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Analysis of the Spatial Market Integration of Oilseed Crop Markets in Myanmar

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This study was undertaken to distinguish the nature and extent of spatial integration of selected oilseed crops markets in Myanmar using the monthly price data from January 2002 to December 2007. The objectives of this study are to appraise the price transmission between oilseed crops markets by evaluating the degree of spatial market integration and to recommend policy interventions in order to correct and improve the whole oilseed crops sector in Myanmar. The Johansen's multivariate co–integration test was used to test for long run market integration. The results indicated that the markets in the producing area are highly integrated in the long run. Dynamics of short–run price responses were examined by using vector error correction model (VECM). By examining the short–run price adjustment, it was found that almost all of the markets deviated from long run equilibrium. Long run market performance was good for all markets, but there is disequilibrium condition in the short run market integration. The imperfection of market integration is attributed to weak diffusion of market information and asymmetric price transmission on market conditions. It can be concluded that if market infrastructure like transportation, communication facilities and market information are highly improved, the efficiency of market can be accelerated.

INTRODUCTION

Myanmar is an agricultural country, and agriculture sector is the back bone of its economy. It supplies food for country's growing population and generates national income. Agriculture sector contributes 37% of GDP; 13.3% of total export earnings; and employs 61.2% of the labor force (2006–07). The oil crops occupied 16% of the total crops, where as rice, is the staple food in Myanmar, and occupied majority of sown area (about 40%). Oilseed crop play a vital role based on Myanmar's higher consumption of cooking oil compared to neighboring countries. Among oilseed crops, groundnut is the most important oil crop in Myanmar and sesame occupied the largest sown area. Over 79% of the total production is from Central Myanmar, Sagaing, Magway and Mandalay Division. In 2006–2007, the total sown area of groundnut and sesame is 0.67 million hectare and 1.60 million hectares respectively. In 1987–88, the production of groundnut with shell was 0.54 million tons and those of sesame is 0.2 million tons and 1 million ton and 0.6 million tons in 2006–07. The average yield per hectare of groundnut and sesame is 15,037 and 3,750 kg per hectare respectively.

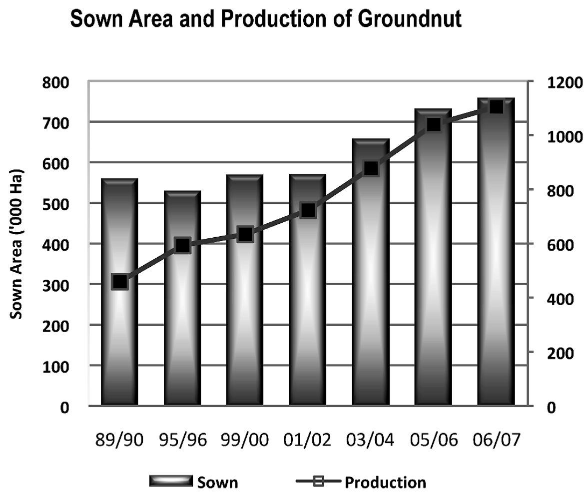

Fig. 1. Sown area and production of groundnut.

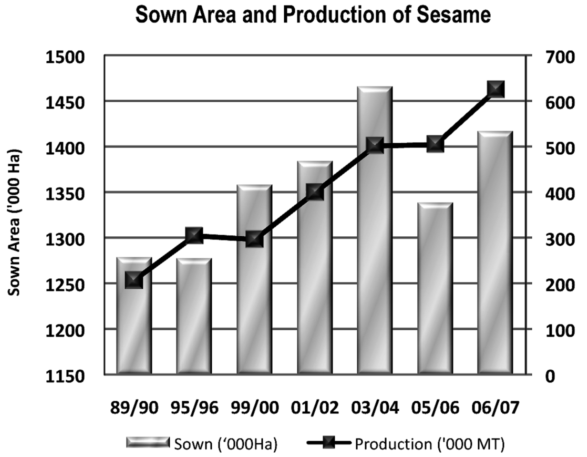

Fig. 2. Sown area and production of sesame.

