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From Market Concentration to Market Diversification: WTO and the Marine Products Exports from Kerala- Using ARIMA Method

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Abstract

Marine product export does something pivotal in the fish export economy of Kerala. The post WTO period has witnessed a strengthening of food safety and quality standards applied on food products in the developed countries. In the case of the primary importers, like the EU, the US and Japan, market actions will have far reaching reverberations and implications for the marine product exports from developing nations. The article focuses on Kerala's marine product exports that had been targeting the markets of the EU, the US and Japan, and the concomitant shift in markets owing to the stringent stipulations under the WTO regime. Despite the overwhelming importance of the EU in the marine product exports of the state, the pronounced influence of irregular components on the quantity and value of marine product exports to the EU in the post WTO period raises concern. However, the tendencies of market diversification validated by the forecast generated for the emerging markets of the SEA, the MEA and others, to an extent, allay the pressures on the marine product export sector of the state which had hitherto relied heavily on the markets of the EU, the US and Japan.

Keywords: marine products, WTO, market concentration, ARIMA, market diversification

1. Introduction

Marine product export sector has, for a very long time, played a major role in the fish economy of Kerala. Kerala accounts for 16 percent marine product exports in terms of quantity and 17 percent in terms of value, and thereby serving the major markets for fish and fishery products of the European Union (the EU), Japan and the United States (the US). In the mid 1980s, the combined share of these markets in the marine product exports of the state accounted for 91 percent and 87 percent in terms of quantity and value respectively. Though the combined shares of these markets fell to 83 percent in terms of quantity at the start of the WTO period, their market shares in terms of value remained intact.

The developing countries have emerged as the net exporters of fish and fishery products since 1970s. About 75 percent of the fish and fishery product exports, in terms of value, from developing nations are directed to the developed countries (FAO, 2010). Considering the credence nature of the fish products, the EU, the US and Japan have strengthened the food safety standards and quality regulations to ensure the quality of the imported products. With the establishment of the WTO, there has been a lowering of tariff barriers on imports accompanied by a rise in non tariff measures imposed by the developed countries on the imported food products, especially fish and fishery products. The measures applied by the developed countries on the imports of fish and fishery products from developing countries are in the form of quality and safety standards, labeling and packaging, other technical requirements, countervailing and anti-dumping duties etc.

2. Materials and Methods

The concerns of the developing countries, in the wake of the implementation of the SPS standards and its potentiality to become non-tariff measures to limit trade, have been well documented via the seminal works of Henson and Loader (2001); Jha (2002); Athukorala and Jayasuriya (2003). In the context of trade limiting factors in the import markets, developing nations are persistently striving to mitigate volatilities in export earnings to go for market diversification to lend stability to their export performance (Prebisch, 1950; Singer, 1950) The article scrutinizes the impact of the strengthening of standards in the EU, the US and Japan on the marine product exports from Kerala in the post WTO phase vis-à-vis the pre WTO period with the help of export statistics available from the Marine Product Development Authority (MPEDA). The models of best fit generated using time series modeler describe the influence of various components of the time series on the quantity and value of marine product exports from the state to various markets in the pre and the post WTO periods (see Table 1). A forecast of the quantity and value of marine product exports from the state to these markets for the period 2010-14 is made.

3. Results and Discussions

The individual shares of the major markets in the marine product exports of Kerala underwent changes in the time period from 1995-96 to 2009-10. The EU retained its dominant share in the marine product exports of Kerala in terms of quantity and value over this period. But the respective shares of the US and Japan in the marine product exports of Kerala in terms of quantity fell from 17 to 12 percent in 1995-96 and from 6 to 5 percent in 2009-10. A similar drop in the respective shares of the US and Japan in the marine product exports of Kerala in terms of value ensued during this period.

