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Price transmission in the broiler chicken sector in Indonesia: an asymmetric NARDL approach

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ABSTRACT— Broiler chicken meat is a strategic commodity that is growing rapidly, produced by the livestock sub-sector. West Java Province is the main producer of broiler chickens in Indonesia. This study aimed to analyze the price transmission in the supply chain of broiler chickens. This study used an asymmetric NARDL model. The data used were monthly data on farmer, wholesale and retail from January 2014 to December 2019. The results show that in the farmer-wholesales relationship, there is a long-term price asymmetry, as well as wholesale-retailer relationship. Meanwhile, the relationship between farmer and retail does not occur in the long term asymmetrical relationship. The result also suggests to improve the structure of the broiler market is that the government needs to provide facilities for smallholder farmers to join independent farmer groups.

KEYWORDS: Asymmetric price transmission, Broiler chicken, Market behavior, NARDL.

1. INTRODUCTION

Broiler chicken meat is a strategic commodity that is growing rapidly, produced by the livestock sub- sector. Household consumption of broiler chickens nationally averaged 6.36 kg/capita/year or increased by 3.92% on average compared to 2017 and is the highest consumption of meat from other animal proteins [6]. In addition, the price of this product is more affordable, easy to obtain, easy to process with a relatively fast turnover of capital. [9], [23]. In addition, poultry sector is the largest contributor to animal protein in Indonesia, namely 65% [18]. West Java Province is the main broiler producer center in Indonesia, which accounts for 32% of total production. There is a problem with broiler chickens that is still whacking until now. The classic problem of marketing broiler chickens is an inefficient market. The market structure of broiler chickens in several producer centers in Indonesia is not efficient. The market structure is formed by imperfect competition (oligopsony) and its system is not integrated [15]. [23] found that the formation of live broiler prices at the producer level in West Java is largely determined by the oligopoly power in the form of a large-scale farm company led oligopoly, which results in an inefficient broiler market. Price plays an important role in the marketing chain [13]. The process of price transmission from one market to another shows a tendency for asymmetric price transmission. Asymmetric price transmission occurs when there is a difference in price response to a positive price shock and a negative price shock. Price asymmetry can occur in relation to the characteristics of imperfect competitive markets [14]. [25], one of the causes of asymmetric price transmission in vertical markets is the behavior between uncompetitive intermediary traders in a concentrated market. They tend to maintain their profit level and will not raise / lower prices according to changes in the actual price signal. This condition causes imperfect price transmission between producers and traders. The literature on asymmetry is dominated by three regime-switching models. First, the ECM threshold [4]. Second, Markov-switching ECM [20]. Third, smooth transition regression ECM [11]. The three models above are linear models that have weaknesses, namely the inability in obtaining dynamic error correction representations associated with long-term asymmetric co-integration regression. The asymmetric adjustment pattern of the dependent variable due to positive and negative shocks of each explanatory variable cannot be seen. Hence, the ARDL basic model, [24] was developed to overcome this problem into the nonlinear autoregressive distributed lag (NARDL) model. The NARDL model is a model that can capture asymmetric effects with different lags for each variable. This model is a development of the ARDL linear cointegration standard model developed by [19]. It uses a partial decomposition of positive and negative summation which allows it to detect asymmetric effects in both the long and short term. The Assymmetric Price Transmission was separated in terms of size and speed. Three advantages of the NARDL model were noted. It can be used to obtain a dynamic error correction representation associated with asymmetric long-term co- integration regression. Following [17], [19], it can be seen whether there is long-term relationship stability regardless of whether the underlying regressors are I (0), I (1) or are co-integrated. The asymmetric adjustment pattern for the dependent variable due to positive and negative shocks for each explanatory variable can be seen using this model. Various empirical studies have used NARDL analysis. It has been used to examine the price transmission of agriculture product asymmetry [22], [1], to study asymmetric price transmission in the energy market [2], [16], to analyze exchange rate pass-throughs [7], [8], to investigate the dynamics of housing prices [12] Therefore, as far as we are concerned, there is no published study of asymmetric price transmission in the broiler market using the NARDL approach, so it is interesting to study this issue. The present study aims to analyze the transmission of asymmetric prices using NARDL so that it can accommodate long-term and short-term asymmetric transmissions and can describe the intensity and linkages of broiler prices.

