The Study of Price Behavior of Vegetable Markets in Myanmar and Japan

Myae, Aye Chan
Department of Agricultural Planning,Ministry of Agriculture and Irrigation,Myanmar

Yutaka, Tomoyuki
Faculty of Agriculture, Kyushu University

Fukuda, Susumu
Faculty of Agriculture, Kyushu University

Kai, Satoshi
Faculty of Agriculture, Kyushu University

https://doi.org/10.5109/4724

出版情報：九州大学大学院農学研究院紀要. 51 (1), pp.139-146, 2006-02-01. Faculty of Agriculture, Kyushu University
バージョン：
権利関係：

J. Fac. Agr., Kyushu Univ., **51** (1), 139–146 (2006)

The Study of Price Behavior of Vegetable Markets in Myanmar and Japan

Aye Chan MYAE[1], Tomoyuki YUTAKA, Susumu FUKUDA and Satoshi KAI*

Laboratory of Agricultural Marketing, Division of Industrial Organization of Agribusiness, Department of Agricultural and Resource Economics, Faculty of Agriculture, Kyushu University, Fukuoka 812–8581, Japan

(Received October 28, 2005 and accepted November 16, 2005)

With the basic knowledge of different marketing system in Myanmar and Japan, this study focuses on the empirical test to find out the number of distributed lags the retail price had, from wholesale price for some selected vegetables. Using monthly data for three years (2001–2003), The Almon Distributed Lag Model, introduced by Shirlay Lamon (1965), was applied in order to verify the number of lags in Myanmar and Japan. Following the introduction about the marketing behavior in both countries, the methodological framework, results, and discussions with some concluding remarks were conducted in this paper. The results evidenced that there was a lag from wholesale to retail price in Myanmar for all crops. However, in Japan, there was no lag for very perishable crops like tomato and cabbage, but with a lag for less perishable crops of potato and onion. The lags of price responses for very perishable crops in Myanmar showed the weakness of price formation process due to inefficient marketing system. It has been suggested that the efficiency in Myanmar can be improved by 1) increasing the volume of business; 2) introducing in wholesale markets with effective laws; 3) upgrading modern retailing system; and 4) facilitating the construction of information, infrastructure and transportation systems.

INTRODUCTION

Present Status of Vegetable Marketing in Myanmar

In Myanmar, the real central wholesale market is absent. There exist no laws distinguishing wholesale markets from retail ones. They have multi commodity and are multifunctional, performing wholesale function for some commodity and semi wholesale or retail or transit function for some other commodity, at the same time. The marketing system is still based on the age–old customs and traditions with the lack of any efforts to streamline with the market oriented economy. The typical marketing channel for vegetables and fruits in Myanmar can be seen in figure (1).

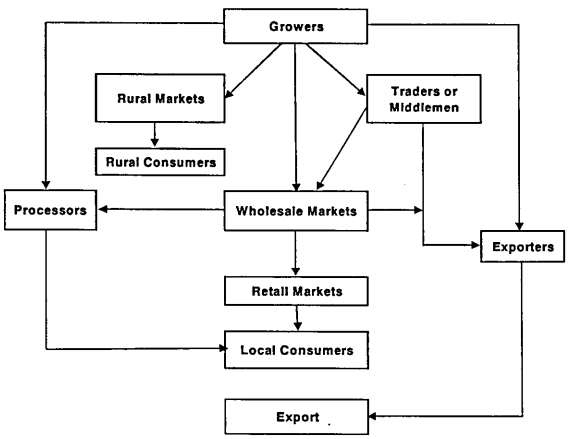


Fig. 1. Marketing Channels of Fruits and Vegetables in Myanmar

The price is decided in direct negotiations based on their experience, skill and intuition. Several price levels for a commodity were set at any one time. The basic information on the quantity of commodity arrival and prevailing market prices as well as the timely observation on the behaviors of other traders are necessary for them. Through personal networks, market information is transmitted relatively correctly and quickly. The price for the similar size and quality of the same product is not much different from trader to trader.

For being a very competitive business, there arise many personal elements for customer relationship such as offering a variety of service to their regular partners as well as provision of market information and financial support. Moreover, the fixed and closed relationship between brokers in the producing district and traders in the capital city makes barriers to market entry and higher margin rates and profitability. They are having upper hand in the absence of alternate/competitive agencies. Although they have responsibility to provide an appropriate arrangements for proper space, it dose not come into practice. The produce is brought into the market at the risk of sellers. The element of risk lies with the seller till it is sold. The situation is further aggravated by rough handling at the hands of labor.

Generally, there are six steps for a commodity to pass from producers to consumers. These steps are illustrated in figure (2).

