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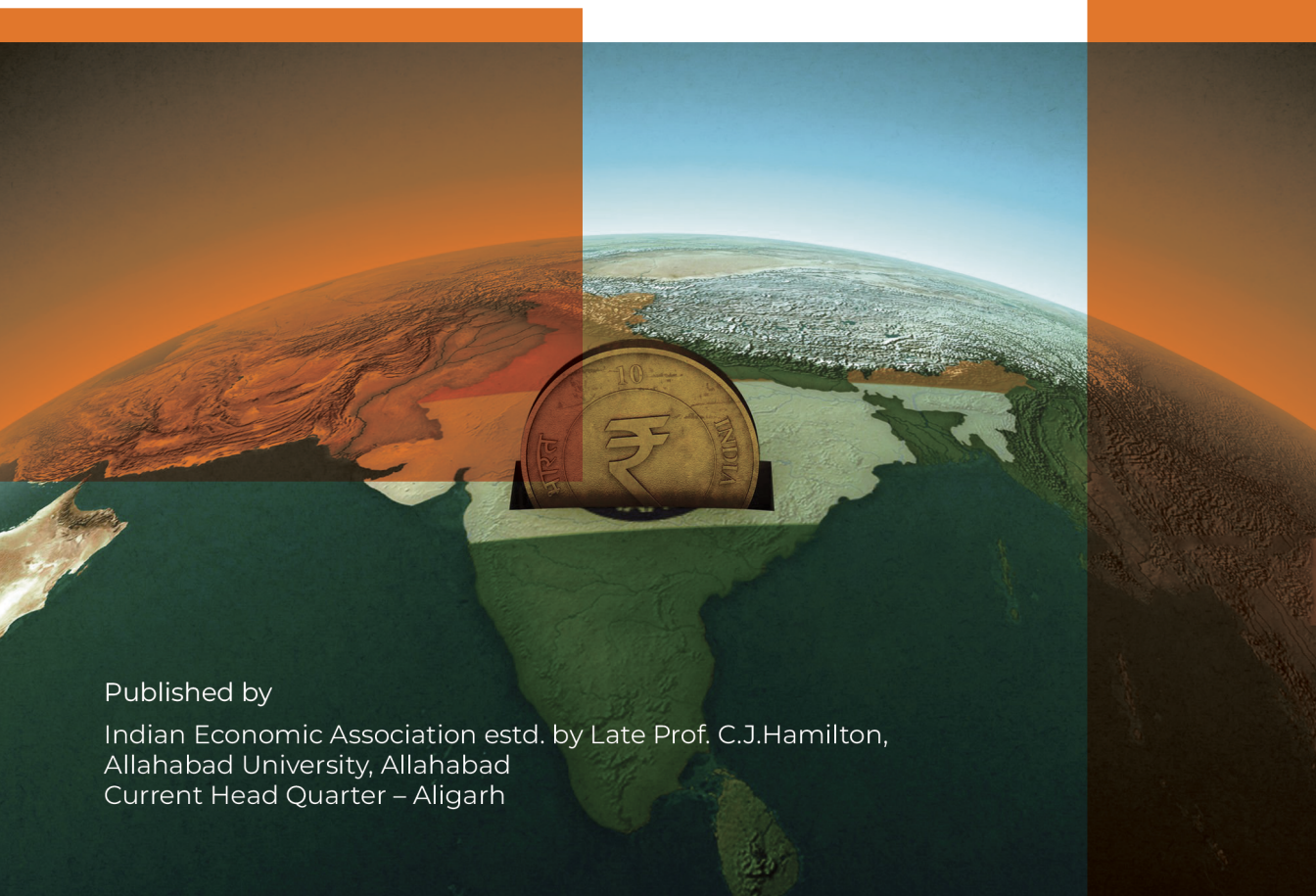

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TABLE OF CONTENTS

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ABOUT THE JOURNAL

The Indian Journal of Economy and Policy (IJEP) is a peer reviewed / refereed quarterly journal in the discipline of Economics edited for the first time by Dr Shri Prakash. The journal is owned by Indian Economic Association. The executive council of Indian Economic Association in its online meeting held on 7th April 2022 appointed Prof Shri Prakash as editor of the journal. The journal intends to provide researchers, academicians, professionals and practitioners a platform to share knowledge through genuine research in the areas largely pertaining to the problems of the economies and economic policies. The journal is designed to promote high quality original and innovative empirical research, methodological and realistic analysis and provide policy frameworks on existing economic problems. The journal encourages researchers and policymakers to share their thoughts and experience in the area of policy making and spread this knowledge to the academic community. The journal also aims to provide an interface for multidisciplinary research by providing a platform to researchers to share the research findings focusing on economic aspects of social, political, ecological and technological phenomena.

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From Guest Editor's Pen

We have the pleasure to inform you that Volume 2, Number 1 issue of Indian Journal of Economy and Policy (IJEP) is finally ready to be in the hands of our esteemed members, educationists, and readers. Though every effort has been taken for correctly printing of the research paper yet readers are welcome for their observations, comments and suggestions for improvements in the contents and presentations. We are proposing to send their comments to the respective author/ s for their response or may be published in the Journal for open discussion,if it necessitates doing so. The issue in hand deals with varied aspects of the Indian economy such as agriculture policy, trade, stock market, investors behaviour and UP economy.

The paper by Ritisnigdha Panigrahi seeks to explore the degree and direction of interrelations between stock prices of India and ASEAN countries during and after economic slowdown. The time series data covers the period from April, 2008 to February 2009 and March, 2009 to February 15, 2010. Two alternative models , ANOVA and regression models have been used. Two hypotheses are being tested. The study finds that the prices of stocks of all nine countries are closely related to the prices of the Indian Stock market.

Tarujyoti Buragohain in her paper on agriculture policy reviewed the literature from ancient period to British colonial period to post-independence period. She mentioned that production of cash crops for commercialisation was emphasized between 1850 to 1947. There was tremendous demand for raw materials such as cotton, jute, sugarcane, groundnuts during the period of the Industrial Revolution. This peasants movement to industrial crops forced peasants to buy foodstuffs from the mandir for their own consumption . This period was marked by the occurrence of the most terrible famine in the economic history of India. During post- independence, the continuous changes in the agriculture policy not only the foodgrains production has increased more than 6 times but the productivity has also increased nearly 5 times. India now has emerged as a foodgrains surplus country.

Rebecca Donald has studied the growth effect of the construction industry on the economy of Uttar Pradesh, using Input Output Modelling.107*107 input output model, 2017 of the UP economy is the basis of empirical analysis. A special vector of final demand of the construction industry is prepared, all elements of the vector except construction are zero. The study found that the growth effects of the construction industry vary extremely high between the sectors. It concluded that the construction industry is the major propellant of the process of growth of the economy of Uttar Pradesh.

Ruchi Tyagi and Sudhir Sharma in their paper focussed on the determinants of Indian imports from three countries viz. Malaysia, Japan, and South Korea. It also studied the interrelations between India's GDP and net global imports, and also imports from these three countries. It also examined whether the distribution of GDP, NGIMPTS, and imports from these three countries diverge from normal distribution. It was found that GDP, NGIMPTS and imports from MJK grow at significantly high rates. It further found that the growth of the Indian economy is highly dependent on the imports from these three MJK countries.

Aditi Pandey in her paper on paradigm shift in investor's behaviour in India has pointed out that during the uncertainty period, not only the investment in the capital markets and mutual funds has increased but also the new investors have entered the capital market. The study period is 2014 to 2024. It also analyses the various risk return indicators wrt the behaviour of investors and the causes of this change. Based on her data, the author concluded that bears have gone, only bulls remained. This transformation from bear to bull is the paradigm shift in the investors ' behaviour.

I would like to share a few significant facts about the Indian economy by this time. The real GDP has been estimated to grow by 6.7 percent in the first quarter of FY 2024-25 over the growth rate of 8.2 percent in the same period last year. Further, real GVA has grown by 6.8 percent in Q1 of FY 2024-25 over the growth rate of 8.3 percent in Q1 of the previous FY. This is the slowest growth in five quarters, mainly due to a sharp slowdown in government spending. This situation may partly be explained by the general elections between April- June, 2024 in the country. However, private consumption grew by 7.4 percent, exports by 8.7 percent and gross fixed capital formation by 7.5 percent during the period. We witnessed revival of household consumption, rising capacity utilisation, strong manufacturing activity, continued thrust on infrastructure spending etc. have contributed to India's economic growth in Q1 of 2024. The magnitude and direction of the investment in the country in agriculture, industry, especially in manufacturing,and services sectors is in the right direction, and will steer the economy to the higher growth path, to become a developed nation, "Vikasit Bharat" by 2047.

- Prof. Prahlad Kumar
Former Dean, Faculty of Commerce, Department of Economics,
University of Allahabad

Are Indian Stock Prices Movements Related To The Price Movements of The Selected Asian Stock Markets?

Ritisnigdha Panigrahi[1]

Abstract

The paper seeks to explore the degree and direction of interrelations between stock prices of India, Japan, China, Hong Kong, Indonesia, South Korea, Malaysia, Thailand, Taiwan, and Singapore both during and after economic slowdown. Study uses time series data. First part of the time series data covers the period from first April, 2008 to February 28, 2009. This period coincides with economic slowdown. Second part of the time series covers the period from 1st March, 2009 to February 15, 2010. This period coincides with the beginning and near completion of recovery from slowdown.

Singapore is the gateway to Southeast Asia. Besides being a port town, it was the first country to become a part of globalization in Asia after Japan and Korea. Malaysia got some spill over benefits from Singapore. Formation of ASEAN brought all member countries together under the process of globalization. China and India came under the fold of globalization much later. Currently both China and India have been accorded observer status by ASEAN. In addition to this, both India and China are attempting to come closer to ASEAN. Policies are continuously directed towards this end.

For investigation of interrelation between different stock prices, two alternative models will be used: ANOVA and Regression Model. India will be paired with all other 9 countries included in the study.

Two hypotheses will be evaluated: i) Worldwide Economic Slowdown have affected the prices of all stock markets, including ASEAN; ii) Globalization has brought integration between the stock markets of ASEAN and India.

Major findings of the study are that prices of stocks of all nine countries are closely related to the prices of Indian stock market. Stock prices in all the ten countries depicted great deal of variation of both during and after economic slowdown. But the degree of volatility of Indian market in the second period has been less than that for Indonesia stock market. But remaining eight countries has shown less volatility than Indian stock market after Economic slowdown. During Economic slowdown Indian stocks have shown lower volatility than five countries that is *Indonesia, Singapore, Taiwan, Thailand, and China and more volatile than four stock markets such as Malaysia, South Korea, Japan, and Hong Kong.*

Introduction

Globalization has resulted in the integration of various national into international markets. This has made national economies closely interdependent; change in one economy affects the entire world economy.

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[1] Former Faculty , BIMTECH, Greater Noida

Naturally, economic slowdown since September 2008 has adversely affected the world economy. Worldwide repercussions of slowdown of US economy reflect the degree and direction of integration of national systems of production of goods and services, financial services and investment into world economic system of the day. This study examines the interrelation between stock prices of India and nine other countries of Asia. After Globalization all Asian stock market come closer than before.

Stock Market – A Barometer of Economy

Stock market is considered to be a barometer of economic health of a country. It is an index of macro fundamentals of an economy. Higher the development stage of an economy, healthier and more vibrant will be its stock market. Stage of growth reflects greater purchasing power. Higher the income, greater tends to be the savings and investment, a substantial part of which is likely to be parked in equity capital. Besides, *population and income together determine market size, where the size of market is an indicator of capital absorption capacity of an economy. Size and role of stock market increases with an increase in size of commodity, services and financial markets of the economy.* Market size, to a great extent, moves up with the growth of an economy. Then, New Economic Policy of 1991 has opened up the Indian economy. It has facilitated entry of foreign investors. FDI and FII enter economy through different routes, including stock market. In and outflows of foreign investment affects the stock prices directly. *This imparts a substantive volatility to stock prices,* since FII is foot loose. *Thus, stock market indicates the degree and direction of integration of national capital market into international financial system. In and outflows of foreign investment directly affect the stock market.* Therefore, we have considered the relation of BSE SENSEX with Asian stock prices in order to furnish an idea about the integration of Indian market into Asian financial system. This integration directly shows the economic interdependence of countries.

Objectives

i) The paper seeks to explore the degree and direction of interrelations between stock prices of India, Japan, China, Hong Kong, Indonesia, South Korea, Malaysia, Thailand, Taiwan, and Singapore both during and after economic slowdown.
ii) It also examines the comparative degree of volatility of these markets both during and after Economic slowdown.

Hypotheses

Two hypotheses will be evaluated: i) Worldwide Economic Slowdown has affected the prices of all stock markets, including Asian markets; ii) Globalization has brought integration between the stock markets of Asia and India.

Sources of Data

We have down loaded one year ten months' day wise data of index of BSE Sensex from *Prowess.* Data thus cover the period from 1st April, 2008 to 15th February, 2010. Asian countries data have been taken from Yahoo Finance and *Prowess.*

Methods of Analysis

Data have been analyzed by different methods. Methods for data analysis have been selected on the basis of objectives of the study and nature of the data. Analysis is based on Regression Model, ANOVA, CV and Interclass Correlation and t test.

Regression Analysis

For the evaluation of inter-relation between variables, linear regression and log linear regression functions have been used. Regression captures the interrelation between prices of two stock markets. We have treated prices of Indian stocks as dependent upon the prices of stocks of other countries. The reason is that countries covered by the study have been a part of the globalization much earlier than India and some of these countries have been investing in India. So, Indian stock market is likely to be affected more by stock market of the countries covered by the study. Naturally, prices of the stock markets of these countries are not affected by the prices of the Indian stock market to the same extent.

$Yi = \alpha + \beta xj$

i = India, j = 1,2,3,…….9

Yi = stock prices of India, xj = stock prices of other countries

Log Linear Regression Method

We take log linear regression function mainly for the following three reasons:

i) To evaluate which of the two curves or functions fits the data better;
ii) To smoothen non-linearity in the data, if present; and
iii) Direct derivation of elasticity.

ANOVA

ANOVA has been employed to examine the degree and direction of variation through time and over countries of stock prices. Results of ANOVA enable us to evaluate the degree of variation between days and between prices of ten stock markets. ANOVA furnishes results for the entire data set, covering all days and prices together. Results will thus embody an aggregation/ averaging effect of all days and different prices of BSE SENSEX and Asian stock prices.

Coefficient of Variance

CV, the Coefficient of Variation, is a part of descriptive statistics. It is a measure of variation relative to the mean as a percentage.

$$C = \frac{\sigma}{\mu} \times 100$$

CV will enable us to examine the degree of inter-country variability of stock prices for comparison with each other.

Intra class Correlation

The correlation between the members of a family or group is defined as intra class correlation. The coefficient is calculated as follows:

$$r_a = \frac{m_b - m_w}{m_b + (n_j - 1)m_w}$$

Where m_b is the sum of square (SS) between families and mw is the SS within families (A.C.Rosander, May 1951). In our case, m_b denotes the SS of variation between days and mw shows the SS of variation of different countries' stock prices. n_i is the degrees of freedom of between class variation. In interclass correlation if the coefficient has positive sign, it reflects that between class variations is greater than within class variation. If it has negative sign then within class variation is greater than between class variations. Coefficient figure reflect magnitude that is high or low.

t Test

For evaluating statistical significance of difference between two slope coefficients t test has been used.