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DATA

A time series monthly price data for groundnut and sesame price data from 2002 to 2007 is used in this study. These data were collected by the Market Information Service, Department of Agricultural Planning under the Ministry of agriculture and Irrigation. The study analyzes the market integration and price transmission among the markets of oilseed crop. The wholesale markets included in this study are Mandalay, Myingyan, Monwya, Pyay and Pakokku. The criteria for selecting these markets are based on the market position, geographical distribution, volume of trade and importance of market to the national edible oil and oilseed flow.

METHODOLOGY

Cointegration analysis

Cointegration analysis allows a detailed study of price co–movements. This study uses cointegration analysis to study oilseed crops and edible oil market integration in the wholesale markets of Myanmar. Cointegration analysis provides a way of maintaining the validity of the Ravallion equations by using cointegrated series. The cointegrated series are stationary, that is, they have no trend of any sort. The extent to which a series is integrated depends on how many times a difference have to be taken before it becomes stationary. If the series is to be differenced once before it is stationary, then the first difference is stationary i.e. $\Delta yt \sim I(0)$, and the series is itself integrated of order one. Determination of market integration using the cointegration techniques is a sequential procedure.

First, each price series is determined for order of integration. The Augmented Dickey Fuller (ADF) test is used to investigate the order of integration in each individual series. The first stage is to test whether each series is stationary i.e. I (0). If the null hypothesis of nonstationarity cannot be rejected, that is the absolute value of the ADF statistic is smaller than the critical ADF value, then the next stage is to test whether the first differences are stationary. If the null hypothesis of nonstationarity cannot be rejected, then the series is still not stationary. Therefore, continue differencing until the series becomes stationary and note the order of integration. To test unit root, the ADF test is based on the following regression equation

$$\Delta X_t = \alpha + \delta X_{t-1} + \sum_{k=1}^{p} \gamma_k \Delta X_{t-k} + \varepsilon_t \quad (1)$$

Where Xt = the relevant time series

Δ = the first difference operator

ε_t = an error term

It should be determined firstly the lag length or order of the vector auto–regression (VAR) efore applying the Johansen's approach. It is a key element in the specification of the VAR, which forms the basis of inference for the co–integration rank. The most commonly used criteria are the Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC). These are given as:

$$AIC = \ln|\Omega(\hat{r}, p)| + (2/T)m \quad (2)$$

$$SBC = \ln|\Omega(\hat{r}, p)| + (\ln T/T)m \quad (3)$$

Where,

$$\Omega(\hat{r}, p) = \hat{\varepsilon}\hat{\varepsilon}/T$$

m = the number of freely estimated parameter in a VAR model of lag "p" and conintegration rank "r".

$\hat{\varepsilon}_t$ = a residual vector in the restricted rank VAR

ln = natural log, and

T = the number of observations

When using AIC or SBC based on the estimated standard errors in respective equation, the model with the lowest value for the AIC or SBC is chosen.

Second, the integrated series are tested for cointegration. If the series to be investigated are both integrated with the same order, the next stage is to investigate whether they are cointegrated with each other and this is done either through the Johansen's multivariate framework. The Johansen procedure is based on the maximum likelihood estimation of the error correction model as in the following equation.

$$\Delta X_t = \sum_{i=1}^{p-1} \Gamma_i \Delta X_{t-1} + \Pi X_{t-1} + \varepsilon_t \quad (4)$$

where X = the vector of endogenous variables,

Γ i = the matrix of short run coefficients

Π = the matrix of long–run coefficients

ε t =the vector of independently normally distributed errors.

The matrix Π contains the cointegrating vectors and a set of loading vectors which determine the weight of the cointegrating vectors in each single equation. By means of normalization, the cointegrating vectors can be identified from the estimated Π matrix. To determine the number of cointegrating relationships r, the Johansen's procedure provides two likelihood ratio tests: the trace (TR) and maximum eigenvalue (MAX) test. The trace statistic tests the null hypothesis of r co–integrating relations against the alternative of k cointegrating relations, where k is the number of endogenous variables, for r = 0, 1,..., k–1.

$$TR(r/k) = T\sum_{i=r+1}^{k} \ln(1-\lambda_i) \quad (5)$$

Where λi = the i–th largest eigenvalue in the Π matrix

T = the sample size.