2. Methods

The Nonlinear Autoregressive Distributed Lag (NARDL) model developed by [24] was used to study the performance of the broiler chicken marketing channel in this study. It is an analysis approach of the price movement of broiler chickens at the farmer level (PFC) to the price of broiler chickens at wholesales (PBC) and retail levels (PIC). [24] developed an asymmetric ARDL co-integration methodology, using positive and negative partial sum decomposition that allows detecting asymmetric effects in both the long and short term. The ARDL asymmetric specification allows for a joint analysis of non-stationary and non-linear issues in the context of an unrestricted error correction model. The nonlinear asymmetric co-integrating regression [17], [19], [24] is as follows:

$$y_t = \beta^+ {x_t}^+ + \beta^- {x_t}^- + u_t \quad (1)$$

where β^+ and β^- are interrelated long-term parameters and x_t is the k x 1 vector of the decomposition of the regressors such as:

$$x_t = x_0 + {x_t}^+ + {x_t}^- \quad (2)$$

where x_t^+ and x_t^- is the partial sum process of the positive and negative changes in x_t:

$${x_t}^+ = \sum_{j=1}^{t} \Delta {x_j}^+ = \sum_{j=1}^{t} \max(\Delta x_j, 0) \text{ dan } {x_t}^- = \sum_{j=1}^{t} \Delta {x_j}^- = \sum_{j=1}^{t} \min(\Delta x_j, 0) \quad (3)$$

The following is a NARDL model based on ECM according to [24] from the ARDL basic model by [19]:

$$\Delta y_t = \rho y_{t-1} + \theta^{+'} x_{t-1}^+ + \theta^{-'} x_{t-1}^- + \sum_{j=1}^{p-1} \gamma_j \Delta y_{t-j} + \sum_{j=0}^{q-1} \left(\varphi_j^{+'} \Delta x_{t-j}^+ + \varphi_j^{-'} \Delta x_{t-j}^- \right) + e_t$$
$$= \rho \xi_{t-1} + \sum_{j=1}^{p-1} \gamma_j \Delta y_{t-j} + \sum_{j=0}^{q-1} \left(\varphi_j^{+'} \Delta x_{t-j}^+ + \varphi_j^{-'} \Delta x_{t-j}^- \right) + e_t \quad (4)$$

where $\rho = \sum_{j=1}^{p} \emptyset_j - 1$, $\gamma_j = -\sum_{i=j+1}^{p} \emptyset_i$ for j=1,...p-1, $\theta^+ = \sum_{j=0}^{q} \theta_j^+$, $\theta^- = \sum_{j=0}^{q} \theta_j^-$, $\varphi_0^+ = \theta_0^-$, $\varphi_j^+ =$

$-\sum_{i=j+1}^{q}\theta_j^+$ for j=1,...q-1, and $\varphi_0^+ = \theta_0^-$, $\varphi_j^- = -\sum_{i=j+1}^{q}\theta_j^-$ for j=1,...q-1 dan $\xi_t = y_t - \beta^{+'}x_t^+ - \beta^{-'}x_t^-$ are nonlinear error correction terms where $\beta^+ = -\theta^+/\rho$ dan $\beta^- = -\theta^-/\rho$ is long-term asymmetry parameters.

Before entering into the estimation stage, a pre-estimation was carried out including the unit root test, optimum lag, and co-integration test.

Data stationary. The stationary test (unit root test) of the data in this study used the Augmented Dickey Fuller (ADF) test. The general equation model is as follows:

$$y_t = \alpha + \rho y_{t-1} + e_t \quad (5)$$

Where ρ is the estimated parameter. Furthermore, if the value $|\rho| \geq 1$ then y_t is not stationary. Conversely, if indigo $|\rho| \leq 1$ then y_t is stationary. Next, the trend stationary hypothesis was tested to examine whether the absolute value of $\rho < 1$. The general testing of the hypothesis is H_0: $\rho = 1$ and H_1: $\rho < 1$. Rejecting H_0 indicates that the data is stationary. If the test results do not reject H_0 (means not stationary), then both sides of equation (5) were reduced into:

$$\Delta y_t = \alpha + \rho^* y_{t-1} + e_t \text{ , } \rho^* = \rho - 1 \quad (6)$$

Where, H_0: $\rho * = 0$ and H_1: $\rho * < 0$. If the ADF t-statistic value is smaller than Mac Kinnon's t-statistic, then H_0 was rejected meaning the data is stationary at a difference of one level. It is known as the first difference.