Following is the formula for testing the differences between two slope coefficients:

$$t = (\beta_1 - \beta_2)\sqrt{\frac{(n_1 + n_2 - 4)\sum x_1^2 \times \sum x_2^2}{\left(\sum y_1^2 + \sum y_2^2\right)\left(\sum x_1^2 + \sum x_2^2\right)}}$$

$\sum x_1^2$ = Sum of squares of deviations from the mean of an Asian country other than India, the stock prices of which are treated as independent.

$\sum x_2^2$ = Sum of squares of deviations from the mean of second Asian country other than one.

$\sum y_1^2$ and $\sum y_2^2$ = Sum of squares of deviations of stock prices of India.

$(\beta_1 - \beta_2)$ = Difference between two slope coefficients of two regressions.

We use this formula for evaluating the degree and direction of interrelation of stock prices of these countries with stock prices of India.

Empirical Analysis

Interrelation between Indian stock prices and Asian stock prices and its elasticity have been analyzed by the help of linear regression and log linear regression models.

Results of Regression Models before Economic Slowdown

For evaluating the fit of the curve of the data, we have estimated both linear and non-linear models. The results show that

i) *Both functions fit the data well; and*
ii) *Log linear function fits the data a little better than the linear function, except for the case of China before economic slowdown.*
iii) But the slope coefficient of linear function measures the change in prices of Indian stocks in response to one unit change in the price of stocks of other countries. As against this, slope coefficient of log linear function furnishes a direct estimate of elasticity. *The function is also known as constant elasticity function*, because in this case, elasticity does not change from point to point. We have analyzed all the results of both the functions holistically. OLS estimates of this model are reported below

Table-1
OLS Estimates of Regression Functions during Economic Slowdown

Country	Intercept	Slope	t1	t2	R2	F
Indonesia-India Linear- Log Linear-	1870.18031 1.336048	5.87227074* 0.847703*	7.2514876 22.81003	43.012651 47.02114	0.88686959 0.903555	1850.088127 2210.987
Malaysia-India Linear-Log Linear-	-1518.5426 0.083369	13.4376729* 1.327868*	-2.234948 0.579406	21.087881 27.84206	0.65329744 0.766609	444.6987449 775.1805
Singapore-India Linear- Log Linear-	1299.88342 1.090726	4.68390451* 0.889947*	6.1728837 21.87574	55.378832 60.15638	0.9285458 0.938777	3066.815017 3618.79
South Korea-India Linear- Log Linear-	-1309.6837 0.580531	9.77551816* 1.115569*	-4.336819 7.928508	47.018342 47.9277	0.90354451 0.906832	2210.72449 2297.064

Japan-India Linear-Log Linear-	141.51575 0.145146	1.12141324* 0.977434*	0.5359375 1.958628	48.404739 53.22859	0.90849233 0.923109	2343.018777 2833.283
China-India Linear-Log Linear-	2304.34775 1.166686	4.1342936* 0.863232*	5.2875446 9.328002	24.329686 23.37057	0.71495299 0.69828	591.9336104 546.1833
Thailand-India Linear-Log Linear-	2164.71266 1.780177	17.0646673* 0.833184*	10.331928 42.11281	51.647365 54.65672	0.9187174 0.926784	2667.450311 2987.357
Hong Kong-India Linear-Log Linear-	1088.25636 0.206084	0.61348494* 0.911362*	5.1147233 3.080049	55.775694 58.04346	0.92948758 0.934536	3110.928086 3369.044
Taiwan-India Linear-Log Linear-	2474.68643 0.964181	1.60471755* 0.825724*	11.30949 15.96614	48.065151 51.76169	0.907315 0.919047	2310.258774 2679.272

* Significant at .05 probability level

All slope coefficients of linear and non linear regression are statistically significant. The magnitudes of coefficients vary between the pairs.

Fit of the Curves and Explained Variation

i) Both the curves fit the data equally well for period during Economic Slowdown.
ii) All coefficient of determination are statistically significant for both the function.
iii) The proportion of variation explained by the linear regression function lies between 65% and 93%.
iv) The variation explained by the log linear function ranges from 70% to 90%. Thus, the fit of the log linear function slightly better than that of the linear function.

Marginal or Percentage Response of Indian Stock Prices to Asian Stock Prices

Despite the evidence to support the thesis of interrelation between the stock prices of different countries, two questions remain to be answered. Whether the degree of interrelation of Indian stock prices with the stock prices of nine other countries is equally strong and do the stock prices of these countries vary similarly or differently between time and space. For answering first question we have calculated t statistics to evaluate the significance of differences between slope coefficients. For evaluating inter temporal and inter country variability, we have used ANOVA.

i) The linear function shows that the minimum marginal change value in the Indian *stock in response to a change in the price of the stock of other nine countries is 0.61 for Hong Kong and maximum is 5.87 for Indonesia.*
ii) Whereas the elasticity coefficient vary from minimum to 0.83 for Taiwan and maximum to 1.33 for Malaysia.

Table-2
Values of t on paired differences of coefficients (during Economic Slowdown)

The following table depicts the calculated values of t for paired differences of slope coefficients. As expected the differences between the paired slopes are highly significant statistically even at .01 probability level. Thus, the degree of inter dependence varies between countries.

India with	t values
Indonesia and Malaysia	6.682672
Malaysia and Singapore	7.926522
Singapore and South Korea	7.020593
South Korea and Japan	13.11297
Japan and China	9.396463
China and Thailand	10.98454
Thailand and Hong Kong	14.48374
Hong Kong and Taiwan	8.633038

Table-3
ANOVA (during Economic Slowdown)

ANOVA						
Source of Variation	SS	Df	MS	F	P-value	F crit
Rows	4600068338	237	19409571	8.173179543	6E-173	1.16608
Columns	8.3341E+10	9	9.26E+09	3899.357995	0	1.88426
Error	5065423416	2133	2374788.3			
Total	9.3007E+10	2379				

Both between columns and rows variation is statistically significant. It means that stock prices vary both within and between countries. Prices of stocks of all countries depict inter temporal volatility but the volatility differs between the countries. This inference needs further evaluation. For this, we use Coefficient Variance and Intra class Correlation Coefficient.

Intra class Correlation (during Economic Slowdown)

The estimated values are reported below:

r_a = -0.125

It indicates that above results do not indicate whether Indian stock market is more volatile than Asian market. For this, Coefficient of Variance has been calculated. Results are reported in table-4.

Within the countries stock price variation has been greater than that between the countries.

Table-4
Coefficient of Variance (during Economic Slowdown)

Countries	Indonesia Close price	Malaysia Close price	Singapore Close Price	South Korea Close price	Japan Close Price
Coefficient of Variance	25.9111	16.9049	25.1761	20.179	22.5892
Countries	China Close price	Thailand Close price	Hong Kong Close	Taiwan Close Price	India BSE Close Price
Coefficient of Variance	24.24466	27.11587	24.72617	27.7712	23.43356

i) The values of *Coefficient of Variance* range from 17% to 28%. This degree of variation cannot be defined as volatility. It may therefore be inferred that no Asian stock market has depicted volatility during the world wide Economic slowdown. The price movement has been by and large smooth.
ii) Malaysia stock have shown the least variability during slowdown, where as Thailand and Taiwan stocks have shown the highest level of volatility within this group of countries.
iii) Indian stock market have shown a degree of variability which falls between the middle of the range.
iv) This is the variation of stock prices during Economic Slowdown. I*ndian stocks are less volatile than Indonesia, Singapore, Taiwan, Thailand, and China and more volatile than four stock markets such as Malaysia, South Korea, Japan, and Hong Kong before Economic Slowdown.* South Korea, Japan, and Hong Kong are much more developed than other countries and also their integration is developed. So their stock price is less volatile than less developed countries. Internal stability gets reflected in to external stability. So these countries have been less stable inside and therefore external stability is shown greater to a greater degree. These countries are much more internally stable. Greater the degree of immunity less is the degree of volatility.

Table-5
OLS estimates of Regression Function after Economic Slowdown

Country	Intercept	Slope	t1	t2	R2	F
Indonesia-India Linear- Log Linear-	867.246434 0.94226906	6.4140167* 0.96738518*	4.147508207 21.64492455	67.50546742 73.95656127	0.94878188 0.9569597	4556.988131 5469.57295
Malaysia-India Linear- Log Linear-	-6107.8606 -0.5244225	1.53545339* 1.327868*	-5.52594395 0.579406	49.37565999 27.84206	0.90834424 0.766609	2437.9558 775.1805
Singa-pore-India Linear- Log Linear-	-1165.1603 0.398989267	6.5356088* 1.112905019*	9.202746379 21.87574	86.78672173 60.15638	0.968372068 0.938777	7531.93507 3618.79
South Ko-rea-India Linear- Log Linear-	-7721.4371 -1.0430031	14.9652967* 1.63961895*	-15.55136756 -9.28069919	45.53359395 46.30850715	0.89393389 0.8970917	2073.308178 2144.47783
Japan-India Linear- Log Linear-	-12798.472 -3.9994767	2.83684324* 2.04741869*	-14.41746565 -17.1865425	31.14568368 35.06746063	0.79770629 0.83330248	970.0536121 1229.72679
China-India Linear- Log Linear-	-4998.5441 -1.0298027	6.80850207* 1.50036511*	-6.755483256 -6.04012819	26.86514666 30.44726852	0.74579847 0.79028779	721.736105 927.03616
Thailand-India Linear- Log Linear-	-668.6657 1.098194	24.7971812* 1.0988226*	-2.937765641 23.4659802	68.66534344 65.46391255	0.95041252 0.94571363	4714.92939 4285.52385
Hong Kong-India Linear- Log Linear-	-1731.4053 -0.8241301	0.86060391* 1.16567353*	-6.946329884 -12.3334406	66.91079639 74.61068541	0.94791506 0.95767927	3110.928086 5566.75438
Taiwan-India Linear- Log Linear-	-4244.2923 -1.0982187	2.74985136* 1.37123138*	-11.75915929 -11.6385487	53.08451772 55.73914278	0.9197119 0.92662963	2817.966021 3106.85204

* Significant at .05 probability level

All slope coefficients of linear and non linear regression are statistically significant. The magnitudes of coefficients vary between the pairs.

Fit of the Curves and Explained Variation

v) Both the curves fit the data equally well for period after Economic Slowdown.
vi) All coefficient of determination are statistically significant for both the functions.
vii) The proportion of variation explained by the linear regression function lies between 75% and 97%.
viii) The variation explained by the log linear function ranges from 77% to 96%. Thus, the fit of the log linear function slightly better than that of the linear function. Thus, these results are similar to those for during slow down. Results imply that there is hardly any change in the fit of the curves after slowdown. Therefore the interrelations between the prices of stocks of these Asian countries have not been affected either by slowdown or by recovery in it.

Marginal or Percentage Response of Indian Stock Prices to Asian Stock Prices

iii) The linear function shows that the minimum marginal change in value of the Indian stock prices in response to a change in the price of the stock of other nine countries is 0.86 for Hong Kong and maximum is 6.80 for China.
iv) Whereas the elasticity coefficient vary from minimum to 0.96 for Indonesia and maximum to 2.05 for Japan.
Despite the evidence to support the thesis of interrelation between the stock prices of different countries, some questions still remain to be answered; first question is has the degree of interrelation of Indian stock prices with the stock prices of nine other countries remained unaffected or not by economic slowdown? Second question is whether the degree of variability of stock prices has not been affected by slowdown and recovery from it.
For answering first question, we have calculated t statistics to evaluate the significance of differences between slope coefficients for after slow down. For evaluating inter temporal and inter country variability, we have used ANOVA.

t Test of differences of slope coefficients after Economic Slowdown

The objective of t test is to discover whether relation of Indian stock market with each of the nine countries included in the study is similar or different. Significant difference between the paired coefficients will imply qualitative or quantitative difference between interrelations between stock markets. The formula for testing such differences has been reported in the section in the methods and model. Calculated values of t are reported below:

Table-6
Values of t of paired differences of Regression coefficients after Economic Slowdown

The following table depicts the calculated values of t of paired differences of slope coefficients. As expected, values of t of differences of paired slopes are highly significant statistically even at .01 probability level. Thus, the degree of inter dependence varies between countries after slow down also.

India with	t values
Indonesia and Malaysia	9.215694297
Malaysia and Singapore	9.111089625
Singapore and South Korea	7.699066639
South Korea and Japan	11.78332033
Japan and China	7.328880171
China and Thailand	10.59501024
Thailand and Hong Kong	14.7509938
Hong Kong and Taiwan	9.875512603

Second question relates to the degree of variability of stock prices after slow down. Results of ANOVA are reported in the table below:

Source of Variation	SS	Df	MS	F	P-value	F crit
Rows	1844467607	247	7467480.19	6.597280281	6.2823E-140	1.1625486
Columns	9.2714E+10	9	10301607151	9101.140945	0	1.88408379
Error	2516219981	2223	1131902.825			
Total	9.7075E+10	2479				

Both between columns and rows variation is statistically significant. It means that stock prices vary both within and between countries. Prices of stocks of all countries depict inter temporal volatility but the volatility differs between the countries. Thus, variability of stock prices depicts the similar pattern during and after economic slowdown. This inference needs further evaluation. For this, we use Coefficient Variance and Intra class Correlation Coefficient.

Intra class Correlation (after Economic Slowdown)

The estimated values are reported below:

r_a =-0.1249

It indicates that above results do not indicate whether Indian stock market is more volatile than Asian market. For this, Coefficient of Variance has been calculated. Results are reported in table-8. Absolute value of the coefficient indicates that it is extremely low. But within the countries stock price variation is greater than that between countries variation. Thus, inter temporal and inter country variation depict similar pattern during and after slowdown.

Table-8
Coefficient of Variance (after Economic Slowdown)

Countries	Indonesia price	Malaysia Close price	Singapore Close Price	South Korea Close price	Japan Close Price
Coeff. Variance	18.38646608	11.9762354	16.1553475	11.0261302	8.49627195
Countries	**China Close price**	**Thailand Close price**	**Hong Kong Close**	**Taiwan Close Price**	**India BSE Close Price**
Coeff. Variance	11.45973476	16.5692452	15.4805192	13.2312513	17.7664351

i) The values of Coefficient of Variance range from 9% to 18%. This degree of variation cannot be defined as volatility. It may therefore be inferred that no Asian stock market has depicted volatility after the world wide Economic slowdown. The price movement has been by and large smooth.
ii) Japan stocks have shown the least variability during slowdown, where as Indonesia and India stocks have shown the highest level of volatility within this group of countries.
iii) This is the variation of stock prices after Economic Slowdown. Indian stocks are less volatile than Indonesia and more volatile than other eight stock markets such as Malaysia, Singapore, South Korea, Japan, China, Thailand, and Hong Kong, Taiwan after Economic Slowdown. India and China is the larger recipient of foreign investment in Asia. That is why India is more affected by the economic slowdown than any rest of the other countries.

Conclusion

i) Both the functions fit the data well.
ii) The log linear function fits the data better than the linear function except for the case of China that is for during economic slowdown.
iii) Both the curves fit the data equally well of linear and log linear regression for during and after Economic Slowdown.
iv) All slope coefficients of linear and non linear regression are statistically significant for during and after Economic Slowdown. The magnitudes of coefficients vary between the pairs.
v) Both column variation and rows variation are statistically significant for before and after Economic Slowdown. It means stock prices vary from country to country and within the country inter temporal variation also statistically significant.
vi) Within the countries stock price variation has been greater than that between the countries.
vii) Indian stocks are less volatile than Indonesia, Singapore, Taiwan, Thailand, and China and more volatile than four stock markets such as Malaysia, South Korea, Japan, and Hong Kong before Economic Slowdown.
viii) Indian stocks are less volatile than Indonesia and more volatile than other eight stock markets such as Malaysia, Singapore, South Korea, Japan, China, Thailand, and Hong Kong, Taiwan after Economic Slowdown.
ix) There is a difference between the slope coefficient of India and rest of the countries included in this study before and after Economic Slowdown.

