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# **Estimating Price Rigidity in Vertically Differentiated Food Product Categories with Private Labels**

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# Estimating Price Rigidity in Vertically Differentiated Food Product Categories with Private Labels

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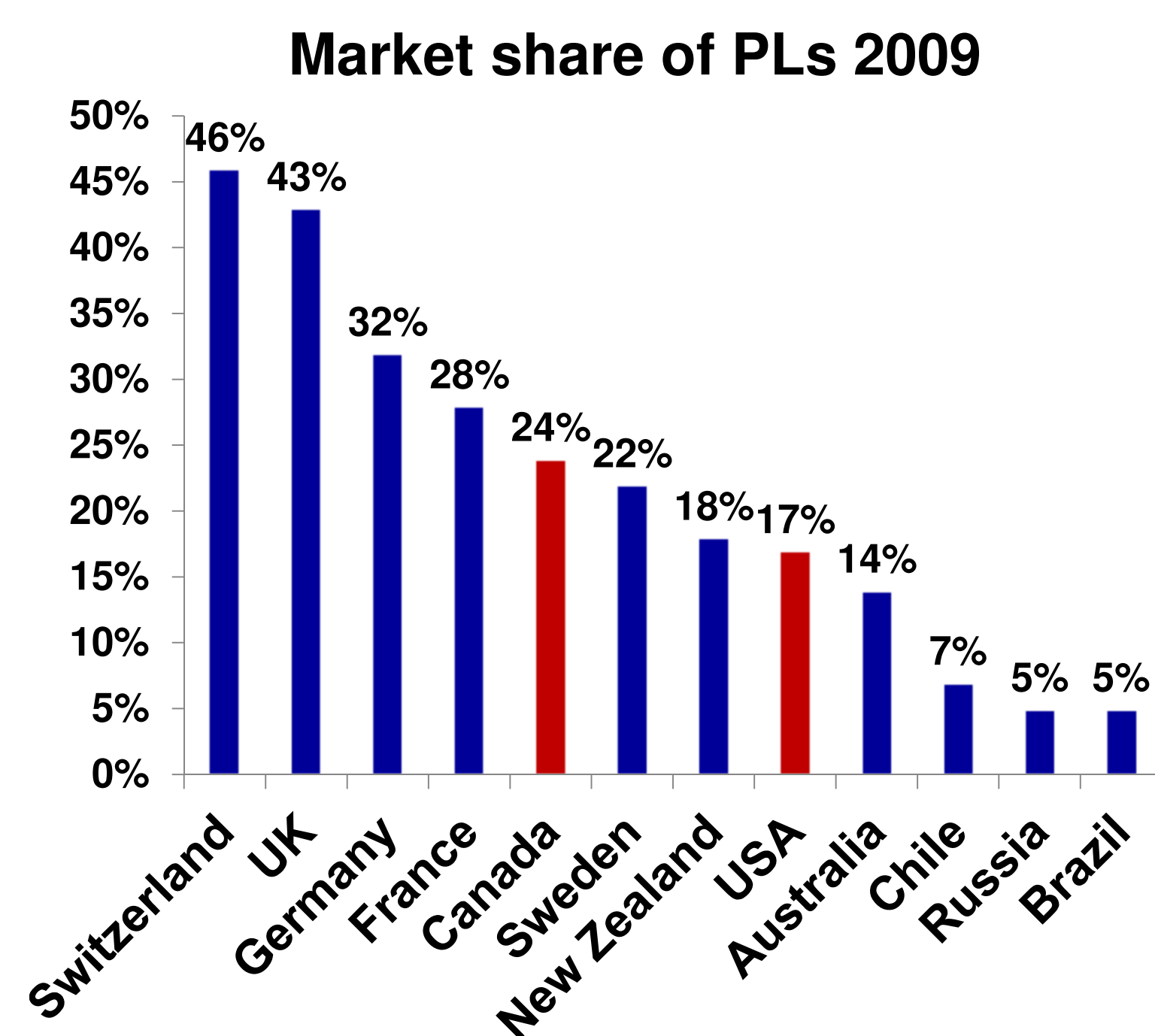
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## Background

- Rapid emergence of private labels (PL) → new and stiff competition for manufacturers of national brands (NB)



Source: The Nielsen Company, 2011.

Perceptions of PL quality in North America	
42 %	PL substitute for NB
37 %	Quality PL = quality NB
36 %	Some PL of higher quality than NB
33 %	PL as good as NB
18 %	PL have cheap looking packaging
10 %	PL not suitable when quality matters

- Agri-food industrial organization literature has paid limited attention to the new differentiated PL product lines and the deeper analysis of role of wholesale prices.
- Relatively constant prices despite changes in demand and costs → Prices change gradually because of price adjustment costs (Blinder et al., 1998).
- Variation of retail prices rather explained by price promotions than by changes in costs (Hosken and Reiffen, 2004).
- Kumar and Steenkamp (2007) divided PLs into:
  - Generics:** low price, standard quality, no advertising
  - Copycat:** price below and quality/packaging close to brand leader, frequent price promotions
  - Premium:** price and quality close or higher than leading brand, source of differentiation, limited price promotions, higher margins
- Assumption: Price rigidity (PR) higher for PLs than for NBs  
→  $PR_{\text{Premium}} > PR_{\text{Generic}} > PR_{\text{Copycat}}$

## Objectives

Quantifying the impact of the different types of PLs on price rigidity.

