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PROSPECTS OF COTTON YARN EXPORT FROM PAKISTAN UP TO THE YEAR 2010

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Enhancement of exports from Pakistan is highly essential for its economic growth. Present study is an attempt leading to empirical modeling and forecasting of cotton yarn export from Pakistan to assess its future prospects up to the year 2010. The data used in this study were collected from secondary sources such as Pakistan Central Cotton Committee, Export Promotion Bureau, All Pakistan Textile Mills Association, etc. Autoregressive Integrated Moving Average (ARIMA) model was applied on the collected data. Various diagnostic checks were carried out for analysis of data which showed that ARIMA 1,2,1 is an appropriate model for time series data of cotton yarn export from the year 1971 to 1995. The forecasts exhibited that up to the year 2010 there will be a significant improvement in the exports of cotton yarn.

Key words: ARIMA model, cotton yarn, export from Pakistan, to year 2010

INTRODUCTION

Regardless of the nature of economy, agriculture sector assumes a pivotal role in economic development of countries like Pakistan. Modern agriculture has always been a means to provide the foundations for a self-sustaining industrial economy. In Pakistan, the share of agricultural products is about 74 % in foreign exchange earnings (Annual Report, 1996-97). Cotton sector has been the main foreign exchange earner of the country. The share of cotton sector in foreign exchange earned by Pakistan was 64.35 % for the year 1996-97 (Anonymous, 1996-97).

Cotton sector consists of raw cotton, cotton yarn, cotton cloth and made-ups, Pakistan has for a long time been the 1st largest exporter and 4th largest producer of cotton yarn in the world. Cotton yarn contributed 18.8 % of the total foreign exchange earnings of the country in 1994-95 against 19.3 %, 17.1%, 16.5%, and 18.2 % during 1990-91, 1991-92, 1992-93 and 1993-94 respectively (ICAC, 1994-95). Cotton yarn exports have continued to grow in terms of quantity but have registered negative growth in terms of quality and value. With the emergence of the trading system under the auspices of the newly established World Trade Organization, competitiveness of Pakistan exports like cotton yarn and textile products has assumed special significance. Improvement in the future export potential must be sought out. Keeping in view the importance of cotton yarn in foreign exchange earnings of the country, present study was conducted to forecast the cotton yarn export up to the year 2010.

METHODOLOGY

The study was based on time series data related to export of cotton yarn (1947-48 to 1971-72), which were collected from the agencies like Pakistan Central Cotton Committee, Export Promotion Bureau, All Pakistan Textile Mills Association, etc. The data thus collected were thoroughly edited and discrepancies found were removed before their use to make forecasts for the export of cotton yarn.

Forecasts can be obtained by various methods such as purely, judgmental approaches, structural econometric models, univariate time series models and multivariate time series models. Many researchers have applied various models in combination (Bessler and Chamberlain, 1989; Olorunnipa, 1989 and Rosa, 1990). Univariate time series methods are often cheaper than causal models and may be used where causal models are inappropriate due to lack of data or incomplete knowledge regarding the causal structure. From the class of univariate time series models we have made a choice of autoregressive integrated moving average (ARIMA) model for making cotton yarn export forecasts. ARIMA models are marginally superior to conventional econometric forecasting models (Miller, 1985) and (Albiac, 1989).

The acronym" ARIMA stands for 'Auto Regressive Integrated Moving Average' model showing a combination of auto-regressive and moving averages model. Lags of the differenced series appearing in the forecasting equation are called 'auto-regressive' terms. Lags of the forecast errors are called 'moving averages' and a time series which needs to be differenced is said to be an integrated version of