The best fit models identified facilitates a pre and post comparison of the quantity and value of marine product exports from Kerala to the EU, the US and Japan. In the post-WTO phase, the quantity and value of marine product exports from Kerala to the EU illustrate an increase, except for the year 1997-98 when a ban was imposed by the EU on the marine product exports from India owing to quality issues (see Table 2). Despite the increase observed for the EU, it is not possible to overlook the influences of the random error terms on the quantity and value of marine product exports in the post WTO period unlike the pre-WTO period when the seasonal factors had an upper hand. The marked influence of random shocks on the marine product exports to the EU can be attributed to the issues of rejections and detentions faced by the exporters of the state in that market. The influence of random error terms on the quantity of marine product exports to the US in the pre-WTO period produced a lasting impact as the quantity of exports to this market began to decline in the subsequent phase (see Table 2). In the post-WTO phase, the exports to the US began to decline, both in terms of quantity and value since 2004, owing to certain factors such as the imposition of anti-dumping duties and enhanced bonding requirements on shrimps from developing nations including India. In the post-WTO period, while the quantity of marine product exports to the US is influenced by level and seasonality, the value of marine product exports is subject to the lone influence of the level of the series. The signs of decline became visible in the Japanese market since the late 1980s itself. This tendency accentuated in the post-WTO phase as the compound annual growth rate of marine product exports recorded for Japan in terms of quantity and value turned negative (see Table 2). The quantity of marine product exports to Japan in the pre and the post WTO periods are influenced by the level of the series. In fact, the mean quantity of exports from the state to Japan is lower in the post-WTO period vis-à-vis the pre-WTO period. The value of marine product exports from Kerala to Japan in both these phases is subject to the pressures of irregular variations. This is hardly a surprise for a market showing signs of deceleration.

The estimates of the model parameters, as given in Table 3, have enabled to forecast the quantity and value of marine product exports from Kerala to the EU, the US and Japan for the period 2010-11 to 2013-14. Forecast statistics suggests that the EU continues to hold sway in the marine product exports of Kerala. The quantity of marine product exports to the EU peaks during the II and III quarters of every year

coinciding with the active phase in the marine sector of the state. The same pattern is also visible in terms of value to the EU markets (See Table 4). But the forecast offers a bleak picture for the US and Japan, especially in terms of quantity. The quantity of marine product exports from Kerala to both these markets is meager even during the peak phases of activity in the marine sector (see Table 3). This reveals that these markets have lost sheen of late. The value of exports forecast for the US and Japan, though lower than the forecast figures for the EU and other emerging markets as given in Table 4, still fares better due to comparatively higher unit value realized in these markets.

3.1 Shifts to New Markets

The marine product exports from the state are increasingly moving to the so called non-traditional markets, especially the markets of the South East Asia (SEA), the Middle East Asia (MEA) and 'Others' that consist mainly of China, Turkey, and Tunisia etc. In 1990-91, the combined share of these markets in the marine product exports of the state was 8 percent in terms of quantity and 4 percent in terms of value. Recent trends show a higher market share of 38 percent in terms of quantity fetching a value of 28 percent. Table 5 shows the model parameters and significance levels that explain the pattern of flow of marine products from the state to these markets in the pre and the post-WTO periods. The volume of exports moving to these markets was quite insignificant in the pre-WTO phase. The influence of irregular components on the quantity of marine product exports to these markets was so pronounced in the pre-WTO period. The value of marine product exports to various markets were subject to varied influences. While the value of exports to the SEA and 'Others' came under the influence of seasonal and irregular components respectively, those to the MEA were subject to a negative influence of autoregressive elements. The quantity and value of marine product exports to these markets increased in the post WTO phase. The SEA offers bright prospects for marine product exports in quantity terms as it is influenced by seasonal factors. This suggests that the bulk of our marine product exports move to this market in the peak seasons, reflecting the importance of this market. This is validated by the forecast for the SEA (see Table 6). However, the value of marine product exports is subject to the influence of random error terms suggesting the influence of factors other than availability of raw materials on the series (see Table 7).

