

# A Study on Price Stability in Consumer Co-operatives: Focusing on Asymmetric Price Transmission for Agricultural Products of iCOOP KOREA

CO-OPERATIVES IN LOCAL AND REGIONAL DEVELOPMENT

ICA Research Conference, Pula, 27 June 2014

Ji, Minjin

Researcher, iCOOP Co-operatives Institute 

CHOI, Woosuck

Associate Professor, Department of Management of Co-operatives, Sungkonghoe  
University



Belief in the competitiveness of Co-operative Business Model

but

How to show...?

·  
·  
·

➤ **focusing on Asymmetric Price Transmission**

“The asymmetry of price transmission in conventional agricultural products market would be considerably alleviated in consumer co-operatives”

➤ **A study on the expected outcome of co-ops. business  
in terms of fairness in income distribution**

## CONTENTS

- **Price Transmission**  
(what is, what does mean, how be identified...)
- **pricing policy in consumer co-operatives in Korea, specifically iCOOP KOREA**
- **empirical analysis on Asymmetric Price Transmission,**  
for comparing conventional markets with consumer co-ops.

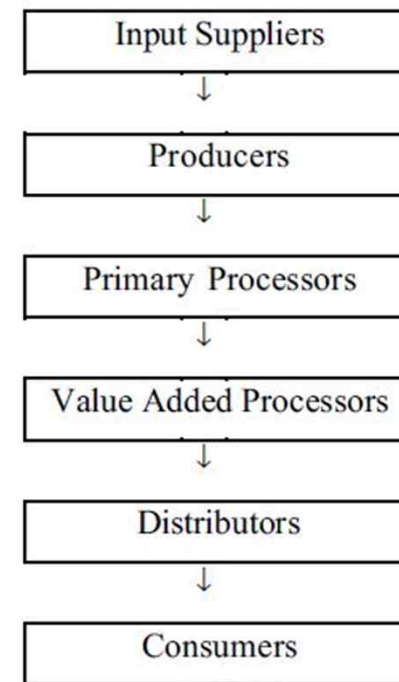
## 1. THE IDEA OF ASYMMETRIC PRICE TRANSMISSION

### PRICE TRANSMISSION

a *process* in which main input prices (or prices quoted on higher market levels like wholesale markets) affect output prices (or prices quoted on lower market levels like retail markets).

### ASYMMETRIC PRICE TRANSMISSION (APT)

shocks in higher market level prices are transmitted asymmetrically with the extend of adjustment to lower market level prices.



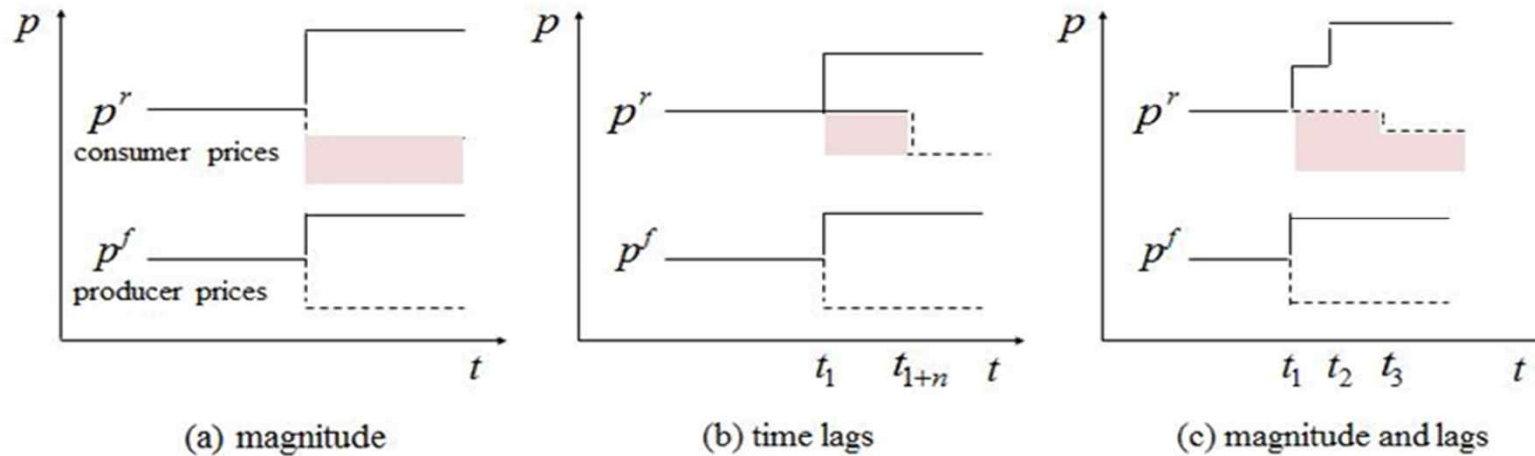
F.1 a Typical Industrial Chain for Agricultural Products

# 1. THE IDEA OF ASYMMETRIC PRICE TRANSMISSION

## TYPES AND EFFECT OF APT

The Two Classifying Criteria of APT

1) The first refers to *whether it occurs in terms of the magnitude or the speed.*