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Agricultural Policy: Pre and Post-Independence in India

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Abstract

In this paper an attempt is made to review the agricultural policy during ancient period, British colonial and post independences period based on available literature in India. During the British period, under the ryotwari settlement, each peasant holding a plot of land was called land lord and they made payment of land revenue directly to the state. Another noteworthy change in Indian Agriculture was more emphasized on production of cash crops for commercialization that spread between 1850 and1947. Commercialization of agriculture implies production of crops for sale rather than for family consumption. By the middle of the nineteenth century, there was a tremendous demand for raw materials, especially cotton, jute, sugarcane, groundnuts, for the British during the period of Industrial Revolution. Consequently, the peasants shifted to industrial crops and in some districts, the movement for commercial agriculture became so strong that the peasants started buying food stuffs from the mandis for their own consumption. This led to a fall in the production of food and, consequently this period was marked by the occurrence of most terrible famine in the economic history of India. After Independence from the British rule, Government of India made significant progress through implementation of various agricultural policies. In 1950-51 the production of foodgrain was 51 million tonne which has increased to 316 million in 2021-22, increased by 6 times. Similarly, productivity has increased to 2419 kg/hectare for the year 2021-22 from 522 kg/hectare in 1950-51. India emerged as a foodgrain surplus country recently.

Introduction

Agriculture plays a significant role in India's economic development. The Indian agriculture system began as early as 9000 BC. During this period techniques were developed for the settled mode of production in agriculture. The major crops viz; wheat, barley and jujube were the popular crops that were domesticated in the subcontinent as early as by 9000 BC.

In ancient period people were used primitive technology for growing crops. Fields were not ploughed, but dug up with a light toothed instrument. Gradually people started using a wooden plough with a sharp-ended copper bar attached to its end for tilling the field. There was no scarcity of land for cultivation. People were enjoyed the land without hindrance as the first man who cleared the forest and stared tilling. Land is the gift of God. "Sarva Bhumi Gopal Ki" – which means all land belongs to God. Land belonged to those who tilled it and used for agricultural purpose. In the Vedic period the king had no proprietary rights on agricultural land and taxation seems to have been occasional and voluntary. The term "Bali" originally used to denote voluntary offerings made to Gods for security.

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In Rig Veda it has been stated that the king could claim bali from his subjects which was the amount due to him for the protection granted to his subjects. Later in Atharva Veda we find a prayer for the grant of a share of the village to the king. This shows that the king at that time was not regarded as the sole owner of the village and that people granted him some land for maintenance of his authority and dignity (https://www.amazon.in/Atharva-Veda-Ralph-T-H-Griffith-ebook/dp/B01CYJFS2O). Later period Kautilya suggested that all land essentially belonged to the king and even Greek writers dealing with the pre-Gupta times invariably state that all lands belonged to the king. However as long as the cultivators paid the due land revenue to the king, they were not disturbed. Only if they did not pay the revenue or till the land, the kings exercised his power as the ultimate owner of the land.(https://www.amazon.in/Arthashastra-Kautilya/dp/9354403700)

First Agricultural Revolution (8000-4000 BCE)

Ancient Indian cultivators had a fair knowledge of weather condition, plant physiology, soil classifications, seasonal cultivation, rotation of crops, protection of crops, treatment of seeds and used of various kinds of manure. During the Neolithic Revolution which also called First Agricultural Revolution started during 8000-4000 BCE. In this period people stared planting crops in a row, learned for storing grains in a storehouse for future use. People started rearing livestock i.e. cattle, sheep and goats (Ref. https://en.wikipedia.org/wiki/Neolithic_Revo).

Agriculture during Indus Valley Civilization

Indus Valley Civilization was recognised as development of innovation irrigation system around 4500BC. During this period, people were practiced rainfall harvesting for irrigation. Indus Valley civilization relied on the considerable technology achievements of the pre-Harappan culture, including the plough. The farmers were grown peas, sesame and dates. Rice was also cultivated in the Indus Valley Civilization. Sophisticated irrigation and water storage systems were developed by the Indus Valley Civilization, including artificial reservoirs at Girnar dated to 3000 BC and an early canal irrigation system. As a result of this innovation in irrigation, the size and prosperity of the Indus civilization the people were grown different types of crops. (https://en.wikipedia.org/wiki/Indus_Valley_Civilisation).

Agriculture in Vedic Period in India

Agriculture is the oldest key in development of civilization. The agricultural practices in the Vedic period presumably started from c.1500 BC and ended in c.500 BC, corresponds to last phase of the Chalcolithic period and Iron Age in India. India is primarily agriculture oriented country. Indians are said to have mastered the art of agriculture and our contribution to the economy through agriculture is enormous Cultivation of a wide range of cereals, vegetables, and fruits was common, and animal husbandry was the important means for their livelihood. There was belief that those farmers who are near to nature they must be exceptionally close to God. The importance of seeds was emphasized and a certain sequence of cropping was recommended and the practice of preparation of manure by the cow dung for irrigation was common during this time. (https://cahc.jainuniversity.ac.in/assets/ijhs/Vol44_4_2_MRoy.pdf)

Indian Agriculture during Mauryan Empire

The Mouryan Empire (322-185BCE) categorized soils and made meteorological observations for the agricultural use. Other Mauryan facilitation included construction and maintenance of dams and provision of horse-drawn chariots which was quicker than traditional bullock carts.
The Greek diplomat Megasthenes (300BC) in his book "Indika" provides an eyewitness account of Indian agriculture at that time. According to him, "India has many huge mountains which abound in fruit-trees of every kind, and many vast plains of great fertility. The greater part of the soil is under irrigation and consequently bears two crops in the course of the year. In addition to cereals, there grows millets and different sorts of pulse and rice throughout India. Since there are two monsoons in the course of each year the inhabitants gather in two harvests annually." (https://en.wikipedia.org/wiki/Megasthenes).

South Indian Agriculture

The south Indian people – especially Tamil cultivated a wide range of crops such as rice, sugarcane, millets, black pepper, various grains, coconuts, beans, cotton, tamarind and sandalwood, jackfruit, coconut, palm, areca and plantain trees etc. systematic ploughing, manuring, weeding, irrigation and crop protection was practiced for sustained agriculture in South India. Water storage systems were designed during this period. Kallanai, a dam built on river Kaveri is considered as one of the oldest water-regulation structures in the world that is still in use (https://en.wikipedia.org/wiki/History_of_agriculture_in_the_Indian_subcontinent).

Indian Agriculture in Chola Period

During the Chola Empire (875-1279), the agrarian society in South India reveals that collective holding of land slowly gave to individual plots, each with their own irrigation system during Chola rule. The Cholas also had bureaucrats which oversaw the distribution of water, particularly the distribution of water by tank-and-channel networks to the drier areas. The growth of individual disposition of farming may have led to a decrease in areas of dry cultivation. The Indian agriculture-economy in the pre-British period consisted of isolated and self-sustaining villages on the one hand, and towns, which were the seats of administration, pilgrimage, commerce and handicrafts, on the other. The transport and communication system was highly underdeveloped and the size of the market was very small. (http://www.ibef.org/industry/agriculture-india.aspx).

Agriculture in India during the British Period

The British period in India can be divided into two parts, first the rule of the East India Company ranging from 1757 to 1858, and second, the rule of the British Government in India from 1858 to 1947. The British conquest which started in 1757 with the Battle of Plassey was completed only by 1858. During this period England was passing through the period of changes in the techniques of production which revolutionized manufacturing. The British rule has made important changes in land system in India. During the rule of the East India Company, the Company directors were keen on deriving largest possible land revenue.

This policy was marked by excessive exactions from peasants not realizing that in the process the British were killing the goose that laid the golden egg. But land revenue was a main source of finance for Company administration in India as also of satisfying the Company directors in England with larger returns every year from their conquest of India. In 1793, the British introduced land settlement to bring stability in agriculture system. In Bengal and neighboring areas "permanent settlement" was introduced. It fixed land revenue in perpetuity. This was called Zamindari system and the zamindar was required to deposit an enhanced land revenue to the state. Later the British extended the settlement to other states and created zamindars there too but they changed over to "temporary settlement" under which land revenue could be reassessed after a period of between 25-40 years in different states.

During this time a totally different land system was evolved for large parts of Bombay and Madras and subsequently extended to north-eastern and north-western India. According to this system, called the ryotwari settlement, each peasant holding a plot of land was recognized as the land lord and made directly responsible to the state for the annual payment of land revenue.

It may be pointed out that in both cases, the land rents fixed were excessive and both the system were instrumental in the destruction of the organic village community based on custom and tradition. Daniel and Alice Thorner write: "Whereas the zamindari system made the land lords masters of the village communities, the ryotwari system cut through the heart of the village communities by making separate arrangements between each peasant cultivator and the state." Through the introduction of zamindari system, the British were able to create a class of people whose interests were directly tied to British rule in India. But the system helped to create a class of absentee landlords who were more interested in squeezing higher land rents than in real agricultural progress. Excessive pressure of population resulting in a high demand for land helped the zamindars to charge exorbitant rent and numerous other exactions from the tenant-cultivators. The result of the whole change in the land system led to the emergence of subsistence agriculture. Even the ryotwari-system lost its original form and the rigorous, prompt and inelastic demands of high revenue forced peasant-cultivators to sell land to absentee landlords or moneylenders. The British land system introduced by Lord Cornwallis, thus helped the concentration of economic power in the hands of absentee landlords and moneylenders in rural India. It depressed agriculture and the peasantry. (https://academic.oup.com/book/10430/chapter/158263588).

Commercialization of Agriculture in India (1850-1947)

Another noteworthy change in Indian Agriculture was its commercialization that spread between 1850 and1947. *Commercialization of agriculture implies production of crops for sale rather than for family consumption.* At every stage of the economic history of the nation, a part of the agricultural output is produced for the market. Then, what distinguished commercial agriculture from normal sales of marketable surplus? It was a deliberate policy worked up under pressure from British industries. By the middle of the nineteenth century, Industrial Revolution had been completed in England. There was a tremendous demand for raw materials, especially cotton, jute, sugarcane, groundnuts, for the British Consequently, the peasants shifted to industrial crops and in some districts, the movement for commercial agriculture became so strong that the peasants started buying food stuffs from the mandis for their domestic needs.

This led to a fall in the production of food and, consequently this period is marked by the occurrence of most terrible famine in the economic history of India. Commercial agriculture was also, to some extent, the result of the mounting demands of the land revenue by the state and excessive rents by the landlords from the peasantry.

The process of commercial agriculture necessitated by the Industrial Revolution was intensified by the development of an elaborate network of railway in India after 1850. Railways linked the interior of the country with ports and harbours, urban marketing centres and thus Indian agriculture began to produce for world markets. Large quantities of wheat from Punjab, jute from Bengal and cotton from Bombay poured in for export to England. The same railways which carried commercial crops from the various parts of the country brought back the foreign machine-made manufactures to India. Thus, railways and link-roads connecting the hinter-land of country with commercial and trading centres were instrumental in intensifying commercial agriculture on the one hand and sharpening competition of machine-made goods with Indian handicrafts, on the other. These factors led to the ruin of Indian industries. (Ref https://edukemy.com/blog/commercialization-of-agriculture-during-british-rule-in-india-modern-history-notes)

Agriculture since Post-Independence period

At the time of independence India's agriculture was stagnant and suffering from food insecurity. The new government initiated agricultural policy under a planning framework both at the State and Central levels. The planning started with some institutional changes within agriculture sector such as abolition of intermediaries, Zamindars and Jagirdars. This section of the paper reviews the extent of Government agriculture policy for agricultural growth. In a paper by George Blyn (1966) estimates the foodgrain output during British period was 0.11 percent per year. In the latter half of the period of 1891-1947, the growth rate of foodgrain was 0.03 per cent. During this period population growth rate was 0.67 per cent. Moreover, he found, during the period of 1911 and 1941, the availability of foodgrain declined by 26 per cent. India emerged as food deficit Independent country.

First Five year Plan on agricultural policy (1951-56)

In order to increase foodgrain production, the First Five-year Plan was launched in 1951 which mainly focused in the development of the primary sector. The First 5-Year Plan gave a predominant importance to the development of agriculture and irrigation sector. Out of a total outlay of Rs. 1960 crores made in the first plan, of which Rs 601 crores i.e. 31% was allotted to agricultural sector. Many irrigation projects were initiated during this period, including the Bhakra, Hirakud and Damodar Valley dams. However, the growth of agriculture sector was 2.7 % only. https://en.wikipedia.org/wiki/Five-Year_Plans_of_India

Second five year plan on agricultural policy (1956-61)

After the achievement of First 5-Year Plan the target of food grain production, which has increased from 50.82 million tonnes in 1950-51 to 66.85 million tonnes in 1955-56- the planners has reduced the plan outlay from 31 per cent to 20 per cent for agricultural sector during the second plan period. Despite allocation of low plan outlay for agriculture during the second five year plan, the growth of agriculture was 3.15 per cent. https://en.wikipedia.org/wiki/Five-Year_Plans_of_India

Third five year plan on agricultural policy (1961-66)

One of the major objectives of the third five year Plan was to increase foodgrain production to make surplus for exports. Experience under the first two plans and especially in the second plan has shown that the rate of growth in the agricultural production is one of the main limiting factors in the process of Indian economy. Agricultural production has therefore, to be increased to the largest extent feasible, and adequate resource have to be provided under the Third Plan for raising the agricultural production for export earnings. During this period, despite implementation of Intensive Agricultural District Programme (IADP) as well as introduction of HYV seeds growth of agriculture declined by 0.72 percent as compared to second five year plan. Out of total out lay 21 per cent were allotted for this sector. Punjab began producing an abundance of wheat. https://en.wikipedia.org/wiki/Five-Year_Plans_of_India

Annual Plan Period on agricultural policy (1966-69)

During this period, the government adopted a "New Agricultural Strategy". Major focus was given to minor irrigation and this was followed by adoption of a HYV seeds programme to increase agricultural production and productivity. This period is considered crucial for Indian agriculture as the *Green Revolution* took place during this period. The Government also set up Agricultural Prices Commission (APC) to assure minimum support prices to the farmers and the Food Corporation of India (FCI) for maintaining buffer-stock to overcome fluctuation in the supplies of food grains and their prices. Out of total outlay 16.7 per cent was allotted for agricultural development. https://en.wikipedia.org/wiki/Five-Year_Plans_of_India

Minimum Support Price or MSP was introduced first by the Centre in 1966-67 for wheat crops only. This was after India faced a major deficit in cereal production at the time of Independence. The less production was not able to meet the population's high demand for foodgrain. Now GoI implemented MSP for 23 crops.

Fourth Plan on agricultural policy (1969-74)

The Fourth five year Plan envisaged an expenditure of 23 per cent of the total expenditure of Rs 15902 crores on agricultural sector.

- The concept of a buffer stock was first introduced and a buffer stock of 5 million tonnes of food grains was envisaged
- The Drought Prone Area Program (DPAP) was launched for irrigation
- To provide the necessary provisions for a sustained agricultural growth to increase of about 5 per cent foodgrain per annum over the next decade.
- To enable as large a sector of the rural population as possible, including the small farmer, the farmer in dry areas and agricultural labourers to participate in development and share its benefits.
- The strategy of agricultural development was based largely on the further extension of the high yielding varieties (HYV) and multiple cropping programmes.

