Building An Optimal Trade Portfolio For Indian Spices Exports By Mean Variance Optimization

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ABSTRACT

An attempt is made in this paper to build an optimized trade portfolio for Indian spices sector in the context of the projection that India is going to be the world's processing hub of spices in the next ten years. The current Indian spices trade portfolio was constructed by estimating the weights of each of the fifteen spice items that constitute the trade portfolio and the trend of growth rates and instability indices for each of these items. The trend growth rates are considered as returns, and instability indices are considered as risks associated with each of the spice items in the trade portfolio. Using the mean variance optimization technique, a optimal portfolio that yields a 20% CAGR with minimum instability was obtained by utilizing the MATLAB program. The results indicate the need for reorganization of Indian spices trade portfolio in favour of value added items.

Keywords: Trade Portfolio, Portfolio Optimization, Trend Growth Rates, Instability Indices, Mean Variance Optimization, Value Added Spices, Efficient Frontier

JEL Classification : C13, C61, F14, G11

INTRODUCTION

Spices constitute an important group of agricultural commodities, which are used for flavouring and are the main ingredients for any appetizing dish. India is considered to be the home of spices, and its spice trade has a history that spans over 3500 years. Because of the varying agro climatic conditions, India produces a wide range of spices: Pepper, Chilies, Cardamom, Turmeric, Ginger, Garlic, Coriander, Cumin, Fennel, Fenugreek, Spice oils and Oleoresins, etc. India at present commands a formidable position in the world spice trade with a share of 48% in volume and 44% in value. India exports about 150 varieties of spices both in raw form and value added form to over 150 countries around the world, but 97% of the export revenue comes from about fifteen spice items. Mint products account for the bulk of spice exports from India, followed by Chilly, Spice Oils & Oleoresins and Pepper. The major importers of Indian spices are USA, EU, Japan, Malaysia, China, Pakistan, UAE, South Africa and Japan. Spices are an important component of agricultural exports from India. The share of spices in the export earnings of agricultural and allied products from India is about 8% (2007-08). Because of the strong domestic demand, India could export only 8 to 10 percent of its spices output, and the rest is accounted by domestic demand. In the year 2010-11, India exported 525,750 tons of spices, valued at ₹ 6840.71 crores (US $ 1502.85 Million) as against 502,750 tonnes valued at ₹ 5560.50 crores (US $ 1173.75 Million) in 2009-10. Given the comparative advantages that India enjoys in the spices trade, it is expected to emerge as the global processing hub of spices in the coming years.

According to the Spices Board, to achieve the status of the global processing hub of spices, the Indian spice trade should grow at a CAGR (Compound Annual Growth Rate) of 20% in the next 10 years compared to the present growth rate of about 14%. However, export instability is a major constraint for achieving this objective. Year to year fluctuations in Indian spices exports are adversely affecting both their production and policy making (Figure 1). Thus, achieving export stability is the key for rapid growth of Indian spices exports.In this context, the present paper attempts to build an optimum trade portfolio for the Indian spice trade, which could ensure a CAGR of 20% with minimum export instability. This optimum trade portfolio is being constructed by using the Markowitz's Mean Variance Optimization Model.

STATEMENT OF THE RESEARCH PROBLEM

India was the leading producer, consumer and exporter of spices in the world. Indian spice trade is currently growing at a CAGR of 14% by value. To achieve the status of India being the global processing hub of spices, a CAGR of about