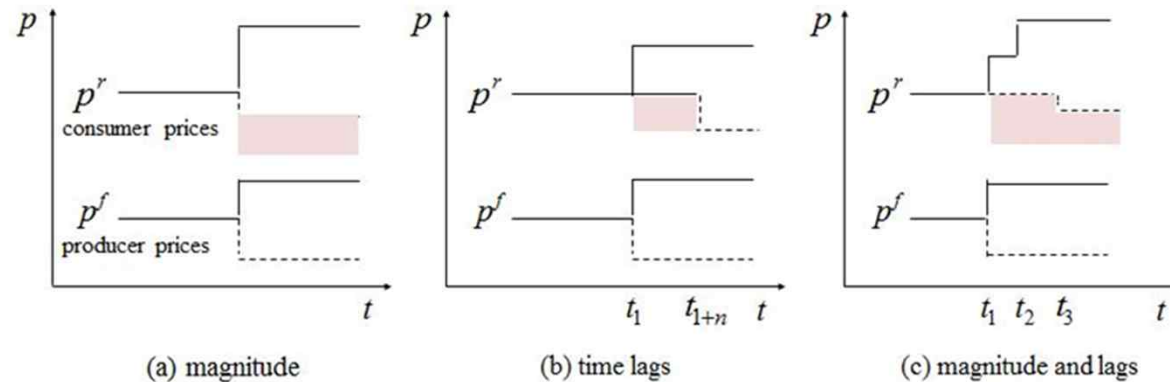


**F.2 Types of Asymmetric Price Transmission** (sources: Meyer and von Cramon-Taubadel , 2004)

# 1. THE IDEA OF ASYMMETRIC PRICE TRANSMISSION

## TYPES AND EFFECT OF APT

1) whether APT occurs *in terms of the magnitude or the speed*.



### F.2 Types of Asymmetric Price Transmission (sources: Meyer and von Cramon-Taubadel , 2004)

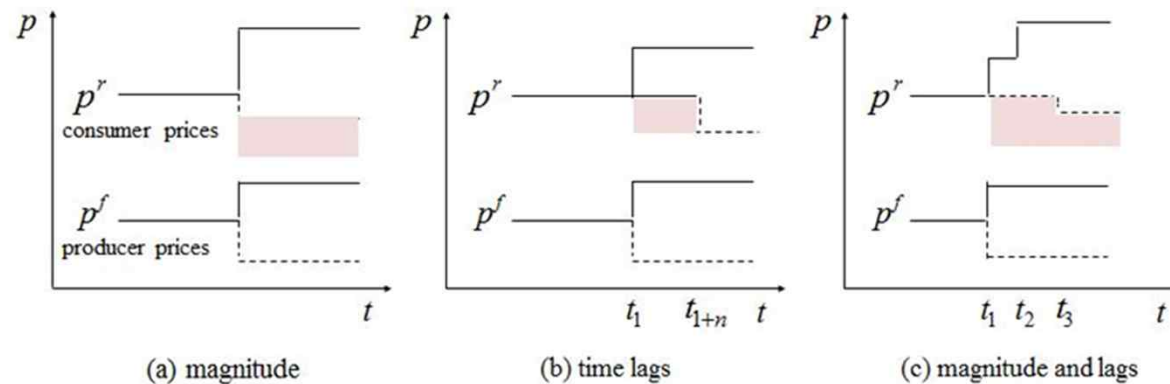
➤ **The Effect**

- Asymmetry with respect to the *speed* of price transmission leads to a *temporary transfer of welfare*, the size of which depends on the lag as well as the price changes and transaction volumes involved.
- Asymmetry with respect to the *magnitude* leads to a *permanent transfer of welfare*, the amount of which depends only on the price changes and transaction volumes involved. (Meyer and von Cramon-Taubadel , 2004)

# 1. THE IDEA OF ASYMMETRIC PRICE TRANSMISSION

## TYPES AND EFFECT OF APT

1) whether it occurs *in terms of the magnitude or the speed*.



## F.2 Types of Asymmetric Price Transmission (sources: Meyer and von Cramon-Taubadel , 2004)

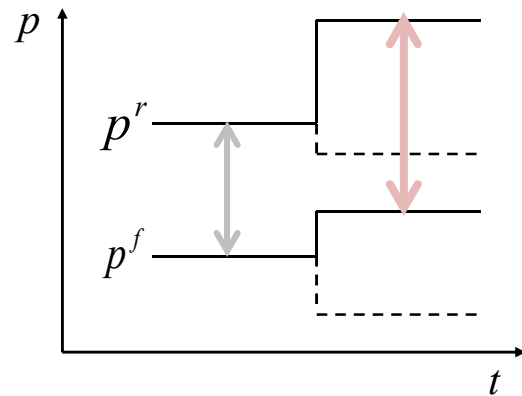
### ➤ Identifying the Effect

- contemporaneous effect
- distributed lag effect
- cumulative effect

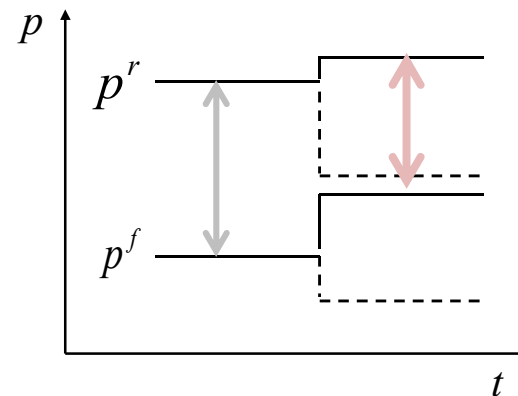
# 1. THE IDEA OF ASYMMETRIC PRICE TRANSMISSION

## TYPES AND EFFECT OF APT

2) Secondly, it refers to whether price transmission *leads to increases in the margin* between input price and output price *or leads to decreases in the margin*.



(a) positive(+) transmission



(b) negative(-) transmission

**F.3 Types of Asymmetric Price Transmission** (sources: Meyer and von Cramon-Taubadel , 2004)

### ➤ Identifying the Effect

- positive(+) price transmission: leading to margin increases (middlemen's excess gaining)
- negative(-) price transmission: leading to margin decreases



## 1. THE IDEA OF ASYMMETRIC PRICE TRANSMISSION

### THE CAUSES OF APT

1) main explanation of APT: *'non-competitive market structure'*

margin-squeezing increases in input prices will be transmitted more rapidly or fully than the corresponding margin-stretching price changes, and it leads to positive transmission which increases margin (Boyd and Brorsen, 1988; Karrenbrock, 1991; Griffith and Piggot, 1994; Mohanty, Peterson and Kruse, 1995).

ex) downward stickiness in retail prices for gasoline (Borenstein et al., 1997)

✓ This tendency is regarded as **an indirect evidence of imperfect competition and is intensified in the markets where distribution process is long and complex.**

2) other proposed explanations: 'adjustment costs' ( or 'menu costs'), 'information asymmetry', 'price support policy', etc.