The maximum eigenvalue statistic tests the null hypothesis of r cointegrating vectors against the alternative of $r + 1$ cointegrating vectors. It is computed as

$$MAX(r/r+1) = -T\ \ln(1-\lambda_{r+1}) \quad (6)$$

The next step involves determination of causality and exogeneity. If two price series are integrated and they are also '*cointegrated of order 1,1*', then there must be some causality in one direction or the other between the two price series (Wyeth, 1992). Causality reflects the fact that price changes in the location towards which causation moves, occur both after, and in a way which is related to price changes in the location from which the causation comes.

To test for Granger causality, Eviews (EVIEWS 1994), runs bivariate regressions in the form

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \ldots + \alpha_i y_{t-i} + \beta_1 x_{t-1} + \ldots + \beta_i x_{t-i} \quad (7)$$

$$x_t = \alpha_0 + \alpha_1 x_{t-1} + \ldots + \alpha_i x_{t-i} + \beta_1 y_{t-1} + \ldots + \beta_i y_{t-i} \quad (8)$$

for all possible pairs of (x,y) series in the group. The reported F–statistics are the Wald statistics for the joint hypothesis

$$\beta_1 = \ldots = \beta_i = 0$$

for each equation. The null hypothesis is therefore that x does not Granger–cause y in the first equation and y does not Granger–cause x in the second equation. For instance, if we cannot reject the hypothesis that x does not Granger cause y , then the F–value is insignificant (P<0.1). Conversely, if the null hypothesis is that y does not Granger–cause x, and the F–value is significant (P<0.1), then we reject the null hypothesis that y does not Granger–causes x. The two tests show that the Granger causality runs one–way, from y to x and not the other way.

RESULTS AND DISCUSSION

Step 1: Testing for Stationary

Before applying the co–integration tests, Augmented Dickey–Fuller (ADF) unit root tests are first applied to each price series and to their first differences to determine the stationarity of each individual price series. The stationarity properties and the exhibition of unit roots in the time series are substantiated by performing the Augmented Dickey – Fuller (ADF) test. This test is conducted on the variables in level and first differences. The variables that are integrated of the same order may be cointegrated, while the unit root test finds out which variables are integrated of order one, or I(1).

Using the ADF test, the results are presented in the Tables 5.1(a), 5.1(b), 5.1(c), 5.1(d) and 5.1(e). The price series for all markets of oilseed crop (sesame and groundnut) and of groundnut oil, sesame oil and palm oil are I(1). For all the price series, the unit root test with an intercept showed that the coefficients of x_{t-1} were not significantly different from zero, and none of the price series was stationary. Moreover, the unit root test on first differences with an intercept confirmed the opposite, therefore it can be concluded that all the prices series are integrated of order (1).

Table 1a. Unit root test on groundnut price series in domestic markets

Markets	Obs	Unit root tests on price levels			Obs	Unit root tests on first difference		
		ADF[1]	δ	t–value[2]		ADF	δ	t–value
Mandalay	71	ADF(0)	0.039	1.300	70	ADF(0)	–0.825	–6.663
Myingyan	70	ADF(1)	0.029	0.846	70	ADF(0)	–0.757	–6.214
Monywa	71	ADF(0)	0.030	0.869	70	ADF(0)	–0.883	–7.103
Pakokku	70	ADF(1)	0.036	1.133	70	ADF(0)	–0.737	–6.110
Pyay	71	ADF(0)	0.053	1.475	70	ADF(0)	–0.864	–7.089

Note: (1) In the ADF column the number of lags that was allowed for unit root test is indicated in bracket, based on the Schwartz criterion. ADF test was carried out in the E–views–5

(2) Critical values are given in MacKinnon t= –2.90, 5% level of significant

Source: Monthly price data of groundnut price series from Jan 2002 to Dec 2007. Market Information Service, Department of Agricultural Planning, Ministry of Agriculture and Irrigation, MYANMAR

Table 1b. Unit root test on sesame price series in domestic markets

Markets	Obs	Unit root tests on price levels			Obs	Unit root tests on first difference		
		ADF[1]	δ	t–value[2]		ADF	δ	t–value
Mandalay	71	ADF(0)	0.029	0.936	70	ADF(0)	–0.912	–7.549
Myingyan	71	ADF(0)	0.045	1.635	70	ADF(0)	–0.839	–6.439
Monywa	70	ADF(1)	0.024	0.859	70	ADF(0)	–0.724	–6.146
Pakokku	70	ADF(1)	0.012	0.029	70	ADF(0)	–0.690	–5.757
Pyay	70	ADF(1)	0.019	0.682	70	ADF(0)	–0.067	–5.520