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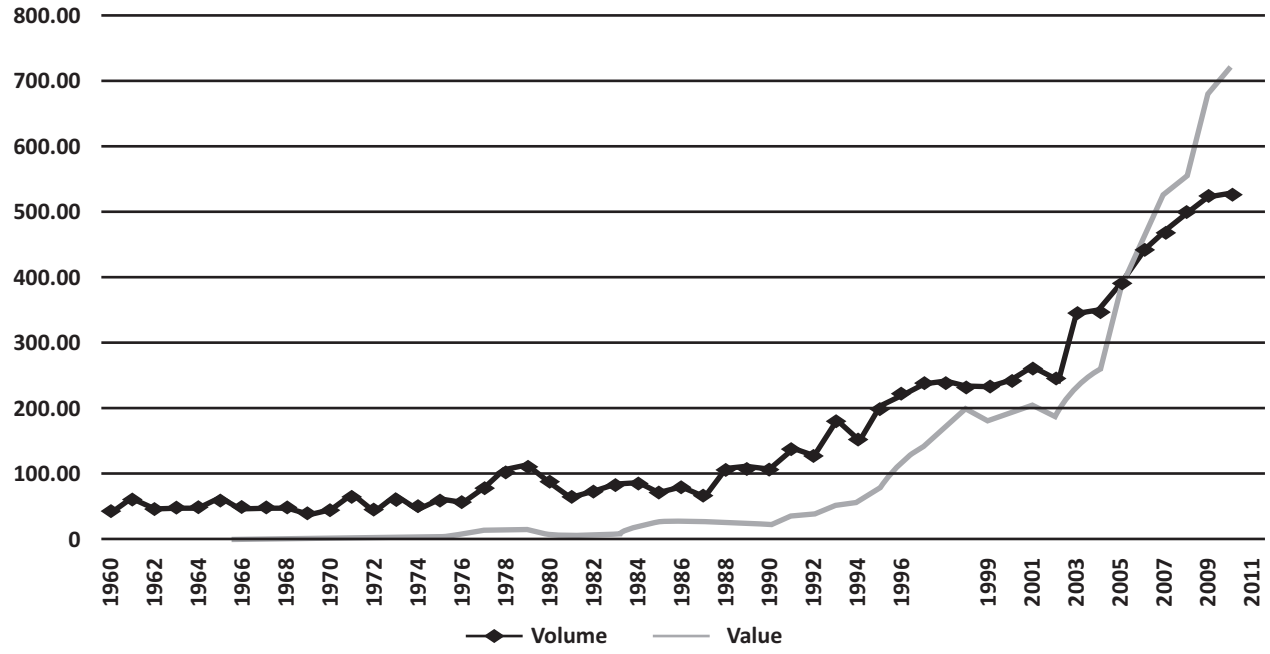
20% in export revenue is required in the next ten years. The major problem for achieving this is the instability in the export revenue. However, by nature, export instability cannot be eliminated totally, but can be minimized. Thus, achieving the required export growth rate with minimum instability is necessary for India to realize its dream of becoming the global processing hub of spices. In this context, the present paper aims to build an optimum spice trade portfolio for Indian spices, which can theoretically ensure the needed 20% growth rate with minimum export instability.

Figure 1 : Trends In Indian Spices Exports By Value (1960-2010)



Source: Spices Statistics, Spices Board India, Government of India.

REVIEW OF LITERATURE

Modern Portfolio Theory (MPT) was first developed in the 1950s and since then, there has been a vast amount of theoretical and empirical literature available in this area. The seminal contribution to this area was made by Markowitz (1952, 1959), whose Mean Variance Optimization Theory proposed a tradeoff between portfolio return and risk, and became the standard model for subsequent developments in portfolio optimization. Tobin (1958) developed the necessary conditions for mean variance optimization using utility theory. Alternative theories for portfolio optimization were proposed by Hakkanson (1970), Lichtenberger (1976), and Lee (1977). Unlike the single period problem addressed by Markowitz, more realistic multiperiod models of optimization were proposed by Mossin (1964), Fama (1970) and Merton (1990). These models are extensions of mean variance optimization for multiple periods under different assumptions. Another related strand of research is the development of index models that were used to estimate covariance matrix, which originated with the wok of Sharpe (1967).