Determination of the optimum lag aims to determine the lag. It determines to what extent there is still a significant effect of the independent or dependent variable towards the dependent variable. Determination of the optimum lag on the NARDL model was done with the Eviews 10 tool which automatically provides the optimum lag results for the NARDL model based on the smallest Akaike Information Criterion (AIC) value. The non-linear co-integration test [19] utilized the bound test to determine the existence of a long-term stable relationship that applies regardless of whether the underlying regressors are I (0), I (1) or are co-integrated. There are two operational testing procedures to see if there is an asymmetric (co-integration) long-term relationship based on ECM NARDL:

$$\Delta y_t = \rho\xi_{t-1} + \sum_{j=1}^{p-1}\gamma_j\Delta y_{t-j} + \sum_{j=0}^{q-1}\left(\varphi_j^{+'}\,\Delta x_{t-j}^+ + \varphi_j^{-'}\,\Delta x_{t-j}^-\right) \quad (7)$$

where $\pi_0^+ = \theta_0^+ + \omega$, $\pi_0^- = \theta_0^- + \omega$, $\pi_j^+ = \varphi_j^+ - \omega'\Lambda_j$ dan $\pi_j^- = \varphi_j^- - \omega'\Lambda_j$ for j= 1,..,q-1.

If $\rho = 0$, the above equation (7) reduces the regression involving only the first event, which implies that there is no long-term relationship between the levels of y_t, x_t^+ and x_t^-. This co-integration test with the t-statistical test H_0: $\rho = 0$ and H_1: $\rho < 0$ for above equation (7). Where each of these tests was indicated by t_{BDM} and F_{pss}. [19] tabulated critical value bounds for the t_{BDM} and F_{pss} statistics below the k value range. The number of regressors entering a long-term relationship where the value.

The hypothesis used in the long-term Wald test was as follows: H_0: $\beta^+ = \beta^-$ or symmetric; H_1: $\beta^+ \neq \beta^-$ or asymmetric. A variable can be stated to have an asymmetric effect if H_0 in the Wald test is rejected. H_0 is rejected if the F-statistical probability value is less than 5% meaning that there is an asymmetric effect of an independent variable towards the dependent variable.

The research was conducted in West Java. The location selection was carried out purposively with the consideration that the province is a broiler production center in Indonesia, with a production share of 32%. The data used in this study was secondary data, in the form of monthly time series data with 72 series periods. Starting from January 2014 to December 2019. The broiler price data used includes the price at the producer level of farmers in West Java obtained from the producer price of the Central Statistics Agency (BPS). Bandung wholesales price was obtained through a price proxy at the farmer level plus a margin at the wholesale level. Indonesian market price data as retail was represented by Jakarta Capital City consumer prices, which are the largest consumers of Indonesian broiler chicken meat obtained from BPS. Data in this study were processed using Microsoft Excel 2010 and Eviews 10.

The econometric model of price transmission asymmetry analyzed using the NARDL model is based on the nonlinear asymmetric co-integration structure equation model [24] and consideration of the results of potential asymmetric effects. Potential asymmetric effects on the independent variables in influencing the dependent were carried out through model simulations. Each model simulation explains the relationship of the dependent variable value influenced by the independent variable which has been transformed into positive and negative forms (x^+ and x^-). The parameter values (β^+ and β^+) in the simulation show the value of the Wald test results.