Note: (1) In the ADF column the number of lags that was allowed for unit root test is indicated in brackets, based on the Schwartz criterion. ADF test was carried out in the E–views–5

(2)Critical values are given in MacKinnon t= –2.90, 5% level of significant

Source: Monthly price data of sesame price series from January 2002 to December 2007. Market Information Service, Department of Agricultural Planning, Ministry of Agriculture and Irrigation, MYANMAR

Step 2: Testing for the lag length

To proceeds with Johansen test, it is necessary to set up a VAR with an appropriate number of lags.

$$x_{kt} = A_{k1}X_{kt-1} + A_{k2}X_{kt-1} + ... + A_{kp}X_{kt-p} + \varepsilon_{it}$$

For the determination of the lag length to be included in VAR, another VAR was estimated with the first differences of the price series. This is to avoid serial correlation that may lead to incorrect estimation due to the non–stationary price series. In VAR analysis, Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC) were used to select suitable lag length. The result of the cointegration test can be quite sensitive to the lag length. Begin with the longest lag length deemed reasonable and test whether the lag length can be shortened (Walter Enders, 2004). The VAR analysis on first difference shows that the smallest value for both AIC and SBC is obtained with lag length 1. The lag length, defined by the smallest value for both AIC and SBC is shown in the following tables.

From the above table, it could be concluded that in general, present price change is not correlated with the own price change in the previous period. For the sesame market price series, it can be seen clearly that none of the current price correlated with their own price changes in the previous period. But for the ground market price series, only Myingyan's market current price depend on its previous price changes.

Step 3: Determining the number of cointegration equations

The next step involves checking for cointegration among the price series. Johansen's multivariate procedure was used to determine the presence or absence of cointegration among the integrated series. Using Akaike Information Criterion (AIC), a lag length of 1 was chosen and used in the cointegration test estimated with a linear deterministic trend. The results of the cointegration tests summarized in the following tables (table 3a and table 3b) indicate that there is cointegration among the price series. This implies that even though the markets

Table 2a. VAR analysis on groundnut price series of different market in Myanmar

Groundnut	ΔMDY (–1)	ΔMGN (–1)	ΔMWA (–1)	ΔPKU (–1)	ΔPYAY (–1)
ΔMDY					0.604 (2.523)
ΔMGN	0.417 (2.724)	–0.555 (–2.498)			0.389 (1.978)
ΔMWA	0.259 (1.913)				0.670 (3.835)
ΔPKU					0.380 (1.879)
ΔPYAY					

The result of the VAR analysis are based on one lag (the AIC and SC value are smallest)
All figures in parenthesis are t–value, non–significant values are omitted

Table 2b. VAR analysis on sesame price series of different market in Myanmar

Sesame	ΔMDY (–1)	ΔMGN (–1)	ΔMWA (–1)	ΔPKU (–1)	ΔPYAY (–1)
ΔMDY			0.362 (1.806)		
ΔMGN					
ΔMWA					
ΔPKU			0.315 (1.832)		0.336 (2.072)
ΔPYAY					

The result of the VAR analysis are based on one lag (the AIC and SC value are smallest)
All figures in parenthesis are t–value, non–significant values are omitted

Table 3a. Testing for number of cointegration relations (Groundnut)

H_0:	H_A:		95%	Prob.**	Hypothesized
λ Trace tests		λ Trace value	Critical value		No. of CE(s)
r=0	r>0	97.06802	76.97277	0.0007	None *
r≤1	r>1	58.79202	54.07904	0.0179	At most 1 *
r≤2	r>2	28.34151	35.19275	0.2264	At most 2
r≤3	r>3	13.02974	20.26184	0.3615	At most 3
r≤4	r>4	3.500703	9.164546	0.4915	At most 4
λ Max tests		λ Max value			
r=0	r=1	97.06802	76.97277	0.0007	None *
r=1	r=2	58.79202	54.07904	0.0179	At most 1 *
r=2	r=3	28.34151	35.19275	0.2264	At most 2
r=3	r=4	13.02974	20.26184	0.3615	At most 3
r=4	r=5	3.500703	9.164546	0.4915	At most 4