The reformulated multi index models were analyzed by Ross (1978) and Ingersoll (1987). Practical portfolio optimization techniques were developed by Elton and Gruber (1976, 1978, 1992, and 1995). Modern Portfolio Theory found a number of applications in the areas of asset allocation, portfolio management and portfolio construction. There are a number of studies on portfolio optimization with reference to India. Barua and Varma (1991) examined the performance of Master share, the equity fund of UTI using MPT and they reported mediocre performance of the equity fund from the investors' perspective. Singh (2004) estimated the Intertemporal Optimization Model for balance of trade in India for the period from 1951-96. Estimation results of the model suggested the need for further trade liberalization. Rao and Venugopal (2004) utilized the dynamic portfolio selection model considering both equity and debt securities to enable switching from debt to equity during bull phase and vice versa of BSE Sensex stock data. It is

observed that at medium and high levels of risk, a substantial appreciation is obtained over the period when the market index showed a marginal increase. Goel and Kumar (2006) discussed a class of risk sensitive portfolio problems in the finite horizon with reference to spot interest rates. Gupta, Mehlawat and Saxena (2007) applied Multi Criteria Decision Making via Fuzzy Logic to develop a comprehensive model for asset portfolio optimization.

Gupta and Basu (2009) studied the nature of diversification of investment portfolios across industries and sectors in India in the post liberalization period. Suganya and Pai (2010) proposed a network strategy to achieve multi objective portfolio optimization. Sen (2010) built an optimal portfolio from all 100 scrips of S&P CNX 100 using Sharpe's Single Index model. Mishra (2011) studied optimal return for a loan portfolio for selected Indian commercial banks using the Genetic Algorithm. Mishra, Subramanyam and Vyas (2011) used Black-Litterman Approach to overcome the sensitiveness of mean variance optimization technique to variations in inputs. The study considered the BSE Sensex to test the two approaches and found that Black-Litterman method is superior to the mean variance optimization method.

OBJECTIVES OF THE STUDY

The basic objectives of the study are:

1) To build a spice trade portfolio for India that can ensure a 20% CAGR with minimum instability.

2) To estimate the trend growth rates and instability indices of various spices items that constitute the Indian spice trade portfolio.

3) To identify the basic strategy to be pursued by the Indian spices sector in the coming years.

LIMITATIONS OF THE STUDY

1)The estimated trend growth rates and instability indices for various spice items are based on time series data. As such, they may be affected by extreme values.

2) The mean variance optimization model being estimated is sensitive to variations in input values.

3) It is assumed that the current trends in international trade of Indian spices will continue in the future.

THE PORTFOLIO OPTIMIZATION PROBLEM

A portfolio is a bundle of individual assets or securities. The two main characteristics of a portfolio are the expected return (mean), and the risk measured by the variance (or the standard deviation). The behaviour of a portfolio can be quite different from the behaviour of its constituent components. This observation is the basis for portfolio theory, which says that although the expected return of the investment portfolio is simply a weighted average of expected returns of the individual investments that goes to make up the portfolio; the risk of the portfolio is less than the weighted average risk of the individual constituent investments - i.e. diversification reduces the risk. Thus, portfolio diversification can reduce portfolio risk without a consequent reduction in expected return. This is called the risk-reduction effect of portfolio diversification as proposed by Markowitz. According to him, for a well-diversified portfolio, the risk or average deviation from the mean of each asset contributes little to portfolio risk. Instead, it is the difference or covariance of individual asset's levels of risk that determines the overall portfolio risk. As a result, investors benefit from holding diversified portfolios instead of individual stocks. The best level of portfolio diversification can be theoretically determined by the point of tangency between the efficient frontier and the expected return line.

THE PORTFOLIO OPTIMIZATION PROBLEM IN THE CONTEXT OF EXPORT DIVERSIFICATION OF INDIAN SPICES

The portfolio diversification problem as discussed above can be applied to the Indian Spice Trade Portfolio. India exports about 50 varieties of spices in the whole form and 110 varieties in the value-added form. However, 97 percent of the export revenue is received from just 15 spice items. This group of 15 major Indian spices is considered here as the Indian spice trade portfolio. Here, return and risk of the portfolio are considered as growth and instability respectively in spices export earnings. Export diversification can minimize the instability for a given level of growth.