The Fourth Plan postulated an annual growth rate of 5% for agriculture as a whole. The compound growth rate target for food' grains worked out to be 5.6% p.a. The target for food grains was 129 mn. tones for 1973-74, but the actual production in that year was only 104.37 mn. tonnes. https://en.wikipedia.org/wiki/Five-Year_Plans_of_India

Fifth Plan on agricultural policy (1974-79)

The Fifth Plan has targeted a growth rate of 4.2% for food-grains as a whole. "It is envisaged that the fulfillment, of these targets will make country not only self-sufficient in respect of food grains but also leave a major portion of foodgrain for building a buffer stock. The dimension of growth in commercial crops envisaged in the Plan are such as to take care of export requirement in addition to meet the indigenous needs by way of industrial raw material." In other words, the objective is food self-sufficiency and self-reliance."

During this period, the actual production of foodgrain exceed the targeted foodgrain production. The agricultural growth was 3.28 per cent. Out of total outlay, 22% were spent on the development of agriculture and irrigation. https://en.wikipedia.org/wiki/Five-Year_Plans_of_India

Sixth Plan on agricultural policy (1980-85)

The Sixth Five Year Plan (1980-85) was started in an extremely different circumstances as the year of 1979-80 witnessed a worse drought situation. It affected agricultural production adversely. However, the achievements of the plan were satisfactory. Only wheat has been keeping pace with the plan targets. The production of rice came close to the target of 55 million tons in 1980-81 but failed to show any improvement in the following years. Kharif crop also suffered a setback due to drought weather in many parts of the country during 1982-83. The total production of total food grains in the terminal year of sixth plan was recorded 138.1 million tonnes. During this period, the production of rice and wheat was about 54.5 and 41.2 million tonnes respectively. Similarly, oilseeds production was 11.4 million tons against as target of 12.5 million tonnes. Millet production has reached closed to the target in 1984-85. Out of total outlay Rs.6440 crores (24 percent) were spent for agricultural development during this period. https://en.wikipedia.org/wiki/Five-Year_Plans_of_India

Seventh Plan on agricultural policy (1985-90)

The main objectives of the Seventh Five-Year Plan were to establish growth in areas under agriculture, increase agricultural productivity, production of food grains, and generating employment through "Social Justice".

During this period, the average level of annual production of food grains was around 155 million tonnes. In 1990-91 food grain production reached to the level of 176.92 million tonnes against the production of 140.35 million tonnes in 1987-88. The production of pulses, oilseed and sugarcane peaked to the level of 14.06, 18.46 and 240 million tonnes in 1990-91 respectively.

The certified seeds distributed were 57.04 lakh quintals ending 1989-90 against the target of 70 lakh quintals. The total consumption of fertilizer N, P and K was 11.5 million tonnes while pesticides was of 72.47 thousand tonnes during this plan period. The area under high yielding varieties was 63.1 million hectares against the target of 70.00 million hectares. The production of tea and rubber was also increased from 652 million Kgs. and 201000 tonnes in the year 1984-85 to 703 million Kgs and 297000 tonnes in the year 1989-90 respectively.

During the plan period, disbursement of agriculture credit through co¬operatives society, commercial banks and regional rural banks increased from Rs.5810 crores in 1984-85 to Rs. 12570 crores by 1989-90. The debt relief scheme was also announced in 1990-91, affected the recovery climate resulting in a lower volume of credit flow.

There were 76,000 fertilizer retailer outlets and 40 lakh tonnes of fertilizer nutrients were distributed during 1989-90. The number of co-operative godown/warehousing capacity increased from 80 lakh tonnes in 1984-85 to 100 lakh tonnes in 1987-88. Soil and water conservation activity in 27 catchments taken up in 17 states covering 2.4 million hectares by the close of plan period.

The contribution of the livestock sector has increased to Rs. 27,700 crores in 1987-88 as compared to Rs. 10,000 crores in 1980-81 which constitutes 25.5 percent of the total agricultural output. By the end of Seventh Plan, 22.75 lakh tonnes of marine and 14.02 lakh tonnes of inland fish were produced, indicating an average annual growth rate 6.25 per cent. However, during 1990-91 export of marine products was 138400 tonnes valued at Rs.8.90 crores while fish production stood at 38.36 lakh tonnes over the same year. Out of total outlay 22 percent were spent for this account. https://en.wikipedia.org/wiki/Five-Year_Plans_of_India

Eight Plan on agricultural policy (1992-97)

During this period investment in agriculture, irrigation, and allied sector has increased significantly. Government gave priority on growth and crop diversification of agriculture to achieve self-sufficiency in food grain and to generate a surplus for export. In this period, the agricultural sector registered an impressive growth at 4.6 per cent. Total production of food grains has increased to 179.5 million tonnes in 1992-93 showing a growth rate of 6.6 per cent and it has further increased to 184.0 million tonnes in 1993-94. In 1996-97 the production of foodgrain increased further to 199 million tonnes. Thus the agricultural sector both in respect of food grains and fibre crops has registered almost a stagnation during the first two years of the Eighth Plan.

In 1994-95, production of food grains has increased to 191 million tonnes which shows a growth of only 3.7 per cent. Thus the new economic policy could not create any favourable impact on the performance of the agricultural sector of the country. The potential of irrigation increased from 728 lakh hectares to 894 lakh. Out of total outlay 20 per cent were allotted for agriculture sector during this period. https://en.wikipedia.org/wiki/Five-Year_Plans_of_India

Ninth Plan on agricultural policy (1997-2002)

During this period, Government of India had a plan to double the production of foodgrain for security purpose to make India huger free in ten years. The agricultural growth was 2.44 per cent only and the set target was not achieved. End of this plan, the government introduced the *National Agricultural Policy (NAP) to achieve the agricultural growth rate about 4 percent.*

Accordingly the Ninth Plan target is to achieve a growth rate of about 4.5 per cent per annum in agricultural output and production of 234 million tonnes of food grains by 2001-02. In order to achieve the goal of doubling the food graingrain production and alleviation of hunger, a regionally differentiated strategy based on agro-climatic regional planning were adopted.

Regional programmes was formulated particularly for hilly backward and tribal areas. Agricultural credit got special attention and efforts were made to increase public investment during this plan period. In every district rural infrastructure development fund was used to promote productive projects.

During this period, more emphasis was given for the development of livestock sector and horticulture sector, fisheries, and dairy sector development. A special efforts were made to export agricultural products and development of the co-operative sectors during this period.

There was a plan for setting-up agro-processing industries and agro-industries for employment generation in the country. The consumption of fertilizers (NPK) during 1996-97 was 14.31 million tonnes, during the Ninth Five Year Plan. The greater use of Bio-fertilizers and bio- technological research were encouraged. https://en.wikipedia.org/wiki/Five-Year_Plans_of_India

Tenth Plan on agricultural policy (2002-2007)

During this period, Government envisaged for sustainable agricultural growth through better management of water, soil, natural resources. However, the growth of agriculture was only 2.3 per cent during this period. Total production of food grains increased from 179.4 million tonnes in 2002-03 to 212.4 million tonnes in 2003-04 and then to 208.3 million tonnes in 2006-07. The index of agricultural production in 1981-82 = 100) increased from 150.4 in 2002-03 to 181.0 in 2003-04 and then to 197.1 in 2006- 07. Thus the agriculture and allied sector has been showing a mixed performance during this period. https://en.wikipedia.org/wiki/Five-Year_Plans_of_India

Eleventh Plan on agricultural policy (2007-2012)

The approach paper to the Eleventh Plan has highlighted a holistic framework and suggested the following strategy to raise agricultural output such as (i)Doubling the rate of growth of irrigated area, (ii)Improving water management, rain water harvesting and watershed development, (iii) Reclaiming degraded land and focusing on soil quality, (iv)Bridging the knowledge gap through effective extension, (v)Diversifying into high value outputs, fruits, vegetables, flowers,, herbs and spices, medicinal plants, bamboo, bio-diesel. but with adequate measures to ensure food security, (vi)Promoting animal husbandry and fishery, (vii)Providing easy access to credit at affordable rales, (viii)Improving the incentive structure and functioning of market, if necessary, through state intervention for improving the prices of agricultural produce and (ix)Refocusing on land reforms issues. National Commission on Farmers has already laid the foundation for such a framework.

Moreover, R&D expenditure on agriculture in India was low by international standards, despite its high social return. Increased R&D expenditure backed by modern technologies and compatible institutions was the major focused. During this period, the annual average growth was 3.6 per cent of gross domestic product from agriculture against a target of 4 per cent. https://en.wikipedia.org/wiki/Five-Year_Plans_of_India

Twelve Plan on agricultural policy (2012-17)

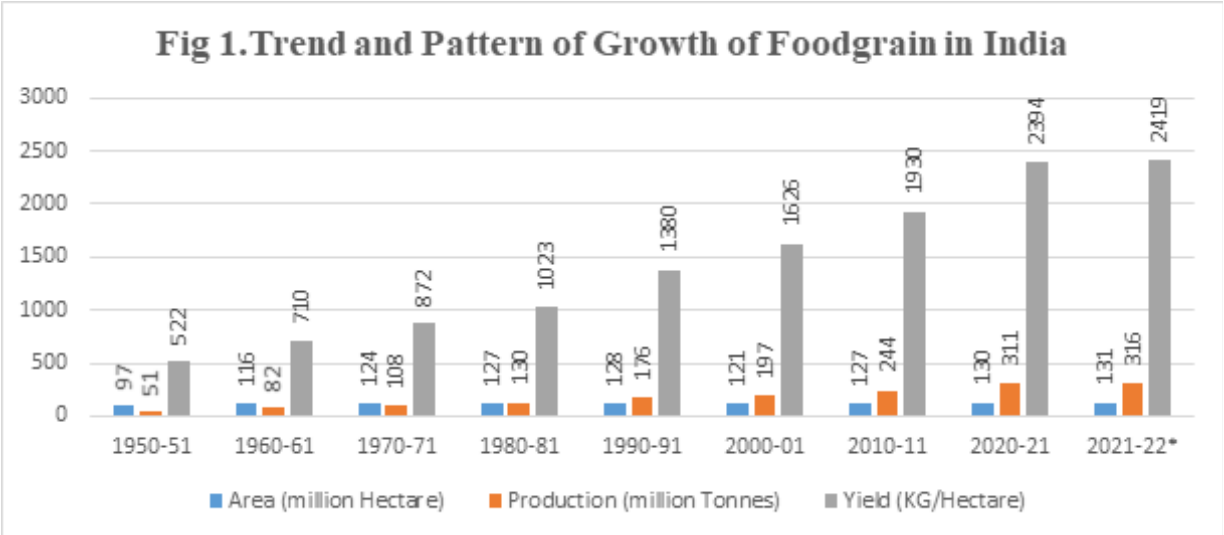
The twelve five year Plan had sought to reverse the deceleration of agricultural production growth which occurred in the previous two plans period- Ninth Plan and continued into the Tenth Plan. It has had some success in food grain production that has touched a new peak of 241 million tonnes in 2010-11 and growth in agriculture in the Eleventh Plan is likely to average 3.3 per cent per year as compared to 2.3 per cent in the Tenth Plan. The target for agricultural growth was 4.0 per cent during this period of the Twelfth Plan period. https://en.wikipedia.org/wiki/Five-Year_Plans_of_India

During this period, two major schemes namely RKVY & NFSM were introduced. Many rainfed areas are now substantially contributing to food basket of the country. ACA based RKVY takes care of these issues of food grain production. The Plan focussed on other priorities such as resource-use efficiency and technology to ensure sustainability of natural resources, adaptation to climate change and improvements in total factor productivity. The Government of India is currently implementing four schemes, that is, NAIS, MNAIS, WBCIS and another pilot Coconut Palm Insurance Scheme (CPIS). However, only NAIS is being implemented as a full-fledged scheme and the other three are being implemented on pilot basis. Out of total plan 7.1 percent were allotted for agricultural sector.

With the Planning Commission dissolved in 2014-15, no more formal plans are made for the agricultural economy,

Trend and pattern of growth of foodgrain since independence

India made significant progress on foodgrain production (fig 1). In 1950-51 the production of foodgrain was 51 million tonne which has increased to 316 million in 2021-22, increased by 6 times. Similarly, productivity has increased to 2419 kg/hectare for the year 2021-22 from 522 kg/hectare in 1950-51. The area under foodgrain increased from 97 million hectare to 131 million during the same period.



Recent Policy for Agricultural growth

In June 2022, the government of India (GoI) increased MSPs for several summer-planted crops, including rice and maize. Similarly, it raised MSPs for several winter-planted crops in October 2022, including rapeseed, wheat, and lentils (Table 1). There has been a significant increase of MSP in both kharif and rabi crops. It is observed that the range of increase in case kharif about 4 to 7 per cent whereas in case of rabi crops the range of increase about 3 to 6 percent.

Table 1. Minimum Support Prices (Rs. per quintal) for Kharif Crops

	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	CAGR (%)
Paddy (com)	1750	1815	1868	1940	2040	2183	2300	3.98
Jowar	2430	2550	2620	2738	2970	3180	3871	6.88
Bajra	1950	2000	2150	2250	2350	2500	2625	4.34
Ragi	2897	3150	3295	3377	3578	3846	4290	5.77
Maize	1700	1760	1850	1870	1962	2090	2228	3.94
Tur	5675	5800	6000	6300	6600	7000	7550	4.16
Moong	6975	7050	7196	7275	7755	8558	8682	3.18
Rabi Crops								
	2018-19	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**CAGR (%)**		
Wheat	1840	1925	1975	2015	2125	2.92		
Barley	1440	1525	1600	1635	1735	3.80		
Gram	4620	4875	5100	5230	5335	2.92		
Mosur Lentil	4475	4800	5100	5500	6000	6.04		
Rape-seed & Mustard	4200	4425	4650	5050	5450	5.35		

Source: Ministry of Agriculture and farmers Welfare, Government of India.

The Department of Fertilizers of the Ministry of Agriculture and Farmers' Welfare (MAFW) increased fertiliser subsidies in April 2022 and November 2022 for summer- and winter-planted crops in response to rising international fertiliser prices. This includes support for domestically produced fertilisers through freight subsidies to cover transport from producer states to other parts of the country.

Recent reductions in tariffs and relaxation of quantitative restrictions on selected pulses, albeit temporary, are additional positive steps towards improving food security and diversifying diets. Together with domestic marketing reforms, easing export and import restrictions would make the market more predictable and increase incentives for producers and traders to invest in supply chains. India made significant progress eliminating inefficiencies in the food-distribution system in the period before the COVID-19 pandemic. The experimental replacement of physical grain distribution with direct cash transfers could be gradually expanded, including by drawing on recommendations made by the High-Level Commission on Restructuring the Food Corporation of India, which suggested focusing initially on cities with populations over 1 million, followed by grain surplus states

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Input–Output Modelling of Growth Effect of Construction Industry on The Economy of Uttar Pradesh

Rebecca Donald[1]

Abstract

Various factors have been limiting the growth of the economy of Uttar Pradesh(U.P.). U.P. has been identified as one of the BIMARU in states of India. The state has come out of this list recently due to rapid growth. The state has apparently chosen unbalanced growth strategy. U.P. is not an exception of this. Input output model is used in the study for empirical analysis. 107 * 107 input output model 2017 of the economy of U.P. is the basis of empirical analysis a special vector of final demand of construction industry is prepared; all elements of the vector except construction are zero. This isolates the process of growth of the economy of U.P. from the influence of all sectors except construction. Following are the main findings of the study:

1. The total growth effect and the average growth effect of the construction industry in U.P. in 2020 are very high;
2. The growth effects of construction industry vary extremely highly between the sectors
3. The distribution of the growth effects is highly positively skewed and the high effects sectors are concentrated in and around the narrow space of the mode and
4. The growth effects of construction industry vary between zero and rupees 12479556.57 Crores.
5. The construction industry is the major propellant of the process of growth of the economy of U.P.
6. The above results are the part of the policy of the central and the state governments to pay special attention to the development of physical and economic infrastructure and the provision of pakka toilets and pakka houses to the poor of U.P.
7. The above findings and conclusions show that the study has furnished concrete and précised answers to the four research questions which are the focus of the study.

