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TRANSMISSION AND VOLATILITY OF SHRIMP AND PRAWN PRICES AT DIFFERENT MARKET CHAINS IN BANGLADESH

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ABSTRACT

This study uses weekly prices of fish in the two levels of the market chain wholesale and retail—to investigate price transmission and volatility for the shrimp and prawn fish markets. Information was gathered from Bangladesh's Department of Agricultural Marketing (DAM) and WorldFish Center. Volatility index, Granger causality test and Houck approaches were used for testing price transmission and volatility of shrimp and prawn prices. The empirical results suggest that price transmission exhibits asymmetry in both the short-run and the long-run. Out of the eleven price series pairs that were analyzed, four pairs displayed short-term price asymmetries, and seven pairs demonstrated long-term price asymmetries. The policy implication is that price volatility needs to minimize through continuous market monitoring. Therefore, pricing asymmetries continue over the long run in addition to the increasing and decreasing price response elasticities, which are both not unexpected and not appreciably different in the short-run.

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I. INTRODUCTION

Bangladesh's agriculture policy places a strong emphasis on the competitiveness of the country's food and agriculture sector, which includes downstream businesses like processors and retailers in addition to primary production. Because the level of market power affects how price changes are transmitted throughout the marketing chains, price signals' transmission throughout the food supply chains also provides information about the competitiveness of the food industry (McCorriston, 2002). Different prices flow up and down the value chain at different rates, which implies how various value chain actors compete with one another and shows how the chain is constructed and organized (Goodwin and Holt, 1999).

Price adjustments at different points in the supply chain can have a large effect on the welfare of producers and consumers. Furthermore, even though consumers pay higher prices at the retail level, fisherman frequently complain that they are getting low return for their produce. Fishing costs are also going up, but fishermen can't pass these costs on to their consumers. Consequently, there are notable price differences and margins between farm and retail levels (Acharjee et al. 2023; Acharjee et al., 2022). This usually leads to lower price transmission between different market chains (Holloway, 1991; McCorriston et al., 1998; Peltzman, 2000; McCorriston et al., 2001), resulting in asymmetric price transmission (Abdulai, 2002; Bakucs et al., 2013), since output prices respond faster to increases in input prices than to decreases of it (Peltzman, 2000). Asian aquaculture chains are extremely consolidated, according to research, which facilitates market domination by retailers (Sapkota et al., 2015; Singh et al., 2015).

Price transmission inefficiency is an indicator of market power, which alters the prices in expense of higher price paid by the consumers (Peltzman, 2000; Meyer and von Cramon-Taubadel, 2004). Perishability, contracts, government involvement, inventor holding and value, geographical dispersion, price expectations, and the presence of re-pricing costs can lead to asymmetric price transmission. Earlier studies on value chain analysis of fishes (FAO, 2011; Alam et al., 2012; Begum et al., 2016; Rashid, 2017, Rosales et al., 2017; Hossain et al., 2019; Acharjee et al., 2022), value addition decisions (Acharjee et al., 2023; Acharjee et al., 2022), fish preference (Mirera et al., 2023), fish farmers’ market choice options (Acharjee et al., 2021), price volatility (Asche et al., 2015;), supply chain price transmission (Asche et al., 2015; Asche et al., 2007; Acharjee et al., 2022), market integration and price transmission (Deb et al., 2020; Hossain et al., 2011; Hossain and Verbake, 2010) are dealt with in major fish species and crops and found heterogeneous results.

This paper examines the asymmetric price transmission and price volatility of shrimp and prawn in Bangladesh. Bangladesh is one of the world's leading producers of these seafood products, with a total production of 4.915 million tons in 2022–2023 on a land area of 4.707 lakh ha (FSYB, 2023). These results are important because they provide insight into the workings of the shrimp and prawn market and have applications in demand analysis, profits, and welfare distribution along the supply chains. Additionally, the study's conclusions and suggestions might apply to other regions, especially those with similar marketplaces and consumer patterns, such as Southeast Asia and other Asian countries.

II. MATERIALS AND METHODS

2.1 Data

The study used weekly price observations of shrimp and prawns at two different points of the market chains. The information, which spans the months of October 2010 through June 2022, was sourced from the WorldFish Center and the Department of Agricultural Marketing (DAM) in Bangladesh. For this study, the wholesale and retail pricing of four significant regional fish production hubs—Khulna, Faridpur, Barishal, and Jessore—were taken into account. Additionally, the Department of Agricultural Marketing provided the terminal market statistics for Dhaka. Due to the absence of certain weekly data, there were in total 195 observations. Based on the distribution of various weight classes, the average weight (grade B; medium grade) is considered for prices and quantity. Additionally, because the data were divided into weight classes (grade A, B, and C, the paper used a weighted average (grade B) to obtain one observation for a particular week.

The prices of shrimp and prawn fishes exhibit distinct evolutionary trends, as illustrated in Figure 1. However, there is greater fluctuation in retail prices. The prices of shrimp and prawn fishes exhibit distinct evolutionary. trends, as illustrated in Figure 1. However, there is greater fluctuation in retail prices.