The constitutions of costs and profits for tomato and cabbages were determined using the survey results on June, 2004. The number of observed sample farmers and traders during the survey period is shown in table (1), and the cost and profit constitution is shown in figure (3) for tomato and in figure (4) for cabbage.

From the figures, profit of farmer was larger than that of wholesaler in the case of tomato. For cabbage,

[1] Department of Agricultural Planning, Ministry of Agriculture and Irrigation, Myanmar.
* Corresponding author (E-mail: satokai@agr.kyushu-u.ac.jp)

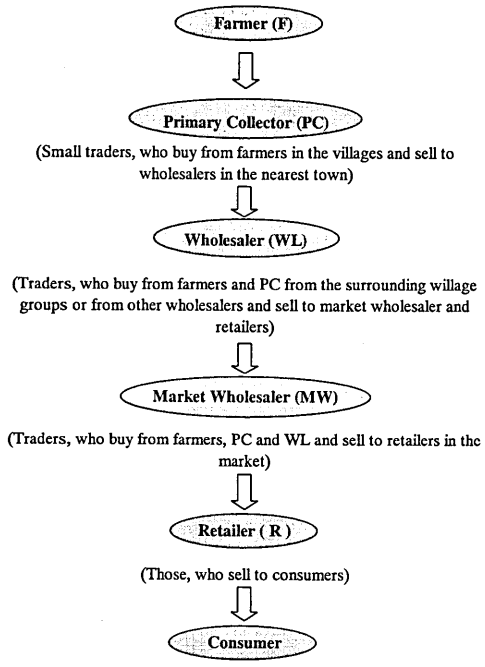


Fig. 2. The steps of Commodity Flow in Myanmar

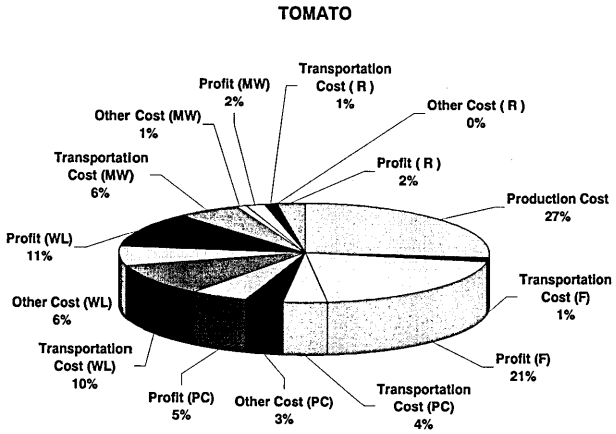


Fig. 3. Constitution of Costs and Margins for Tomato in Myanmar

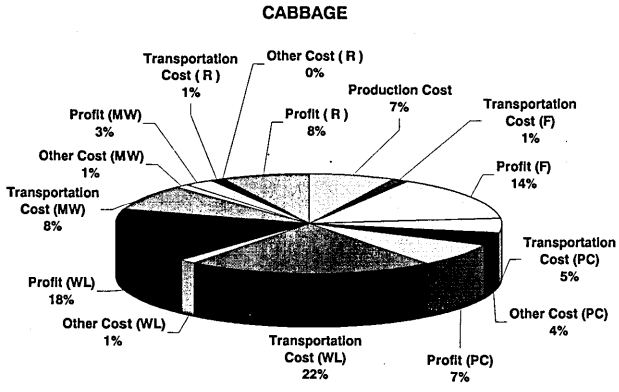


Fig. 4. Constitution of Costs and Margins for Cabbage in Myanmar

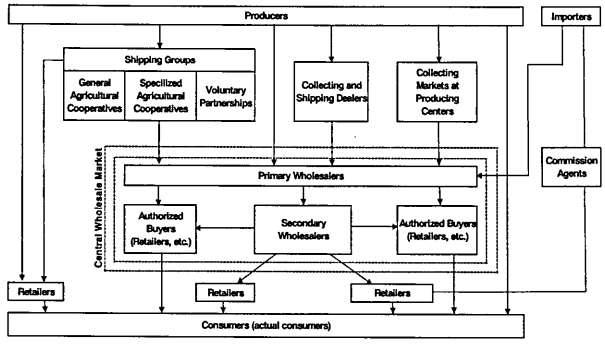
Table 1. Number of sample farmers and traders covered during the survey period.