The formulation of the NARDL model is based on [24] model. The NARDL model is formulated as follows:

$$\Delta PBC_t = \alpha_0 + \sum_{i=1}^{p-1} \varphi_i \Delta PBC_{t-i} + \sum_{i=0}^{q-1} \pi_i^+ \Delta PFC_{t-i}^+ + \sum_{i=0}^{q-1} \pi_i^- \Delta PFC_{t-i}^- + \rho PBC_{t-1} + \theta_1^+ PFC_{t-1}^+ + \theta_1^- PFC_{t-1}^- + e_t \tag{8}$$

$$\Delta PIC_t = \alpha_0 + \sum_{i=1}^{p-1} \varphi_i \Delta PIC_{t-i} + \sum_{i=0}^{q-1} \pi_i^+ \Delta PBC_{t-i}^+ + \sum_{i=0}^{q-1} \pi_i^- \Delta PBC_{t-i}^- + \rho PIC_{t-1} + \theta_1^+ PBC_{t-1}^+ + \theta_1^- PBC_{t-1}^- + e_t \tag{9}$$

$$\Delta PIC_t = \alpha_0 + \sum_{i=1}^{p-1} \varphi_i \Delta PIC_{t-i} + \sum_{i=0}^{q-1} \pi_i^+ \Delta PFC_{t-i}^+ + \sum_{i=0}^{q-1} \pi_i^- \Delta PFC_{t-i}^- + \rho PIC_{t-1} + \theta_1^+ PFC_{t-1}^+ + \theta_1^- PFC_{t-1}^- + e_t \tag{10}$$

Where α_0 = constant; $\varphi_i, \pi_i, \pi_i^{+/-}$ = short-term parameter coefficient; $\rho, \theta_1, \theta_1^{+/-}$ = long-term parameter coefficient; PBC_{t-1} = price of broiler chickens in the Bandung wholesales at time *t*-1; PIC_{t-1} = price of broiler chickens in the Indonesian market at time *t*-1; $PFC_{t-1}^{+/-}$ = the amount of increase / decrease in broiler price at farmer level at time *t*-1 ; $PBC_{t-1}^{+/-}$ = the amount of increase / decrease in the price of broiler chickens in the Bandung wholesales at time *t*-1; ΔPBC_{t-i} = change in the price of broiler chickens in the Bandung wholesales at time *t-i; ΔPIC_{t-i}* = change in the price of broiler chickens in the Indonesian market at time *t-i*; ΔPFC_{t-i} = change in price of broilers at farmer level at time *t-i*; $\Delta PBC_{t-i}^{+/-}$ = change in the increase / decrease in the price of broiler chickens in Bandung wholesales at time *t-i* ; $\Delta PFC_{t-i}^{+/-}$ = change in the increase / decrease in the price of broiler chickens in Bandung wholesales at time *t-i*

3. Results

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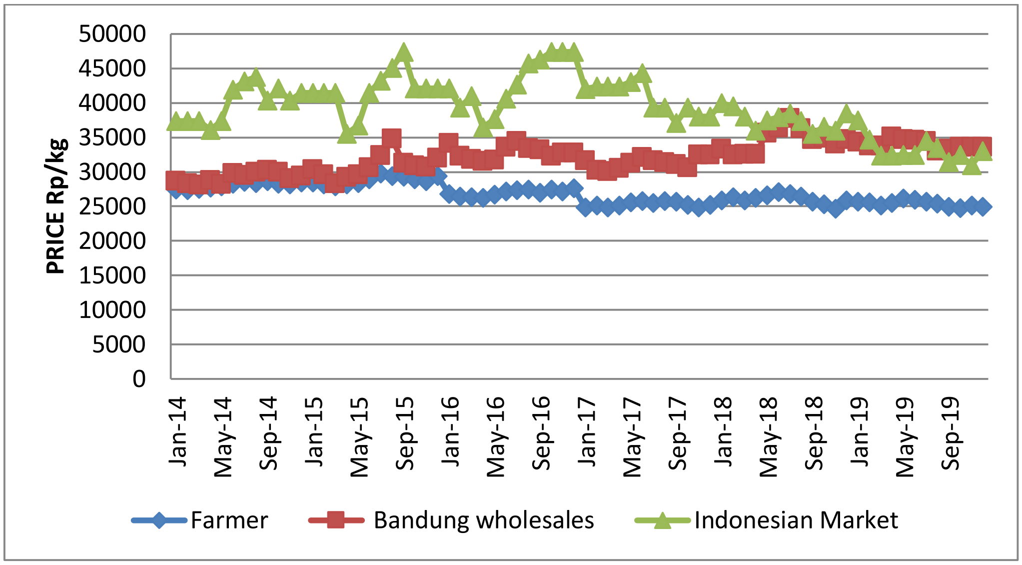

Figure 1. The fluctuation of price variables in the model: farmer, Bandung wholesales and Indonesian market in 2014-2019.

