}^i + error_t^i$
- We use K values of 4 and 12 and calculate "long-term" pass-through as $\beta^{Ki} = \sum_{k=1}^{K} \beta^{ki}$

First-step: Product-level pass-through

Figure : Distribution of first-stage pass-through estimates for 12 month horizon



- Median pass-through from w->p: 70%, c-> w:5%

Second-step: determinants of product-level pass-through

$$\ln \hat{\beta}_{ic}^{K} = \alpha_c + \gamma_1 I[Retail\ \ Manufactured_i] + \gamma_2 I[Retail\ \ Branded_i] + \gamma_3 Product\ \ RevShare_{ic} + \gamma_4 Brand\ \ RevShare_{ic} + \epsilon_{ic}$$

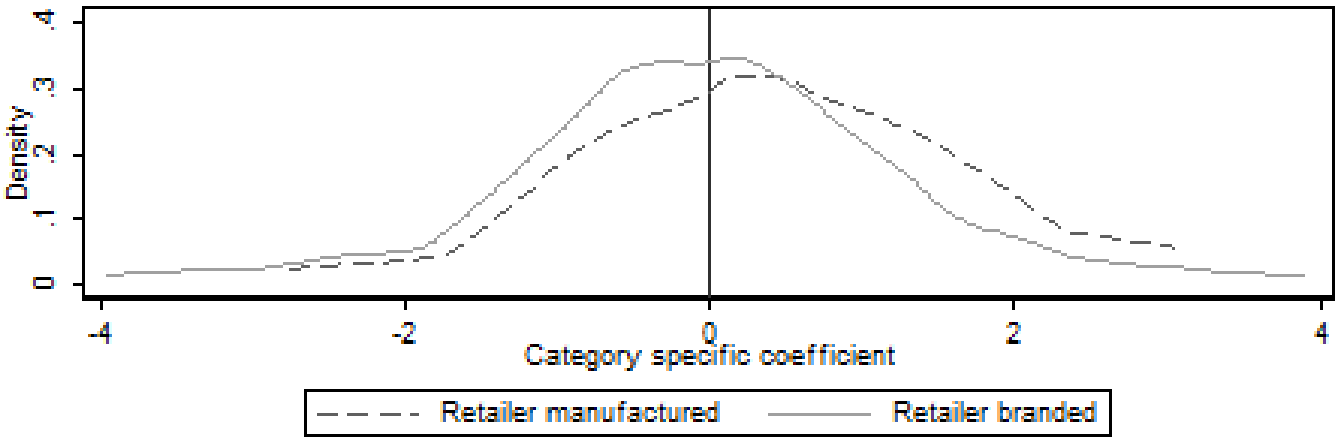
where c indexes the classification units we are using (e.g. category, subclass, etc.)

Regular Price and Commodity Price Passthroughs

Table : Regular Price and Commodity Price Passthrough

Window	12 months						
Median	0.064						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
RetailManufactured	0.389***		0.456***	0.306***		0.416***	0.350***
	(0.039)		(0.040)	(0.059)		(0.061)	(0.062)
RetailBranded	0.028		0.055	0.120**		0.150***	0.100**
	(0.036)		(0.036)	(0.050)		(0.050)	(0.051)
Product RevShare		-5.373***	-5.234***		-0.928***	-0.918***	-0.873***
		(1.061)	(1.055)		(0.087)	(0.086)	(0.086)
Brand RevShare		-0.273***	-0.393***		-0.285***	-0.431***	-0.414***
		(0.058)	(0.058)		(0.085)	(0.087)	(0.085)
Log(Med. Price)							-0.208***
							(0.044)
Obs.	12627	12627	12627	12627	12627	12627	12627
$\bar{R}^2$	0.195	0.195	0.202	0.303	0.309	0.313	0.316
Category	Y	Y	Y	N	N	N	N
Subsubclass	N	N	N	Y	Y	Y	Y