Type of Questionnaires	Number of Interviewee		
	Tomato	Cabbage	Total
Farmer	4	4	8
Primary Collector	2	1	3
Market Wholesaler	1	1	2
Wholesaler (large scale)	4	2	6
Retailer	1	1	2
Total	12	9	21

not only wholesaler profit but also wholesaler transportation cost was larger. The high wholesaler profit and transportation cost of cabbage came from the result of high perishablity, bulkiness, lack of storage facilities and bad transportation system, leading to lower farmer profit. These factors showed the weakness of operational marketing efficiency in Myanmar.

Present Status of Vegetable Marketing in Japan

The Marketing channel of Japan involves central wholesale markets. According to the Wholesale Market Law, wholesale markets are of three types, i.e. central wholesale market, local wholesale market, and other wholesale market. The typical marketing channels for fruit and vegetables through central wholesale, is shown in Figure (5).



Source: H. Fujishima, "The Present Status and Future Issues of The Japanese Wholesale Market", *Operation of Agricultural Wholesale Markets*, Asian Productivity Organization, Tokyo, 2002.

Fig. 5. Marketing Channels of Fruits and Vegetables in Japan

Generally, there are five steps for a commodity to pass from producers to consumers. These steps are illustrated in figure (6).

There are three kind of wholesale markets dealers:

(a) Primary Wholesalers (Primary Wholesale Company in the Wholesale Market)

If the market handles only fruits and vegetables, there are only one or two primary wholesalers at each market. Primary wholesalers sell to secondary wholesalers and authorized buyers through auctions or one–on–one negotiation at the wholesale floor in the premises of wholesale market. Primary whole-

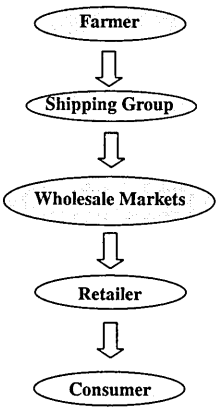


Fig. 6. The steps of Commodity Flow in Japan

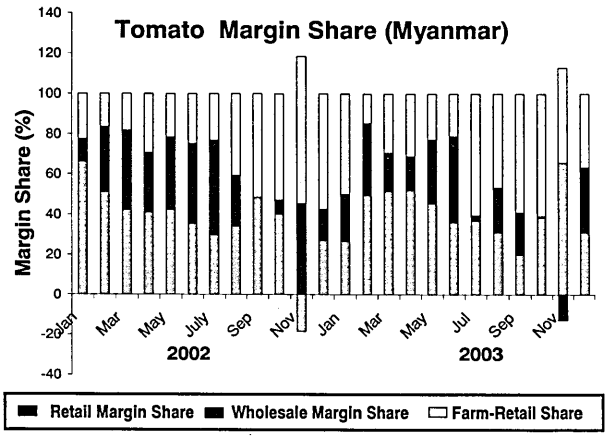


Fig. 7. Margin Share of Tomato in Myanmar

salers take the commission of 8.5% for vegetables and 7.0% for fruits.

(b) Secondary Wholesalers (Secondary Wholesale Company in the Wholesale Market)

Secondary wholesalers have their shops located in the premises of wholesale market for conducting their job. They sell to the authorized buyers and other buyers who come to the wholesale market. They also deliver the goods to the retailer's shop or distribution center according to their order. The number of secondary wholesalers is from 10 to 200 per wholesale market.

(c) Authorized Buyers

Authorized buyers are retailers and restaurant owners. They come and buy goods only from the secondary wholesalers. They cannot buy from primary wholesalers. They do not have any facility in the premises of wholesale market. The number of authorized buyers varies from several hundred to more than thousand per wholesale market. The prices of transaction between primary wholesalers and secondary wholesalers or primary wholesalers and authorized buyers are determined as wholesale market price.

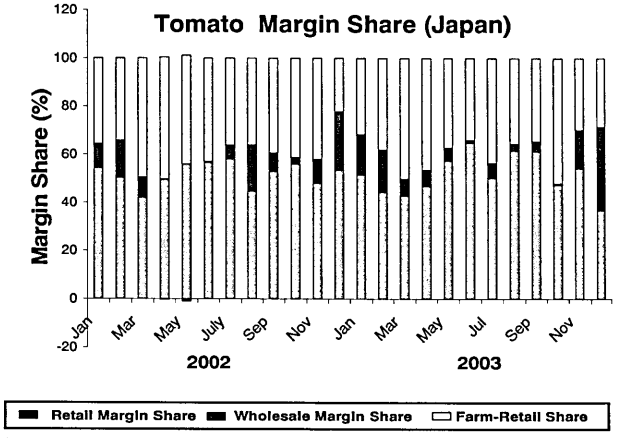


Fig. 8. Margin Share of Tomato in Japan

The Impact of Marketing system on the Margin Share

With the respective marketing systems, the margin share can be observed in the figures (7), (8), (9), and (10).