The MEA, as a market for the marine products of Kerala, grew principally in terms of quantity. The quantity of marine product exports to the MEA in the post-WTO period is influenced by the level of the series. In fact, the mean quantity of marine product exports to the MEA is higher in the post rather than the pre-WTO period. But the value of marine product exports to this market continues to be under the adverse influence of autoregressive elements (see Table 6 and 7). Though the market segment 'Others' has assumed significance in quantity terms and the series in the post-WTO phase is influenced by level, trend and season, the forecast predicts a declining trend for this market. Nevertheless, the value of exports to this market is influenced by the level of the series which is higher for the post-WTO period vis-à-vis pre-WTO period. This is indeed a welcome signal as this market segment is getting transformed from being a market for low end value product to high value added products.

4. Conclusion

The empirical estimates and its forecasts, based on export data pertaining to the marine products export from Kerala for the period 2010-11 to 2013-14, present a very bleak picture in as much as the traditionally strong market base of the US and Japan has eroded considerably in the post-WTO phase. Though the EU holds a considerable sway over the marine product export basket of the state, it is not possible to overlook the influences exerted by the irregular components on the quantity and value of exports. However, the forecast generated from the model estimates gives a promising estimate for the markets of the SEA, the MEA and 'Others'. The market segment 'Others' is a market to reckon as it offers bright prospects for the marine products of Kerala, especially in value terms. It is also worth mentioning here that these new markets have acted as shock absorbers for the marine product exports of the state in the events of crisis in

the traditional markets. This is testified by the fact that the quantity and value of marine products to these markets shot up in 1997 followed by the ban in the EU. Further, the importance of these markets has grown tremendously since 2004 when the marine product exports from the state started facing problems in the US and Japan. With these empirical justifications, it is possible to hypothesize that the marine product exports from Kerala in the post-WTO period have witnessed a shift from market concentration to market diversification.

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Note: Lakh = 0.1 million

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Table 1 Models of Best Fit for the markets–Pre and Post WTO Periods

The EU	**Pre WTO Period**	**Post WTO Period**
Quantity in tonnes	ARIMA (0,1,0) (0,0,0)	ARIMA(0,1,1)(0,1,1)
Value in Rs (Lakhs)	Winters' additive	ARIMA(0,0,0)(0,1,1)
The US		
Quantity in tonnes	Winters' additive	Simple seasonal
Value in Rs (Lakhs)	Winters' additive	Simple
Japan		
Quantity in tonnes	Simple seasonal	Simple seasonal
Value in Rs (Lakhs)	ARIMA(0,0,0)(0,0,0)	ARIMA(0,0,0)(0,1,1)

Table 2 Model Estimates and Significance of Market wise Exports of Marine Products from Kerala-Pre and Post-WTO Periods

	Best Fitting Models	Model Parameters	Estimate	t value	Level of significance
Exports to the EU (Quantity) in the Pre WTO Phase	ARIMA (0,1,0) (0,0,0)	Fails to yield a parameter	-	-	-
Exports to the EU (Quantity) in the Post WTO Phase	ARIMA(0,1,1)(0,1,1)	Non seasonal MA (1)	0.704	6.219	.000
		Seasonal MA(1)	0.712	5.316	.000
Exports to the EU (Value) in the Pre WTO Phase	Winters Additive	Level	4.26E-06	2.86E-05	1.000
		Trend	0	1.51E-07	1.000
		Season	1	3.511	0.002
Exports to the EU (Value) in the Post WTO Phase	ARIMA(0,0,0)(0,1,1)	Constant	1539.498	9.238	.000
		Seasonal MA(1)	0.671	5.286	.000
Exports to the US (Quantity) in the Pre WTO Phase	Winters' Additive	Level	0.09	0.934	0.358
		Trend	2.09E-06	0	1.000
		Season	9.88E-05	0.001	0.999
Exports to the US (Quantity) in the Post WTO Phase	Simple seasonal	Level	0.279	3.02	0.004
		Season	0.507	3.575	0.001
Exports to the US (Value) in the Pre WTO Phase	Winters' Additive	Level	0.409	2.256	0.032
		Trend	0.26	0.929	0.361
		season	0.001	0.009	0.993
Exports to the US (Value) in the Post WTO Phase	Simple	Level	0.291	3.202	0.002
Exports to Japan (Quantity) in the Pre WTO Period	Simple seasonal	Level	0.3	2.008	0.054
		Season	1.61E-05	0	1.000
Exports to Japan (Quantity) in the Post WTO Period	Simple seasonal	Level	0.3	3.285	0.002
		Season	5.94E-07	5.33E-06	1.000
Exports to Japan (Value) in the Pre WTO Period	ARIMA(0,0,0)(0,0,0)	Constant	7.785	133.749	.000
Exports to Japan (Value) in the Post WTO Period	ARIMA(0,0,0)(0,1,1)	Seasonal MA (1)	0.754	5.908	.000