Heterogeneity by category



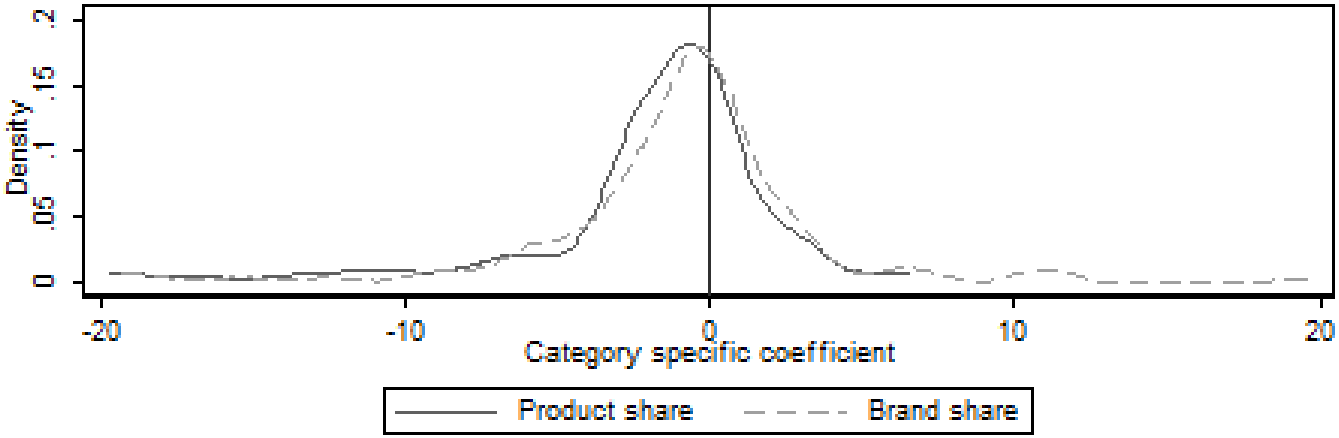


Table : Regular Price and Wholesale Cost Index Passthroughs

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel B: Dependent Variable (Log Passthrough of Wholesale Index to Regular Price)							
Window	12 months						
Median	1.006						
RetailManufactured	0.216***		0.254***	0.265***		0.320***	0.289***
	(0.070)		(0.072)	(0.098)		(0.102)	(0.103)
RetailBranded	0.148***		0.156***	0.103***		0.105***	0.077*
	(0.033)		(0.033)	(0.040)		(0.039)	(0.041)
Product RevShare		-2.916***	-2.712***		-0.855***	-0.840***	-0.793***
		(0.844)	(0.830)		(0.100)	(0.099)	(0.098)
Brand RevShare		0.035	-0.073		0.153*	0.021	0.022
		(0.065)	(0.066)		(0.079)	(0.081)	(0.081)
Log(Med. Price)							-0.113***
							(0.043)
Obs.	9653	9653	9653	9653	9653	9653	9653
$\bar{R}^2$	0.323	0.322	0.324	0.429	0.432	0.433	0.434
Category	Y	Y	Y	N	N	N	N
Subsubclass	N	N	N	Y	Y	Y	Y

Multi-Retailer Data

Data Source: IRI Symphony from 2001 to 2011

Table : Multiple-retailers: Regular Price and Commodity Price Passthroughs

Dependent Variable (Log Passthrough of Commodity Prices to Regular Price)				
Median	0.079			
	(1)	(2)	(3)	(4)
PrivateLabel	0.356***	0.357***	0.453***	0.357***
s.e	(0.067)	(0.068)	(0.069)	(0.69)
Product RevShare(Within Store)		-8.512***		
s.e.		(0.042)		
Product RevShare(All Sample)				-7.439***
s.e.				(0.824)
Category	Y	Y	Y	Y
Chain	Y	Y	Y	Y
City	N	N	N	N
Obs	12556	12556	12556	12556
R^2	0.107	0.128	0.105	0.116