From the figures, it was evident that margin shares were almost stable in Japan, but highly fluctuated in Myanmar. Highly efficient market infrastructure, and transparent transaction, made the margin shares in Japan stable. The instability of price spreads in Myanmar was primarily caused by two factors. First, price variations in farm and wholesale level were higher than that in retail level. Fluctuations in farm and wholesale prices, coupled with relatively stable retail prices, caused spreads to vary. Secondly, the delay between farm and retail price changes also made price spreads more volatile. For example, when farm and wholesale

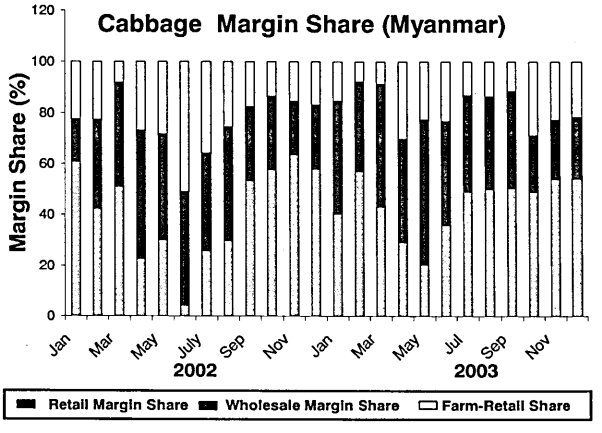


Fig. 9. Margin Share of Cabbage in Myanmar

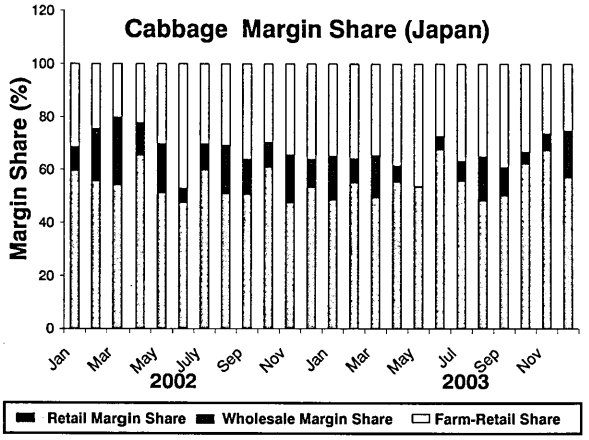


Fig. 10. Margin Share of Cabbage in Japan

prices rise, the lag in response by retail price causes the wholesale–to–retail price spread to narrow. When farm and wholesale prices drop, a lag causes the wholesale–to–retail price spread to widen. This process caused to all margin shares fluctuate.

Purpose and Organization of the Study

This paper attempts to fulfill the knowledge about the extent of adjustment and speed with which shocks are transmitted among producer, wholesale, and retail market. The price behavior is an important factor reflecting the actions of market participants at different levels. However, the transmission of price changes depends greatly on the type of product. Vegetables, fruits, and fresh milk of highly perishable with minimal processing products are expected to have a relatively quick price transmission mechanism. Even within vegetables, there can be some lags of price formation in those products like potato, onion, garlic, etc., which can be stored relatively easily for a few months. An empirical test is developed to verify the price transmission from wholesale to retail level. The concept of distributed lag had been first introduced by Shirley Almon (1965). Almon lag model is very flexible and easy to estimate.

The rest of this paper is organized as follows. The next section mentions the methodological framework of Almon Distributed Lag Model, which is followed by a plan of estimating the distributed lag. Then the result of the test is determined along with some discussion on the possible factors of lag or non–lag of some selected crops in Myanmar and Japan. The paper concludes with some concluding remarks.

DESCRIPTIONS OF THE DATA AND THEIR MOVEMENT

Since the comparison of farm, wholesale, and retail price is a more accurate reflection of overall marketing margins for agricultural products. Using monthly data for three years (January 2001–December 2003), the distributed lags of wholesale to retail price had been determined. In Myanmar, monthly wholesale price was collected from Monthly Price Bulletin, Market Information Service Project, Department of Agricultural Planning, Ministry of Agriculture and Irrigation, and monthly retail price was collected from "Selected Monthly Economic Indicators", Ministry of National Planning and Economic Development, Myanmar. Monthly price data in Japan was collected from "Monthly Statistics of Agriculture, Forestry and Fisheries", Ministry of Agriculture, Forestry and Fisheries, Japan.

