**AN EXAMINATION OF PRICE TRANSMISSION
IN THE U.S. PEANUT BUTTER INDUSTRY**

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INTRODUCTION

- Price transmission focuses on the relationship between two points within the supply chain. Often this is farm-retail, where researchers are interested in how changing farm prices impact retail prices.

- Many papers have been published showing asymmetric price transmission for different agricultural products (e.g. Kinnucan and Forker, 1987; von Cramon-Taubadel, 1998; Capps and Sherwell, 2007; Loy et al, 2014).

- Price transmission research is important because of impacts on markets and consumer demand.

PEANUTS AND PRICE TRANSMISSION

- Limited price transmission research in the peanut industry (Zhang, Fletcher, and Carley, 1995; Revoredo, Nadolnyak, and Fletcher, 2004)

- No research has examined this issue after the end of the U.S. peanut quota.

DATA

- Retail prices: U.S. Bureau of Labor Statistics (BLS)
  - Monthly national level price data for peanut butter, from 1994 to 2017

- Wholesale prices of shelled peanuts: Annual Peanut Marketing Summary reports and Peanut Farm Market News

- Farm prices: U.S. Department of Agriculture National Agricultural Statistics Service (USDA-NASS)

- Other data: U.S. Bureau of Labor and Statistics (BLS), U.S. Energy Information Administration (EIA),