Source: Computed from MPEDA Data, 1988- 2010

Table 3 Forecasts of the Marine Product Exports to the EU, the US and Japan

(Quantity in tonnes)

Period	**2010-11**		**2011-12**	**2012-13**	**2013-14**
The EU	**Predicted Values**	**Actual Values***			
Q1	12004	9582	12447	12891	13335
Q2	16205	16403	16649	17093	17536
Q3	15637	18061	16081	16525	16968
Q4	12130	12955	12574	13017	13461
The US					
Q1	1417	1497	1417	1417	1417
Q2	2113	1822	2113	2113	2113
Q3	1925	2095	1925	1925	1925
Q4	1462	2127	1462	1462	1462
Japan					
Q1	1457	1245	1457	1457	1457
Q2	1597	2008	1597	1597	1597
Q3	955	1424	955	955	955
Q4	1639	1749	1639	1639	1639

Source: Computed from Table 2, MPEDA Data, 2011

Table 4 Forecast Values of Exports to the EU, the US and Japan

(Value in Rs Lakhs)

Period	**2010-11**		**2011-12**	**2012-13**	**2013-14**
The EU	**Predicted values**	**Actual values***			
Q1	21570.28	17619.76	23109.78	24649.28	26188.78
Q2	28568.44	30730.07	30107.94	31647.44	33186.94
Q3	27299.35	32355.54	28838.85	30378.35	31917.85
Q4	22077.3	24844.14	23616.8	25156.3	26695.8
The US					
Q1	3710.63	3198.78	3710.63	3710.63	3710.63
Q2	3710.63	3870.21	3710.63	3710.63	3710.63
Q3	3710.63	4006.19	3710.63	3710.63	3710.63
Q4	3710.63	4954.19	3710.63	3710.63	3710.63
Japan					
Q1	3908.66	3146.79	3908.66	3908.66	3908.66
Q2	4340.26	5697.92	4340.26	4340.26	4340.26
Q3	3081.68	4190.82	3081.68	3081.68	3081.68
Q4	4257.24	4744.15	4257.24	4257.24	4257.24

Source: Computed from Table 2, MPEDA Data, 2011

Table 5 Model estimates of Marine Products from Kerala to New Markets-Pre and Post -WTO Periods