Table : Retail price - wholesale cost pass-through

Dep. variable: log pass-through of wholesale cost to to regular price				
	12 month rolling window			
Median	0.983			
	(1)	(2)	(3)	(4)
RetailManufactured	-0.372***	-0.394***	-0.81***	-0.777***
s.e.	(0.061)	(0.071)	(0.089)	(0.092)
RetailBranded	-0.429***	-0.43***	-0.506***	-0.504***
s.e.	(0.038)	(0.038)	(0.048)	(0.048)
Product RevShare				-0.538***
s.e.				(0.111)
Brand RevShare				0.032
s.e.				(0.064)
Category	N	Y	N	N
Subsubclass	N	N	Y	Y
Obs	10939	10939	10939	10939
R^2	0.0177	0.1136	0.376	0.3777

Table : Wholesale cost - commodity pass-through

Dep. variable: log pass-through of commodity price to wholesale cost				
		12 month rolling window		
Median	0.065			
	(1)	(2)	(3)	(4)
RetailManufactured	0.329***	0.211***	0.347***	0.415***
s.e.	(0.046)	(0.045)	(0.067)	(0.068)
RetailBranded	0.206***	0.292***	0.264***	0.291***
s.e.	(0.042)	(0.042)	(0.055)	(0.055)
Product RevShare				-0.115
s.e.				(0.102)
Brand RevShare				-0.513***
s.e.				(0.069)
Category	N	Y	N	N
Subsubclass	N	N	Y	Y
Obs	12757	12757	12757	12757
R^2	0.0044	0.28	0.5782	0.5825

One-step Estimation

$$\Delta^{12} \ln p_{it} = \alpha_t + \alpha_i + \beta_j \Delta^{12} \ln c_{jt} + (\gamma_1 I[Retail\ Manufactured] + \gamma_2 I[Retail\ Branded] + \gamma_3 Product\ RevShare_i + \gamma_4 Brand\ RevShare_i) * \Delta^{12} \ln c_{1t} + \epsilon_{it} \quad (4)$$

Table : One-step estimation

Pass-through	Commodity-Retail		Commodity-Wholesale		Wholesale-Retail	
	(1)	(2)	(3)	(4)	(5)	(6)
RetailManufactured	0.0268***	0.0175***	0.0320***	0.0163***	-0.4284***	-0.5266***
	(0.0058)	(0.0065)	(0.0053)	(0.0063)	(0.0785)	(0.0728)
	[0.0025]					
RetailBranded	-0.0045	0.0004	-0.0020	-0.0101	-0.4718***	-0.3841***
	(0.0049)	(0.0053)	(0.0107)	(0.0086)	(0.0896)	(0.0731)
	[0.0050]					
Product Share	0.1903*	-0.0231	0.5078**	0.0633**	-0.2851	-0.0447
	(0.1095)	(0.0169)	(0.2092)	(0.0315)	(0.3668)	(0.0842)
	[0.0590]					
Brand Share	0.0600***	0.0762***	0.0211	0.0270*	0.8815***	0.7190***
	(0.0086)	(0.0102)	(0.0166)	(0.0141)	(0.1922)	(0.1663)
	[0.0072]					
Obs.	203479	203479	203076	203078	203077	203077
R^2 within	0.0273	0.0455	0.0127	0.1365	0.1063	0.1744
Controls	Category	Subclass	Category	Subclass	Category	Subclass

Variation in PL share in our data

- Question: What are the cyclical sensitivity of private label market shares?
- Data: gas prices, local MSA unemployment series
- Cross-sectional variations of private label goods in our data
- Doubling median income lowers store-level PL share by 8 percentage points (mean 20)
- Look at "demand" driven shifts in composition, e.g. local "business cycle" variables (Gicheva, Hastings and Villas-Boas (2010))
- These short-term shifts hold entry/market structure roughly constant – we look at variation in the private label share over time (t) and across individual stores (s) in our sample.
- $PLshare_{st} = \alpha_s + \gamma_t + \beta_1 gas_{st} + \beta_2 unemp_{st} + \epsilon_{st}$