The movement of farm, wholesale and retail prices for tomato and cabbage in both Myanmar and Japan, can

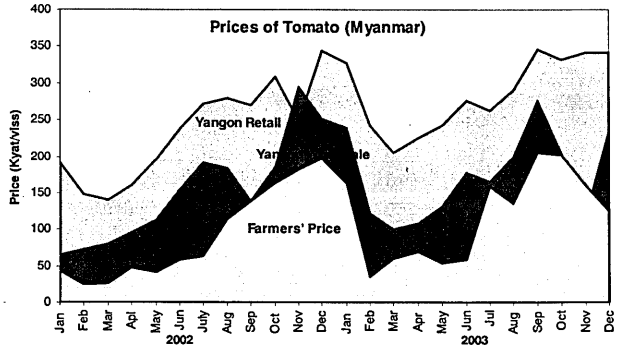


Fig. 11. Pattern of Farm, Wholesale and Retail Price Changes of Tomato in Myanmar

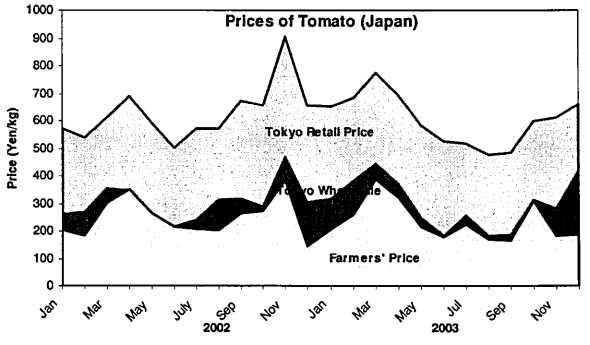


Fig. 12. Pattern of Farm, Wholesale and Retail Price Changes of Tomato in Japan

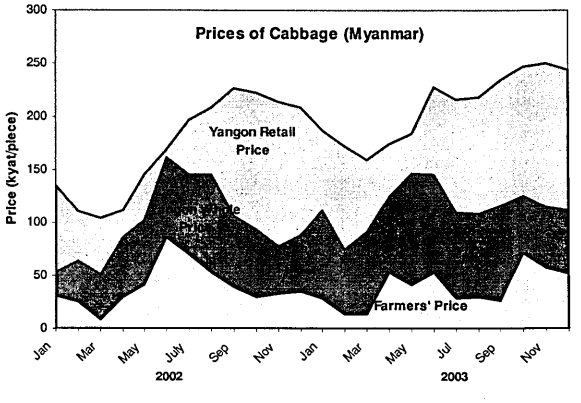


Fig. 13. Pattern of Farm, Wholesale and Retail Price Changes of Cabbage in Myanmar

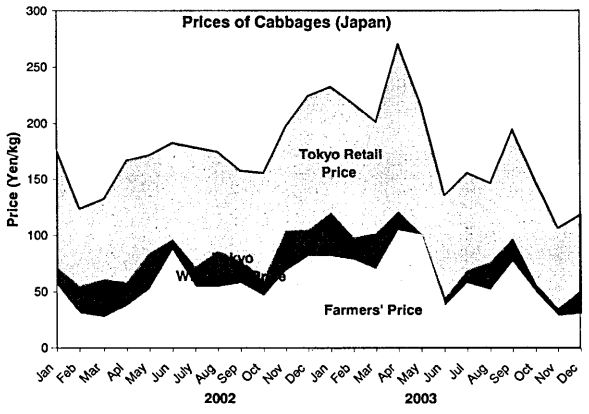


Fig. 14. Pattern of Farm, Wholesale and Retail Price Changes of Cabbage in Japan

be observed in the figures (11), (12), (13), and (14). With the expectation of high price response in very perishable crops, tomato and cabbage were selected to put into figures. In these figures, the response of retail and wholesale prices to farm prices as well as the composition of market margin can be determined.

It could be screened from the figures that retail and wholesale prices responded more equally to both rising and falling of farm prices in Japan than in Myanmar. Short term farm price changes were not quickly transmitted to wholesale and retail prices in Myanmar.