Thus, export diversification of spices in the context of portfolio variance refers to reducing the instability of export earnings of spices, brought upon by varying the relative export shares of different spice commodities in the spice trade portfolio. The spice trade portfolio variance can therefore be written as:

$$V = \sum_{i=1}^{15} W^2 Var(X_i) + \sum_{i=1}^{15} \sum_{j=1,\ j\neq i}^{15} W_i W_j\ Cov(X_i X_j) \quad \text{------ (1)}$$

Where, Wi is the export share of spice 'i ', Var(Xi) is the variance of export earnings for spice ' i ' , Cov (X_i, X_j) represents the covariance in export earnings from commodities i and j and the sum of Wi equals to 1, and all Wi are non-negative. The first term in equation (1) is the non-diversifiable risk and the second term is the diversifiable risk. Covariances are fundamental for export diversification strategies that are aimed at hedging against lowering export earnings instability. If export earnings from commodity 'i' and 'j' are negatively correlated, this covariance lowers the overall variance of export portfolio.

The portfolio variance approach to export diversification is implicitly based on the objective function of a risk averse policymaker, whose sole objective is to minimize the instability of export earnings subject to a given rate of growth in export earnings. The objective function of a risk averse policymaker aimed at export diversification of Indian spices can be written as follows:

$$E(X^A) = E\sum_{i=1}^{15} Wi\,Xi \quad \text{------ (2)}$$

E (X^A) is the mean expected export earnings given by the export portfolio 'A' of Indian spices. From equations (1) and (2), we can derive an efficient set of possible export configurations that can minimize risk for a specified expected return (20% in the present case), which can be obtained by solving the following optimzation problem:

$$\text{Minimise : } V = \sum_{i=1}^{15} W^2 Var(X_i) + \sum_{i=1}^{15}\sum_{j=1 \text{ and } I\neq j}^{15} W_i W_j\ Cov(X_i X_j) \quad \text{------ (3)}$$

$$\text{Sub. To: } E(X^A) = 20\,\% = E\sum_{i=1 \text{ and } Wi>0 \text{ for } i=1,2,3,\ldots\ldots\ldots,15}^{15} Wi\,Xi \quad \text{-------} \quad (4)$$

This is the standard Markowitz quadratic programming problem of portfolio theory and is often called Mean Variance (MV) optimization. The term mean refers to the mean or the expected return of the portfolio and the variance is the measure of the instability (risk) associated with the portfolio. The solution to this problem will provide an optimal portfolio of Indian spices that ensures 20% annual growth and minimum instability. This can be obtained by generalizing the results of equations (3) and (4) .

RESEARCH METHODOLOGY

A group of 15 Indian spice items that are being exported are considered here as the spice trade portfolio. These fifteen spice items can be broadly classified into two categories: raw spices and value added spices. Pepper, Chilies, Cardamom, Ginger, Turmeric, Fennel, Fenugreek, Coriander, Garlic, Cumin, and Celery come under the raw spices category ; whereas, Spice oils, Mint products and Curry powders come under the value added spices. Growth and instability of spice trade portfolio are considered as portfolio return and risk respectively. Then, to construct an optimum spice trade portfolio, we proceed as follows:

1) First, the current shares (weights) of the fifteen spice items that constitute the Indian spice trade portfolio were calculated based on the spices export revenue data for the year 2010-11.

2) Next, the Compound Annual Growth Rates (CAGR) for the various spice items for the period from 1960-2010 were obtained by fitting a log linear trend equation of the type:

$$\ln(Yt) = \alpha + \beta t + \epsilon t \text{ , and then, } CAGR(Yt) = (\text{antilog } \beta - 1) \times 100$$

3) Export instability in this study is defined as the fluctuations around the estimated time trend path and is measured by the coefficient of variation of the estimate. Year to year instability in exports is measured as the average percentage deviations of the observed values of export proceeds from an exponential growth path.