Table : Dependent variable: store/month private-label market share

	(1)	(2)	(3)	Mean
Log median household income	-0.078^{***}	-0.081^{***}		10.90
s.e.	(0.014)	(0.002)		(0.343)
Log gas price	0.135^{*}	0.023^{***}	0.009^{***}	0.616
s.e.	(0.082)	(0.003)	(0.004)	(0.225)
Unemployment rate	0.428^{*}	0.266^{***}	0.211^{***}	0.049
s.e.	(0.227)	(0.039)	(0.030)	(0.017)
Months	Jan.2004	All	All	All
Store and month FE	No	No	Yes	
Obs				
R^2	0.21	0.21	0.96	

Macro implications

- Counter-cyclical PL share is a mechanism for generating higher pass-through during recessions
- E.g. raising unemployment by 20 points only raises PLshare by 4 percentage points $\rightarrow$ store pass-through of commodity prices rises about 1.2 points through vertical channel assuming market share stolen from large firms (holding horizontal effects constant)
- Although PL and NB difference in pass-through is substantial, variation in the shares over time is fairly small
- Great Recession aggregate PL growth is 2-3 percentage points, consistent with modest increase in commodity price pass-through
- Biggest differences in cross-section and long-run

Cross-country commodity pass-through and private labels

Private label market share (around 2009) for supermarkets varies across countries (Switzerland (46%), UK (42%), Italy (15%), Iceland (10%)...)
Question: Are private label shares correlated with the strength of pass-through?
Data: Eurostat Food supply chain monitor (monthly consumer prices, producer prices and agricultural commodity prices for 32 European countries in 17 categories between January 2005 to March 2013). - use 22 countries up to 11 categories

$$\Delta^T \ln p_{ijt} = \alpha_t + \alpha_{ij} + \beta_j \Delta^T \ln c_{ijt} + \gamma \Delta^T \ln c_{ijt} * plshare_i + \epsilon_{ijt} \quad (5)$$

Cross-country commodity pass-through and private labels

Table : European country-level pass-throughs and private label shares

Panel A: Pooled country/category commodity to consumer price pass-through (2005:1-2013:3)		
T difference	12 months	1 month
Median category pass-through when PL=0	0.041	0.109
$\Delta \ln c * plshare_j$	-0.163**	-0.250**
s.e.	(0.077)	(0.105)
Obs.	12154	15175
$\bar{R}^2$	0.011	0.027
Countries	22	22
Categories	11	11
Country x category	210	210
Panel B: Pooled country/category commodity to producer price pass-through (2005:1-2013:3)		
T difference	12 months	1 month
Median category pass-through when PL=0	0.031	0.024
$\Delta \ln c * plshare_j$	0.146**	0.204***
s.e.	(0.069)	(0.053)
Obs.	4725	5499
$\bar{R}^2$	0.013	0.047
Countries	7	7
Categories	10	10
Country x category	61	64

Implications of Cross-Country Comparison

- Private label share is associated with lower pass-through of commodity prices to consumer prices.
- PL from 0 to 0.1 would lower the passthrough from 0.041 to 0.025.
- In European countries, the correlation of private label shares with market concentration is 0.50.
- Most private label goods in Europe are not manufactured directly by the retailer.
- Taken all together, these results are consistent with story in which European countries with highly concentrated retail sectors have a large role for private label goods –> low market power for producer, high market power for retailers.
- most manufacturers in these countries low market share, therefore, high commodity pass-through.
- Retailers, on the other hand, show high concentration and