METHODOLOGICAL FRAMEWORK

To specify retail prices as a distributed lag in wholesale prices, the Almon Distributed Lag Model was used. To reduce the effects of co-linearity in distributed lag settings, Almon or polynomial distributed lags were used. They impose some particular shape on lag coefficients. Theory is as follow:

$$R_t=\gamma+\sum_{i=0}^{k}\beta_i W_{t-1}+u_t \qquad (1)$$

where, R_t is current retail price, W is wholesale price and i indexes the k lag lengths. The relationship between the polynomial lag terms and the distributed lag coefficient can be found by the following equation:

$$\beta_i=\alpha_0+\alpha_1 i+\alpha_2 i^2+...+\alpha_m i^m \quad (i: 0, 1, ..., k) \qquad (2)$$

so that β_i is now an mth-order polynomial with m <k. Plug (2) in (1):

$$\begin{aligned}R_t&=\gamma+\sum_{i=0}^{k}(\alpha_0+\alpha_1 i+\alpha_2 i^2+...+\alpha_m i^m)W_{t-1}+u_t\\&=\gamma+\alpha_0\sum_{i=0}^{k}W_{t-1}+\alpha_1\sum_{i=0}^{k}iW_{t-1}+...\\&\quad+\alpha_m\sum_{i=0}^{k}i^m W_{t-1}+u_t\end{aligned} \qquad (3)$$

By constructing,

$$Z_{0t}=\sum_{i=0}^{k}W_{t-1}$$

$$Z_{1t}=\sum_{i=0}^{k}iW_{t-1}$$

$$Z_{2t}=\sum_{i=0}^{k}i^2W_{t-1}$$

...

$$Z_{mt}=\sum_{i=0}^{k}i^m W_{t-1}$$

Equation (3) can be rewritten as:

$$R_t=\gamma+\alpha_0 Z_{0t}+\alpha_1 Z_{1t}+\alpha_2 Z_{2t}+...+\alpha_m Z_{mt}+u_t \qquad (4)$$

This equation is estimated via OLS and the estimated parameters are used to calculate the parameters from the distributed lag model (the $\hat{\beta}_i s$) by using equation (2). The sampling variances and covariances of the $\hat{\beta}_i s$ can be computed from those of the $\hat{\alpha} s$ and significant tests are carried out on the $\hat{\beta}_i s$. Defining $\boldsymbol{H}$ as the matrix of coefficients in Eq. (1),

$$H=\begin{bmatrix}1&0&0&0\\1&1&1&1\\1&2&4&8\\1&3&9&27\\..&..&..&..\\1&i&i^2&i^3\end{bmatrix}$$

Equation (2) then becomes:

$$\beta=H\alpha \qquad (5)$$

The matrix form of the original equation (1) is

$$\begin{aligned}R&=\gamma i+WH\alpha+u\\&=\gamma i+Z\alpha+u \qquad (Z=WH)\end{aligned} \qquad (6)$$

The least square estimate of α is:

$$\hat{\alpha}=(Z'Z)^{-1}Z'R \qquad (7)$$

An estimator of β is : $\hat{\beta}=H\hat{\alpha}$

which is distributed as,

$$N(\beta,\ \sigma^2 H(Z'Z)^{-1}H')$$

The standard errors of the distributed leg weights are:

$$\begin{aligned}S_i^2&=H\sigma^2(Z'Z)^{-1}H'\\&=H\,\mathrm{var}[\hat{\alpha}]\,H'\\&=\mathrm{var}[\hat{\beta}]\end{aligned} \qquad (8)$$

From the $\hat{\beta}_i s$, a weighted average of these lags is constructed to get a mean lag, or average lag by using the following formula:

$$Meanlag=\frac{\sum_{i=0}^{k}i\beta_i}{\sum_{i=0}^{k}\beta_i}=\frac{\beta_1+2\beta_2+3\beta_3+...+k\beta_k}{\beta_0+\beta_1+\beta_2+...+\beta_k} \qquad (9)$$

Then, the **coefficient of multiple determinations** (R^2) and the **Durbin–Watson Test** (d) of the original model, equation (1) is calculated by using the following formulas, (10) and (11):

$$R^2=1-\frac{\sum \hat{u}_t^2}{\sum(R_t-\overline{R})^2} \quad (10)$$

where, $\hat{u}_t$ – residuals, R_t – retail price, and $\overline{R}$ – mean of retail prices

$$d=\frac{\sum_{t=2}^{T}(\hat{u}_t-\hat{u}_{t-1})^2}{\sum_{t=1}^{T}\hat{u}_t^2}$$

RESULT AND DISCUSSION OF THE TEST

In the Almon procedure, the degree of polynomial (m) and the period of the largest lag (i) were used under various combinations and the best one with maximum R^2 was chosen. Using monthly data for three years (2001~2003), the results were shown in table (2). The results suggested that the residuals from equation (1) were auto– correlated having very small Durbin–Watson statistics for most of the results. However, autocorrelation here was not terribly serious, since it does not mean biased estimates, and the standard errors were quite small. The regression coefficients were substantially more than twice their standard errors.

From the table (2), it was evident that there was a lag from wholesale to retail price in Myanmar for all crops. However, in Japan, there was no lag for very perishable crops like tomato and cabbage, but with a lag for potato and onion, which were less perishable than tomato and cabbage.