Note: if the value of λ trace and λ max excess the critical value, can reject the null hypothesis and accept the alternative hypothesis of more co–integration vectors
* denotes rejection of the hypothesis at the 0.05 level, **MacKinnon–Haug–Michelis (1999) p–values

Table 3b. Testing for number of cointegration relations (Sesame)

H_0:	H_A:		95%	Prob.**	Hypothesized
λ Trace tests		λ Trace value	Critical value		No. of CE(s)
r=0	r>0	98.31053	76.97277	0.0005	None *
r≤1	r>1	56.74707	54.07904	0.0284	At most 1 *
r≤2	r>2	28.94654	35.19275	0.2015	At most 2
r≤3	r>3	14.26826	20.26184	0.2714	At most 3
r≤4	r>4	5.782942	9.164546	0.2082	At most 4
λ Max tests		λ Max value			
r=0	r=1	41.56346	34.80587	0.0067	None *
r=1	r=2	28.80053	28.58808	0.0628	At most 1 *
r=2	r=3	14.67828	22.29962	0.4019	At most 2
r=3	r=4	8.485319	15.89210	0.4909	At most 3
r=4	r=5	5.782942	9.164546	0.2082	At most 4

Note: if the value of λ trace and λ max excess the critical value, can reject the null hypothesis and accept the alternative hypothesis of more co–integration vectors
* denotes rejection of the hypothesis at the 0.05 level, **MacKinnon–Haug–Michelis (1999) p–values

have significant short–run divergence, long–run relationship among the various oilseed crops markets exist. Both the trace and maximum eigenvalue tests have a rank (Π) of two at the 95 percent significant level. The rank is the number of cointegrating relationships.

Step 4: Testing for long–run price integration

We focus on the long run cointegration of the price series by analysing the normalized cointegrating coefficients (β). To estimate the cointegrating coefficients β, we use the Johansen's test as implemented in EVIEWS. If it is normalized with respect to wholesale price in oilseed crop and edible oil markets, the normalized cointegrating equations can be seen as follows:

Long run integration for groundnut price series

Mandalay = 0.63 Pakokku – 5.65 Myingyan + 4.04 Pyay
(1.16)ns **(7.84)***** **(5.03)*****
CoinEq(1)

Monywa = 0.07 Pakokku – 1.17Myingyan + 0.09 Pyay
(0.65)ns **(8.44)***** (0.61)ns
CoinEq(2)

The significant coefficients in all the cointegrating equations for the groundnut price series indicate that Mandalay market has long run relationship (cointegrated) with Myingyan and Pyay, whereas Monywa is cointegrated only with Myingyan markets. The results indicate that Myingyan and Pyay prices co–move with Mandalay prices in the long run, whereas Myingyan prices co–move with Monywa prices series in long run.

Long run integration for sesame price series

Mandalay = 0.46 Myingyan – 1.65 Pakokku + 0.28 Pyay
(2.80)*** **(7.38)***** **(1.56)***
CoinEq(1)

Monywa = 0.36 Myingyan – 1.76 Pakokku + 0.58Pyay
(3.64)*** **(13.11)***** **(5.43)*****
CoinEq(2)

For the sesame markets, two normalized cointegration equations with respect to Mandalay and Monywa markets were calculated. Pakokku market is strongly cointegrated with Mandalay market followed by Myingyan market whereas Pyay market is weakly cointegrated from Mandalay market. According to the cointegration equation(2), all the markets, Myingyan, Pakokku and Pyay markets have long run relationship with Monywa markets.

Step 5: Testing for short run market integration with a Vector Error Correction Model (VECM)

A principal feature of cointegrated variables is that their time paths are influenced by the extent of any deviation from long–run equilibrium. After all, if the system is to return to long–run equilibrium, the movement of at least some of the variables must respond to the magnitude of the disequilibrium (Walter Anders, 2004). Short run integration test can be incorporated in the model by specifying a Vector Error Correction Model (VECM) implemented in the EVIEWS when long–run integration is observed. This VECM can be used to estimate the dynamics in the short run. Using the same price series used to obtain the cointegrating equations, the results of the short run dynamics are presented in the following table 4a. The numbers presented are the coefficients of the cointegrating relations in the regression for the price changes.