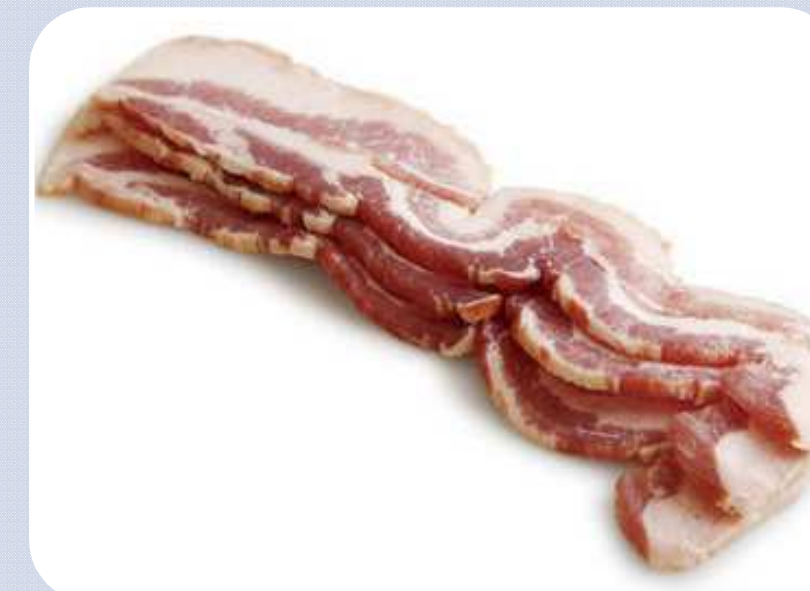
Analyzing the impact of wholesale prices on price rigidity across products and categories.

## Data

### Case study analysis:

- Weekly store level scanner data from 2004/W1– 2007/W22
- Major U.S.- Canadian retail chain
- 70 stores across Canada
- Two case studies: Packaged side bacon and bottled salad dressings

### Case study 1



high quality, few varieties, input price of pork subject to fluctuations, PL share 48%