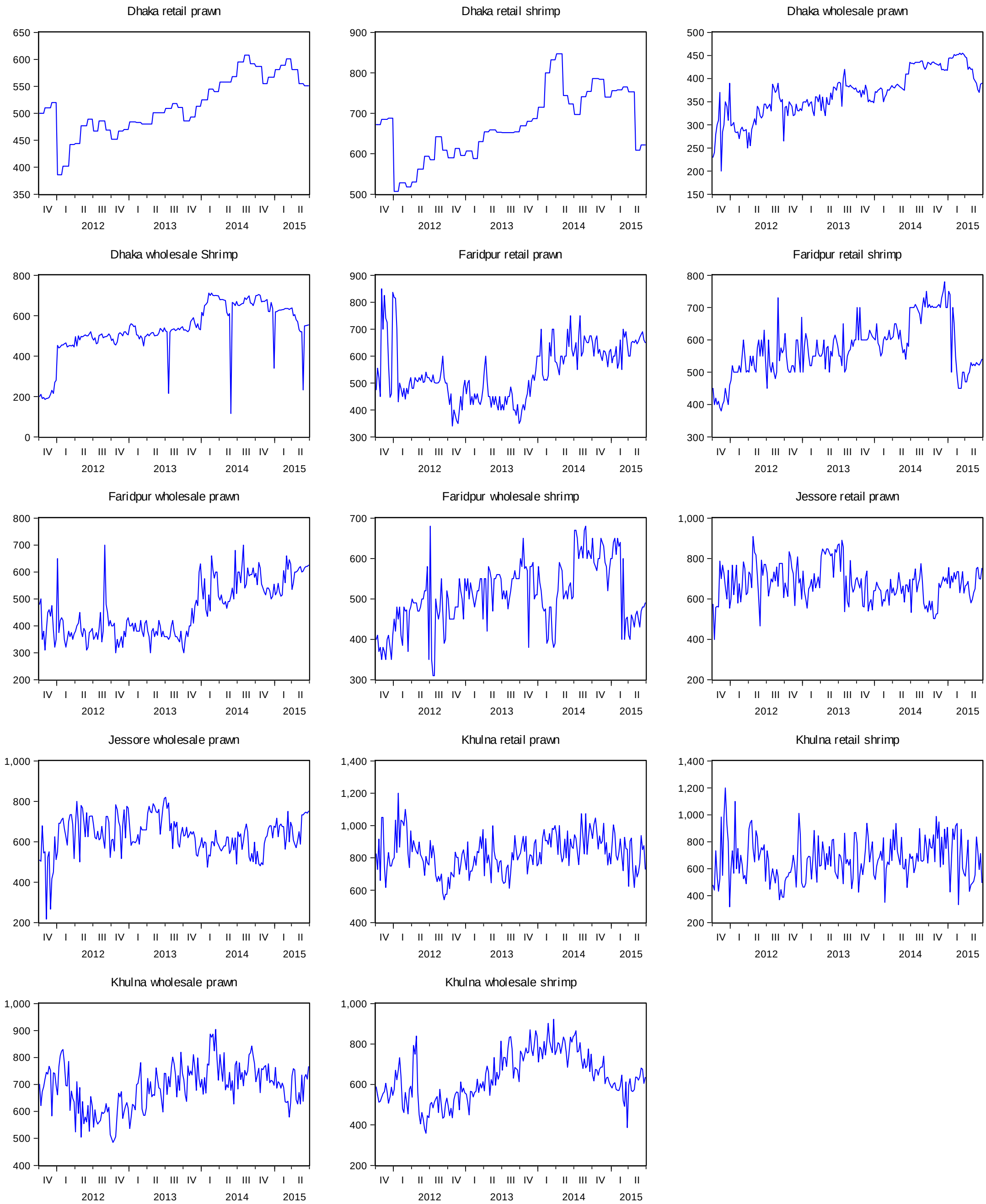

Figure 1: Shrimp and prawn price transmission with time

2.2 The link between market phases and price transmission

Price transmission is the process by which prices at the producer level affect prices at the retailer level. Based on a simultaneous equilibrium, the theory of derived demand explains the connections between the value chain's upstream and downstream stages. However, this approach requires a lot of data and is frequently impractical in practice (Asche et al., 2002). Because of this, only prices at different levels of the market chain are usually looked at, especially for primary products, as demonstrated in Goodwin and Holt, 1999; and Asche et al., 2002, among other places.

The margin is the difference in a product's price between two phases of the market chain. George and King (1971) conducted research on a variety of commodities and found that links between a product's pricing (margins) along the market chain often involve a continuous combination of both absolute and percentage margins. Thomsen (1951), Buse and Brandow (1960), and Shepherd (1962) have already explained the empirical basis for these margins.

Equation 1 thus shows that the price of a product at any stage of the market chain may be expressed as a function of the product's price at a different stage of the market.

$$P_d = c + bP_u \quad \text{..........} \quad (1)$$

In this case, c represents a constant markup, b represents a proportional markup, and P_d represents a downstream price and P_u represents an upstream price.

2.3 Volatility

Volatility means depression of price and usually measured by the coefficient of variation, variance, or standard deviation of a variable. The dispersion of the variables from their average is measured by the standard deviation (SD).

$$SD = \frac{\sum_{i=1}^{n} (P_i - P)^2}{n-1} \quad \text{..........} \quad (2)$$

where P_i stands for each price in the time series, P is the average price, and n is the number of price observations.

The standard deviation to mean ratio, on the other hand, yields the coefficient of variation (CV).

$$CV = \frac{SD}{X} \quad \text{..........} \quad (3)$$

2.4 Causality

Causation is the relationship between one event (the cause) and another (the effect); the cause event leads to the effect event. In economics, it is useful to ascertain whether a time series variable aids in the prediction of another time series variable. Price transmission analysis uses causality to determine whether a price change at one stage of the market is a direct effect of a price change at another.

Many studies (Natcher and Weaver, 1999; Buguk et al., 2003; Prakash and Bilbert, 2011, Olah et al., 2017; Malesios et al., 2020; Stephens et al., 2025) have examined the direction of pricing impacts on market phases in food markets. It is commonly believed that fresh product markets have long-term causal links that move upward (from the retail to the manufacturing sector). Nevertheless, short-term upstream pricing swings usually precede downstream price changes.