Table 5.4 (a) shows that the short run oilseed crop market except Myingyan market, react to at least one of the long–run cointegration equations. The partial short run adjustment of price changes at Mandalay, Monywa, Pakokku and Pyay markets react significantly on the deviation from the long–run equilibrium. Mandalay is the strongest follower of cointegration equation (1) and Monwya is the strongest follower of cointegration equa-

Table 4a. Estimation of the dynamic in the short–run by using VECM (Oilseed crop)

Error Correction:	D(MDY)	D(MGN)	D(MWA)	D(PKU)	D(PYAY)
Groundnut					
CointEq1	–0.620590	–0.234207	–0.184568	–0.202814	–0.139762
	(0.16785)	(0.14809)	(0.12856)	(0.14913)	(0.14122)
	[–3.69722]***	[–1.58147]	[–1.43570]	[–1.36000]	[–0.98970]
CointEq2	0.810932	–0.097341	0.919614	0.518254	0.622841
	(0.38142)	(0.33652)	(0.29212)	(0.33887)	(0.32089)
	[2.12610]**	[–0.28926]	[3.14804]***	[1.52937]	[1.94098]*
CointEq3	0.620031	0.564073	–0.479856	0.456352	0.404048
	(0.36549)	(0.32247)	(0.27993)	(0.32472)	(0.30749)
	[1.69643]	[1.74923]	[–1.71423]	[1.40538]	[1.31401]
Sesame					
CointEq1	–0.242748	0.166577	0.453681	0.220509	0.305937
	(0.21288)	(0.20060)	(0.23439)	(0.19812)	(0.22980)
	[–1.14030]	[0.83041]	[1.93559]*	[1.11300]	[1.33134]
CointEq2	–0.135455	–0.067641	–0.020691	0.135273	–0.161822
	(0.07573)	(0.07136)	(0.08338)	(0.07048)	(0.08174)
	[–1.78875]	[–0.94792]	[–0.24817]	[1.91942]*	[–1.97962]*

Note: All figures in brackets (…) are standard errors and all figures in parenthesis […] are t–values

tion (2) with the coefficient of –0.620590 and 0.919614 for Mandalay and Monywa, respectively, for groundnut market. For sesame market, Monywa is the strongest follower in the cointegration equation (1) and Pyay is the strongest follower. In the cointegration equation (2), Pyay market with a coefficient of –0.161822 has the strongest short–term reaction to the long–run equilibrium. However, the price adjustments do not occur instantaneously and completely.

Granger Causality Test

The concept of Granger causality is based on the idea that a cause cannot come after its effect. More precisely, variable X is said to Granger–cause another variable, Y, if the current value of Y (y_t) is conditional on the past values of X (x_{t-1}, x_{t-2}, ... , x_0) and thus the history of X is likely to help predict Y. Cointegration implies Granger causality in at least one direction. The concept of causality is here interpreted in the limited meaning of contribution to predictability (Goletti & Babu 1994). The direction of causality in oilseed crop prices was examined using the Granger causality test in EVIEWS. Granger causality is a useful approach in determining whether price movements follow well defined paths, that is, start around

Table 5a. Pair–wise Granger Causality Test for Groundnut

From \ To	Mandalay	Myingyan	Monywa	Pakokku	Pyay
Mandalay	–	5.06	4.32	6.73	3.89
Myingyan	3.49	–	5.89	7.31	7.17
Monywa	2.36 ns	4.27	–	8.55	7.09
Pakokku	0.16 ns	2.15 ns	0.98 ns	–	1.03 ns
Pyay	3.42	4.71	10.05	6.31	–

Note: “ns” refers to no significant cointegration at ≤ 95% significant level

Table 5b. Pair–wise Granger Causality Test for Sesame

From \ To	Mandalay	Myingyan	Monywa	Pakokku	Pyay
Mandalay	–	1.22 ns	2.88	1.24 ns	1.28 ns
Myingyan	2.32 ns	–	2.97	2.11 ns	0.70 ns
Monywa	4.05	0.72 ns	–	3.13	1.14 ns
Pakokku	2.99	1.35 ns	4.07	–	1.67 ns
Pyay	1.40 ns	1.97 ns	3.60	4.43	–

Note: “ns” refers to no significant cointegration at ≤ 95% significant level demand or production centers and then spread around the country.