Evaluation and Discussion on the Factors of Price Asymmetry in Myanmar

In the case of Myanmar, the lag between wholesale and retail is due to factors other than the time it takes to move commodity from wholesale market to their shop. One of the factors is that the price is decided in direct negotiations, and competitiveness with other retailers in the market. Therefore, wholesalers or retailers cannot move the selling price up sharply while the buying price is rising. Sometimes, they sell out with no profit, or sell out with below buying price. Consequently, wholesalers and retailers do not shift the selling price down for a particular time, although the buying price is going down, in order to compensate their losses at the time of sharp price rise.

The other possible factors are: a) the preference of consumers for daily diet; b) the lack of wholesale price information to consumers and some retailers; and c) the lack of modern retailing system with standard weights,

Table 2. Distributed leg of Retail Price to Wholesale Price for Some Selected Crops in Myanmar and Japan

	Tomato		Cabbage		Potato		Onion	
m , i	Myanmar	Japan	Myanmar	Japan	Myanmar	Japan	Myanmar	Japan
	3, 4	2, 4	1, 5	1, 3	1, 5	2, 3	4, 5	1, 3
α_0	0.607	0.855	0.389	1.097	0.373	0.087	0.504	0.367
	(0.098)	(0.090)	(0.036)	(0.081)	(0.055)	(0.104)	(0.089)	(0.054)
α_1	–0.229	–0.580	–0.025	–0.411	–0.050	0.485	2.099	–0.102
	(0.333)	(0.120)	(0.013)	(0.049)	(0.021)	(0.243)	(0.710)	(0.034)
α_2	–0.002	0.089				–0.154	–2.319	
	(0.219)	(0.029)				(0.08)	(0.835)	
α_3	0.007						0.710	
	(0.037)						(0.282)	
α_4							–0.067	
							(0.029)	
β_0	0.607	0.855	0.389	1.097	0.373	0.087	0.504	0.367
	(0.115)	(0.389)	(0.004)	(0.381)	(0.016)	(0.035)	(0.076)	(0.023)
β_1	0.382	0.364	0.365	0.686	0.323	0.418	0.927	0.265
	(0.013)	(0.018)	(0.001)	(0.042)	(0.006)	(0.021)	(0.487)	(0.003)
β_2	0.192	0.052	0.34	0.275	0.273	0.439	0.037	0.163
	(0.006)	(0.032)	(0.0002)	(0.042)	(0.0006)	(0.027)	(0.037)	(0.003)
β_3	0.077	–0.081	0.315	–0.137	0.223	0.151	–0.307	0.061
	(0.036)	(0.097)	(0.0002)	(0.381)	(0.0006)	(0.015)	(0.287)	(0.023)
β_4	0.076	–0.034	0.291		0.173		0.15	
	(0.036)	(0.071)	(0.001)		(0.006)		(0.006)	
β_5			0.266		0.123		0.062	
			(0.004)		(0.016)		(0.028)	
Mean lag	**0.97**	**0.08**	**2.5**	**0.4**	**1.9**	**1.6**	**0.7**	**0.9**
d (DW)	1.2	1.6	1.1	2.5	0.5	1.3	1.1	1.3
R^2	0.854	0.797	0.961	0.874	0.926	0.857	0.944	0.803

Note: 1) m : degree of polynomial; 2) i : the period of the largest lag; 3) standard errors in parenthesis

packages, and price information on commodities with good storage facilities. As the preference, Myanmar consumes curry everyday and curry is made from tomato and onion. The demand on tomato and onion is very high compared to cabbage and potato. Therefore, the price response is higher for these two commodities, tomato and onion.

Evaluation and Discussion on the Factors of Price Symmetry and Asymmetry in Japan

In the case of Japan, retail price was lagged only 0.08 and 0.4 month for tomato and cabbage, respectively. We could say that there was no lag of retail price from wholesale price for these very perishable commodities. Therefore, we could say that Retail and wholesale prices were symmetry, moving at the same time. This price symmetry is likely due to the biological nature of fresh vegetables, and how retailers in the distribution channel have adjusted to accommodate those demands.

However, there was 1.9 and 0.7 months lag for potato and onion respectively. In the case of very perishable crops like tomato and cabbage, the commodity is changing almost every day in retail store with the new price on each day. But in the case of less perishable crops, like potato and onion, they can stay 1 to 2 month without changing the commodity with the same price. As the consequence, there was a lag in these commodities. Therefore, one most important factor causing imperfections in price transmission in Japan may be due to several adjustment costs including labeling, advertising and goodwill.