Keywords

Input Output, Modelling, growth, construction industry, backward and forward linkages, policy

Introduction

Construction industries happen to be one of the leading sectors of growth of all the economies of the globe. Economy of U.P. is no exception of this general property of the construction industries. Roads, railways, airways, waterways are among the basic physical and economic infrastructure of the economies besides markets shopping malls, offices, factories, barns on farms and houses are among the output of construction industry. Construction industry has backward and forward linkages with most of the sectors of the national and regional economies, including the economy of U.P. Besides, construction industry is not only among the fastest growing sectors of the national economies like the Indian one and the regional economies like the economy of UP.

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In addition to these general properties of construction industry across the globe, construction industry in India has been assigned pivotal role in the growth of the national economy of India and the regional economy of U.P. The government of the India has adopted the policy of assigning major role to the construction industry to the development of the national economy and the economies of the states. A concerted effort has been made to develop interconnectivity across the states and within the states by the construction of national and regional highways on the one hand and a special drive has been launched to provide toilets and pakka houses to the homeless families and toilets to the families who don't have it, in addition to this electricity and water connection have also been provided to a large number of families in India, especially in U.P. Four crores pakka houses have been supplied to the homeless families so far. U.P. has got a share in this booty. U.P. government has also provided pakka houses to the homeless families at highly subsidised prices. Several medical colleges, airports, metros and expressways have been constructed in U.P. since 2017. Several malls and plazas have also come up. All of the above have contributed to the rapid expansion of construction industry in U.P. and its growth effect naturally been quite high.

This paper focuses on the growth effect of construction industry and attempts to quantify the contribution of construction industry in the development of the economy of U.P. Backward and Forward linkages are the two legs on which the growth effect of construction industry moves. The high priority assigned to construction industry in the development policy in U.P. is the part of selectivity approach and unbalanced growth strategy of development. However it does not mean that the development policy of U.P government has neglected the growth of other sectors of the economy.

Each nation and its regions/states have the option to choose strategy of development. The following are the important options from which development strategy may be chosen: Strategy of unbalanced growth. (For illustration, see Hirschman) or the strategy balanced growth. (For illustration, see Nurkse)

The Balanced growth strategy requires every sector of the economy grows at the same constant rate. The maximal growth may be attained if the constant rate is equal to the reciprocal of Perron – frobinious root of the equations of the system. Perron – frobinious root is the minimum Eigen root (see P.N. Mathur, 1966)

Under unbalanced growth strategy different sectors of the economy grow at different rates. The theory/ strategy is proposed due to paucity of resources especially capital and competent human resources in the developing economies. This strategy requires identification of leading sectors which are capable of propelling of the growth of subsidiary sectors of the leading ones. The growth of subsidiary sectors is pulled up by the backward and forward linkages of the leading sectors of the economy. Rasmussen proposed the use of the input coefficients of Leontief Model. But Shri Prakash (1986/1991) highlighted the limitations of Rasmussen's methods of calculations of linkages and proposed the use of coefficients of Leontief Inverse for the estimation of linkages. This method has been found to yield much greater values of linkages related to the estimated values of linkages on the basis of Rasmussen methods. The construction industry has been found to be among the leading sectors of the Indian economy (Shri Prakash and Shalini Sharma 2003. It is the above theoretical and empirical paradigms that induced the authors to choose construction industry as the major propellant of the growth of the economy of Uttar Pradesh.

Objectives/Research Questions

The paper attempts to answer the following questions:

1. Is the progress of construction industry growth neutral so far as the economy as a whole is concern?
2. What is the degree of impetuous and the momentum imparted by the progress of construction industry in U.P. to the rest of the economy?
3. Does the progress of construction industry affect the growth of all the sectors of the economy equally?
4. What is the minimum and maximum growth effects of the progress of construction industry and which sectors of the economy are affected the least and which sectors of the economy are affected most by the progress of the construction industry?

The answers to above questions are furnished by the solution values of the Leontief model outlined in the study.

Data and their Source

The basic data set comprises two parts:

107 * 107 Input Output table, 2016 of the state of U.P. which has been constructed for Directorate of Economics and Statistics, Lucknow U.P. by the team headed by Shri Prakash (2020) at Giri Instititute of Development Studies, Lucknow.

Second part of the data set comprises the final demand/Products of construction industry in U.P.; these comprise toilets, houses, malls and plazas, metro stations and lines, airports, roads and other buildings etc. in the year 2020 in U.P. The values of these products are expressed in Rupees Lakh Crores. Data have been taken from the Ministry of Railways, highways/P.W.D., railways, metros, civil aviation, etc.

Methods/ Models

The paper uses the Leontief input output model1. The IO model is based on 107*107 matrix of the economy of U.P. Therefore the technology and production is that of 2017. But the final demand for the output of the construction industry is that of 2020. The following equation gives the solution value of the model:

$X = (I-A)^{-1} * f$ …….Equation 1

In this paper X is the gross output vector which is derived as the solution of the Leontief Model and the solution is derived on the basis of final demand of construction industry in A is the matrix of input coefficients, I is an Identity Matrix. $(I-A)^{-1}$ is Leontief inverse. f is especially constructed vector of final demand in which all elements except the final demand for the products of construction industry are 0.

Note: the transaction and inverse matrices are available with Editor IJEP Prof. Shri Prakash. Copies of these may be supplied on request.

This vector has been designed to insulate the growth of output of all sectors of the economy from the influence of factors other than the final demand of construction industry (see, Shri Prakash 1992)

The total growth effect of construction industry comprises two parts: Direct and indirect. Both direct and indirect growth effects of construction industry on the economy of U.P. captured by the solution value of X of the Leontief model. The total growth effect of construction industry is accounted by the final demand for the output/products of construction industry.

Besides the Leontief model the paper has used descriptive statistics in order to estimate

1. Nature of distribution of growth effects between the sectors,
2. Average growth effect,
3. Coefficients of Kurtosis and skewness,
4. Minimum and maximum growth effect of construction industry

Discussion of empirical result

The empirical results of application of Leontief Model are discussed hereunder:
1. Total output/ Growth Effect of construction industries in U.P. in 2020 is Rupees 21549246.11 crores;
2. Out of 107 sectors into which the economy of U.P. is classified only 5 sectors show zero growth effect of construction industry. These sectors have neither backward nor forward linkages with the construction industry. These sectors are Seasemum oil seeds, Guava, Gooseberry, Other Non-Food Crops, Jems & jewelry;
3. As many as 102 sectors including construction, registered positive growth of output;
4. Maximum growth effect is that of construction industry itself which is rupees 12479556.57 Lakh crores;
5. The growth effect varies highly between the sectors;
6. The average growth effect of construction industry is Rupees 201394.8235 Crores
7. The coefficient of variation has as extremely high value as 171.639% which indicates very high degree of differences in growth gain of different sectors;
8. The values of coefficients of skewness and kurtosis are 9.961541016 and 101.5294891 respectively. These values also suggest that the distribution of growth effect of construction industry is significantly positively skewed and high growth effects are centred in and around the narrow space of mode

Major Findings and Conclusions

The following are the main findings of the study:

1. The total growth effect and the average growth effect of the construction industry in U.P. in 2020 are very high;
2. The growth effects of construction industry vary extremely highly between the sectors
3. The distribution of the growth effects is highly positively skewed and the high effects sectors are concentrated in and around the narrow space of the mode and

4. The growth effects of construction industry vary between zero and rupees 12479556.57 Crores.
5 The construction industry is the major propellant of the process of growth of the economy of U.P.
6. The above results are the part of the policy of the central and the state governments to pay special attention to the development of physical and economic infrastructure and the provision of pakka toilets and pakka houses to the poor of U.P.
7. The above findings and conclusions show that the study has furnished concrete and précised answers to the four research questions which are the focus of the study.

The findings of this paper highlight the need for further research based on the use of input –output table of the economy of U.P. The table is greatly helpful in policy related research.

Appendix

	TABLE 1 FINAL DEMAND VECTOR			
			Construction	Final Demand
Agriculture	1	Paddy	0.0004	-
Agriculture	2	Wheat	0.0001	-
Agriculture	3	Jowar	0.0000	-
Agriculture	4	Bajra	0.0000	-
Agriculture	5	Maize	0.0001	-
Agriculture	6	Gram	0.0000	-
Agriculture	7	Barley	0.0000	-
Agriculture	8	Sugarcane	0.0014	-
Agriculture	9	Groundnut	0.0000	-
Agriculture	10	Sesamum	-	-
Agriculture	11	Rapeseed & Mustard	0.0001	-
Agriculture	12	Other oilseeds	0.0001	-
Agriculture	13	Cotton	0.0000	-
Agriculture	14	Arhar	0.0000	-
Agriculture	15	Lentil	0.0000	-
Agriculture	16	Urad	0.0000	-
Agriculture	17	Other Pulses	0.0003	-
Agriculture	18	Potato	0.0001	-
Agriculture	19	Vegetables	0.0002	-
Agriculture	20	Mango	0.0000	-

Agriculture	21	Guava	-	-
Agriculture	22	Litchi	0.0000	-
Agriculture	23	Gooseberry	-	-
Agriculture	24	Papaya	0.0000	-
Agriculture	25	Other Fruits	0.0001	-
Agriculture	26	Tobacco	0.0000	-
Agriculture	27	Other crops	0.0059	-
Agriculture	28	Other Non-food crops	-	-
Animal Husbandry	29	Milk and milk products	0.0011	-
Animal Husbandry	30	Other liv.st. produ.	0.0011	-
Fishing & Forestry	31	Forestry and logging	0.0290	-
Fishing & Forestry	32	Fishing	0.0000	-
Energy	33	Coal and lignite	0.0113	-
Energy	34	Petroleum products	0.0634	-
Energy	35	Electricity	0.0327	-
Mining	36	Natural gas	0.0217	-
Mining	37	Lime stone	0.0002	-
Mining	38	Other non metallic minerals	0.0171	-
Manufacturing	39	Sugar	0.0006	-
Manufacturing	40	Khandsari, boora	0.0001	-
Manufacturing	41	Milling of Grain and Pulses	0.0002	-
Manufacturing	42	Miscellaneous food (Incl Dairy) products	0.0031	-
Manufacturing	43	Beverages	0.0001	-
Manufacturing	44	Tobacco products	0.0001	-
Manufacturing	45	Khadi, cotton textiles (handlooms)	0.0000	-

Manufacturing	46	Cotton textiles	0.0005	-
Manufacturing	47	Readymade garments	0.0009	-
Manufacturing	48	Miscellaneous textile products	0.0018	-
Manufacturing	49	Furniture and fixtures-wooden	0.0007	-
Manufacturing	50	Wood and wood products	0.0173	-
Manufacturing	51	Paper, paper prods. & news-print	0.0062	-
Manufacturing	52	Printing and publishing	0.0018	-
Manufacturing	53	Leather foot-wear	0.0000	-
Manufacturing	54	Leather and leather products	0.0005	-
Manufacturing	55	Rubber prod-ucts	0.0027	-
Manufacturing	56	Plastic products	0.0171	-
Manufacturing	57	Coal tar prod-ucts	0.0186	-
Manufacturing	58	Inorganic heavy chemicals	0.0034	-
Manufacturing	59	Fertilizers	0.0014	-
Manufacturing	60	Paints, varnish-es and lacquers	0.0154	-
Manufacturing	61	Drugs and med-icines	0.0006	-
Manufacturing	62	Synthetic fibers, resin	0.0046	-
Manufacturing	63	Other chemicals	0.0154	-
Manufacturing	64	Other non-me-tallic mineral prods.	0.0335	-
Manufacturing	65	Iron, steel and ferro alloys	0.0794	-
Manufacturing	66	Iron and steel foundries	0.0891	-

Manufacturing	67	Non-ferrous basic metals	0.0102	-
Manufacturing	68	Tractors and agri. implements	0.0069	-
Manufacturing	69	Machine tools	0.0002	-
Manufacturing	70	Other non-electrical machinery	0.0071	-
Manufacturing	71	Electrical industrial Machinery	0.0010	-
Manufacturing	72	Electrical wires & cables	0.0095	-
Manufacturing	73	Batteries	0.0003	-
Manufacturing	74	Electrical appliances	0.0011	-
Manufacturing	75	Communication equipments	0.0004	-
Manufacturing	76	Other electrical Machinery	0.0017	-
Manufacturing	77	Electronic equipments (incl.TV)	0.0006	-
Manufacturing	78	Ships and boats	0.0000	-
Manufacturing	79	Rail equipments	0.0008	-
Manufacturing	80	Motor vehicles	0.0027	-
Manufacturing	81	Motor cycles and scooters	0.0001	-
Manufacturing	82	Bicycles, cycle-rickshaw	0.0001	-
Manufacturing	83	Other transport equipments	0.0013	-
Manufacturing	84	Watches and clocks	0.0000	-
Manufacturing	85	Medical, precision& optical instru.s	0.0000	-
Manufacturing	86	Jems & jewelry	0.0000	-
Manufacturing	87	Aircraft & spacecraft	-	-
Manufacturing	88	Miscellaneous manufacturing	0.0074	-

Manufacturing	**89**	**Construction**	**1.1343**	**1.10019E+12**
Manufacturing	90	Water supply	0.0022	-
Manufacturing	91	Railway transport services	0.0051	-
Manufacturing	92	Land tpt including via pipeline	0.0495	-
Manufacturing	93	Air transport	0.0005	-
Manufacturing	94	Supporting and aux. tpt activities	0.0045	-
Manufacturing	95	Storage and warehousing	0.0005	-
Manufacturing	96	Communication	0.0030	-
Services	97	Trade	0.0901	-
Services	98	Hotels and restaurants	0.0074	-
Services	99	Banking	0.0267	-
Services	100	Education and research	0.0024	-
Services	101	Medical and health	0.0008	-
Services	102	Business services	0.0219	-
Services	103	Computer & related activities	0.0004	-
Services	104	Real estate activities	0.0015	-
Services	105	O.com, social&personal services	0.0004	-
Services	106	Other services	0.0005	-
Services	107	Public administration	0.0538	-