## 2. IDENTIFYING APT

- A defining characteristic of the literature on asymmetric transmission and especially estimation techniques is the strong focus on agricultural markets.  
(von Cramon-Taubadel, 1998; Bunte and Peerlings, 2003; Miller and Hayenga, 2001; Goodwin and Holt, 1999; Azzam, 1999; Abduali, 2002).
- Meyer and von Carmon-Taubadel (2004) show that **most of the 40 empirical studies on APT** which were published in major journals from 1980-2002 **are concerned with agricultural or food distribution channels.**
- Even though these empirical studies have some differences in applied econometric models, such researches for identifying APT have been accomplished continually.

## 2. IDENTIFYING APT

### THE TWO MAIN IDENTIFYING METHODS

#### 1) Autoregressive Distributed Lag (ARDL) Model

An ADRL model suggests that *a present output price depends on both present and past input prices, as well as own past prices, i.e. past output prices.*

T 1. Selected Empirical Studies based on Autoregressive Distributed Lag Model(ARDL)

list	specific econometric model	focused types of asymmetries
Tweeten and Quance (1969)	<ul style="list-style-type: none"> <li>agricultural products' supply function without considering lags</li> </ul>	<ul style="list-style-type: none"> <li>distributed lag effect</li> </ul>
Wolffram (1971)	<ul style="list-style-type: none"> <li>including first difference as an explanatory variable</li> </ul>	<ul style="list-style-type: none"> <li>including cumulated impact</li> </ul>
Ward (1982)	<ul style="list-style-type: none"> <li>fresh vegetables' wholesale prices – retail prices</li> <li>including lags of wholesale price variations</li> </ul>	<ul style="list-style-type: none"> <li>including cumulated impact</li> </ul>
Aguiar and Santana (2002) *	<ul style="list-style-type: none"> <li>transmission from changes in producer prices into retail prices in agricultural products</li> </ul>	<ul style="list-style-type: none"> <li>contemporaneous impact, distributed lag effect, cumulated impact ;</li> </ul>

## 2. IDENTIFYING APT

### THE TWO MAIN IDENTIFYING METHODS

#### 2) Error Correction Model (ECM)

An ECM model devises that *a present output price depends*, like in an ARDL model, on both present and past input prices, as well as own past prices, i.e. past output prices, and *additionally depends on a long term relation between output prices and input prices*

T 2. Selected Empirical Studies based on Autoregressive Distributed Lag Model(ARDL)

list	specific econometric model	focused types of asymmetries
von Cramon-Taubadel and Fahlbusch (1994)	<ul style="list-style-type: none"> <li>German pork market</li> <li>producer prices – wholesale prices</li> <li>dividing error correction terms into positive(+) and negative(-)</li> </ul>	<ul style="list-style-type: none"> <li>comparing the coefficients of positive error correction terms and negative error correction terms</li> <li>asymmetries of long term equilibria deviation adjustments</li> </ul>
von Cramon-Taubadel and Loy (1996)	<ul style="list-style-type: none"> <li>World wheat market</li> <li>dividing output price variations due to input price variations into positive(+) and negative(-)</li> </ul>	<ul style="list-style-type: none"> <li>spatial price transmission</li> <li>dynamic transmission process in short term</li> </ul>
Beradi et al. (2000)	<ul style="list-style-type: none"> <li>Italian refined gasoline wholesale market</li> </ul>	<ul style="list-style-type: none"> <li>short term dynamic (contemporaneous, cumulated impact), and long term adjustment effect</li> </ul>

## 1. Pricing Policy based on Contract Farming (Direct Transaction)

- Consumer co-operatives in Korea, including iCOOP Korea, **mainly carry out the direct transactions** of environmentally friendly and organic agricultural products through contract farming.
- In a direct distribution system in consumer co-operatives in Korea, agricultural products follow the **simple distribution process from producers to consumers**. The agricultural products are delivered through a supply chain which has so simple steps; i.e. ‘producers-a consumer co-operative – consumers’.
- **Pricing policies are based on the direct transactions**, and ultimately they are designed not for profit.
  - divided largely into 2 categories according to the classification of the direct transactions of those agricultural products.
  - One is the fixed-pricing policy, and the flexible-pricing policy is the other.

## 1. Pricing Policy based on Contract Farming (Direct Transaction)

### 1) FIXED PRICING POLICY

- is **the general transaction system** of consumer co-operatives in Korea.
  - In this general system, producers sell their products to consumer co-operatives at the price which is set in contract with consumer co-operatives before farming.
  - And a consumer price is set to agreed-upon price, being added basic operational costs.
  
- However, this policy **fails to balance out supply and demand** or absorb shocks in markets, although it keeps consumer prices stable.
  - It's because consumer co-operatives don't force producers to supply their products to co-operatives even when market prices are higher than the producer price in co-operatives.