A causal test is required in order to investigate the direction of the influences between market levels. This research employs the Granger Causality Tests (Granger, 1969), which have been widely used to examine price transmission between market stages (Ward, 1982; Tiffin and Dawson, 2000; Jimenez-Toribio et al., 2003; and Bakucs and Ferto, 2005, Sapkota et al., 2015; Sun et al., 2018; Qi et al., 2020; Zhou et al., 2022; Acharjee et al. 2023). One time series is said to Granger causes the second if its values provide statistically significant information about the second's values.

2.5 Price Transmission Elasticity

The proportional change in retail price to the relative change in producer price, while all other factors influencing processor behavior are held constant, is known as price transmission elasticity (Hildreth and Jarrett, 1995). Therefore, the elasticity of price transmission calculates the percentage change in a product's price at a downstream stage of the market chain compared to the relative change in the same product's price at an upstream stage. This study measures the price transmission elasticity between the wholesale and retail levels. The price transmission elasticity between two market chain stages can be calculated using the formula below:

$$\varepsilon_T = \frac{\delta P_d}{\delta P_u} \cdot \frac{P_u}{P_d} \quad \text{...} \quad (4)$$

The parameter $\frac{\delta P_d}{\delta P_u}$, which shows how prices at the downstream level fluctuate as prices at the upstream level fluctuate, can be found by calculating the regression coefficient that links downstream and upstream stage prices (equation 1). The elasticity of price transmission (equation 6) is identical to the regression coefficient when the variables are taken into account in their log form (equation 5).

By estimating the regression coefficient that connects downstream and upstream stage prices, one may determine the parameter$\frac{\delta P_d}{\delta P_u}$, which indicates the fluctuation of prices at the downstream level when the prices at the upstream level vary (equation 1). The regression coefficient equals the elasticity of price transmission (equation 6) when the variables are taken into account in their log form (equation 5).

$$Ln(P_d) = c + \ln(bP_u) \quad \text{..} \quad (5)$$

$$\varepsilon_T = \frac{\delta P_d}{\delta P_u} \cdot \frac{P_u}{P_d} = \frac{\delta Ln(P_d)}{\delta Ln(P_u)} \quad \text{..} \quad (6)$$

2.6 Price Transmission Asymmetry

When downstream prices respond differently to upstream price changes, this is known as price transmission asymmetry, or asymmetric price transmission. A common explanation for the existence of asymmetrical in vertical price transmission is collusive behavior. In order to determine whether market power exists, it is common practice to test price transmission asymmetries. At some point in the supply chain, market power can be used to prevent supplier price declines from being fully transmitted while perfectly transmitting price increases.

In addition to market power, other factors that contribute to asymmetric price transmission include the perishable nature of goods (Granger, 1969; and Kinnucan and Forker, 1987), the presence of re-pricing costs (Worth, 1999), the public's involvement (Hildreth and Jarrett, 1995), inventor holding and value (Wright and Williams, 1982; and Wohlgenant, 1989), and price expectations (Aguiar and Santana, 2002).

The existence of price transmission asymmetry is investigated by Guillen and Franquesa (2010) in light of Houck (1977). Houck's method, which Granger (1969) later used to capture the dynamics of price transmissions between market stages, was developed from earlier research by Wolffram (1971), Farre (1952), and Tweeten and Quance (1969).

To investigate whether price transmission asymmetry exists, equation 1 has been approximated using Pu+ and Pu- terms that account for the positive and negative price changes at an upstream stage, respectively. To avoid multicollinearity problems, two separate equations (equations 7 and 8) that account for both positive and negative price variations have been used to simulate asymmetry.

$$P_d = a + bP_u + cP_u^+ \quad \text{.......} \quad (7)$$

$$P_d = a + bP_u + cP_u^- \quad \text{.......} \quad (8)$$

When used in their absolute terms, the variables that explain both positive and negative price movements are defined as follows:

$$P_u^+ = \Delta P_u = P_u - P_{u-1} \quad if\ \Delta P_u > 0 \quad \text{.......} \quad (9)$$

$$P_u^- = \Delta P_u = P_u - P_{u-1} \quad if\ \Delta P_u < 0 \quad \text{.......} \quad (10)$$

Consequently, there is asymmetry when the coefficient c is substantial and so deviates from 0.

III. RESULTS AND DISCUSSIONS

3.1 Volatility

Table 1 displays descriptive data (mean, standard deviation, and coefficient of variation) for the prawn and shrimp prices at the two market phases. Shrimp that exhibits the highest standard deviation and volatility metric is the most valuable product. Prices at the wholesale level exhibit greater unpredictability than those at the retail stage, according to data in Table 1. According to the standard of variation, the volatility's arithmetic mean is 98.57 at the retail level and 93.77 at the wholesale level. The arithmetic mean of the coefficient of variation is 15% at the retail level and 17% at the wholesale level. The coefficient of variation is used to standardize the variability by the mean.

3.2 Causality

The results of the Granger causality test, which was employed to investigate the connection between market stages, are shown in Table 2. In the short run, wholesale stage price changes often take precedence over retail stage price changes, as Table 2 illustrates. At a 5% significance level, seven (50% of the cases) causal relationships between the wholesale and retail stages have been identified, one of which is bidirectional. Five causal links - one of which is bidirectional—between the retail and wholesale stages have been found (36% of the cases).