Figure 1 shows the differences in price movements for broilers. Price movements in the Indonesian market tend to fluctuate more with a coefficient of variance (CV) 0.105, compared to prices at the Bandung wholesales level (CV 0.071) and farmer prices (CV 0.052). This shows that prices in the Indonesian market change more rapidly than price movements at the wholesale and farmer level. This shows the occurrence of asymmetric price transmission between the three markets because it still requires time to adjust for price changes at a higher level.

The NARDL model explains whether there is an asymmetric effect on the price of broilers in the Bandung wholesales (PBC), the Indonesian market (PIC) from changes in the price of broiler prices at the farmer level (PFC). The estimation results of the NARDL model on the PBC variable can be seen in Table 1 below.

Table 1. The estimation result of PFC to PBC of the NARDL model

Dependent variable: D(PBC)		
Conditional error correction regression		
Variable	Coefficient	Prob.
C	11444.94	0.0000*
PBC(-1)	-0.409828	0.0000*
PFC_POS(-1)	0.726080	0.0007*
PFC_NEG(-1)	0.448341	0.0024*
D(PFC_POS)	1.580506	0.0008*

Note: * = significant at 5%

Based on Table 1, it can be seen that the price of broilers at the farmer level has a significant 5% effect on the price of broilers in the PBC in the long term. In the short term, only the PFC_POS variable, namely the increase in the price of broilers at the farmer, has a significant effect on the price of broilers in the PBC. Based on the conditional error correction regression in Table 1, the NARDL regression equation for the PBC broiler price variable is obtained as follows.

$$\Delta PBC_t = 11444.94 + 1.580506\Delta PFC\_POS_t - 0.409828PBC_{t-1} + 0.726080PFC\_POS_{t-1} + 0.448341PFC\_NEG_{t-1}$$

Table 2. The estimation result of PBC to PIC of the NARDL model

Dependent variable: D(PIC)		
Conditional error correction regression		
Variable	Coefficient	Prob.
C	8952.075	0.0025*
PIC(-1)	-0.209090	0.0023*
PBC_POS	0.388277	0.0175*
PBC_NEG	0.549947	0.0064*

Note: * = significant at 5%

The estimation results of the NARDL PBC - PIC model are presented in the Table 2. It is seen that the price of broiler chickens in PBC, both when the price goes up and the price goes down, has a significant 5% effect on the price of broiler chickens in the PIC in the long term. While in the short term, it has no effect. Based on the conditional error correction regression in Table 2, the NARDL regression equation for the broiler price variable in the Indonesian market is obtained as follows.

$$\Delta PIC_t = 8952.075 - 0.20909PIC_{t-1} + 0.388277PBC\_POS_t + 0.549947PBC\_NEG_t$$

Table 3. The estimation result of PFC to PIC of the NARDL model

Variabel dependen: D(PIC)		
Conditional error correction regression		
Variabel	Koefisien	Prob.
C	8208.059	0.0122*
PIC(-1)	-0.200708	0.0075*
PFC_POS(-1)	0.050132	0.8946
PFC_NEG(-1)	0.171958	0.5552
D(PFC_POS)	2.003137	0.0531
D(PFC_POS(-1))	2.127416	0.0373*
D(PFC_NEG)	0.937850	0.1096

Note: * = significant at 5%

The estimation results of the NARDL PFC-PIC model are shown in Table 3. It can be seen that the broiler price variable in PFC does not have a significant effect on broiler prices in the PIC in the long- term. Meanwhile, in the short term, only the PFC_POSt-1 variable, namely the increase in broiler prices at the farmer level in the previous period, has a significant effect on the PIC broiler prices at the 5% real level. Based on the conditional error correction regression in Table 3, the NARDL regression equation is obtained for the variable price of broiler chickens in the PIC with the price of broiler chickens in PFC as the independent variable as follows.