**1. Pricing Policy based on Contract Farming (Direct Transaction)**

T.3 Two Pricing Policies by the ways to conduct the direct transactions

	<b>Fixed pricing policy (‘Direct distribution’)(before 2010)</b>	<b>Flexible pricing policy (‘Sales agency’ in iCOOP)</b>
Contract object	Price	Supply quantity(sales volume)
Concept	Guarantees the price of agricultural products	Guarantees producers’ income (creating additional income through investment in primary production and processing).
Supply quantity	Not set in the contract	Producers are responsible for providing the entire supply quantity (130~200% of expected consumption)
Producer price	Maintaining a set price to guarantee production costs	Basic price (i.e. guaranteed production cost) and a target price (i.e. variable price)
Price fluctuation	Consumer price is set to agreed-upon price	Variable price (flexible managing in accordance with changing market price and member demands)
Characteristics	Cannot balance out supply and demand or absorb shocks in the market.	Securing stable supply quantity and having flexible pricing system to meet supply and demand.*

## 1. Pricing Policy based on Contract Farming (Direct Transaction)

### 2) FLEXIBLE PRICING POLICY

- is a **unique policy** which is carried out in ‘Sales Agency’ of iCOOP KOREA.
- The most distinct difference with fixed pricing policy is
  - that producers are required to be a member of iCOOP Association of Producer Groups and commit to providing an agreed upon amount on a contract.
  - iCOOP KOREA is responsible for selling or processing the full amount, and determines consumer prices based on the harvest, changes in demand, fluctuating market prices.
- Additionally, the functioning as stability mechanism is complemented with ‘Price Stabilization Fund’ and ‘Pre-purchase of domestic grain fund’



**1. Pricing Policy based on Contract Farming (Direct Transaction)**

**FLEXIBLE PRICING POLICY**

- T. 4 The Stability Mechanism of Flexible Pricing Policy in iCOOP Korea

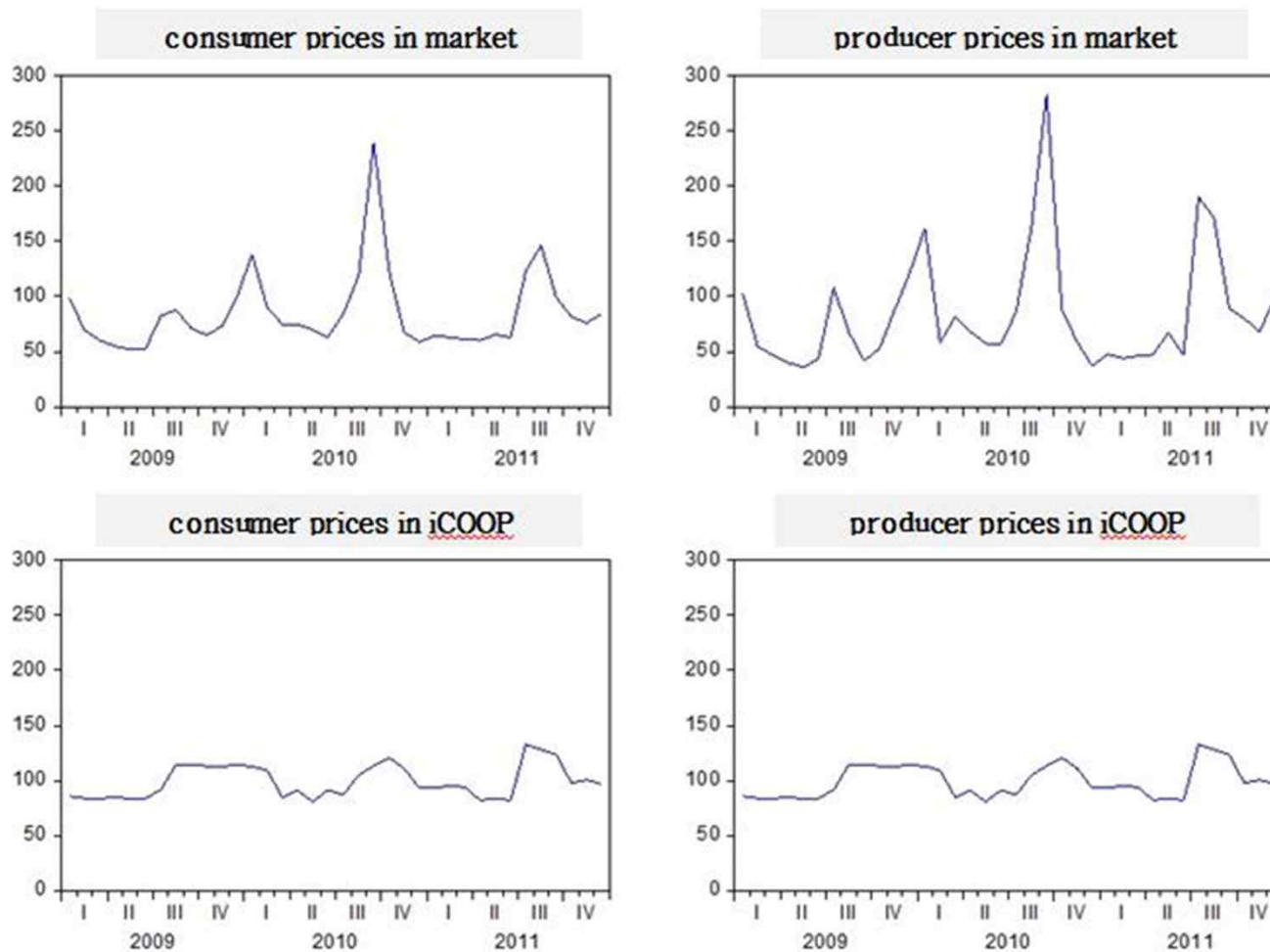
3 elements	Operation Characteristics
Flexible pricing system	<p>A basic and target price are set; when the selling price drops and the basic income of producers isn't secured, iCOOP KOREA injects the price stabilization fund and deposits the damage.</p> <ul style="list-style-type: none"> <li>• Basic price: the sum of the cash costs of production – such as the cost of seeds, labor (excluding the farmer's own labor), and other inputs – and an additional 10~20%. iCOOP KOREA guarantees this price whether or not the sales target is achieved.</li> <li>• Target price: a standard price used to decide administration of price stabilization fund. When a product is sold at higher than this price, 20~30% of the difference is placed into the price stabilization fund. The target and basic price are decided every year by iCOOP's Association of Producer Groups.</li> </ul>
Advance payment	<p>At the beginning of production, iCOOP KOREA pays 10-15% of the basic price within the sale agency system to the producers.</p>
Producer's income	<p>Producer's income = [selling price – production cost (i.e. the producer's commission)] ± (price stabilization fund saving or payment)</p>