3.3 Price transmission elasticity

The price transmission elasticities for shrimp and prawns under study across several market phases are shown in Table 3. Eight pairs in the short and long run demonstrated asymmetric price transmission for prawns out of the fourteen pairs that were analyzed. The elasticity of price transmission varied from -0.06 to 0.72 and from -0.55 to 0.81 for both short-term and long-term price rises. Elasticities for falling prices varied from -0.09 to 1.05 and from -0.64 to 0.32 in all cases (Table 3 and 4).

It was found that two shrimp pairs showed both short- and long-run asymmetric price transmissions. The Faridpur wholesale and retail series and the Dhaka wholesale and retail pair both exhibited short-run and long-run symmetric price transmissions. Short-term price transmission elasticities ranged from 0.04 to 2.09 for increasing prices and from -0.54 to 0.16 for falling prices. According to Tables 3 and 4, these elasticities, however, varied throughout time, going from -0.04 to 0.19 for rising prices and from 0.002 to 0.69 for falling prices.

Table 1: Descriptive statistics of shrimp and prawn prices of different market stages

	Wholesale							Retail						
	Dhaka prawn	Dhaka shrimp	Faridpur prawn	Faridpur shrimp	Jessore prawn	Khulna prawn	Khulna shrimp	Dhaka prawn	Dhaka shrimp	Faridpur prawn	Faridpur shrimp	Jessore prawn	Khulna prawn	Khulna shrimp
Mean	367.95	533.50	460.92	508.43	633.28	690.99	637.62	515.41	670.01	544.33	572.86	677.99	829.27	671.24
Std. Dev.	51.41	125.34	102.93	81.39	91.37	83.21	120.71	52.84	83.77	106.59	84.63	89.37	116.05	156.72
C.V.	0.14	0.23	0.22	0.16	0.14	0.12	0.19	0.10	0.13	0.20	0.15	0.13	0.14	0.23
Max	455.00	712.00	700.00	680.00	820.00	904.38	921.94	608.00	847.00	850.00	780.00	908.33	1,200.00	1,200.00
Min	200.00	115.00	300.00	310.00	216.67	485.00	358.77	386.00	507.00	340.00	380.00	400.00	541.25	316.67
Jarque-Bera	4.61	63.83	15.09	2.31	57.15	1.44	4.63	2.85	3.63	6.87	2.16	0.35	0.60	3.89

Table 2: Granger Causality Test for Pairwise Prices of Shrimp and Prawn at Wholesale and Retail

	Prawn	Shrimp
There is no Granger Cause between Khulna wholesale prices and Khulna's retail price	6.022***	2.134
There is no Granger Cause between Khulna retail price and Khulna wholesale price	1.602	2.518*
There is no Granger Cause between Dhaka retail price and Khulna wholesale price	0.953	2.498*
There is no Granger Cause between Khulna wholesale price and Dhaka retail price	1.580	2.435*
There is no Granger Cause between Faridpur wholesale and Faridpur retail price	1.565	2.546**
There is no Granger Cause between Faridpur retail price Faridpur wholesale price	0.861	0.228
There is no Granger Cause between Dhaka retail price and Faridpur wholesale price	2.455*	0.673
There is no Granger Cause between Faridpur wholesale price and Dhaka retail price	5.621***	0.641
There is no Granger Cause between Jessore wholesale price and Jessore retail price	3.858***	
There is no Granger Cause between Jessore retail and Jessore wholesale price	4.121***	
There is no Granger Cause between Dhaka retail price and Jessore wholesale price	4.656*	
There is no Granger Cause between Jessore wholesale price and Dhaka retail price	0.348	
There is no Granger Cause between Dhaka retail price and Dhaka wholesale price	14.779***	5.558***
There is no Granger Cause between Dhaka wholesale price and Dhaka retail price	2.189	1.392

Table 3: Model estimates using the Houck and Ward method to examine price transmission asymmetry

Species	Prawn			Prawn			Prawn			Prawn		
Market Val. Chain $\ln P_i^*$	Khulna Wholesale (i)	←	Khulna Retail (j)	Dhaka Retail(i)	←	Khulna Wholesale (j)	Faridpur Wholesale (i)	←	Faridpur Retail (j)	Dhaka Retail (i)	←	Faridpur Wholesale (j)
	Coeff.		S.E.	Coeff.		S.E.	Coeff.		S.E.	Coeff.		S.E.
t	-0.1124	***	0.0196	-0.1313	***	0.0111	-0.2977	***	0.0384	-0.0800	***	0.0176
$cum\Delta \ln P_{j,t}^{+}$	0.3939	***	0.1008	0.0489		0.0802	-0.0606		0.2179	0.0075		0.0523
$cum\Delta \ln P_{j,t}^{-}$	-0.0100		0.1087	-0.0176		0.0801	-0.6480	***	0.2220	0.1319	**	0.0638
$cum\Delta \ln P_{j,t-1}^{+}$	0.0026		0.1027	0.0408		0.0775	-0.4921		0.2084	0.1585	***	0.0582
$cum\Delta \ln P_{j,t-1}^{-}$	0.3944	***	0.1069	0.0681		0.0825	-0.0061		0.2289	0.0100		0.0564
Adj. R-squared	0.28			0.70			0.50			0.70		
Durbin-Watson stat	0.968			0.221			0.882			0.276		