Source: Author's calculations

TABLE 2
GROWTH EFFECT OF CONSTRUCTION INDUSTRY IN U.P

Broad Sectors		Name	Construction	Final Demand	Output
Agriculture	1	Paddy	0.000449569	11001941.04	4946.131829
Agriculture	2	Wheat	0.000133907	11001941.04	1473.233268
Agriculture	3	Jowar	1.54384E-07	11001941.04	1.698523843
Agriculture	4	Bajra	6.89373E-07	11001941.04	7.5844457
Agriculture	5	Maize	6.45582E-05	11001941.04	710.2658797
Agriculture	6	Gram	2.36396E-05	11001941.04	260.0820194
Agriculture	7	Barley	1.37301E-06	11001941.04	15.10578391
Agriculture	8	Sugarcane	0.001432089	11001941.04	15755.75923
Agriculture	9	Groundnut	1.05198E-06	11001941.04	11.57385301
Agriculture	10	Sesamum	0	11001941.04	0
Agriculture	11	Rapeseed & Mustard	5.24626E-05	11001941.04	577.1908022
Agriculture	12	Other oilseeds	7.29889E-05	11001941.04	803.01906
Agriculture	13	Cotton	1.83739E-05	11001941.04	202.1483578
Agriculture	14	Arhar	4.94472E-07	11001941.04	5.440150614
Agriculture	15	Lentil	6.23989E-06	11001941.04	68.65090636
Agriculture	16	Urad	3.44955E-06	11001941.04	37.95178052
Agriculture	17	Other Pulses	0.000265903	11001941.04	2925.451297
Agriculture	18	Potato	0.000146848	11001941.04	1615.61784
Agriculture	19	Vegetables	0.00021774	11001941.04	2395.56645
Agriculture	20	Mango	1.8608E-07	11001941.04	2.0472406
Agriculture	21	Guava	0	11001941.04	0
Agriculture	22	Litchi	6.95211E-07	11001941.04	7.648670845
Agriculture	23	Gooseberry	0	11001941.04	0
Agriculture	24	Papaya	2.71336E-06	11001941.04	29.85224437
Agriculture	25	Other Fruits	5.69368E-05	11001941.04	626.415079
Agriculture	26	Tobacco	5.87339E-06	11001941.04	64.61863748
Agriculture	27	Other crops	0.005906235	11001941.04	64980.05061
Agriculture	28	Other Non-Food Crops	0	11001941.04	0

Animal Husbandry	29	Milk and milk products	0.001109647	11001941.04	12208.272
Animal Husbandry	30	Other liv. st. produ.	0.00113772	11001941.04	12517.1261
Fishing & Forestry	31	Forestry and logging	0.029004373	11001941.04	319104.4043
Fishing & Forestry	32	Fishing	2.30452E-05	11001941.04	253.5419538
Energy	33	Coal and lignite	0.011301375	11001941.04	124337.0627
Energy	34	Petroleum products	0.063443876	11001941.04	698005.7816
Energy	35	Electricity	0.032701587	11001941.04	359780.9337
Mining	36	Natural gas	0.021701744	11001941.04	238761.3045
Mining	37	Lime stone	0.000208059	11001941.04	2289.05038
Mining	38	Other non metallic minerals	0.017132582	11001941.04	188491.6603
Manufacturing	39	Sugar	0.000630061	11001941.04	6931.894854
Manufacturing	40	Khandsari, boora	7.18928E-05	11001941.04	790.9602481
Manufacturing	41	Milling of Grain and Pulses	0.000164477	11001941.04	1809.569199
Manufacturing	42	Miscellaneous food (Incl Dairy) products	0.003116194	11001941.04	34284.18766
Manufacturing	43	Beverages	0.000139842	11001941.04	1538.528741
Manufacturing	44	Tobacco products	6.43298E-05	11001941.04	707.7524123
Manufacturing	45	Khadi, cotton textiles (handlooms)	1.75521E-05	11001941.04	193.1074616
Manufacturing	46	Cotton textiles	0.000493029	11001941.04	5424.2707
Manufacturing	47	Readymade garments	0.000873352	11001941.04	9608.57214
Manufacturing	48	Miscellaneous textile products	0.001824126	11001941.04	20068.92166
Manufacturing	49	Furniture and fixtures-wooden	0.00072765	11001941.04	8005.557247

Manufacturing	50	Wood and wood products	0.017261588	11001941.04	189910.9731
Manufacturing	51	Paper, paper prods. & news-print	0.006185975	11001941.04	68057.73414
Manufacturing	52	Printing and publishing	0.001831238	11001941.04	20147.17444
Manufacturing	53	Leather footwear	1.60163E-05	11001941.04	176.2105368
Manufacturing	54	Leather and leather products	0.000530885	11001941.04	5840.762047
Manufacturing	55	Rubber products	0.002655225	11001941.04	29212.62666
Manufacturing	56	Plastic products	0.017142085	11001941.04	188596.2054
Manufacturing	57	Coal tar products	0.018630279	11001941.04	204969.2257
Manufacturing	58	Inorganic heavy chemicals	0.003392532	11001941.04	37324.44075
Manufacturing	59	Fertilizers	0.001402947	11001941.04	15435.1366
Manufacturing	60	Paints, varnishes and lacquers	0.01544006	11001941.04	169870.6269
Manufacturing	61	Drugs and medicines	0.000609017	11001941.04	6700.363783
Manufacturing	62	Synthetic fibers, resin	0.004566597	11001941.04	50241.43298
Manufacturing	63	Other chemicals	0.015382488	11001941.04	169237.2254
Manufacturing	64	Other non-metallic mineral prods.	0.033512846	11001941.04	368706.353
Manufacturing	65	Iron, steel and ferro alloys	0.079390503	11001941.04	873449.6354
Manufacturing	66	Iron and steel foundries	0.08914262	11001941.04	980741.8518
Manufacturing	67	Non-ferrous basic metals	0.010159224	11001941.04	111771.188

Manufacturing	68	Tractors &agri. implements	0.00692341	11001941.04	76170.94598
Manufacturing	69	Machine tools	0.000175386	11001941.04	1929.590571
Manufacturing	70	Other non-electrical machinery	0.007060406	11001941.04	77678.17596
Manufacturing	71	Electrical industrial Machinery	0.001006267	11001941.04	11070.89375
Manufacturing	72	Electrical wires & cables	0.009498514	11001941.04	104502.0959
Manufacturing	73	Batteries	0.000296446	11001941.04	3261.477176
Manufacturing	74	Electrical appliances	0.001134329	11001941.04	12479.81914
Manufacturing	75	Communica-tion equipments	0.000425984	11001941.04	4686.655636
Manufacturing	76	Other electri-cal Machinery	0.001731662	11001941.04	19051.64338
Manufacturing	77	Electronic equipments (incl.TV)	0.000609825	11001941.04	6709.255845
Manufacturing	78	Ships and boats	2.22531E-05	11001941.04	244.827431
Manufacturing	79	Rail equipments	0.000762484	11001941.04	8388.798748
Manufacturing	80	Motor vehicles	0.002662143	11001941.04	29288.73639
Manufacturing	81	Motor cycles and scooters	8.86992E-05	11001941.04	975.8633178
Manufacturing	82	Bicycles, cy-cle-rickshaw	0.000135051	11001941.04	1485.82422
Manufacturing	83	Other transport equipments	0.001285125	11001941.04	14138.86804
Manufacturing	84	Watches and clocks	1.53605E-05	11001941.04	168.9949656
Manufacturing	85	Medical, pre-cision&optical instru.s	5.97044E-06	11001941.04	65.68639995
Manufacturing	86	Jems & jewelry	2.61629E-05	11001941.04	287.8423852
Manufacturing	87	Aircraft & spacecraft	0	11001941.04	0

Manufacturing	88	Miscellaneous manufacturing	0.007361231	11001941.04	80987.8343
Manufacturing	89	Construction	1.134304986	11001941.04	12479556.57
Manufacturing	90	Water supply	0.002188819	11001941.04	24081.25245
Manufacturing	91	Railway transport services	0.00506747	11001941.04	55752.00091
Manufacturing	92	Land tpt including via pipeline	0.049521475	11001941.04	544832.3488
Manufacturing	93	Air transport	0.000510783	11001941.04	5619.599533
Manufacturing	94	Supporting and aux. tpt activities	0.004467936	11001941.04	49155.96793
Manufacturing	95	Storage and warehousing	0.000478735	11001941.04	5267.011114
Manufacturing	96	Communication	0.003000317	11001941.04	33009.31115
Services	97	Trade	0.090094681	11001941.04	991216.3708
Services	98	Hotels and restaurants	0.007362187	11001941.04	80998.34347
Services	99	Banking	0.026747226	11001941.04	294271.4035
Services	100	Education and research	0.002412251	11001941.04	26539.43798
Services	101	Medical and health	0.000796469	11001941.04	8762.707513
Services	102	Business services	0.02192246	11001941.04	241189.6163
Services	103	Computer & related activities	0.000400711	11001941.04	4408.59571
Services	104	Real estate activities	0.001496294	11001941.04	16462.13372
Services	105	O.com, social&personal services	0.000377082	11001941.04	4148.632446
Services	106	Other services	0.000508929	11001941.04	5599.211293
Services	107	Public administration	0.053788421	11001941.04	591777.0333
	Growth effect of construction industry in U.P				**21549246.11**

Source: Author's calculations

Table 3

Descriptive statistics of Growth effect of construction industry in U.P. 2020 -

Output	
Mean	201394.8235
Standard Error	117318.6328
Median	6931.894854
Mode	0
Standard Deviation	1213553.374
Sample Variance	1.47271E+12
Kurtosis	101.5294891
Skewness	9.961541016
Range	12479556.57
Minimum	0
Maximum	12479556.57
Sum	21549246.11
Count	107

Source: Author's calculations

*results reported in the text are in rupees Lakh Crores

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Determination of Indian Imports From Malaysia, Japan And South-Korea

Ruchi Tyagi[1], Sudhir Sharma[2]

Abstract

The paper focuses mainly on interrelations between GDP of India and Net global imports and imports from three countries with which India has comprehensive economic agreement. The paper examines whether the distribution of GDP, NGIMPTS, and imports from three countries diverge from normal distribution. The paper determines the inter-temporal growth of all above three variables. As a preliminary step the paper tropes whether the time series data of these variables are stationary. Two multiple regression equations evaluate NGIMPTS function shift significantly through time and whether the comprehensive agreement has significant impact on imports from Malaysia, Japan and Korea (MJK). The paper finds that the growth of Indian economy is significantly linked with its imports. While GDP significantly affects both NGIMPTS and imports from countries of comprehensive agreement.

Keywords: Growth, imports, stationary, normal distribution, comprehensive agreement

Introduction

International trade acts as a major contributing factor in global economic activity and a catalyst of economic growth in developing as well as developed countries. Differences in various conditions, like resource availability, natural climatic conditions, cost of production, etc., act as the motive behind trade between the countries. International trade has made it all possible and has provided a large number of employment opportunities as well as several goods and services for the consumer. Not just this, it has been a major reason for the rising living standards of people all over the globe. International trade has been a part of human civilization for a very long time; however, the past few decades have seen rapid development in cross-border trading.

During the early phases of the evolution of civilization individuals/ households where self-sufficient and self-reliant. The size of the individual economies and hence the size of the national economies was small. But with emergence of the system of barter nucleus of domestic trade was founded. In due course of time, domestic trade got extended and strengthen in the form of international trade. Both domestic and international trade emerged as the means of an increase in the size of the market of the commodities and services. Increasing size of the market warranted the processing of production for goods and services to be based on the ever increase in division of labor and specialization enhanced trade. All these changes resulted in the promotion of growth and enhancement in the prosperity of the individuals. The Greek philosophers enunciated the concept of homeostasis, i.e., the economics of households is probably related with the size of the kingdom being associated with the city state. So the national economies were also of the mini micro size but the emergence of larger kingdoms and there rulers and emperors also resulted in the ever increasing size of the national economies. Consequently economics emerged in the form of political economy.

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However, political power was recognized in the early stages of human history to be associated with the size of the empire/kingdom and was associated with the geographical area and the size of the population. During the middle ages modified and refined form of mercantilism emerged globally. In the early Middle Ages India and china where the most prosperous countries; India accounted for the greatest amount of GDP followed by china. The Europeans lagged behind these two Asian economic powers. Imparting and stimulus to the Europeans to catch up with Asia. During the latter Middle Ages Europe surpassed both India and china in the race of economic development .consequently the emphasis shifted from political to economic power and prosperity. The mercantilism treated international trade as the means of earning and accumulating more wealth. However, imports were considered to be the drain on national wealth and output / GDP as these have to be paid to the countries from which goods are imported as against import, exports were emphasized to be the source of accumulation of wealth in the form of gold and silver. Practically all the countries were had either gold or silvers standard during this phase of the history.

Adam smith replaced political economy by the concept of modern day economics. In 1776, the economist Adam Smith criticized the theory of mercantilism in his publication, "The Wealth of Nations", and propounded the theory of Absolute advantage. He emphasized the size of the market enhanced division of labor at the means of raising production and productivity. Rise in production and productivity required the enhancing of the size of the market while trade was the factor of extending the size of the market beyond d the national boundaries. This the era during which the race for colonization of less developed countries of Asia, Africa and Latin American countries became highly intensified . countries like UK France, Spain, Portugal and to some extent Germany were the leading players in this race of colonization political colonizism based on economic colonization became the empirical evidence to support the mercantilism concept of economic power being the base of the Greater the efficiency & productivity lower is generally the cost of production this aspect highlights the prudential allocation and utilization of available resource rather than its abundance or scarcity.

The theory of comparative advantage, enunciated by Ricardo in the 19th century suggests that the country should exports such goods in the production of which it has comparative cost advantage.

Hecksher Ohlin emphasized the factor endowment to be the base of trade .since factor endowment the cause that accounts for comparative cost advantage. If the country has more capital relative to labor, then it should export capital intensives goods and import labor intensive good.

However, Leontief found that U.S exports labour intensive goods and imports capital intensive goods, though it has more capital than labour. This came to be known leaontif –paradox. Leaontif pardox inspired numerous economists across the globe to empirically test the validity of factor endowment theory.

R.B Bhardwaj (1954) found that the pattern of India's foreign trade confirms to its factor endowment. Thus, it does not support Leontief -paradox. Bhardwaj – Bhagwati (1969) re-tested factor endowment theory with Indian data. This study focuses on both relative scarcity / abundance of physical and human capital since quantum of labor is assessed in terms of educational endowment. This study also found that India's foreign trade conforms to factor endowment. K.N Prashad (1972) included natural resources also in factor endowment and found that India's foreign trade conforms the growth of labour and natural resources of India.

Steffan Linder, consider the relation between the similarity of the development phase and structure of trade of the countries under consideration. He opines that the structure of the trade of the countries is generally similar to the structure of their economies. Stefan Linder points out that the pattern of

trade and the level and pattern of economic development of the countries have great deal of similarity. According to Linder economic structure enhanced the structure of production is generally guided by the preferences of the consumers. And this preferences continuously push the output of manufactured goods which countries also specialize subsequently to export. Linder has also developed an index of trade relative to commodity concentration in production on the basis of the relative variance of the traded and goods produced (1961) an essay on trade and transformation.

Paul Krugman and Kelvin Lancaster (1980). The intensification of the process of liberalization privatization and globalization globally also led to the radical transformation of factor endowment of the developing economies. In this process multinational corporations of developed economies transfer production facilities from the home to third countries which along with increasing impact of FDI mitigated capital scarcity of several countries of the second and third worlds. Countries like Brazil, Russia, India, China and south Africa (BRICS) emerged as the rapidly growing economies and this has impacted not only economic and trade structures of these countries alone but the structure of global trade (shri praksh 1994)

Shri Prakash and Sonia Dhir 2013 postulated that Hecksher- Ohlin theory is relevant only in static framework. They closely examined the assumptions of this theory to draw this inference. They point out that the movement of Indian economy on his growth path from the decade of 50 s has resulted in not only radically transforming the structure of the economy but the continuous growth based on substitution of import by domestic production of basic and capital goods industries along with incessant accumulation of capital has mitigated scarcity of capital to a great extent .capital accumulation has been furthered accelerated by rapid growth of foreign direct investment in Indian economy besides, rapid growth of education ahead of the population and economy (shri prakash 1977) has transformed labor into human capital , resulting in productivity growth . So, the structure of India's foreign trade has changed radically and is no more the exporter of only of agriculture goods or goods like cotton textile tea and coffee.