4)The shares and the estimated export growth rates and instability indices of each of the selected fifteen spice items

were then put together to construct the current Indian spice trade portfolio. The estimated growth rates and instability indices of the various spice items were considered as portfolio returns and risks respectively.

5) Finally, using the mean variance optimization technique, an optimum spice trade portfolio which ensures a 20% CAGR with minimum instability(risk) was constructed from the current spice trade portfolio by estimating the expected returns and variance-covariance matrix for the fifteen spice items and then solved for the minimum variance portfolio.

6) The optimum spice trade portfolio generates the required shares of each of the fifteen spice items that minimizes the export instability and yields a 20% CAGR for the portfolio, assuming that the estimated trend growth rates and instability indices will hold good in the future.

7) The software MATLAB was utilized to implement the regression (trend growth rates) and mean variance portfolio optimization procedures.

❖ **Data Sources :** The study is based on the secondary time series data for the period from 1960-2010, obtained from Spices Statistics, published by the Spices Board, Ministry of Commerce and Trade, Government of India, Cochin. Annual data was considered due to non-availability of monthly or quarterly data for all the spice items under consideration.

RESULTS AND DISCUSSION

The results of the estimated weights, trend growth rates (CAGR) and instability indices of the various spice items in the current Indian spice trade portfolio based on time-series data for the years: 1960-61 - 2010-11 are presented in the Table 1. As mentioned above, the present study considered trend growth rates as portfolio returns and instability indices as portfolio risks associated with the Indian spices trade portfolio. As per the Table 1, the share of raw spices and value added spices in the current portfolio is about 56% and 44% respectively. This means that raw spices account for a major share of the spices' exports, even though their average growth rate is much below the value-added spices.

The Mean Variance Optimized Portfolio of spice trade is presented in the Table 2. The optimized spice trade portfolio shows that in order to achieve a 20% CAGR with minimum instability, the total weight of value-added products must increase to about 65% from the present level of 44%, and the weight of raw spices should come down to 35% from 56%. This implies the reorganization of the spice trade portfolio in favor of value-added products. This implies that India should encourage export of value added spice items like mint products, spice oils and curry powders instead of raw spices in the near future as these are the items with the highest growth rates (returns) and the lowest instability (risk). This result indicates that India should transform itself from a supplier of raw spices to a global supplier of value-added spices. Thus, there is a clear case for India aiming to become the global processing hub of spices in the coming years. Furthermore, the shift towards value added spice exports can lower instability in export earnings by providing a broader base of exports and enhance growth by substituting commodities with positive volume trends for those with declining volume trends and by additional processing and marketing activities. This transformation process can be achieved by a series of strategic policy interventions. Policy interventions need to be targeted at specific areas and at specific spices to remove impediments adversely affecting the country's spices export. Certain raw spices export items like turmeric and cumin are still important because of their growth potential and low levels of instability as they retained their shares in the optimized portfolio. Efforts should ,therefore, be made to increase their productivity.

Coming to the dimensions of export diversification of Indian spices, there are both horizontal and vertical dimensions. Horizontal diversification involves adjustment in the export mix in order to counter export quantity instability. Vertical diversification involves the creation of additional uses for existing and new commodities through value-added activities such as processing and marketing. Vertical diversification can expand market opportunities for raw materials, which would enhance growth and lead to more stability since processed goods tend to have more stable prices than raw commodities. These different dimensions of diversification are related to the market orientation and degree of processing export commodities.