$$\Delta PIC_t = 8208.06 + 2.003137\Delta PFC\_POS_t + 2.127416\Delta PFC\_POS_{t-1} + 0.93785\Delta PFC\_NEG_t - 0.200708PIC_{t-1} + 0.050132PFC\_POS_{t-1} + 0.171958PFC\_NEG_{t-1}$$

Table 4. The result of Wald test

Long-term asymmetric effect test			
Dependent variable	H_0	Chi-square value	Prob.
ΔPBC_t	$\theta^+_{PFC} = \theta^-_{PFC}$	15.38781	0.0001*
ΔPIC_t	$\theta^+_{PBC} = \theta^-_{PBC}$	11.71905	0.0006*
ΔPIC_t	$\theta^+_{PFC} = \theta^-_{PFC}$	1.263716	0.2609

Short-term asymmetric effect test			
ΔPBC_t	$\sum_{i=0}^{q-1} \pi^{+}_{PFCt-i} = \sum_{i=0}^{q-1} \pi^{-}_{PFCt-i}$	12.33242	0.0004*
ΔPIC_t	$\sum_{i=0}^{q-1} \pi^{+}_{PFCt-i} = \sum_{i=0}^{q-1} \pi^{-}_{PFCt-i}$	4.492938	0.0340*

Note: * = significant at 5%

Based on Table 4, the probability value for the Wald test of the long-term asymmetric effect of PFC on PBC is 0.0001 which is less than the 5% real level. The short-term asymmetric effect of PFC on PBC is 0.0004 which is less than the 5% real level meaning there is also a short-run asymmetric effect of the effect of broiler prices at farmer level on broiler prices in the Bandung market. Wald test for the asymmetric effect of PBC on PIC shows a probability value of 0.0006 which is less than the 5% real level. There is a long-term asymmetry. The asymmetric effect of PFC on PIC of 0.2609 is greater than the 5% real level. This shows that there is no asymmetric effect in the long term.

Table 5. Long-term estimation results

Dependent variable	Long − term parameter = $^{-\theta}/_{\rho}$	
	Variable	Coefficient
ΔPBC_t	PFC_POS	1.771670
	PFC_NEG	1.093974
ΔPIC_t	PBC_POS	1.856987
	PBC_NEG	2.630200
ΔPIC_t	PFC_POS	0.249774
	PFC_NEG	0.856754

Note: * = sigificant at 5%;
θ = parameter of independent variable;
ρ = parameter of dependent variable

Table 5 shows the effect of the long-term PFC-PBC relationship. The magnitude of the effect of broiler prices at the farmer on the price of broilers in the Bandung wholesales in the long term can be determined by looking for the quotient of the negative coefficient of the independent variable on the coefficient of the dependent variable in the previous 1 lag. Based on Table 1, the PFC_POS (-1) coefficient value is 0.726080, the PFC_NEG (-1) value is 0.448341, and the PBCt-1 coefficient value is -0.409828. If the value of these coefficients is operated based on the formula (-θ)⁄ρ, the asymmetrical effect of the broiler price in PFC will be obtained on the price of broiler chicken in PBC as in table 5. So are the two other NARDL equations.

4. Discussion

Figure 1 shows the pattern of monthly prices varies each year. The increase in broiler prices occurred during national religious holidays (HBKN), especially before fasting and Eid, which reached 10-30%. During the last five years were: fasting - Lebaran 2019, 15 May-June; fasting - Lebaran 2018, 5 May- Jun; fasting - Lebaran 2017, 24 April-May; fasting - Lebaran 2016, 13 April– May; and fasting - Lebaran 2015, April - May 2014. The increase in prices started before the fast, and tended to continue until after Eid. At Christmas and New Year, the price of broiler chickens also experienced a limited and temporal increase of 5-10%. This is in line with a statement from [23], [10]. The price and demand for chicken before the HKBN tends to increase. The asymmetric effect test (Wald test) is presented in Table 4. There is an asymmetric effect of the effect of broiler prices at the PFC level on broiler prices in PBC in the long and short term. In addition, there is an asymmetric effect of the effect of the price of broiler chickens in PBC on the price of broiler chickens in the