*Sources: Revised on Shin (2011), Jung (2011), and Kim (2013).*

A impact of iCOOP's Price system of agricultural products

✓ Price Stabilization (with balanced supply and demand)

F. 4 A Comparison of Prices in Market and iCOOP KOREA (lettuce)



## 2. The Possibility of Asymmetry Mitigation in Consumer Co-ops.

- In a typical industry market, we commonly observe asymmetric price transmission, which is regarded as an indirect evidence of imperfect competition and is intensified in the market where distribution process is long and complex.
  - Farmers and consumers are disadvantaged by these asymmetries due to the exploitation of market power by processing industries or retail organizations (McCorriston, Morgan and Rayner, 1998; Bunte and Peerlings, 2003).
- As a consumer co-operative which could play an important role even in sustaining the economic benefits of their members from their businesses, iCOOP KOREA would present a case to show the possibility of an effective pricing system for the economic benefits of the persons interested.

## 1. Hypothesis and Research Model

### **Comparing the Asymmetries in iCOOP KOREA and markets**

- We analyze the vertical price transmission between producer and consumer prices for several goods in iCOOP Korea (called ‘co-op model’), and compare the asymmetries with those in agricultural products market (called ‘market model’) for the same products, respectively.
  
- For both market and co-op models, we conduct our analysis by product
  - using monthly prices between Jan. 2008 and Dec. 2012 (60 months)
  - for 9 products (potato, hot pepper, garlic, mushroom, lettuce, onion, cucumber, and green pepper)

**1. Hypothesis and Research Model**

T.6 research instrument

<b>prices</b>	<b>Agricultural Markets (market model)</b>	<b>iCOOP Korea (co-op. model)</b>
producer	Producer price index (PPI) by product	(from producers) buying price index by product*
consumer	Consumer price index (CPI) by product	(to consumers) selling price index by product*
data sources	Statistics Korea (Kim and Ahn, 2010; Ahn and Kim, 2008; Shim et al., 2006; etc.)	iCOOP Korea

\* We had those raw datum standardized according to the criteria of price index, and generated producer and consumer indices for each product.

## 1. Hypothesis and Research Model

### **To test the asymmetries in both markets and iCOOP KOREA**

- we assume that

- producer prices lead consumer prices (Kinnucan and Forker, 1987; Boyd and Brorsen, 1988; Pick et al., 1990; Griffith and Piggott, 1994; Powers, 1995; etc.). (*ARDL Model*)
- the specification of the ECM with symmetric adjustment to deviations from the long-term equilibrium is given in the equation (Meyer and von Cramon-Taubadel, 2004; etc). (*ECM*)

# 1. Hypothesis and Research Model

## ECM (or ARDL Model)

$$\Delta p_t^r = \gamma + \sum_{i=1}^n \alpha_i^+ \Delta p_{t-i}^r D^+ + \sum_{i=1}^n \alpha_i^- \Delta p_{t-i}^r D^-$$

$$+ \sum_{j=0}^n \beta_j^+ \Delta p_{t-j}^f D^+ + \sum_{j=0}^n \beta_j^- \Delta p_{t-j}^f D^- \quad \text{Hypothesis A,B,C}$$

$$+ \lambda^+ ECT_{t-1}^+ + \lambda^- ECT_{t-1}^- + \epsilon_t \quad \text{Hypothesis D}$$

, where 1) the superscripts  $r$  and  $f$  indicate consumer and producer prices, respectively.

$$2) D^+ = \begin{cases} 1 & \text{if } \Delta p_{t-i}^r \geq 0 \text{ or } \Delta p_{t-j}^f \geq 0 \\ 0 & \text{otherwise} \end{cases}, D^- = \begin{cases} 1 & \text{if } \Delta p_{t-i}^r < 0 \text{ or } \Delta p_{t-j}^f < 0 \\ 0 & \text{otherwise} \end{cases}$$

$$3) ECT_{t-1} = ECT_{t-1}^+ + ECT_{t-1}^- = \epsilon_{t-1} = p_{t-1}^r - \phi_0 - \phi_1 p_{t-1}^f.$$

## Test Hypotheses

- (A) contemporaneous impact
- (B) lagged effect
- (C) cumulated impact
- (D) long-term adjustment effect