There are still many reasons exist for Lags in price response in Japan:

a) The time required to pack, store, and transport products contributes to price responses being less than instantaneous (Kinnucan and Forker, 1987).
b) Retailers may be slow to adjust their prices if they consider price changes at lower levels in the marketing channel to be transitory rather than permanent (Powers, 1994).
c) Before changing the price of fresh produce commodities, retailers may want to check product availability from alternate sources.
d) Other reasons for lagged retail response include costliness of re-pricing (Heien, 1980) and differences in information use at various exchange points within the marketing system (Ward, 1982) (e.g., adoption of internet technology and efficient consumer response).

CONCLUSIONS

Using monthly price data for three years, this paper has determined the distributed lags of retail prices to wholesale prices within the same region in Myanmar and Japan. From the results, it was evident that the lags were significantly high for very perishable crops of tomato and cabbage, having one month and two & half months lag respectively in Myanmar. The lags of price responses showed:

1) the weakness of price formation process due to inefficient marketing system;
2) the lack of price information among producers, traders, and consumers; and
3) the lack of modern retailing system with standard weights, packages, and price information on commodities.

Therefore, it can be drawn that the lack of efficient price formation by auction procedure in wholesale market level, unreliable market information, and lack of modern retail system with prior price information on the commodities caused the lags from farm to wholesale, and wholesale to retail prices. The existence of lag prices, at different levels of marketing, made the margin shares highly fluctuate in Myanmar. Un-expectable profit gives in-satisfaction to producers, and marketing participants. The larger wholesale margin share revealed the weakness of market infrastructure and the proliferation of participants in the marketing chain. Moreover, the inefficient market infrastructure caused the higher wholesaler transportation cost, larger wholesalers' profit, and lower farm-retail spread for very perishable and bulky crops, like cabbage.

Increases of pricing efficiency as well as marketing efficiency in Myanmar can be achieved in a variety of ways: by increasing the volume of business using improved handling methods; by introducing in wholesale markets with effective laws, auction procedure, standardization of weight, quality and packing; by upgrading modern retailing system, cooperative marketing with local assembly stations; and facilitating the construction of information systems, market infrastructure and transportation systems.

REFERENCES

A. H. Studenmund (Occidental College) and H. J. Cassidy (Federal Home Loan Mortgage Corporation). 1987 *Using Econometrics, A practical Guide.* Little, Brown and Company, Boston (Toronto)

B. W. Brorsen, J. P Chavas, W. R. Grant, and L. D. Schnake. 1985 Marketing Margins and Price Uncertainty: The Case of the U.S. Wheat Market. *Amer. J. Agr. Econ.*, **67**: 521-527

Bart Minten. 1999 Infrastructure, Market Access, and Agricultural Prices: Evidence from Madagascar. *MSSD Discussion Paper.*, **26**

Charles Nicholson and Andrew M. Novakovic. Farm to Retail Price Relationships for Fluid Milk and Dairy Products, The Dairy Weblet Series, CPDMP (Cornell Program on Dairy Markets & Policy)

Cristopher Dougherty 1992 *Introduction to Econometrics.* Oxford University Press, Oxford (New York)

Danilo R. D. Aguiar, and J. A. Santana 2002 Asymmetry in Farm to Retail Transmission: Evidence from Brazil. *Agribusiness.*, **18(1)**: 37-48

Geoffrey S. Shepherd 1963 "*Agricultural Price Analysis*", (fifth edition). Lowa State University Press, Ames, lowa (U.S.A).

Ministry of Agriculture, Forestry and Fisheries, Japan. "*Monthly Statistics of Agriculture, Forestry and Fisheries*"

Ministry of National Planning and Economic Development, Myanmar. "*Selected Monthly Economic Indicators*"

Ramanathan, R. 1989 *Introductory Econometrics with applications (Third edition).* The Dryden Press, Fort Worth (U.S.A), pp. 523-583

Report of APO Seminar held in Japan in 1989. 1990 *Marketing Systems for Farm Products in Asia and The Pacific*. Asian Productivity Organization, Tokyo (Japan)

Report of APO Seminar held in Japan from 14 to 24 May 1996. 1997 *Marketing System for Agricultural Products*. Asian Productivity Organization, Tokyo (Japan)

Report of the APO Multi-Country Study Mission on Operation of Agricultural Wholesale Markets in Japan from 4 to 11 July 2000. 2002 *Operation of Agricultural Wholesale Markets*. Asian Productivity Organization, Tokyo (Japan)

Shirley Almon. 1965 The Distributed Lag Between Capital Appropriations and Expenditures. *Econometrica.*, **33(1)**: 178–196