Conclusions

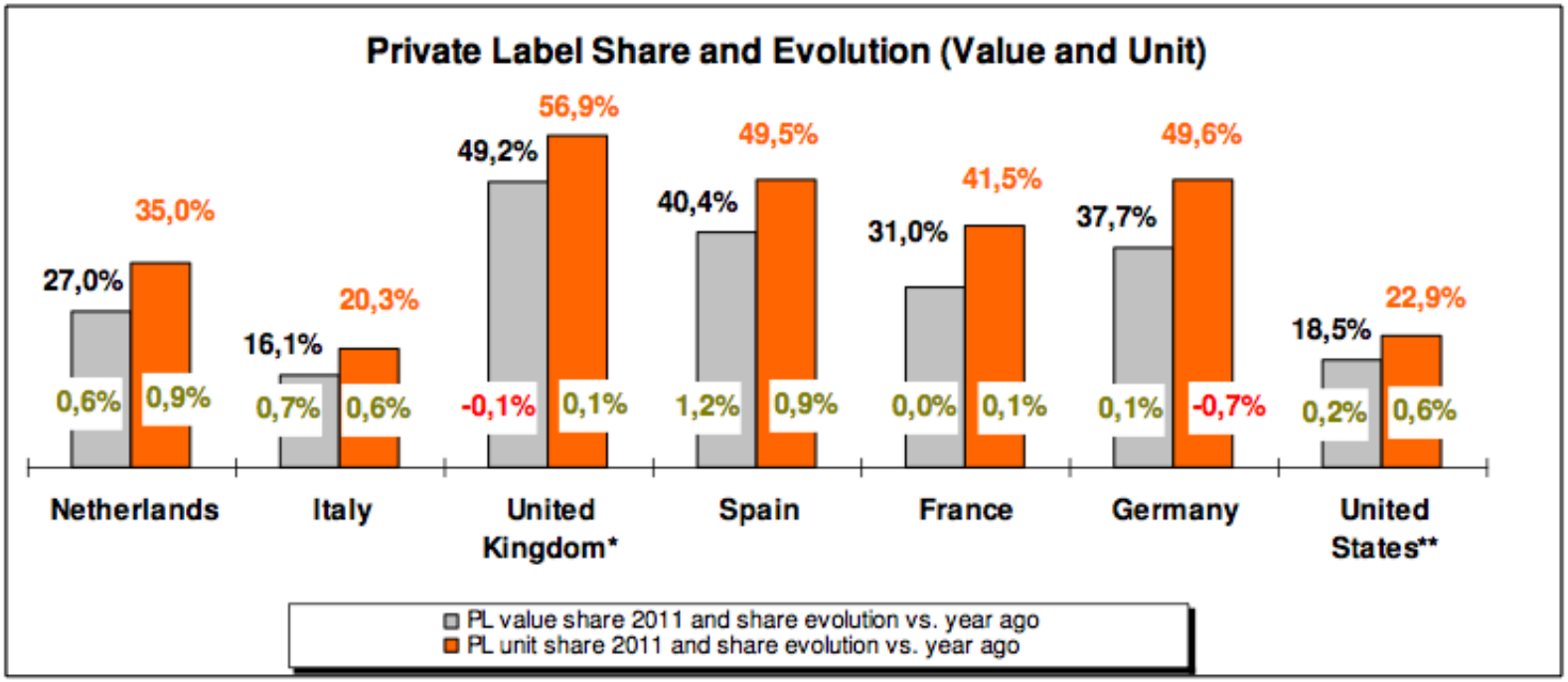
- Confirmation that variation in pass-through in domestic retail market related to horizontal and vertical market structure as predicted by simple theory using different data, context, methodological advantages
- Reduced form pass-through estimates depend on the interaction of both effects (omitted variable bias and potentially off-setting effect of market share)
- Business-cycle effects minor but may be important in cross-section and long-run
- Future work: product entry/exit, sales behavior

Interest to macroeconomists

- Longer term trends: retail consolidation $\rightarrow$ rise in private labels, rise in retail market power, less passive role in shock transmission
- Parallel to intra-firm transactions and outsourcing in international trade – outsourcing like externally manufactured private label (retail control of "marketing/distribution" function)
- Implications for aggregate cost pass-through and inflation dynamics over time, across countries
- Business cycle effects due to demand/composition effect

KIRKLAND
IBUPROFEN
TABLETS USP, 200 MG
500 TABLETS

Walgreens
IBUPROFEN
100 TABLETS
$8.99
Twin Pack Savings
2 BOTTLES INSIDE
Walgreens
IBUPROFEN
TABLETS
100 TABLETS