stationary series. The autoregressive (AR) ,rrodet$, were first introduced by Yule (1926) andlSter. generalized by Walker (1931). The moving average (MA) models were first introduced by Slutzky (1937) and Wold (1938) provided the theoretical foundations to a combined ARIMA process. The basis of ARIMA app-roach of Box-Jenkins consisted of three phases namely identification (specification), , estimation, testing and application (forecasting). This method has been used extensively in economic research (Zhang, 1990 and Muhammad *et st.,* 1992). ARIMA model explains the movement of a time series (Zt). Unlike the regression model, here a set of explanatory variables are not required. Instead Zt is related to its past values and toa weighted *average* of current and lagged random disturbances (Muhammad *et et.,* 1992). According to Box-Jenkins (1976), the ARIMA model is denoted by AR/MA (p,d,q),, where 'p' is the order of the autoregressive process, 'd' is the order of homogeneity i.e. the number of differences to make the series stationary and 'q' is the order of the moving *average* process.

The general form of the ARIMA (p,d.q) is

$$t,dZt = C + (0, t,^{d} Z_{,_} + \ldots\ldots + 0_p t,^{d} Z_{,_p}) - 0, a_{,_} + \ldots\ldots + 0_q 3'\text{-}11 + a,$$

Here 'C' is a constant, $t.$ is a difference operator such that $t.Z, = Z, - Z_{,_}$,

$t.^2$ Ztl = $t.Z, - t.Z_{,_}$ and so on $Z_{,_}$," ..... , Z'-Dare past series values (lags)

The eis. are the coefficients, similar to regression coefficients, to be estimated of theautoregressive model, where autoregressive (AR) model of order 'P' denoted by AR (P) is

$$Z_t = C + \varnothing_1 Z_{t-1} + \varnothing_2 Z_{t-2} + \ldots\ldots + \varnothing_p Z_{t-p}) + a_t$$

a, is a random variable with zero mean and constant variance

<Di'sare the coefficients in the the moving average (MA) model, where moving average model of order q or MA (q) is

$$Z_t = a_t - \Phi_1 a_{t-1} - \Phi_2 a_{t-2} - \ldots\ldots\ldots - \Phi_q a_{t-1}$$

For the specification and estimation of model,, edited time series data were introduced in computer by using the "MINITAB" package. The results thus obtained were put to various diagnostic checks like Residual analysis, Normality tests and Goodness of fit. Forecasts for 15 years ahead (i.e. up to 2010) were worked out.

To make the projections more precise and realistic, certain assumptions were made as under:

1) Absence of exogenous disturbances such as war, social upheavals and abnormal climatic conditions.
2) The relative price structure and policies regarding cotton yarn and other cotton products will remain unchanged during the projected period.
3) The projections will take into account those measures which have already been decided upon under the cotton and textile policy.
4) The cost of production and the price of output will generally remain the same as in the recent past.
5) Finally, the consumer preference will remain the same.

RESULTS AND DISCUSSION

Step 1. Model Specification: The model specification was automatically made by 'MINITAB' package. Parameters p,d.q were determined and ARIMA (1,2,1) was considered an appropriate model.

Step 2. Model Estimation: The brief output of the estimation is as under:

Final Estimates of Parameters

Type	Estimate	St. Dev.	t-ratio
AR 1	-0.1116	0.2277	-0.49
MA 1	0.8990	0.1029	'8.74

Differencing : 2 regular differences
No. of Obs. : Original series 25, after differencing 23
Residuals : SS = 58606989312 (backforecasts excluded)
MS '= 2790809088 DF = 21
Modified Box-Pierce chisquare statistic

Lag	12	24	36	48
Chisquare	9.9(DF=10)*	(DF=*)*	(DF=*)*([F=*)	

Step 3. Diagnostic Checking: Different diagnostic checks were applied on the estimated model. Time series plot of residuals of the estimated model did not show any trend, which was an evidence of the fact that model was fitted properly. In order to find the fitness of model, two normality tests i,e. normality test 1 and normality test 2 were carried out. In normality test 1 normal scores of residuals when plotted vs residuals, gave almost a straight line which