DATA
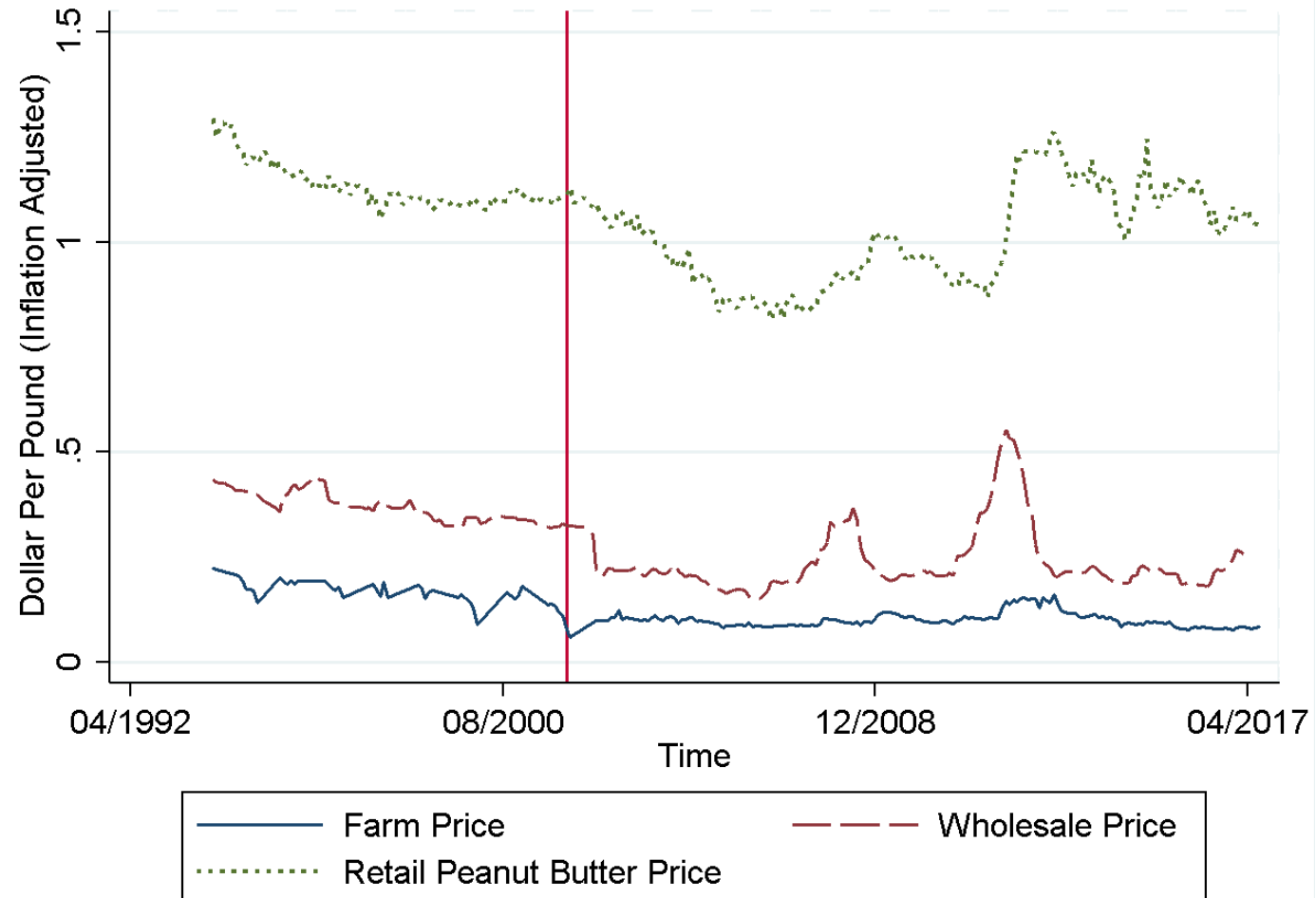
DATA

Variable	Mean	Std. Dev.
Peanut Farm price ($/lb)	0.14	0.06
Wholesale price($/lb)	0.28	0.09
Retail Peanut Butter Price ($/lb)	1.17	0.21
Electricity Price	3.02	0.26
Diesel Price	1.11	0.39

MODEL: ERROR CORRECTION MODEL

- Tests of time series data

  - Unit Root

  - Co-integeration Test

MODEL: ERROR CORRECTION MODEL

$$\Delta Price\_PB_{ijt}$$

$$= \pi_0 + \sum_{k=0}^{2} \pi_{1,k}\, \Delta WP^{+}_{ij,t-k} + \sum_{k=0}^{2} \pi_{2,k}\, \Delta WP^{-}_{ij,t-k} + \sum_{k=1}^{2} \pi_{7,k} \Delta Price\_PB_{ij,t-k}$$

$$+ \gamma_1 \Delta Diesel_{jt} + \gamma_2\, \Delta Electricity_{jt} + \varphi_1 ECT^{+}_{ij,t-1} + \varphi_2 ECT^{-}_{ij,t-1} + \varepsilon_{ijt}$$

- $\Delta Price\_PB_{ijt}$: retail peanut butter prices
- $\Delta WP^{+}_{ij,t-k}$: wholesale price rising
- $\Delta WP^{-}_{ij,t-k}$: wholesale price falling
- $ECT^{+}_{ij,t-1}, ECT^{-}_{ij,t-1}$: error correction terms

RESULTS

Existence of the asymmetry

Short Run	Long Run
$H_o: \pi_{1,k} = \pi_{2,k}, \ k = 0,1,2$	$H_o: \varphi_1 = \varphi_2$
$H_o: \sum_{k=0}^{2} \pi_{1,k} = \sum_{k=0}^{2} \pi_{2,k}, \ k = 0,1,2$	

RESULTS

	With Quota System			After Quota System		
	Estimate	Std.Err.	t-stat	Estimate	Std.Err.	t-stat
Rising wholesale Price						
Current	0.24	0.12	1.96	0.04	0.21	0.18
One Month Lag	0.17	0.30	0.57	0.04	0.23	0.19
Two Month Lag	0.08	0.31	0.25	0.24	0.12	1.98
Falling Wholesale Price						
Current	0.32	0.12	2.74	0.05	0.07	0.71
One Month lag	0.18	0.22	0.84	0.10	0.17	0.56
Two Month Lag	0.15	0.22	0.69	0.12	0.16	0.76
Peanut Butter Price						
One Month Lag	0.24	0.11	2.25	0.09	0.07	1.27
Two Month Lag	0.22	0.10	2.10	0.13	0.07	1.78
Electricity Price	-0.04	0.06	-0.79	0.02	0.06	0.29
Diesel Price	-0.06	0.06	-0.99	-0.09	0.03	-2.72
Error Correction Term +	-0.07	0.03	-2.30	-0.02	0.01	-1.85
Error Correction Term -	-0.15	0.04	-4.21	-0.13	0.05	-2.65
Constant	0.00	0.00	-0.90	-0.01	0.00	-1.47

RESULTS

- Asymmetry in price transmission both during and after the quota period

- In the short run, during the quota period, retail prices have the greatest impact in the current period from both a wholesale price increase and decrease.

- In the long run, peanut butter prices adjust much faster to the price increase in wholesale prices than adjustment in price decrease, suggesting an asymmetric price transmission in the long run.

- Furthermore, the retail price adjusts slightly slower to a price increase after the quota period and the adjustment to a price decrease is much slower.

- Overall, the retail price adjustment is slower after the quota period.

- These findings impact the degree of retail consumer responsiveness to changes in wholesale peanut prices.