Source: SymphonyIRI Infoscan; 52 weeks ending 4/9/2011 versus same period prior year
*Source: Kantar WorldPanel; 52 weeks ending 02/10/2011 versus same period prior year. Channel coverage: supermarkets, hypermarkets and discounters
** Source: SymphonyIRI Market Insight™; 52 weeks ending 8/7/2011 versus same period prior year. Channel coverage: grocery, drug and mass formats point of sales

Private label evolution is strongly impacted by the local retail landscape and macro economy context

Extensions

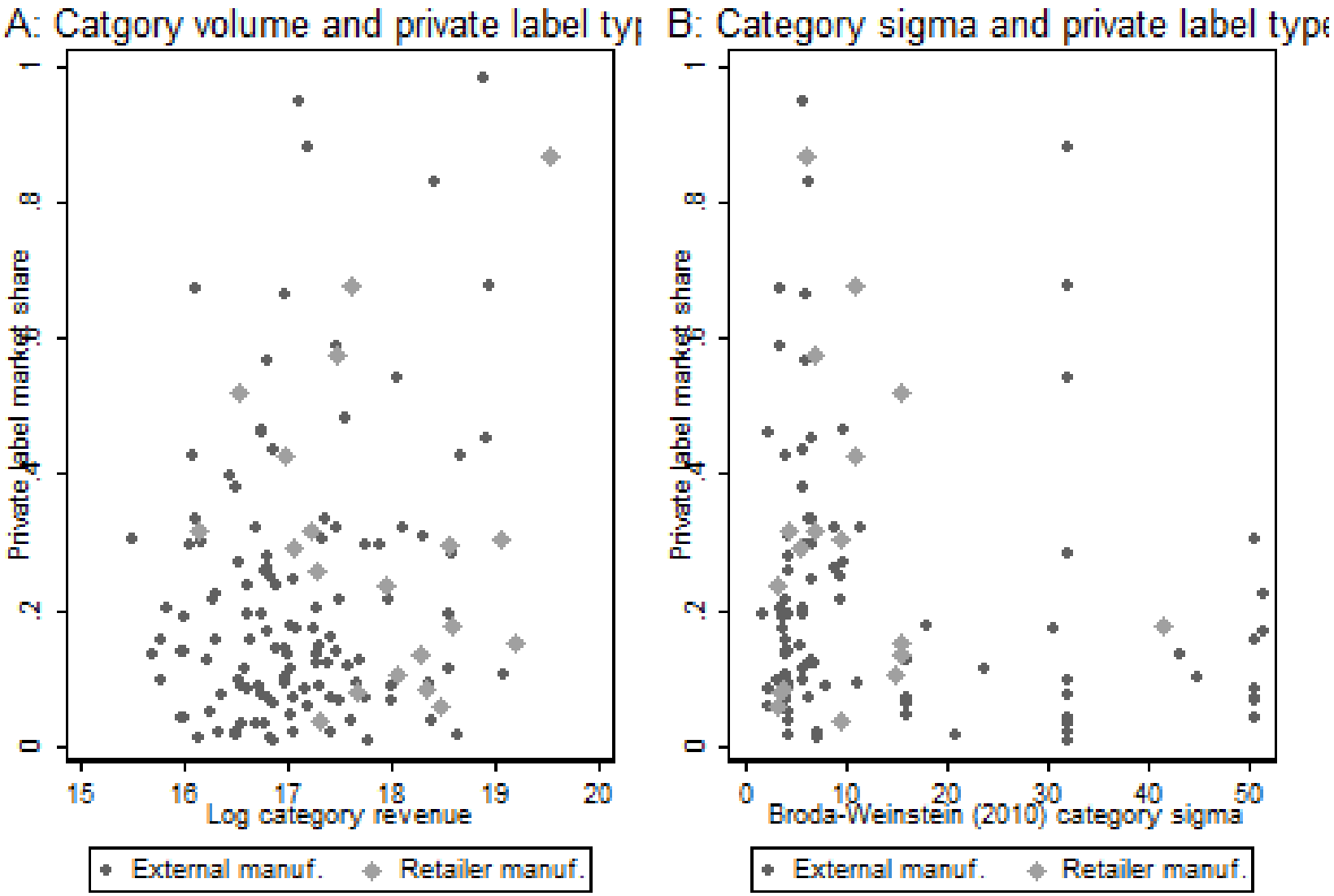
- Multi-product firms: products from the same firm offer less competition (firm's internalize the externality where raising price raises profits for other products), firm/brand market share AND product market share matter
- Common vs. idiosyncratic shocks: given outside option relative pass-through patterns typically preserved (but higher) under common shocks
- Freq. of price adjustment: with common menu costs, positive correlation of long-term/desired pass-through and frequency of price changes