Table 1. Forecasts for cotton yarn export upto 2010-11

Years	Forecast (kg)	Lower limit (kg)	Upper limit (kg)
1996-97	560368.5*	456804.5*	663932.5*
1997-98	582215.5	436528.9	727902.1
1998-99	604355.2	419952.4	788757.9
1999-2000	626462.3	405174.7	847749.8
2000-01	648573.0	~Q'Q33.6	906112.4
2001-02	670683.4	37699Q.6	964371.1
2002-03	692793.9	362758.1	1022830.0
2003-04	714904.4	348138.~	1081670.0
2004-05	737014.9	333022.9	1141007.0
2005-06	759125.5	317335.3	1200916.0
2006-07	781236.0	301026.6	1261445.0
2007-08	803346.5	284064.2	1322629.0
2008-09	825457.1	266426.8	1384487.0
2009-10	847567.6	248100.9	1447034.0
2010-11	869678.1	229078.6	1510278.0

* = 000 kg

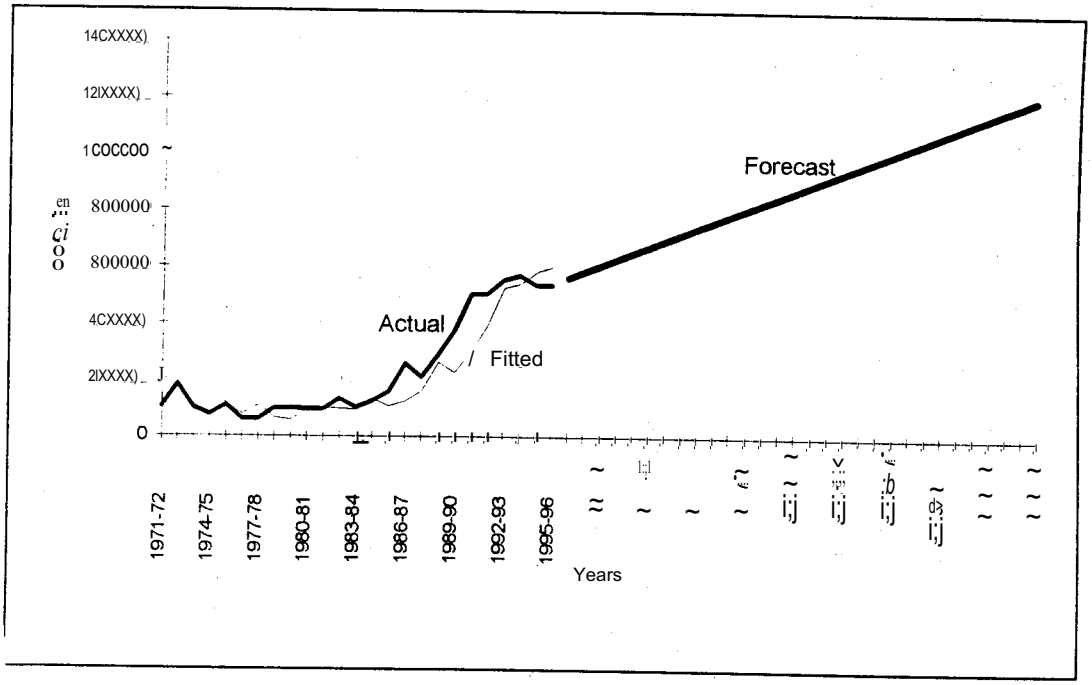

Fig. 1. Plot of actual fitted and forecast values of yarn export

was an indication of normality. In normality test 2, histogram of the residuals was determined that showed the results which were very close to normality. In addition, plot of residuals vs fitted values depicted that patterns of any kind were absent hence model was a good fit. The graph of the original and fitted values and forecasts of exports are given in Fig.1. It is apparent from the graph that the forecasts are acceptable, as observed and fitted values overlap to a greater extent.