$$H_0^{\text{con.}} : \beta_0^+ = \beta_0^-$$

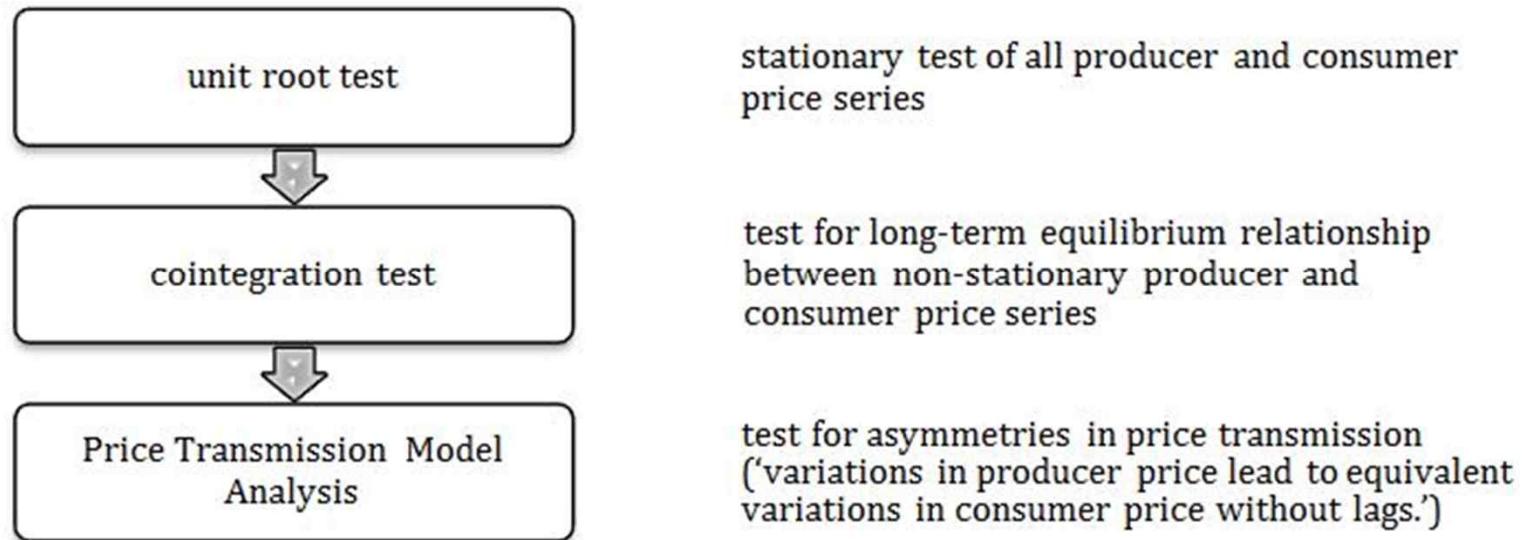
$$H_0^{\text{D.L.}} : \beta_j^+ = \beta_j^- \quad (j = 1, \dots, n)$$

$$H_0^{\text{cum.}} : \sum_{j=0}^n \beta_j^+ = \sum_{j=0}^n \beta_j^-$$

$$H_0^{\text{adj.}} : \lambda^+ = \lambda^-$$

## To test the asymmetries with time series variables

### F. 5 Analysis Process



- T. 5 Applied Analysis Model according to the characteristics of variables for each case**

product	market model	co-op model
hot pepper	ARDL	ECM
mushroom	ARDL	ARDL
onion	ARDL	ECM
tomato	ARDL	ARDL



1. Price Transmission Model Estimation  
1) markets

item	potato	hotpepper	garic	mushroom	lettuce	onion	cucumber	tomato	green pepper
$b_0^+$	0.40 (4.17 <sup>***</sup> )	0.63 (8.32 <sup>***</sup> )	0.53 (7.08 <sup>***</sup> )	0.27 (5.73 <sup>***</sup> )	0.66 (13.26 <sup>***</sup> )	0.49 (5.58 <sup>***</sup> )	0.82 (4.88 <sup>***</sup> )	0.90 (9.07 <sup>***</sup> )	0.51 (8.30 <sup>***</sup> )
$b_1^+$	-0.09 (-0.82)	0.91 (7.75 <sup>***</sup> )	0.37 (3.17 <sup>**</sup> )	0.17 (2.58 <sup>*</sup> )	1.00 (8.40 <sup>***</sup> )	0.68 (4.45 <sup>***</sup> )	0.71 (3.78 <sup>**</sup> )	0.45 (2.44 <sup>*</sup> )	0.71 (6.50 <sup>***</sup> )
$b_2^+$	-0.58 (-5.45 <sup>***</sup> )		0.11 (0.80)	-0.18 (-2.62 <sup>*</sup> )		-0.25 (-1.51)	0.27 (1.06)	0.36 (1.84)	0.39 (2.98 <sup>**</sup> )
$b_3^+$	-0.08 (-0.48)		0.03 (0.22)				-0.10 (-0.43)	0.45 (2.50 <sup>*</sup> )	
$b_4^+$	0.22 (1.56)						0.61 (2.25 <sup>*</sup> )		
$b_6^+$	0.13 (0.88)						0.70 (2.36 <sup>*</sup> )		
$b_0^-$	0.05 (0.39)	0.04 (0.38)	0.02 (0.41)	0.12 (0.58)	-0.10 (-0.53)	0.39 (2.77 <sup>***</sup> )	0.60 (1.61)	0.45 (1.32)	-0.19 (-0.95)
$b_1^-$	0.00 (0.05)	-0.17 (-1.74 <sup>*</sup> )	-0.08 (-1.61)	-0.06 (-0.29)	-0.21 (-1.17)	-0.10 (-0.68)	-0.48 (-1.28)	-0.28 (-0.85)	0.10 (0.55)
$b_2^-$	-0.10 (-0.97)		0.00 (-0.04)	-0.48 (-2.44 <sup>**</sup> )		0.25 (1.75 <sup>*</sup> )	-0.46 (-1.18)	0.03 (0.10)	0.04 (0.20)
$b_3^-$	0.11 (1.13)		-0.05 (-1.21)				-0.35 (-0.87)	0.07 (0.27)	
$b_4^-$	0.17 (1.65)						0.00 (0.01)		
$b_6^-$	-0.10 (-1.14)						-0.01 (-0.03)		

Notes: coefficient (t-value in blank)

\*\*\* (\*\*, \*) indicates being significant at 1 (5, 10) % of a significance level.