Species	Prawn			Prawn			Prawn		
Market	Jessore		Jessore	Dhaka		Jessore	Dhaka		Dhaka
Val. Chain	Wholesale			Retail		Wholesale	Wholesale		
$\ln P_i^*$	(i)	←	Retail (j)	(i)	←	(j)	(i)	←	Retail(j)
	Coeff.		S.E.	Coeff.		S.E.	Coeff.		S.E.
t	0.0611		0.0381	-0.1505	***	0.0162	0.2756	***	0.0182
$cum\Delta \ln P_{j,t}^{+}$	0.3942	**	0.1570	-0.0505		0.0571	0.7209	*	0.4251
$cum\Delta \ln P_{j,t}^{-}$	0.3288	**	0.1476	-0.1856	***	0.0408	0.1059		0.2321
$cum\Delta \ln P_{j,t-1}^{+}$	0.2791	**	0.1374	-0.1442	***	0.0422	0.0989		0.4198
$cum\Delta \ln P_{j,t-1}^{-}$	0.3377	**	0.1666	-0.0451		0.0548	0.3311		0.2304
Adj. R-squared	0.20			0.72			0.75		
Durbin-Watson stat	1.364			0.463			1.270		

Species Market Val. Chain $\ln P_i^*$	Shrimp			Shrimp			Shrimp			Shrimp		
	Khulna Wholesale (i)	Khulna ←	Faridpur Retail (j)	Faridpur Wholesale (i)	←	Retail (j)	Dhaka Retail (i)	←	Faridpur Wholesale (j)	Dhaka Wholesale (i)	←	Dhaka Retail (j)
	Coeff.		S.E.	Coeff.		S.E.	Coeff.		S.E.	Coeff.		S.E.
t	-0.1648	***	0.0369	0.0438		0.0364	-0.1775	***	0.0159	0.5045	***	0.0501
$cum\Delta\ln P_{j,t}^{+}$	0.1596	*	0.0943	0.1291	*	0.2374	0.0441		0.0813	2.0981	*	1.1319
$cum\Delta\ln P_{j,t}^{-}$	0.0128		0.0821	-0.2092		0.2195	-0.0632		0.0762	-0.5411		0.6037
$cum\Delta\ln P_{j,t-1}^{+}$	0.0364		0.0903	-0.1717		0.2170	-0.0639		0.0763	-1.8923	*	1.1297
$cum\Delta\ln P_{j,t-1}^{-}$	0.1691	*	0.0859	0.4396	*	0.2381	0.0038		0.0814	-0.1218		0.6059
Adj. R-squared	0.21			0.20			0.49			0.39		
Durbin-Watson stat	0.458			0.863			0.140			0.931		

Table 4: Price asymmetry test results utilizing the Houck and Ward method

Chain node	Period	β^+	β^-	p-value (Ho: $\beta^+ = \beta^-$)	Decision
			Prawn		
Khulna WP ← Khulna RP	SR	0.3939	-0.0100	0.0000	Asymmetry
	LR	0.3965	0.7886	0.0000	Asymmetry
Dhaka RP ← Khulna WP	SR	0.0489	-0.0176	0.0347	Asymmetry
	LR	0.0897	0.1170	0.0068	Asymmetry
Faridpur WP ← Faridpur RP	SR	-0.0606	-0.6480	0.3303	Symmetry
	LR	-0.5527	-0.0667	0.1234	Symmetry
Dhaka RP ← Faridpur WSP	SR	0.0075	0.1319	0.1400	Symmetry
	LR	0.1660	0.0175	0.0789	Asymmetry
Jessore WP ← Jessore RP	SR	0.3242	0.3288	0.0722	Asymmetry
	LR	0.6733	0.7319	0.1482	Symmetry
Dhaka RP ← Jessore WP	SR	-0.0505	-0.1856	0.1498	Symmetry
	LR	-0.1947	-0.0956	0.0376	Asymmetry
Dhaka WP ← Dhaka RP	SR	0.7209	0.1059	0.2982	Symmetry
	LR	0.8198	1.0520	0.0622	Asymmetry
			Shrimp		
Khulna WP ← Khulna RP	SR	0.1596	0.0128	0.0072	Asymmetry
	LR	0.1960	0.3287	0.0020	Asymmetry
Faridpur WP ← Faridpur RP	SR	0.1291	-0.2092	0.1354	Symmetry
	LR	-0.0426	0.5687	0.1027	Symmetry
Dhaka RP ← Faridpur WP	SR	0.0441	-0.0632	0.0140	Asymmetry
	LR	-0.0198	0.0479	0.0137	Asymmetry
Dhaka WP ← Dhaka RP	SR	2.0981	-0.5411	0.1632	Symmetry
	LR	0.2058	1.9763	0.6903	Symmetry

RP= retail price; WP = wholesale price; SR= short-run; LR=long-run

Four of the eleven pairs of price series (seven intra-market transmissions and four inter-market transmissions) that were examined displayed short-term price asymmetries, whereas seven pairings showed long-run price asymmetries. Given that fish are sold in Bangladesh as highly perishable goods, it is conceivable that price asymmetries do persist over the long term and that the increasing and lowering price response elasticities are neither unexpected nor substantially different in the short run.

In both markets and species, pricing asymmetries have somewhat different features. Asymmetric price transmission in the short run is seen in two of the four interregional price transmission pairs that were examined. Three cases exhibit asymmetric transmission in the short-run and three cases in the long-run out of the seven intra-market price transmissions that were examined.