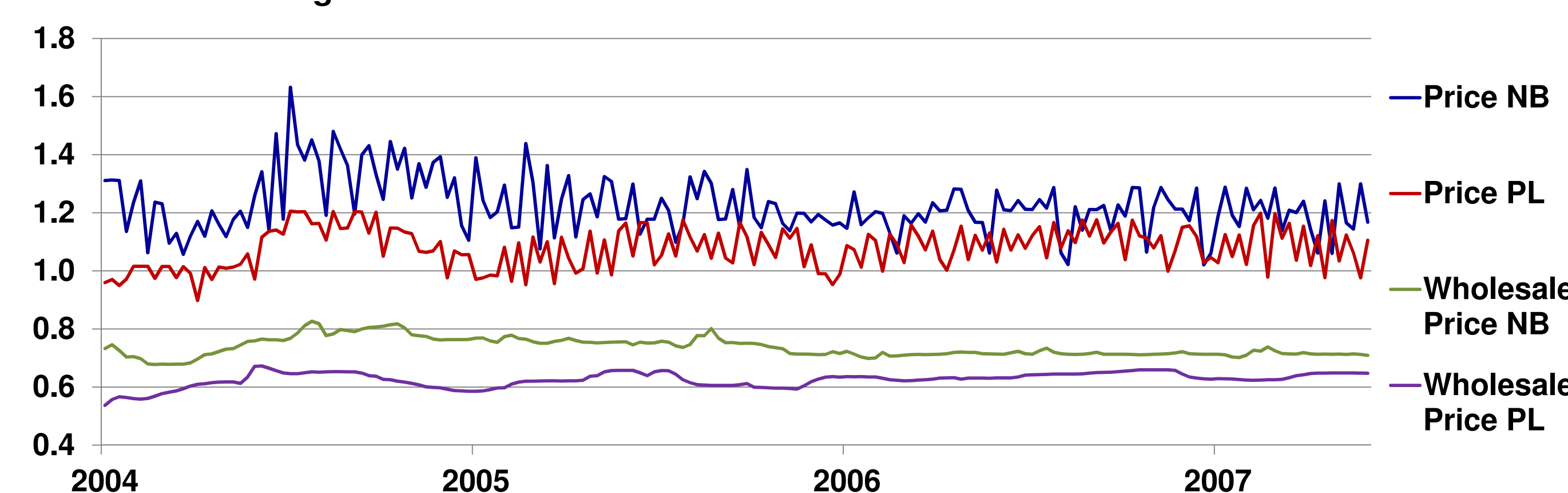
### Case study 2



convenient, long shelf-life, manifold flavors, prominent NB share 74%

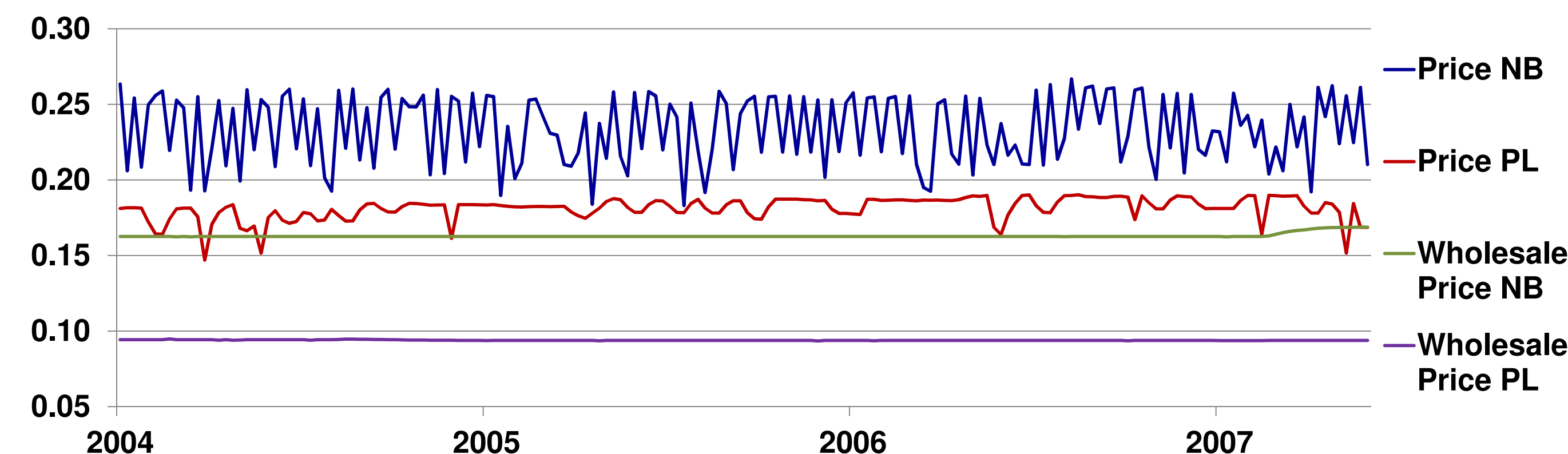
### Bacon: retail price variability > wholesale price variability

Price in CAD/100 g



### Salad dressings: price variability despite rigid wholesale prices

Price in CAD/ounce



## Methods

### 1) Double-log regression model of price rigidity:

$$PR = f(PL_G, PL_C, PL_P, SP_W, Z)$$

### 2) Probabilistic model of retail price adjustment:

$$Y(\Delta P=1) = f(PL_G, PL_C, PL_P, \Delta P_W, \Delta P_{W-t}, Z)$$

**PR:** price rigidity = mean duration of unchanged price  
 **$\Delta P$ :** dummy for price change  
 **$PL_G$ :** dummy for generic  
 **$PL_C$ :** dummy for copycat brand  
 **$PL_P$ :** dummy for premium PL  
 **$SP_W$ :** share of changed wholesale prices  
 **$\Delta P_W$ :** dummy for change in wholesale price  
 **$\Delta P_{W-t}$ :** dummy for lagged change in wholesale price  
**Z:** vector of control variables: management area, store location, package size, store size, for regression additional price promotions (PROMO) and price jumps

## Results<sup>a)</sup>

Variable	Bacon		Salad dressings	
	OLS <sup>b)</sup>	Probit <sup>c)</sup>	OLS <sup>b)</sup>	Probit <sup>c)</sup>
$PL_G$	0.091***	-0.066***	-	-
$PL_C$	0.109***	-0.186***	0.686***	-0.386***
$PL_P$	-0.021***	-0.060***	0.853***	-0.584***
$SP_W$	-0.035***	-	-	-
PROMO	-0.490***	-	-0.358***	-
$\Delta P_W$	-	0.037***	-	-
$\Delta P_{W-1}$	-	0.034***	-	-
$\Delta P_{W-2}$	-	-0.024***	-	-
$\Delta P_{W-3}$	-	-0.017***	-	-

<sup>a)</sup> Selected results of estimation <sup>b)</sup> coefficients <sup>c)</sup> marginal effects of probability

\*\*\* 99.9 % significance level.

- If  $SP_W$  increases by 1 %, PR decreases by 0.035 %:  
→ Marginal effect.
- If  $\Delta P_W$ , immediately or in following week passed.
- PR differs across categories and quality levels:
  - Salad dressings: 98.6 % higher for  $PL_C$ , 134.7 % for  $PL_P$  compared to NBs.
  - Bacon: PR of  $PL_P$  lower than PR of NBs in the regression and effects are marginal.

## Conclusions

Wholesale prices more rigid than retail prices  
→ high price variation due to sales.

Rigid wholesale prices provide evidence for long term contracts.

Salad dressings: Higher PR for all types of PLs.  
Bacon: Marginal effect and no consistent results for the types of PLs.

## References

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