The model ARIMA (1,2,1) was found appropriate for the data from 1971-72 to 1995-96. The 15 year ahead forecasts (up to 2010) and. their 95% confidence intervals given in Table 1 indicate that in

year 1996-97 cotton yarn export will be 560368.!)' thousand kg *with* a minimum export of 456~,5 thousand kg and maximum export of 663;,$3~;5 thousand kg. *In* year 2010-11 Cotton yarn ex~rtWill attain a *level* of 869678.1 thousand k,g'With a minimum limit of export up to 22907S.6ttl§Usand kg and maximum export of 1510278 thoQS'endkg.

Conclusions and Suggestions.; Future forecasts exhibited that up to the year 2010, there *will* be a significant *improvement* in the export of cotton yarn. These forecasts were based en-past data which were aHected by the situatio.ns *like* trade policy, agricultural policy,. 9Et.Rland of domestic textile industry, production, capacity of *textile* industry, and international market. *Following* steps should be helpful to enhance export of cotton yarn:

Export of Cotton Yarn

i) Uruguay round agreement on textile and clothing signed by Pakistanwill significantly affect Cotton export under *all* its head. Pakistan has to face *competition* from *developed* countries as well as *newly* industrialized economies in East Asia which as compared to Pakistan *have* better infrastructure facilities, technology, credit *facilities* and qualified manpower. In order to compare with these countries in the export of cotton yarn, all these requirements must be *fulfilled.*

ii) New world trade order is placing demand on *developing* Countries to satisfy requirements of international quality standards. Although its adoption is *voluntary, however,* number of countries like European Community are now making it mandatory for import of certain products. On the other hand, there is a general perception that Pakistani products are not of a high quality as compared to her competitors. Our yarn manufacturers and exporters should pay attention towards this crucial area of *competitive advantage,* so that they can fetch their share from the export market. For this purpose Pakistan quality control and standard association should be set up which may help to make Pakistan Cotton yarn standards parallel to international ones.

iii) Among other difficulties that exporters are facing, is a lack of national certification agency. Hence foreign companies are authorized to issue certificates, which increases the cost of products. There is need to establish national certification agency which certifies that products are of universal standards.

iv) Availability of adequate supply of export finance must be ensured. Export cells can be set up in commercial banks to cater the export finance needs of exporters.

v) There is a lack of trained manpower to enhance exports. Professionals must be appointed in the export promotion bureau and better training facility should be *provided* to those employed there.

vi) Exhibitions/fashion fairs must be organized both at home and abroad to introduce *developed* prOducts, to attract more buyers.

vii) Textile sect~r has immense importance as it provides major share of foreign eXChange earnings of the country. To *solve* all the problems and difficulties of the sector urgently and make policies to boost textile sector, establishment of a separate textile ministry is a dire need.

Production of Cotton Yarn: To enhance Cotton yarn export, the *level* of cotton yarn production should be such that after fUlfilling the domestic demand, enough exportable surplus is *available.*

Following measures may be adopted to increase Cotton yarn production:

i) The farmers and ginners need to be educated on quality *improvement,* grading, packing, labeling and storage functions of Cotton. It will *enable* spinners to produce Cotton yarn of higher Counts to fetch more foreign exchange.

ii) Free trade policy should be opted to ensure adequate supply of raw material to spinning sector.

iii) Liberal credit facility should be provided to the Cotton yarn manufacturers. *However,* mark up rate of loaning should be inversely related with the production of higher Counts of yarn.

iv) Replacement of outdated machinery with new modernized machinery is a dire need for production of high quality yarn. Special *incentives* should be *provided* to the manufacturers to attract *investment* in modern textile machinery. This will reduce cost of production of cotton yarn and will *provide* competitive *advantage* to exporters in the international markets.

v) To *improve* the skills of labour and management, training institutes must be established.

vi) Complicate taxation system should be simplified and import of *raw* material, components, parts, accessories and packing materials may be made easy.

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