Table : Regular price - commodity pass-through, lags

Dep. variable: log pass-through of commodity prices to regular price				
	Sum of 12 lags			
Median	0.083			
	(1)	(2)	(3)	(4)
RetailManufactured	0.255***	0.358***	0.199**	0.284***
s.e	(0.063)	(0.063)	(0.085)	(0.085)
RetailBranded	0.208***	0.051	0.034	0.051
s.e	(0.042)	(0.043)	(0.057)	(0.051)
Product RevShare				-0.342**
s.e.				(0.148)
Brand RevShare				-0.355***
s.e.				(0.074)
Category	N	Y	N	N
Subsubclass	N	N	Y	Y
Obs	14222	14222	14222	14222
R^2	0.0027	0.136	0.3788	0.3814

Selection

- We ignore selection into PL and PL-type in the empirical analysis (use products that appear in every period)
- Could imagine retailer gets a productivity draw for each product, will only enter if it is high relative to national brand competitors and fixed manufacturing cost
- Model insight 1: VI more profitable when demand elasticity is low, double-marginalization more severe
- Model insight 2: With fixed cost of PL (esp. manufacturing – want to be low on average cost curve!) higher volume products more appealing for vertical integration


A: Catgory volume and private label typ
B: Category sigma and private label type
Private label market share
0
.2
.4
.6
.8
1
15
16
17
18
19
20
Log category revenue
0
10
20
30
40
50
Broda-Weinstein (2010) category sigma
External manuf.
Retailer manuf.

Robustness

Table : Robustness

Dependent Variable (Log 12-month Passthrough)						
	Sales price		Lagged specification		One California store	
	(1)	(2)	(3)	(4)	(5)	(6)
Pass-through dep. var.	Retail	Retail	Retail	Retail	Retail	Retail
Pass-through ind. var.	Comm.	Whole.	Comm.	Whole.	Comm.	Whole.
Median PT	0.092	0.821	0.083	0.981	0.058	0.654
RetailManufactured	0.169***	-0.505***	0.279***	-0.203	1.145***	0.276
	(0.053)	(0.091)	(0.091)	(0.155)	(0.277)	(0.578)
RetailBranded	0.248***	-0.246***	0.049	-0.390***	0.221	-0.860***
	(0.035)	(0.051)	(0.055)	(0.079)	(0.182)	(0.227)
Product RevShare	-0.284***	-0.125	-0.575***	-0.396**	0.972	0.723
	(0.074)	(0.108)	(0.113)	(0.172)	(0.629)	(0.685)
Brand RevShare	-0.221***	-0.118	-0.250**	-0.290*	-0.925***	-0.588
	(0.083)	(0.101)	(0.116)	(0.167)	(0.368)	(0.616)
Obs.	11278	9596	14222	9646	3172	2338
$\bar{R}^2$	0.282	0.281	0.226	0.184	0.471	0.491
Subsubclass	Y	Y	Y	Y	Y	Y

Price rigidity

- Assuming constant menu costs, positive link between desired long-run pass-through and frequency of price changes (Gopinath and Iskhoki (2011))
- We find inconsistent evidence for our various prices, e.g.
  - Wholesale prices behave as expected (frequency higher for PL and lower for high market share firms)
  - Regular price frequency does not behave as predicted w.r.t. vertical structure
  - Sales prices frequency does not behave as predicted w.r.t. horizontal structure
- Several reasons this could be the case (different menu costs, sales frequency orthogonal/driven by different factors than long-run pass-through)