PIC market in the long term. This shows that in the long-term there was abuse of market power by the PBC and PIC markets. Based on Table 2, there is no short-term effect of PBC on PIC, so it can be concluded that there is no short-term asymmetric effect. This means that there are no adjustment costs incurred by business actors to adjust prices due to changes in certain costs [1]. Estimation of the long-term effects are presented in Table 5. It is known that for each increase in the price of broilers at PFC by Rp1, the price of broilers at PBC will increase by Rp1,772. Meanwhile, if there is a decrease in the price of broilers at PFC by Rp1, then the price of broilers at PBC will decrease by Rp1,094. It was concluded that the effect of the increase in the price of broiler at PFC is greater than the effect of the decrease on the price of broiler at PBC. The PFC-PBC relationship shows that at the producer level, the response of price increase is greater than the response of price decrease. The existence of a faster response behavior when prices rise indicates that Bandung wholesales are trying to get more profit, and consider the price increase at the farmer level will be a long-term [16]. This is different from the findings of [3] which states that wholesales respond more quickly when prices fall than when prices go up, due to the maintenance of their market share. According to high level of demand in Bandung wholesales and its surroundings, the price game at the wholesale level is bigger, so that price changes do not really affect its profits. PBC-PIC relationship. If there is an increase in the price of broiler at PBC by Rp1, then the price of broilers at the PIC will also increase by Rp1,857. Meanwhile, if there is a decrease in the price of broiler at PBC by Rp1, then the price of broilers at the PIC will decrease by Rp.2,6302 (Table 5). This means that the effect of the decrease in the price of broiler at PBC is greater than the effect of the increase on the price of broiler chickens in the PIC Indonesian market (retail traders) respond more quickly when prices fall than when prices go up, presumably to maintain their subscriptions. In line with this result, [21] reported that retailers respond more quickly when price drops compared to the situation when price increases at the wholesale level due to the perishable nature of chicken meat. Therefore, retail traders in the Indonesian market choose to reduce the risk of spoilage or failure. Meanwhile, for PIC equation with PFC, as it can be seen in Table 3, there is no long-term relationship between the two.

[5] found that price asymmetry is found more in fragmented market structures. This shows that the structure of the poultry is not well integrated. In the broiler market supply chain in Indonesia, the abuse of market power by intermediary traders is usually related to its market structure. [2], states that the amount of profit margin set by economic actors in the marketing chain is influenced by the structure of the market. The market structure of retailers which tends to be perfectly competitive, so the fact that there is market power at the merchant level indicates that there is a price setting by one or several business actors. The policy that needs to be done to improve the structure of the input market (DOC, feed and medicines) and the structure of the output market (live broilers and chicken meat) is that the government needs to provide facilities so that smallholder farmers join independent farmer groups, so that they are able to meet the transport scale of production inputs, sales of results, and can afford household needs properly. In addition, it is necessary to make policies on poultry agribusiness partnerships that are fair and dynamic. Fair both for partner farmers and for the core company through fair and dynamic sharing of risks and benefits that. Dynamic in the sense that the agreements set forth in the contract are dynamic following the changes that occur, especially changes in production costs and development of prices for poultry products. The development of an information system in the broiler sector is also needed to improve the bargaining position of farmers and the development of livestock groups that is very important to overcome the oligopoly broiler market at the farmer level. There are regular increases in the price of chicken meat products before fasting and Eid and post-Eid due to increased demand and insufficient supply. The solution that can be done is to increase the role of cold storage and cold chain for medium scale breeders and small scale independent farmer groups. From the test results of price transmission using an asymmetric NARDL model, it shows that there is an asymmetric price transmission between broiler marketing agencies in Indonesia. In the relationship between farmer (producer) and wholesales, price asymmetry occurs in the long term, while wholesales-retailer in Indonesian market occur asymmetry in the long term.

Meanwhile, the relationship of farmer and Indonesian market does not occur in an asymmetry long-term. Asymmetry price transmission in the short-term is due to cost adjustment, while asymmetric price transmission in the long-term is caused by the market power of retailers. The abuse of market power by traders which leads to asymmetric price transmission is supported by the market structure of traders that leads to oligopoly, where the number of intermediary traders is relatively small compared to the number of farmer and consumer.

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