Commodity production is directly related to the technology. With the change in technology, technical attributes of the product tend to change and some new products are produced and the production of old products ceases this brings about change in production / economic structure which directly affects the commodity composition of trade. In our opinion, each new technology is more capital, skill and knowledge intensive. It leads to change in factor endowment. (See shri Prakash and Sonia dhir 2013/ 2022)

Trade has been envisaged as an engine of growth (Marshall (1962). P.N Mathur distinguished growth from welfare effect of international trade. Who also emphasized the growth effect of trade through regional cooperation/ and grouping which may either include dilution or elimination of tariffs on the imports from member countries or it may be represented by economic union like EU but trade comprises export and imports of commodities and factors like labor (migration) and capital. Exports directly and positively affect the growth of the exporting country. Imports have been postulated to adversely affect growth however, imports may broadly be classified into following categories: 1) competitive imports; 2) noncompetitive imports and; 3) production technology, capital and production facility for producing imports domestically by joint production with multinational corporation or

establishing their subsidiary in the country. Competitive imports may come as substitutes of domestic products. This may result in the loss to the domestic produces by reducing their market share or even leading to the closer of domestic companies. But access to the cheaper and better quality substitutes of domestic products lead to improvement in the consumers' welfare ;2) noncompetitive imports comprise two types of goods – consumer goods and producer goods which are not produced within the country . Producer goods may comprise both intermediate inputs machinery and equipment's etc. these imports act as the supplementary source of supply needed for domestic production hence, such imports generally leads to both positive growth and welfare effect on the importing economy. The above attributes of imports have induced the author to make growth effect of imports as the focus of this paper.

In the second phase of the look-east policy following liberalization, India inked Comprehensive Economic Partnership Agreements with South Korea and Japan in 2011 and Comprehensive Economic co-operation Agreement (CECA) with Malaysia in 2010. Asia's most advanced economy is that of Japan. Japan and India have had trade links since the Cold War and the years following World War II, when India transitioned to a mixed economy. India's iron exports helped Japan bounce back from the devastation of World War II. In 1958, Japan returned the favor by providing the first-ever yen loans to India's government. Japan has been India's main aid supplier ever since. In addition to developing a sizable middle class, Japan was able to establish a technology-driven economy and a nascent automotive industry that would dominate the market for many years.

Asia is now the center of the world's economic expansion. South Korea and India have the third and fourth largest economies in the area, respectively, after China and Japan (World Bank 2008). In 1962, South Korea began pursuing an outward-focused economic growth plan at the beginning of the five-year era, which resulted in Korea's rapid expansion and worldwide economic integration. Due to its subsequent robust and consistent economic growth, South Korea has emerged as one of Asia's high-income economies.

The main drivers of Malaysia's economy before to its independence in 1957 were commodities and agriculture. To become a major supplier of electrical appliance parts and components, the nation has effectively diversified its economy to include robust manufacturing and service sectors.

This paper focuses on imports from Malaysia, S. Korea and Japan alone with which India has comprehensive economic agreement (CECA, CEPA) countries. The following are the important clauses of these agreements pertaining to trade and investment. The imports have been classified into two category in this paper: imports from CECA countries and; global imports net of ceca countries.

Research questions

The following are the research questions answered to which are sought in the paper:
1) What is the level of India's global imports net of imports from Malaysia, Japan and Korea (MJK), the three countries covered in comprehensive economic agreement?
2) What is the level of imports from Malaysia, Japan and S. Korea?
3) What are the determinants of net global imports of India?
4) What are the determinants of imports from Malaysia, Japan and Korea (MJK)?

5) Is there significant difference in the level of imports before and after the comprehensive economic agreement with MJK?
6) Does the net global import function shift temporally?

The empirical answers are sought to the above questions.

Sources of data

All of the data was obtained from WITS. Logarithmic terms have been formed from the original data. The following benefits have prompted the author to turn to this transformation: 1) Log values for variables like GDP, MJKIMPTS and NGIMPTS. The original values of these variables included up to nine digits; 2) the data series is smoothed by log transformation. In general, it removes outliers and transforms non-stationary time series;3) the log linear function former provides direct estimates of the elasticity coefficient, which is computed in terms of rates, proportions, and percentages; 4) a reduction in the large values makes the computations more labor- and time-efficient.

Three-year moving averages of all variables were taken in order to remove the effects of periodic recessionary phases that occurred during the study period. This is also anticipated to have reduced the probability of the variables that the time series data of the core variables would be found to be non-stationary. Additionally, this correction generally causes a considerable auto-correlation to occur. Nevertheless, neither the log transformation nor the three-year moving average is an ideal technique for ensuring the elimination of non-stationary character or the likelihood of significant autocorrelation.

Methods/Models

The study does not depend on one single methods or models of data analysis because each method and models has its own limitations and specific assumptions under which the model can be applied. Therefore, the methods / models are selected on the basis of their appropriateness for the realization of the objective of the study, nature and extent of data used. The data limitations are also kept in view.

The study comprises summary statistics and a t statistic for evaluating the nature of the distribution of the core variables. A random walk model is used to highlight the stationary property of core variables and is further examined by the Engel Granger unit root test of the residuals to determine whether the time series of core variables are stationary. Growth curves are used to estimate the growth of three core variables. Multiple regression models are used to evaluate the nature and magnitude of the relations between the dependent/endogenous and independent/exogenous variables.

The empirical results are discussed in the same sequence in which the methods of data analysis are listed.

Discussion of empirical results of summary statistics

Table 1. Summary statistics of core variables

Statistic	GDP	NGIMPTS	MJKIMPTS
Mean	9.1323	8.3849	7.2670
Standard Error	0.0562	0.0825	0.0708
Median	9.2042	8.5596	7.3470
Standard deviation	0.2451	0.3597	0.3088
Sample variance	0.0600	0.1294	0.0954
Kurtosis	-1.0185	-0.6452	-0.4736
Skewness	-0.5190	-0.8171	-0.8633
Range	0.7475	1.1276	0.9664
Count	19	19	19
t-value	5.56	8.48	5.23

We evaluate the assumption whether the distribution of three core variables is normal; it is treated as null hypothesis. The calculated value of t statistics 5.56, 8.4, and 5.23 respectively. The value indicates that the distribution of GDP, Global imports net of imports from MJK with comprehensive economic agreement and imports from countries of agreement significantly diverges from normal distribution. So the null hypothesis that the distribution of these variables is also normal stands rejected. This property is based on the property of the normal distribution that the mean and median are equal. (shri prakash et al 2024). This result may also suggest that the time- series data of these core variables may not be stationary but this facet shall be rigorously examined by Dicky fuller test.

The co-efficient of kurtosis of GDP, Net global imports and imports from MJK with comprehensive economic agreement has negative sign. These values suggest that extremely high values of these three core variables are not concentrated in or around the narrow space of mode.

All three co-efficient of skewness are negative and approximately equal -1. It may therefore be inferred that the distribution of the three core variables are nominally negatively skewed.

Dicky fuller test of stationarity

A Dicky fuller test linked to the Random Walk Model is used to assess the stationarity of the time-series data of the main variables. According to Yule's theory on the importance of making sure that time-series econometric modeling is based on stationarity, three versions of the random walk model—which was put forth by the most well-known Dicky-Fuller—are used. The following are the three versions of random walk model:

$lnGDP_{yt} = \beta lnGDP_{yt-1} + U$ ……..1
$lnGDP_{yt} = \alpha+\beta lnGDP_{yt-1} + U$ ……..2
$lnGDP_{yt} = \alpha+\beta lnGDP_{yt-1} +\Delta T+U$ …….3
$lnNGIMPTS = \beta lnNGIMPTS_{yt-1} + U$ ……4
$lnNGIMPTS= \alpha+\beta lnNIGMPTS_{yt-1} + U$ 5
$lnNGIMPTS = \alpha+\beta lnNGIMPTS_{yt-t} + \Delta T+ U$ ……6
$lnMJKIMPTS= \beta lnMJKIMPTS_{yt-1} + U$ ……7
$lnMJKIMPTS = \alpha+\beta lnMJKIMPTS_{yt-1} + U$ ……8
$lnMJKIMPTS = \alpha+\beta lnMJKIMPTS_{yt-1} + U$ ……9

OLS estimates of three versions of Random walk model are given below in table2:

Table 2: Random Walk Model

GDP	**Co-efficients**	**t- Stat**
1) intercept	0	**N/A**
yt-1	1.0048	1320.054
2) intercept	**0.4416**	**1.923**
Yt-1	0.9563	37.87
3) intercept	**0.2926**	**0.209**
Yt-1	**0.9735**	**6.027**
T	**-0.0016**	**0.108**
NGIMPTS		
4) intercept	**0**	**N/A**
yt-1	**1.0069**	**545.34**

5) intercept	**0.5946**	**2.412**
yt-1	**0.9247**	**27.13**
6) intercept	**0.8785**	**1.0568**
yt-1	**0.8817**	**7.059**
T	**0.0053**	**0.3601**
MJKIMPTS		
7) intercept	**0**	**N/A**
Yt-1	**1.010**	**286.895**
8) intercept	**0.2344**	**0.3154**
Yt-1	**0.9821**	**11.009**
9) intercept	**-2.0292**	**1.386**
Yt-1	**1.2807**	**6.749**
T	**-0.0443**	**-1.729**

Source: own calculations

1) The equation 1, 4 and 7 show that the co-efficients of lagged GDP, lagged net global imports and imports from the three countries of cooperation agreement are statistically significant. So all three time series are shown to be non-stationary; 2) the co-efficients of lagged GDP, lagged net global imports and imports from countries of comprehensive agreement are also statistically significant. These equation also highlights a non –stationary nature of all three time –series and the equation 3, 6 & 9 also show the co-efficients of lagged GDP, net global import and three countries to be statistically significant. So all three series emerge non-stationary in this case also ;3) the co-efficient of drift is positive for GDP and imports from three countries while it is negative for net global imports but none of these co-efficients is statistically in significant. Thus, the current value does not drift away from the preceding value significantly, the equation 3, 6 & 9 also show that none of these time-series contain significant trend or stochastic error.

Analysis of the results of Growth curves

The following table shows the estimated values of annual compound rates of the growth. The OLS estimates of the growth curves of GDP, net imports and imports from comprehensive economic agreement countries.

Table 3: OLS estimates of the growth curves

GDP	Co-efficient	t- stat	R^2	F -stat	P-value
Intercept	8.705	370.9	0.9620	430.70	1.15E-34
T	0.042	20.75			
NGIMPTS					
Intercept	7.8371	85.94	0.7340	46.915	2.82E-06
T	0.0547	6.84			
MJKIMPTS					
Intercept	6.745	142.37	0.9025	157.46	5.06E-10
T	0.0521	12.54			

Source: own calculations

The table shows that the co-efficients of determination of the three core variable under consideration or as high as 0.0962, 0.73, and 0.90 respectively. The calculated value of f are statistically significant at practically o probability. Thus the growth curves explains as high as proportion of total variation as 96.2, 73.4 & 90.2 % respectively

Intercepts of all three growth curves are positive and statistically significant. Thus it may inferred that such variables excluded from the growth curves as investment, consumption expenditure also plays significant role in the growth of these variables. Consumption expenditure captures consumption multiplier effect on growth while investment accounts for accelerator effect of investment on growth.

The coefficient of time of all three variables are positive and highly statistically significant at around 0.01 probability. The estimated growth curves furnish annual compound rates of growth 4.2, 5.4 and 5.2 of GDP, net global imports, imports from MJK.

1) The calculated values of the co-efficient of time (t) show that net global imports are growing are growing at a greater rate than the GDP of India; 2) the imports are growing from MJK is also growing more rapidly than GDP but the net global imports from are also growing at a slightly greater rate than the MJKIMPTS. Though the difference between the two growth rates 0.02 % appears to be negligible.

The above results show that the imports into India grow more rapidly than the economy. Thus, the degree of openness of Indian economy hits vis-s –vis imports turn to increase with growth. It may also imply that the imports dependence of the economy hits growth. The results also show that the comprehensive economic agreements probably increases our imports dependence on these three countries almost similar to the import dependence on the globe.

Functional relations
Following are the regression equations:
$lnNGIMPTS= \alpha+\beta lnGDP+\beta 2T+U$ ……10
$lnMJKIMPTS= \alpha+\beta lnGDP+\beta 2D+U$ ……11

Table 4: the OLS estimates of the regression equation10

	Co-efficient	**t-stat**	**R^2**	**Multiple R**
Intercept	-21.24	-7.39	0.9640	0.9818
GDP	3.3414	10.120		
T	-0.0866	-6.058		

Source: own calculations

Engel Granger Test

	Co-efficient	**t-stat**	**P-value**	**F stat**	**F-sig**
Intercept	-0.043	-0.2025	.8452	4.078	0.0831
Ut-1	0.933	2.0194	0.0831		

Source: own calculations
OLS estimates of equation 11

	Co-efficient	**t-stat**	**R^2**	**Multiple R**
intercepts	-4.98006	-7.874	0.9845	0.9922
GDP	1.344	19.009		
Dummy	-0.0505	-1.503		

Source: own calculations

Engel Grager Test

	Co-efficient	t-stat	P-value	F-stat	F-sig
Intercept	0.0042	0.3255	0.7542	1.1851	0.3123
Ut-1	0.3647	1.088	0.3123		

Source: own calculations

The results contain in table show that: 1) both the equations 10 and 11 fit the data well. The co-efficient of determinants are extremely high and statiscally significant at 0.1 probability level; 2) the equation 10 explains as high as 96.40% of the total variation in net global imports while equation 11 explains as high a 98.45% of total variation of import from MJK; 3)The co-efficient of GDP in both the equation are statistically significant corresponding to 1 % increase in GDP, net global imports increase by as high as 334% whereas 1 % increase in GDP induces an increase of 134 % increase in imports from the countries of comprehensive agreement. Thus, the growth of GDP imparts greater momentum in the growth of global imports than the momentum imparted to growth of imports of three countries (MJK) of comprehensive economic agreement; 4) the negative coefficient of time show that the function of net global imports shifts towards the left / negatively even if GDP is held constant the shift of parameter of time shall statistically significant. Therefore the NGIMPTS will decline by 86% per annum. This implies the consistent decline the net adverse balance of trade with the globe. However, the imports from MJK do not decline significantly through time under the influence of co-operation agreement. This is despite the significance in imports from the rest of the world; 4) the co-efficient of the dummy variable in equation 11 is also not significant so the cooperation agreements emerges to exercise non-significant influence on imports from theses countries.

Engel Granger test

The calculated value of B the co-efficient of lagged or stochastic error/ residual is 0.933 and the t-statistic = 2.019 which is statistically significant only at 0.08 probability but is not significant statistically at 0.05 probability. Thus all the variables in equation 1 of NGIMPTS are well co-integrated. The coefficient of lagged or stochastic error / residual and the t-statistic is not significant which is not significant at 0.2 probability. Thus all the variables in the equation of comprehensive agreement countries imports are well co-integrated.

The above results show that the results of regression equations of NGIMPTS and the imports from MJK countries of comprehensive agreement are valid and acceptable.