1. Price Transmission  
Model Estimation

2) co-ops.

item	potato	hotpepper	garlic	mushroom	lettuce	onion	cucumber	tomato	green pepper
$b_0^+$	0.44 (3.74 <sup>***</sup> )	0.67 (4.53 <sup>***</sup> )	-0.01 (-0.16)	0.58 (5.36 <sup>***</sup> )	0.36 (3.33 <sup>***</sup> )	-0.15 (-1.71)	0.92 (7.67 <sup>***</sup> )	1.34 (6.06 <sup>***</sup> )	0.51 (3.38 <sup>***</sup> )
$b_1^+$	0.01 (0.11)	0.42 (1.97)	-0.11 (-1.55)	0.11 (0.89)	0.27 (2.31 <sup>**</sup> )	0.15 (1.40)	0.48 (3.02 <sup>***</sup> )	0.58 (1.62)	0.25 (1.59)
$b_2^+$		0.16 (0.70)	0.01 (0.10)				0.14 (0.87)	0.84 (2.61 <sup>**</sup> )	0.32 (1.97)
$b_3^+$		0.37 (1.51)	0.00 (0.07)					0.38 (1.57)	0.61 (3.25 <sup>***</sup> )
$b_4^+$		0.13 (0.61)	-0.02 (-0.34)					0.08 (0.27)	
$b_5^+$			-0.22 (-2.46 <sup>**</sup> )						
$b_0^-$	0.82 (6.70 <sup>***</sup> )	0.58 (3.11 <sup>**</sup> )	1.01 (9.92 <sup>***</sup> )	1.06 (11.92 <sup>***</sup> )	0.87 (11.78 <sup>***</sup> )	0.94 (8.35 <sup>***</sup> )	1.03 (17.45 <sup>***</sup> )	0.94 (10.39 <sup>***</sup> )	0.83 (5.80 <sup>***</sup> )
$b_1^-$	0.10 (0.55)	0.00 (0.02)	-0.04 (-0.23)	0.21 (0.89)	-0.03 (-0.22)	0.19 (1.02)	0.23 (1.36)	-0.68 (-2.61 <sup>**</sup> )	-0.01 (-0.06)
$b_2^-$		-1.01 (-3.51 <sup>***</sup> )	-0.49 (-2.48 <sup>**</sup> )				0.08 (0.49)	-0.21 (-0.61)	0.20 (0.90)
$b_3^-$		-0.58 (-1.80)	0.34 (1.79)					-0.40 (-1.66)	-0.08 (-0.35)
$b_4^-$		-0.06 (-0.21)	0.26 (1.27)					0.04 (0.15)	
$b_5^-$			0.09 (0.50)						
$\lambda^+$	-0.67 (-5.03 <sup>***</sup> )	-0.58 (-2.32 <sup>**</sup> )			-0.20 (-2.20 <sup>**</sup> )	-0.19 (-1.46)			
$\lambda^-$	0.18 (0.92)	-0.03 (-0.16)			-0.14 (-1.54)	0.05 (0.36)			

## Empirical Results

### 1. Price Transmission Model Estimation

#### 1) markets

	potato	hotpepper	garlic	mushroom	lettuce	onion	cucumber	tomato	green pepper
$b_0^+$	0.40 (4.17***)	0.63 (8.32***)	0.53 (7.08***)	0.27 (5.73***)	0.66 (13.26***)	0.49 (5.58***)	0.82 (4.88***)	0.90 (9.07***)	0.51 (8.30***)
$b_1^+$	-0.09 (-0.82)	0.91 (7.75***)	0.37 (3.17***)	0.17 (2.58**)	1.00 (8.40***)	0.68 (4.45***)	0.71 (3.78***)	0.45 (2.44**)	0.71 (6.50***)
$b_2^+$	-0.58 (-5.45***)		0.11 (0.80)	-0.18 (-2.62**)		-0.25 (-1.51)	0.27 (1.06)	0.36 (1.84*)	0.39 (2.98**)
$b_3^+$	-0.08 (-0.48)		0.03 (0.22)				-0.10 (-0.43)	0.45 (2.50**)	
$b_4^+$	0.22 (1.56)						0.61 (2.25**)		
$b_5^+$	0.13 (0.88)						0.70 (2.36**)		
$b_0^-$	0.05 (0.39)	0.04 (0.38)	0.02 (0.41)	0.12 (0.58)	-0.10 (-0.53)	0.39 (2.77***)	0.60 (1.61)	0.45 (1.32)	-0.19 (-0.95)
$b_1^-$	0.00 (0.05)	-0.17 (-1.74*)	-0.08 (-1.61)	-0.06 (-0.29)	-0.21 (-1.17)	-0.10 (-0.68)	-0.48 (-1.28)	-0.28 (-0.85)	0.10 (0.55)

- $b_0^+$ : increases in consumer prices at time t, due to increases in producer prices at time t ; significant in 9 products
- $b_0^-$ : decreases in consumer prices at time t, due to decreases in producer prices at time t ; significant in only 1
- $b_0^+$ : increases in consumer prices at time t, due to increases in producer prices at time (t-1) ; significant in 8 products
- $b_1^+$  in 8 products

✓ When producer prices increase (decrease), consumer prices increase (do not decrease).

Additionally, this impacts last several months.

✓ Such APT consequently leads to increases in the margin (i.e. positive (+) transmission) ;

( $b_j^+ - b_j^- > 0$ ) ; 9 products at time t, 8 products at time (t-1)

## Empirical Results

### 1. Price Transmission Model Estimation 2) co-ops.

item	potato	hotpaper	garlic	mushroom	leuce	onion	cucumber	tomato	green paper
$\beta_0^+$	0.44 (3.74***)	0.67 (4.53***)	-0.01 (-0.16)	0.58 (5.36***)	0.36 (3.33***)	-0.15 (-1.71)	0.92 (7.67***)	1.34 (6.06***)	0.51 (3.38***)
$\beta_1^+$	0.01 (0.11)	0.42 (1.97*)	-0.11 (-1.55)	0.11 (0.89)	0.27 (2.31**)	0.15 (1.40)	0.48 (3.02***)	0.58 (1.62)	0.25 (1.59)
$\beta_2^+$		0.16 (0.70)	0.01 (0.10)				0.14 (0.87)	0.84 (2.61**)	0.32 (1.97)
$\beta_3^+$		0.37 (1.51)	0.00 (0.07)					0.38 (1.57)	0.61 (3.25***)
$\beta_4^+$		0.13 (0.61)	-0.02 (-0.34)					0.08 (0.27)	
$\beta_5^+$			-0.22 (-2.46**)						
$\beta_0^-$	0.82 (6.70***)	0.58 (3.11***)	1.01 (9.92***)	1.06 (11.92***)	0.87 (11.78***)	0.94 (8.35***)	1.03 (17.45***)	0.94 (10.39***)	0.83 (5.80***)
$\beta_1^-$	0.10 (0.55)	0.00 (0.02)	-0.04 (-0.23)	0.21 (0.89)	-0.03 (-0.22)	0.19 (1.02)	0.23 (1.36)	-0.68 (-2.61**)	-0.01 (-0.06)