DISCUSSIONS

These causality and volatility findings are consistent with the majority of earlier research on the markets for seafood products. Heien (1980) found that out of 57% of the examples examined, changes in production stage prices occur before retail level prices changes, in the short-run and bidirectional causal linkages were found 13%. For 17 food products in Australia, Freebairn (1984) uses the Granger-Sims causality tests. In 35% of the cases, he finds a unidirectional causal relationship from the production stage to the retail stage, one unidirectional causal tie from the retail stage to the production stage, and no bidirectional causal relationships. Tiffin and Dawson (2000) apply the same Granger's methodology to determine that ex-vessel prices have an impact on the wholesale prices of striped benus and red sea bream in Spain. Using co-integration and erogeneity tests, Hartmann et al. (2000) conclude that the auction prices of hake in France affect both the wholesale and retail stages. Singh et al. (2022) discover that the prices of frozen shrimp imported and exported from India to the American and Japanese markets are co-integrated. Price transmission to USA was found symmetric while import price was found to be asymmetric. According to Deb et al. (2022), market information is shifting from the retail market to the wholesale market, suggesting that the retail market has greater market power.

Additionally, according to the authors, the fish market in Bangladesh does not function uniformly; rather, it exhibits distinct features depending on the area in the short-run. Price transmission and asymmetry in a dynamic seafood supply chain are examined by Kidane (2025), who finds that price transmission happens in all value chains under investigation and that the export market is a key player. Retail prices are higher than wholesale and farmgate prices, according to Acharjee et al. (2023). Fifteen pairs of farmgate, wholesale, and retail price series were analyzed by the authors; fourteen of these pairs were co-integrated. According to their research, the price transmission pattern is asymmetric in the long term and symmetric in the short term. This asymmetric price behavior suggests that changes in retail prices are not fully reflected at farmgate and wholesale prices. Additionally, the communicated prices may fluctuate in accordance with the retail prices, depending on whether they are rising or declining.

The price transmission in this study is likewise in line with previous studies, according to the literature. These results demonstrate more asymmetric price transmission linkages than those of Pelzman (2000) and Meyer and von Cramon-Taubadel (2004), who used similar methodologies and discovered asymmetry in 66% (out of 285 tests) and 68% (63 out of 93) of the cases, respectively.

IV. CONCLUSIONS AND POLICY RECOMMENDATIONS

The study used the WorldFish Center and the Department of Agricultural Marketing in Bangladesh weekly data for investigating price transmission and volatility of shrimp and prawn prices in four fish hubs in Bangladesh. The results showed that shrimp and prawn prices are volatile and have short and long run relationships. Out of the fourteen pairs examined, eight pairs in the short and long-run showed asymmetric price transmission for prawns. Four of the eleven pairs of price series that were examined displayed short-run price asymmetries, whereas seven pairings showed long-run price asymmetries for shrimp. To reduce the price volatility, market information should be disseminated across the markets and regular market monitoring should be encouraged.

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REFERENCES

Abdulai, A. (2002). Using threshold cointegration to estimate asymmetric price transmission in the Swiss pork market. Applied Economics 34: 679-687.

Acharjee, D. C., Alam, G.M., Gosh, K., Haque, A. M., Raha, S. K., and Hossain, M. I. (2021). Fish value chain and the determinants of value addition decision: Empirical evidence from Bangladesh. Journal of the World Aquaculture Society, 54(4), 931-944. https://doi.org/10.1111/jwas.12941

Acharjee, D., Rahman, S., Alam, G. M. M., Gosh, K., Haque, A. B. M. M., and Hossain, M. I. (2023).Factors influencing fish farmers' decision in selecting the right market outlet: empirical evidence from Bangladesh *Journal of Applied Aquaculture*, *36*(4), 702–721. https://doi.org/10.1080/10454438.2023.2299029

Acharjee, D.C., G.M.M. Alam, K. Gosh, A.B.M.M. Haque, M.I. Hossain (2022). Price transmission asymmetry of selected fishes in Bangladesh: An econometric and value chain analysis. Aquaculture Economics & Management, https://doi.org/10.1080/13657305.2022.2163720

Acharjee, D.C., G.M.M. Alam, K. Gosh, A.B.M.M. Haque, and M.I. Hossain (2022). Fish value chain and the determinants of value addition decision: Empirical evidence from Bangladesh. Journal of the World Aquaculture Society, https://doi.org/10.1111/jwas.12941

Acharjee, D.C., Gosh, K., Alam, G.M.M., Haque, A.B.M.M., Sayem, S.M., and Hossain, M.I. (2023). Price transmission asymmetry of selected fishes in Bangladesh: An econometric and value chain analysis. *Aquaculture Economics & Management*, *27*(4), 638–665. https://doi.org/10.1080/13657305.2022.2163720

Acharjee, D.C., Rahman M.S., Gosh K., Amin, M.R., Alam, G.M.M. and Hossain M.I. (2023). An Analysis of fish farming profitability and marketing efficiency of selected fish species in Bangladesh. Journal of Fisheries and Environment, 47(3): 102-115. https://li01.tci-thaijo.org/index.php/JFE/article/view/259341/177655

Aguiar, D.R.D, and Santana, J.A. (2002). Asymmetry in farm to retail price transmission: evidence from Brazil. Agribusiness 18, 37-48.

Alam, M.F., Palash, M.S., Mian, I.A., Dey, M.M. (2012). Marketing of major fish species in Bangladesh: a value chain analysis. *A report submitted to Food and Agriculture Organization for the project entitled "A Value-chain Analysis of International Fish Trade and Food Security with an Impact Assessment of the Small-scale Sector".*

Asche, F., Dahl, R. E., and Steen, M. (2015). Price volatility in seafood markets: Farmed vs. wild fish. *Aquaculture Economics & Management*, *19*(3), 316–335. https://doi.org/10.1080/13657305.2015.1057879

Asche, F., Dahl, R. E., Valderrama, D., and Zhang, D. (2014). Price transmission in new supply chains—the case of salmon in France. *Aquaculture Economics & Management*, *18*(2), 205–219. https://doi.org/10.1080/13657305.2014.903309

Asche, F., Jaffry, S., and Hartmann, J. (2007). Price transmission and market integration: Vertical and horizontal price linkages for salmon. *Applied Economics*, *39*(19), 2535–2545. https://doi.org/10.1080/00036840500486524

Asche, F., Menezes, R. and Ferreira, D.J. (2002). Transmission of price signals in cross boundary value chain. *Proceedings of the EAFE Conference*.