The results of the granger causality tests for all markets are shown in the following tables 4a and 4b. The null hypothesis that X does not cause Y was rejected based on the value of F statistic. The results which are applied to a maximum of two lags show that some markets exhibit a bi–directional causality (feedback causality) and none of the markets was exogenous. The other markets exhibited unidirectional causality.

The direction of Granger causality of oilseed crop markets is illustrated in the Fig. 2 and Fig. 3. For the groundnut market, Mandalay markets caused all markets price. Mandalay price caused Monywa, and Pakokku markets with unidirectional movements and Myingyan and Pyay caused Mandalay Mandalay feedback. Pyay market caused Pakokku with unidirectional movement and Monywa, Myingyan and Mandalay caused feedback with bidirectional way. Price causality of Pakokku caused with any markets.

For the sesame markets, only two markets exhibit a bi–directional causality (feedback causality) e.g. Mandalay and Pakokku caused feedback Monywa maket. Only a few markets show unidirectional causality e.g. Myingyan caused Monywa markets and Pyay caused Pakokku markets.

The results indicated that, Mandalay markets is leading market for price formation of groundnut and radial price transmission can be found in groundnut markets. But for the sesame markets, price causality is not distributed well among all markets. Monywa market is the most powerful markets than other markets and no radial market transmission can be found.

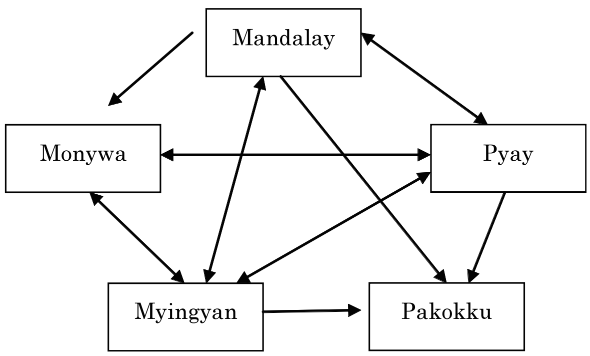

Fig. 3. Direction of causality of groundnut price.

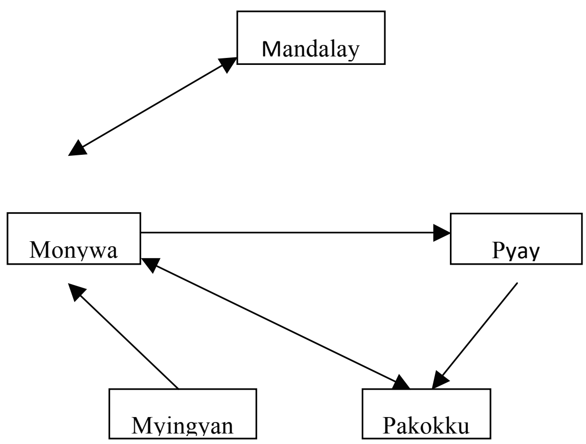

Fig. 4. Direction of causality of sesame price.

CONCLUSION AND POLICY IMPLICATION

Evidence on market integration analysis showed that although the results of long run market performance was good for all oilseed crop and edible oil markets, but there is disequilibrium in the short run market integration. The causality analyses provided mixed results. In most cases, causality is unidirectional. Therefore, there is no evidence of the existence of a central market for oilseed crop and edible oil sector in Myanmar.

The oilseed crop marketing system is insufficient with the imperfect in the short run market integration. To achieve the efficient marketing system, market information service and market infrastructure should be strengthened by increasing the efficient distribution of the reliable up–to–date market information through from different media. Market infrastructure should be improved by investing in marketing facilities in both rural and urban areas with should be increased by introducing advanced technology in agricultural marketing system. Additional research related to continuous trade flow and fixed transactions costs among markets are needed. From this study, we can expect better and positive attitude from the government authorities linked to investments in trekking routes, rails, and road transportation can improve significantly the efficiency of edible oil sub sector in Myanmar.

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