SUMMARY AND CONCLUSION

The present study made an attempt to build an optimum trade portfolio for the Indian spice sector, which is aspiring to

Table 1 : Current Spice Trade Portfolio of India (2010-11)				
	Spice Item	**Weights* (% of total)**	**Return (CAGR) (%)**	**Risk (Instability index)**
Raw spices (56%)	Pepper	11.30	12.76	0.52
	Cardamom(L)	1.80	16.30	0.42
	Cardamom(S)	0.54	4.20	0.51
	Chilly	24.7	16.18	0.89
	Ginger	0.63	9.10	0.41
	Turmeric	3.53	13.50	0.34
	Fennel	0.11	13.30	0.42
	Coriander	2.98	17.40	0.83
	Cumin	6.57	16.70	0.71
	Celery	0.29	9.06	0.26
	Garlic	0.50	13.33	0.47
	Others	3.88	13.09	0.27
Value added spices (44%)	Spice Oils	12.60	27.20	0.62
	Curry Powders	2.51	13.50	0.26
	Mint Products	28.81	30.21	0.28
	Total	**100**	**14.02**	**0.43**
* By value Source: Author's Calculations				

Table 2: Optimized Spice Trade Portfolio of India			
	Spice Item	**Optimized Weights (% of total)**	**Current Weights (% of total)**
Raw Spices (35%)	Pepper	7.13	11.30
	Cardamom(L)	2.07	1.80
	Cardamom(S)	0.50	0.54
	Chilly	10.41	24.7
	Ginger	1.41	0.63
	Turmeric	3.01	3.53
	Fennel	0.60	0.11
	Coriander	2.13	2.98
	Cumin	4.74	6.57
	Celery	0.29	0.29
	Garlic	1.23	0.50
	Others	2.03	3.88
Value added Spices (65%)	Spice Oils	17.13	12.60
	Curry Powders	10.19	2.51
	Mint Products	37.13	28.81
	Total	**100**	**100**
Source: Author's Calculations			

become the world's processing hub of spices in the next ten years. To construct the optimum spice trade portfolio, the current spice trade portfolio was estimated first. Later, using the mean variance optimization technique, a portfolio which can yield a 20% CAGR (return) with the least possible instability (risk) was calculated. The resultant portfolio indicates that the current weight of value added items in the spice trade portfolio should be increased from the present 44% to 65%.

This means that India should export more value added spice items rather than raw spices to achieve the needed growth with stability. Hence, creating the necessary infrastructure for converting raw spices into value added items is the key issue that the Indian policymakers should address in the coming years to realize the above said status for India being the global processing hub of spices.

SCOPE FOR FUTURE RESEARCH

The present study attempted to build an optimal trade portfolio for the Indian spices sector that is aiming to become the global processing hub of spices in the coming years. The results of the study indicate the need for reorganization of the Indian spice trade portfolio in favor of value added spice items. Reorganization of the current trade portfolio requires a SWOT analysis of the Indian Spices sector and formulation of appropriate strategies is required to achieve the desired reorganization. Hence, future research in this area can take this course.

REFERENCES

1) Barua, S. K. and Varma, J. R. (1991). "Master Shares: A Bonanza for Large Investors." *Pragna*, 16(1), pp. 21-26.

2) Campa, Jose (2004). "Sources of Gains from International Portfolio Diversification." *CEPR Discussion Paper No 4390,* pp.125-137, http://www.iese.edu/research/pdfs/DI-0559-E.pdf accessed on January 5, 2012.

3) Chand, R. and Tewari , S.C. (1991) . "Growth and Instability of Indian Exports and Imports of Agricultural Commodities." *Indian Journal of Agricultural Economics*, 46(2), pp.159-165.

4) Charan, V. (1984) . "Instability In Export Earnings, Export Concentration and India." *Foreign Trade Review*, 19, April-June, pp.143-150.

5) Elton, E. J., Gruber, M. J., Brown, S. J. and Goetzmann, W.N. (2010). *'Modern Portfolio Theory and Investment Analysis.'* 8th Edition, Wiley & Sons, pp.41-64.

6) Fama, E.F. (1970). "Multi Period Consumption Investment Decisions." *American Economic Review*, 60 (1), pp. 163 - 174.