	Best Fitting Models	**Model Parameters**	**Estimate**	**t value**	**Level of significance**
Exports to the SEA (Quantity) in the Pre WTO Phase	ARIMA(0,1,0)(0,1,0)	Constant	0.974	0.52	0.608
Exports to the SEA (Quantity) in the Post WTO Period	Simple seasonal	Level	0.085	1.114	0.27
		Season	0.433	3.477	0.001
Exports to the SEA (Value) in the Pre WTO Phase	Winters Additive	Level	0.135	1.032	0.311
		Trend	1	0.717	0.479
		Season	1	1.82	0.079
Exports to the SEA (Value) in the Post WTO Period	ARIMA(0,0,0) (0,1,1)	Seasonal MA (1)	0.475	3.398	0.001
Exports to the MEA (Quantity) in the Pre WTO Phase	ARIMA(0,0,0)(0,1,0)	Constant	42.269	2.819	0.009
Exports to the MEA (Quantity) in the Post WTO Phase	Simple	Level	0.88	6.866	.000
Exports to the MEA (Value) in the Pre WTO Phase	ARIMA(2,1,0)(0,1,0)	AR(1)	-0.568	2.829	0.01
		AR(2)	-0.465	2.412	0.025
Exports to the MEA (Value) in the Post WTO Period	ARIMA (0, 0, 1) (1, 1, 0)	Constant	0.148	2.956	0.005
		Non seasonal MA(1)	-0.384	-3.015	0.004
		Seasonal AR (1)	-0.656	-6.41	.000
Exports to 'Others' (Quantity) in the Pre WTO Period	ARIMA(0,0,0)(1,0,0)	constant	5.72	24.96	.000
		Seasonal AR (1)	0.553	3.285	0.003
Exports to 'Others'(Quantity) in the Post WTO Period	Winters' multiplicative	Level	0.566	6.749	.000
		Trend	0.376	2.396	0.02
		Season	0.701	3.733	.000
Exports to 'Others' (Value) in the Pre WTO Period	ARIMA(0,0,0)(0,1,1)	Constant	0.208	3.44	0.002
		Seasonal MA(1)	0.556	2.386	0.025
Exports to 'Others' (Value) in the Post WTO Period	Simple seasonal	Level	0.7	5.631	.000
		Season	1.27E-005. 701	8.24E-05	1.000

Source: Computed from MPEDA Data, 1988-2010

Table 6 Forecast generated for Marine Product Exports to the SEA, the MEA and 'Others'

(Quantity in tonnes)

Period	**2010-11**		**2011-12**	**2012-13**	**2013-14**
The SEA	**Predicted values**	**Actual values***			
Q1	1969	3991	1969	1969	1969
Q2	5276	5328	5276	5276	5276
Q3	6071	10581	6071	6071	6071
Q4	2012	5791	2012	2012	2012
The MEA					
Q1	1981	1061	1981	1981	1981
Q2	1981	1986	1981	1981	1981
Q3	1981	1581	1981	1981	1981
Q4	1981	1901	1981	1981	1981
'Others'					
Q1	3445	2872	3041	2636	2231
Q2	3681	4296	3236	2790	2345
Q3	5049	10109	4419	3789	3159
Q4	3042	4151	2650	2258	1867

Source**:** Computed from Table 5, MPEDA Data, 2011

Table 7 Forecast Figures of Marine Product Exports to the SEA, the MEA and 'Others'

(Value in Rs. Lakhs)

Period	**2010-11**		**2011-12**	**2012-13**	**2013-14**
The SEA	**Predicted values**	**Actual values***			
Q1	1761.16	3349.69	1761.16	1761.16	1761.16
Q2	4356.31	5179.45	4356.31	4356.31	4356.31
Q3	4806.61	9051.54	4806.61	4806.61	4806.61
Q4	1760.11	3947.29	1760.11	1760.11	1760.11
The MEA					
Q1	2328.16	1556.96	2696.53	3334.91	3932.96
Q2	3064.91	2613.23	3495.32	4361.9	5111.29
Q3	2576.55	1722.22	3179.25	3767.61	4567.18
Q4	2598.02	2181.48	2906.91	3673.27	4269.17
'Others'					
Q1	5243.8	5240.41	5243.8	5243.8	5243.8
Q2	6228.4	7399.05	6228.4	6228.4	6228.4
Q3	7116.6	12925.48	7116.6	7116.6	7116.6
Q4	5502.5	5685.14	5502.5	5502.5	5502.5

Source: Computed from Table 5, MPEDA Data, 2011