Bakucs, L.Z. and Ferto, I. (2005). Marketing margins and price transmission on the Hungarian pork meat market. Agribusiness 21, 273-286.

Bakucs, Z., Falkowski, J., and Fertö, I. (2013). Does Market Structure Influence Price Transmission in the Agro-Food Sector? A Meta-analysis Perspective. Journal of agricultural economics, 65(1), 1-25.

Begum, M., M.R. Ahmed, T. Noor, Hossain M.I. (2016). Marketing of Orange: A Value Chain Perspective in the Selected Areas of Sylhet District in Bangladesh. *Progressive Agriculture*, 27(3): 327-338.

Buguk, C., Hudson, D., Hanson, T. (2003). Price volatility spillover in agricultural markets: an examination of US Catfish Markets. Journal of Agricultural and Resource Economics, 28 (1): 86-99.

Buse, R.C. and Brandow, G.E. (1960). The relationship of volume prices and costs to marketing margins for farm foods. Journal of Farm Economics 42, 362-370.

Deb, P., Dey, M.M., and Surathkal, P. (2022). Price transmission and market integration of Bangladesh fish markets. Aquaculture, 560, 738592. https://doi.org/10.1016/j.aquaculture.2022.738592.

FAO (2011). Value chain of fish and fishery products: origin, functions and application in developed and developing country markets. Food and Agriculture Organization, Rome, Italy.

Farrel, M.J. (1952). Irreversible Demand Functions. Econometrica 20: 171-186.

Freebairn, J.W. (1984). Farm and retail food pricesReview of Marketing and Agricultural Economics 52: 71-90.

FSYB (Fisheries Statistical Yearbook of Bangladesh). (2023). Department of Fisheries, Ministry of Fisheries and Livestock, Fisheries Resources Survey System, Bangladesh, 29,44.

George, P.S. and King, G.A. (1971). *Consumer demand for food commodities in the United States with projections for 1980*. University California, Berkeley: Giannini Foundation. Monograph, 26.

Goodwin, B. K. and Holt, M.T. (1999). Price Transmission and Asymmetric Adjustment in the U.S. Beef Sector. American Journal of Agricultural Economics 81: 630-637.

Granger, C.W.J. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica* 424-438.

Guillen, J. and Franquesa, R. (2010). Testing for market power in the Spanish meat market: price transmission elasticity and asymmetry using econometric models. *International Journal of Computational Economics and Econometrics* 1(3-4): 294-308.

Hartmann, J., Jaffry, S., and Asche, F. (2000). Price relationships along the value chain: an analysis of the hake market in France. *Proceedings of the IIFET Conference*.

Heien, D.M. (1980). Mark up pricing in a dynamic model of the food industry. American Journal of Agricultural Economics 62,11-18.

Hildreth, C. and Jarrett, F.G. (1995). *A statistical study of livestock production and marketing*. New York: John Wiley & Sons.Cowles Commission Monograph, 5.

Holloway, G. J. (1991). The Farm-Retail Price Spread in an Imperfectly Competitive Food Industry. American Journal of Agricultural Economics 73: 979-989.

Hossain, M.I., and Verbake, M. (2010). Evaluation of Rice Markets Integration in Bangladesh. *Lahore Journal of Economics*, 15 (2): 77-96.

Hossain, M.I., E. Papadopoulou, and M.E.A. Begum (2011). Co-integration Analysis of Rural Wheat Markets in Northern Bangladesh. *Asia-Pacific Journal of Rural Development, XXII(2): 89-104.*

Hossain, M.I., S. Afroz, M. Das, M.M. Haque, M.S. Islam, Lilly Lim Camacho (2019). Value chain analysis of sunflower in coastal areas of Amtali upazila of Barguna district. Journal of Bangladesh Agricultural University, 17(2): 244-250.

Houck, J.P. (1977). An approach to specifying and estimating nonreversible functions. American Journal of Agricultural Economics 59: 570-572.

Jimenez-Toribio, R., Garcia-Del-Hoyo, J.J. and Garcia-Ordaz, F. (2003). Vertical integration and price transmission in the Spanish distribution channel of the Striped Venus. *Proceedings of the EAFE Conference*.

Kidane, D.G. (2025). Price transmission and asymmetry in a changing seafood supply chain. Aquaculture Economics and Management. 1–21. https://doi.org/10.1080/13657305.2024.2447443.

Kinnucan H W and Forker O. D. (1987) Asymmetry in farm-retail price transmission for major dairy products. American Journal of Agricultural Economics 69: 285-292.

Malesios, C., Jones, N. Jones, A. (2020). A change-point analysis of food price shocks. Climate Risk Management, 27, 100208. https://doi.org/10.1016/j.crm.2019.100208.

McCorriston, S. (2002). Why should imperfect competition matter to agricultural economists? European review of agricultural economics 29(3):349-371.

McCorriston, S., Morgan, C.W. and Rayner, A .J. (1998). Processing Technology, Market Power and Price Transmission. Journal of agricultural economics 49: 185-201.

McCorriston, S., Morgan, C.W. and Rayner, A.J. (2001). Price Transmission: The Interaction Between Market Power and Returns to Scale. European review of agricultural economics 28: 143-159.