- When producer prices increase, consumer prices increase significantly in 7 products. But the impacts last to the next term only 3 products.
- the decreases in consumer prices at time t, due to the decreases in producer prices at time t ; significant in all 9 products
- ✓ **Though consumer prices react contemporaneously to producer price increases, such variations couldn't lead to consumer price changes in the next month.**
- ✓ **In the case of producer price decreases, consumer prices decrease completely within same period ( $\beta_0^-$ ) for all 9 products.**
- ✓ **Such APT consequently leads to decreases in the margin (i.e. negative (-) transmission) ;**  
( $b_j^+ - b_j^- < 0$ ) ; 7 products at time t

## 2. Testing Research Hypotheses

### T. 9 Price Transmission Hypothesis Test

		market model				co-op model			
item		(A) CON.	(B) D.L.	(C) CUM.	(D) ADJ.	(A) CON.	(B) D.L.	(C) CUM.	(D) ADJ.
potato	F-statistic	5.18**	3.31**	0.14		4.29**	0.16	3.04	9.24***
	P-value	0.03	0.02	0.71		0.04	0.69	0.09	0.00
hot pepper	F-statistic	22.31***	57.36***	76.76***		0.10	4.22***	8.04***	3.11
	P-value	0.00	0.00	0.00		0.76	0.01	0.01	0.09
garlic	F-statistic	35.73***	4.16**	13.78***		77.29***	2.19	12.22***	
	P-value	0.00	0.01	0.00		0.00	0.08	0.00	
mushroom	F-statistic	0.56	1.64	3.14		9.68***	0.16	3.60	
	P-value	0.46	0.21	0.08		0.00	0.69	0.06	
lettuce	F-statistic	14.94***	33.05***	37.35***		13.79***	3.93	0.79	0.12
	P-value	0.00	0.00	0.00		0.00	0.05	0.38	0.73
onion	F-statistic	0.26	6.29***	1.49		56.87***	0.03	15.34***	1.14
	P-value	0.61	0.00	0.23		0.00	0.87	0.00	0.29
cucumber	F-statistic	0.28	2.20	7.98***		0.65	1.51	0.49	
	P-value	0.60	0.08	0.01		0.42	0.23	0.49	
tomato	F-statistic	1.54	2.15	6.43**		2.45	4.00***	10.81***	
	P-value	0.22	0.11	0.02		0.13	0.01	0.00	
green pepper	F-statistic	11.84***	5.24***	17.38***		2.13	1.92	1.48	
	P-value	0.00	0.01	0.00		0.15	0.14	0.23	

Notes: \*\*\* (\*\*) indicates being significant at 1 (5) % of a significance level.

(A) CON. = contemporaneous effect, (B) D.L. = distributed lags effect, (C) CUM.=cumulative effect, (D) ADJ.= adjustment effect



## 2. Testing Research Hypotheses

**T.10 Asymmetric Price Transmission Products in each effect**

market model				co-op model			
(A) CON.	(B) D.L.	(C) CUM.	(D)* ADJ.	(A) CON.	(B) D.L.	(C) CUM.	(D) ADJ.
potato hot pepper garlic lettuce green pepper	potato hot pepper garlic lettuce onion green pepper	hot pepper garlic lettuce cucumber tomato green pepper	.	potato garlic mushroom lettuce onion	hot pepper tomato	hot pepper garlic onion tomato	potato

Notes: Testing market models are based on an ARDL model. Thus, there are no products to test adjustment effect.

- Using a Wald test, we found that **symmetry can be rejected** in equations (A)-(D) for **many more products in market model** than in co-op model.
- ✓ The result shows that **APT is inclined to occur for many more products in market.**
- ✓ Additionally, in the effect which, **being cumulated**, those variations in several past periods impact on current consumer price, **asymmetries grow more and more involved in market model.**

- ✓ This empirical study finds evidences that **the asymmetry of price transmission in conventional agricultural products market is considerably alleviated** under the pricing policy used by consumer co-operatives, specifically iCOOP KOREA.
  
- ✓ These evidences implicate that **consumer co-operatives contribute to promote a more balanced redistribution of wealth.**
  - It could protect producers as well as consumers from the excess gaining of middlemen with market power.

The findings also suggest that **consumer co-operatives could contribute to enhance the welfare of producers as well as consumers, by their stable pricing policy favorable to both producers and consumers.**

- Consumer co-operatives could play an important role even in sustaining the economic benefits of their members from their businesses.
- The purpose of the pricing system of agricultural products in consumer co-operatives could be to build sustainable structure of food production and consumption.
- This is achieved by transforming a market based antagonistic relationship between producers (seeking to sell at the highest price possible) and consumers (seeking to buy at the lowest price possible) to a win-win cooperative price system based on mutual trust and cooperation with common interests.
- With these pricing policies, consumer co-operatives in Korea could face the less likelihood of asymmetric price transmission by easing price volatility and by integrating the interests of consumers and producers especially in iCOOP KOREA.



**Thank You for Your Attention!**

**I hope that  
this study will reach the fine evidence of the coops' capabilities in terms of fairness  
someday.**

**e-mail : [jiminjin@gmail.com](mailto:jiminjin@gmail.com)**