7) Fernando, K.V. (2001). *'Practical Portfolio Optimization.'* NAG Ltd., Oxford, pp.25-45.

8) Geeta .R,. Mathur, V.C. (2008). *"Causes of Export Instability of Indian Agricultural Exports in New Economic Environment."* Division of Agricultural Economics, IARI, www.iari.res.in accessed on March 16, 2012.

9) Goel, M. and Kumar, S. K.(2006). "A Risk-Sensitive Portfolio Optimization Problem with Stochastic Interest Rate." *Journal of Emerging Market Finance*, 4(5), pp. 22-25.

10) Goyal, S.K., Pandey, R.N. and Singh, J.P. (2000). "India's Agricultural Exports: Growth and Instability." *Foreign Trade Review*, 35(1), pp.32-46.

11) Gujarati , N.D. and Sangeetha (2007). *"Basic Econometrics."* 4th Ed., Tata McGraw Hill, New Delhi, pp.182-187.

12) Gupta, R. and Basu, P. K. (2009). "Sector Analysis and Portfolio Optimization: The Indian Experience." *International Business & Economics Research Journal*, 8(1), pp. 123-128.

13) Hakansson (1974). "Convergence In Multi Period Portfolio Choice." *Journal of Financial Economics*, 1, pp. 201 - 224.

14) Kaundal, K.K and Sharma, M. (2006). "Agricultural Exports of India in the New Economic Environment." *Foreign Trade Review*, 41(2), pp.3-34.

15) Khan, M.Y. and Jain, P. K. (2007). *" Financial Management."* 5th Edition, Tata McGraw-Hill, New Delhi, pp. 3.1-3.18.

16) Kumar, N. and Singhal, K.C. (1989). "India's Export Instability." *Indian Economic Journal*, 36(3), pp. 68-74.

17) Markowitz, H. (1952). "Portfolio Selection." *Journal of Finance*, 7(1), pp. 77 - 91.

18) Mishra, A. K. (2011). "Optimization of Return under Risk constraint: An application on Indian Banks." *International Conference on Financial Management and Economics, International Proceedings of Economic Development and Research (IPEDR),* 11, pp. 353-356, IACSIT Press, Singapore.

19) Mishra, A.K., Pisipati, S. and Vyas, I. (2011). "An Equilibrium Approach For Tactical Asset Allocation: Assessing Black-Litterman Model To Indian Stock Market." *Journal of Economics and International Finance*, 3(10), pp. 553-563.

20) Pal, S. (1992). "Agricultural Exports of India: Issues of Growth and Instability." *Indian Journal of Agricultural Economics*, 47(2), pp.185-193.

21) Panchamukhi, V.R. (1999). "Quantitative Methods and their Applications in International Economics." in K.L Krishna (Ed.) *"Econometric Applications in India."* Oxford University Press, India, pp.145-57.

22) Rao, U.V. and Venugopal, S. (2004). "Usefulness of Genetic Algorithm Model for Dynamic Portfolio Selection." *Journal of Financial Management and Analysis*, 17(1), pp. 45-53.
23) Sarada ,C., Ravisankar ,T., Krishnan, M., and Anandanarayanan , C. (2006) . "Instabilities in Indian Seafood Exports: Sources, Shortfalls and Stabilization Measures- A Time Series Analysis." *CIBA Case Study No.7*, Chennai, pp.12-25, http://www.ciba.res.in accessed on February 12, 2012.
24) Singh,T.(2004). "On The Optimizing Model Of The Balance Of Trade In India." *Journal of Policy Modeling*, 26(5), pp. 605-625.
25) Suganya, N. C. and Pai, G. A. V. (2010). "Pareto-archived Evolutionary Wavelet Network For Financial Constrained Portfolio Optimization: Intelligent Systems In Accounting." *Finance and Management*, 17(2), pp. 59 - 90.

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