Meyer, J. and von Cramon-Taubadel, S. (2004). Asymmetric price transmission: a survey. Journal of agricultural economics on 55: 581-611.

Mirera, D.O., Magondu, E.W., Wainaina, M.W., Muli, B., Okemwa, D., Angulu, R., Heba, I., Moyoni, H. (2023). Fish preference at different vlaue chain levels and implication for managment of mariculture. Marine Policy, 157, 105845. https://doi.org/10.1016/j.marpol.2023.105845.

Natcher, W.C., Weaver R.D. (1999). The transmission of price volatility in the beef markets: A multivariate approach. Paper presented at the 1999 AAEA Annual meeting, August 8-11, 1999, Nashville, Tennessee. Available at: https://core.ac.uk/download/pdf/7066657.pdf.

Olah, J., Lengyel, P., Balogh, P., Harangi-Rakos, M., Popp, J. (2017). The role of biofuelds in commodity prices volatility and land use. J. Competitiveness, 9 (4): 81-93.

Peltzman, S. (2000). Prices rise faster than they fall. Journal of Political Economy 108(3): 466-502.

Prakash, A., Gilbert, C.L. (2011). Rising vulnerability in the global food system: beyond market fundamentals. A. Prakash (Ed.), Safeguarding food security in volatile global markets, FAO, Rome.

Qi, Y., Li, H., Liu, Y., Feng, S., Li, Y., and Guo, S. (2020). Granger causality transmission mechanism of steel product prices under multiple scales—The industrial chain perspective. Resources Policy, 67, 101674. https://doi.org/10.1016/j.resourpol.2020.101674.

Rashid, M.M. (2017). Value chain analysis of major fish species in Jhenaidah district, Bangladesh. An Unpublished MS Thesis Submitted in the Department of Fisheries, Faculty of Biological Sciences, University of Dhaka, Bangladesh.

Rosales, R.M., Pomeroy, R., Calabio, I.J., Batong, M., Cedo, K., Escara, N., Facunla, V., Gulayan, A., Narvadez, M., Sarahadil, M., Sobrevega, M.A. (2017). Value chain analysis and small scale fisheries managment. Marine Policy, 83: 11-21. https://doi.org/10.1016/j.marpol.2017.05.023Get rights and content.

Sapkota, P., Dey, M. M., Alam, Md. F., & Singh, K. (2015). Price Transmission Relationships along the Seafood Value Chain in Bangladesh: Aquaculture and Capture Fisheries. Aquaculture Economics & Management, *19*(1), 82–103. https://doi.org/10.1080/13657305.2015.994237.

Sapkota, P., Dey, M.M., Alam, M.F., and Singh, K. (2015). Price Transmission Relationships along the Seafood Value Chain in Bangladesh: Aquaculture and Capture Fisheries. Aquaculture Economics & Management 19 (1): 82-103, DOI:10.1080/13657305.2015.994237.

Shepherd, G.S. (1962). Marketing farm products-economic analysis. 4th ed. Ames:Iowa State University press.

Singh, K., Dey, M.M., Laowapong, A., and Bastola, U. (2015). Price Transmission in Thai Aquaculture Product Markets: An Analysis along Value Chain and Across Species. Aquaculture Economics & Management 19: 51-81.

Singh, N.D. Krishnan, M., Sivaramane, N., Ramasubramanian, V., and Kiresur, V.R. (2022). Market integration and price transmission in Indian shrimp exports. Aquaculture, 561, 738687. https://doi.org/10.1016/j.aquaculture.2022.738687.

Stephens, P, Madziak, V., Gerhardt, A., Cantafio, J. (2025). Exploring price changes in local food systems compared to mainstream grocery retail in Canada during an era of 'greedflation'. Food Policy, 130, 102773. https://doi.org/10.1016/j.foodpol.2024.102773.

Sun, Q., Gao, X., Wen, S., Chen, Z., and Xiaoqing Hao, X. (2018). The transmission of fluctuation among price indices based on Granger causality network. Physica A: Statistical Mechanics and its Applications, 506: 36-49. https://doi.org/10.1016/j.physa.2018.04.055.

Thomsen, F.L. (1951). *Agricultural marketing*. New York: Mc Graw-Hill.

Tiffin, R. and Dawson, P.J. (2000). Structural breaks, cointegration and the farm-retail price spread for lamb. Applied Economics 32: 1281-1286.

Tweeten, L.G. and Quance, C.L. (1969). Positivistic measures of aggregate supply elasticities: some new approaches. American Journal of Agricultural Economics 51: 342-352.

Ward, W.R. (1982). Asymmetry in retail, wholesale and shipping price point pricing for fresh vegetables. American Journal of Agricultural Economics 64: 205-212.

Wohlgenant, M.K. (1989). Demand for farm output in a complete system of demand functions. Am J Agric Econ 71: 241-252.

Wolffram, R. (1971). Positivistic measures of aggregate supply elasticities: some new approaches – some critical notes. American Journal of Agricultural Economics 53:356-359.

Worth, T. (1999). *The F.o.b.-Retail Price Relationship for Selected Fresh Vegetables*. Economic Research Service/USDA - Vegetables and Specialties.

Wright, B.D. and Williams, J.C. (1982). The economic role of commodity storage. Economics Journal 92: 596-614.

Zhou, X., Zheng, S., Zhang, H., Liu, Q., Xing, W., Li, X., Ham, Y., and Zhao, P. (2022). Risk Transmission of Trade Price Fluctuations from a Nickel Chain Perspective: Based on Systematic Risk Entropy and Granger Causality Networks. *Entropy*, *24*(9), 1221. https://doi.org/10.3390/e24091221