Findings and conclusions

The main findings are:
1. The distributions of GDP, NGIMPTS and imports from countries of comprehensive agreement are not normal.
2. Dickey -fuller Test reveals that the time series of GDP, NGIMPTS imports from MJK are non –stationary.

3. GDP, NGIMPTS and imports from MJK grow at significantly high rates.
4. NGIMPTTS and imports from MJK grow more rapidly than GDP. This indicates growth of Indian economy significantly dependent on Imports.
5. The functional relation of NGIMPTS are significantly dependent on the growth of GDP. Corresponding to 1 % increase in GDP, NIMPTS increase by 334% which is extremely high. This lends empirical support to the inference that the growth of Indian economy significantly depends on global imports.
6. The function of NGIMPTS however significantly shifts backward / negatively to the left. This implies that the dependence on global imports tends to decline independently of the growth of GDP.
7. The imports from MJK significantly depend on the growth of GDP. If GDP increases by 1% imports MJK increased by 134%. This also suggest that the growth of Indian economy is very highly dependent on the imports from these three countries.
8. The results of Engel Grander Test of regression of NGIMPTS and imports from MJK are valid and acceptable.

Above results suggests that the in-depth research is required to be undertaken on the impact of bilateral trade agreements and the agreement about comprehensive economic agreement with countries like Singapore, Thailand etc.

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Paradigm Shift in Investors Behavior in India

Aditi Pandey[1]

Abstract

The classical and neo classical theorists of Economics have mentioned time and again that investors are generally risk averse. These theories believe in hit and run. Invest if there is possibility of profit and run at the very sight of losses. Even Keynes believed that investors have animal spirits "that are governed by doubts than conviction, by fear more than the forecast, by memories of lost time and not by fore knowledge of next time". Even behavioural economists feel that "investors focus more on losses than gains" (Kahneman Prospect Theory). But are investors behaving in the manner as explained by theories in India in this millennium? Sensex has given a positive return for eight consecutive years, highest in world, breaking its own previous record of seven years (1988 to 1994) despite Indian economy slowing down in 2016,2017 and 2018. Pandemic Covid affected the globe for almost 2 years. Indian economy posted negative GDP growth at -7.1%. In India but capital markets are touching new heights every day. In 2020 June, Sensex has dipped to 26,000 from a high of 40,000 in January 2020 (Covid had impacted all kind of economic activities.) but by December, it reached 42,000 recovering all losses of investors and provided gains more than bank deposits. Although due to Covid there was great uncertainty. As per Economic Theory the SENSEX or NIFTY or Asset Under Management with mutual fund Companies should have declined (Individuals prefer cash in the period of uncertainty, Marshall) but this did not happen. Investment in capital markets and mutual funds increased. An Important fact that was noticed in the period was that number of investors(folio) increased during this period, suggesting that even new investors had entered in capital market. This paradigm shift in investors' behaviour needs explanation. This paper is divided into three parts. (1) the analysis of Capital market for the period of 2014 to 2024, with respect the investment in stock markets, mutual funds to discover any perceptible change in investment in pre- and post-Covid period of India. (2) An analysis of various risk return indicators with respect to the behaviour of investors and finally to explain the causes of the change in investors' behaviour if any.

Keywords: Second Generation Behavioral Finance, Efficient Market Hypothesis, Buffet Index, PE Ratio.

Introduction

India stock market capitalization has overtaken Hong Kong's capital market for the first time in history and ranks fourth in the world behind US, China and Japan. India's stock market capitalization has touched the value of $4.33 trillion on January 8, 2024 while Hong Kong's market capitalization is $4.27 trillion. The growth of Indian capital market in last decade has been rapid and stable. India's capital market has posted positive results for eighth consecutive years breaking all earlier record worldwide over. The growth has been recorded in all sectors (table 1). One must remember that during this period every macroeconomic fundamental of Indian economy has been quite strong. India is the fastest growing economy of the world despite various health, geopolitical and economic hazards.

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Its GDP growth is stable between 5.6% to 7.5% over quite a long period. Foreign investors have shown great confidence in India. Even US Taper tantrum has not affected the foreign investment in India. US raised its Fed rate but FDI flow in India has been growing not only in quantum but also in all areas and sectors. Earlier only some states of India used to get most of FDI but now the distribution of FDI is quite diversified. India is one of the countries of the world which has been quite successful in maintaining India's price stability, exchange rate stability and financial stability. CPI has been less than 6% for nearly 10 years as against the most developed economies. Even USA CPI rose to 9% in 2022. India's exchange rate has been also very stable against all emerging countries including Japan, Brazil, Germany, France and even China. The US $ has appreciated a bit but that is because of its character i.e. it is still treated as international liquidity. Yet the depreciation in last three years has slowed down. Now many countries are ready to trade with India in Indian currency. One can conclude that Indian Economy is going strength to strength and the whole world is looking for Indian markets.

The question is whether all these macroeconomic fundamentals are the cause of boom in a stock market? Or there are some other factors? In this research paper, the researcher is trying to evaluate and analyse the bullish run of Indian capital market through some historical as well as new classical theories that are utilized to analyse the risk return relation.

In India as GDI is rising so also is Gross Domestic Savings. Along with this foreign investors are also coming in large number to India. One must remember that Investors have variety of choices for investment such as physical or financial. The growth of investment in physical market can be observed by looking at the value of real estate (index has gone up from 109 to159) or gold where value between 2014 to 2024 is more than doubled (₹28,000 to ₹64,000). In financial markets inventors have to choose between risk less, investment e.g. government securities, bond, FDs of banks etc and risky investments such as capital market. In theory of finance, a comparison is made between the two via various ratios, such Treynor Ratio or Sharpe Ratio. There are some other methods and theories to evaluate the fundamentals of a company to measure its stock value is below per or above per e.g. Capital Asset Pricing Model, Efficient Market Hypothesis, most of these Ratios (theories are used to evaluate the correct share value of any company or fund). These microlevel studies are very important for investors to choose a particular stock or fund. But if one tries to analyze at the macro level, there are some other methods which are used to find out that whether the market at present is efficiently valued or overvalued or undervalued. Mainly there are two methods, PE (earning per share), buffet index (market capitalization) to evaluate whether the stock market at present is overvalued.

Review of Literature

There are various new theories of Financial Investment. A brief look on them would be helpful to explore the behaviour of Investor.The Capital Asset Pricing Model (CAPM) is a theory of portfolio choice developed by **Markowitz (1952, 1959).** It was a special case of expected utility where investors are concerned with the mean and variance of the Payoff for selected portfolios. Markowitz main finding was covariance of chosen asset return is the main cause of profit. Tobin (1958) in the liquidity Preference theory established the mean variance framework as the standard approach to portfolio theory. Brennan in 1989 criticised The investors believe about mean and variances of on assets . Sharpe (1964) and Lintner (1965) introduced equilibrium formula: $\mathbf{E_{ri} = r_f + \beta_i (E_{rm} - r_f) ,}$

Where, E_{ri} = Expected Return on Asset I, rf = Return on Risk free Assets, E_{rm}= Expected Return on the Market Portfolio, $\beta_i = Cov(r_i , r_m)$

Despite the assumption of mean, various preferences and how much unity of investors believe capital asset pricing model was considered as crucial development in finance. **Arbitrage Pricing Theory (Ross, 1977)** is a method used to estimate the returns on assets and portfolios. This model based on the linear relationship between assets expected risk and returns. Arbitrage is the practice of buying in a set at lower price and simultaneously selling it at a higher price. Investors assign macroeconomic factors that may affect the returns on the asset through regression process. **Efficient Market Hypothesis** occupies its own place and different from fundamental and technical analysis because share prices can't be predicted here and this model follows random walk that can present in stochastic process. Market efficiency hypothesis assumed that if market is competitive, symmetric information and no friction cost present in the market then difference in assets returns exist because of difference in risk . Investors who have greater risk bearing capacity, only they can earn higher returns. All available information become reflected in the stock prices so no investor can make higher profit without bearing higher risk and investors are not able to avail the opportunity of arbitraging . Efficient market hypothesis derived from **Fama's** research in 1970s. **Behavioral Finance** attacks on Arbitraging and Rationality of Efficient Market Hypothesis. Behavioral Finance assumes that investors are Irrational because of errors in information process and behavioral biases and do not believing in optimisation of returns. Behavioral finance stands on two pillars (a) Irrationality in investors and (b) limits to Arbitrage. The theories of Behavioral Economics have been developed as a separate field of research since 1960. But economists right from 16th 17th century had been trying to explain realistic human behaviour while dealing with economic decisions. For example many economists tried to explain the human behaviour in risky and uncertain situation of gambling, lottery etc. In 21st century very important behavioural economic theories have been developed which claim that most important cause of individual choice are heuristics i.e. thumb rule which humans follow instinctively for most of the choices and rationality takes a back seat. Kahneman and Tversky are one of the important pioneers of this theory. This new emerging field is important and more focus should be given because through the **Randomized Control Trial**, Psychological experiments (field based / lab based) arguments and premises of Behavioral Finance can be tested and biases can be controlled. Contemporary researches are coming from **Neuro Economics** (Field of Behavioral Economics) which discuss the impact of Neural Network on decision making. So, it is used in finance by transmitting new information by Neurons how quickly and how much investors' decision get affected.

Table 1

Sector	Market Cap (Jan 2024)	Percentage Growth (from 2023)
Agriculture	295905	+133.46%
Banks	4276413	+18.49%
Consumer Durables	219009	+54.86%
Diamond Seller	385538	+183.94%

Finance	2029603	+93.45%
FMCG	1726681	+103.65%
Health Care	1731258	+116.77%
Oil and Gas	2622517	+73.23%
Power	1370725	+172.82%
Software And IT	3532761	+188.38%

Source: BSE, Money Control, Jan 2024

PE Ratio for evaluating valuation of Stocks

Price to earning ratio is the ratio of a stock to its earning per share. It's one of the most popular valuation matric of stock. It provides indication whatever a market at current prices is overvalued or not.

In India, long-term PE values remains between 10 to 30. So, if the PE value is 20 or less, Indian markets are supposedly undervalued, but if it's more than 20, then the present stock are overvalued. The table 2, presented a clear picture that Indian stocks are overvalued.

Table 2

	Nifty Small Cap 250	**Mid Cap**	**Large Cap**
PE Ratio	33.06	26.5	24.39
PB Ratio	4.08	4.1	3.2
Dividend Yield	0.59	0.64	0.96
1 Year Return	56.7	43.68	26.32

Source: BSE, Money Control, Jan 2024

Buffet Indicator of Valuation of Stocks

Another popular measure of a stock market valuation is buffet index given by Warren Buffet. Warren Buffett often hailed as 'Oracle of Omaha' is renowned for his wisdom on investment. He introduced a concept for investment generally known as 'buffet indicator' i.e. ratio of total stock market capitalization value divided by current GDP value, Multiplied by hundred. If the value is equal to or less than 100 specially near 80, it will be beneficial for investors to invest, but if the value is higher than 100 then, according to this indicator, stock values are overvalued, investors shall resist investment. In Indian context at present the current valuation of market capitalization is $4.37 trillion dollar and GDP is $3.78 trillion. So, buffet indicator is as on 17 January 2024 at around 115. As per this indicator, Indian stock market seems to be overvalued. In past 20 years buffet index for India has crossed the level of 100 only on three times and each time Indian market crashed. But past experience cannot always suggest/predict the future. The US market's buffet index is as high as 167 and even then, foreign investors invest largely in US markets. Almost all financial planners of the world are bullish about Indian market.

Following table shows the Buffet indicator of various countries.

Table 3

Country	Buffet Indicator
US	1.76
CHINA	0.78
JAPAN	1.32
GERMANY	0.61
INDIA	1.12
UK	0.98
CANADA	1.41
FRANCE	1.14
RUSSIA	6.04

Source: SEBI Report 2023

After discussing the two theories of share market valuation one can conclude that in Indian market foreign as well as domestic investors which include high net worth Indians to very small investors are keen on investing in capital markets directly or via mutual funds. Even in mutual funds, the investments are increasing in equity markets rather than debt or thematic funds. This factor is proved by RBI data. Taking 2019-20 as base year one finds" a seachange in the financial landscape". There is a sharp increase in growth of AUM of mutual funds in next three years. There was a CAGR of 24.8% (from 20.26 lakh crores to ₹39.42 lakh crores, in this period). As against this in the case of bank deposits, the growth was just 10% (from 135.67 lakh crores in financial year 2020 to

₹ 180.44 lakh crores in financial year 2023). The CRISIL report on market intelligence and analytics 2023, further confirms the RBI data. The report says "that bank fixed deposits still remain the most preferred financial instrument in the country but their share is declining over the years with investors moving towards capital market instruments. While capital market has grown at a pace of 16% in past five years as against bank deposits, which grew at a rate of 10%. This means that AUM of managed products is 79% of fixed deposit as compared to 59% five years back.". If this continues the market analysts believe that by 2027 capital market investment will easily available fixed deposits. India like most emerging economies is moving towards a financial landscape where equities and its alternatives play a key role in asset allocation.

All the above data and analysis points out towards an important fact that now investors are choosing more and more equity/ mutual funds investment(risky) to safe and risk less (FD, Bonds) assets. This change could be due to variety of factors e.g. very low positive inflation beating returns in deposits. Stable and better returns in a stock markets / mutual funds for quite long time. Another reason could be heuristics i.e. cognitive and emotional biases created by advertisement of AMFI through cricket/ film stars. A more possible / plausible explanation is a new kind of behavioural research which can be called as second generation behavioural finance. Behavioural finance theories began in 1980s (first generation.) which believed that at many times investors behave irrationally because of (a) limited information,(b) emotional factors, (c) cognitive errors(not recognizing the correct scenario). These economists believe that people may buy lottery tickets(more risk with little returns because they feel a particular number is lucky to them). Further decision making has to be constrained by time. So, no logical reasoning is required at all the steps. The first generation behavioural finance explains the herding behaviour of investors. The second generation of behavioural theorists like a Statmen, Maier, 2017 and others believed that herd behaviour is not irrational, but normal. Individuals construct their portfolio (FD, MF, stock market, gold) because they have some common beliefs. Every individual wants to move out of poverty, enjoy wealth by having a good house or car. There is an inherent implicit liking to do best for their children in getting best education and health. So naturally they should invest in creation of wealth rather than preventing it in bank deposit over a long period of time. Individuals can only preserve their saving but no wealth creation possible. For this stock market is better option although there are risk but risk are inevitable in life. Without risk wealth creation is simply impossible. So, it is normal and natural that individuals invest in the stock.

If one look at the growth of a stock market and mutual funds with this idea that each individual wishes to live in riches with whatever little he could invest, then present bullish stand of all kind of investors and institutions can be easily explained. Warren buffet writes 'if you don't find a way to make money while you sleep, you will work until you die.' This simply means that you sleep over your investment and when you arise, you find have earned a fortune. This reminds us the story of Hear and tortoise. You keep investing regularly for quite long. You will ultimately win. Now the time of bulls and beers is gone, when Harshad Mehta could earn a fortune by bluffing the people, by taking up one or two shares, force their prices up and profit by selling forcing the market down. If now one looks at the success stories of Indian market like Rakesh Jhunjhunwala, who started investing in 1985, with a 5000 shares of tata Tea and has now built up a fortune of ₹20,000 crores by investing in stocks. Porinju valiyanth appointed as a floor trade in 1999 started his portfolio management service later in Kochi is today having a fortune of ₹18,000 crore. Vijay Kedia, Nimish Shah, Ramesh Damani, Dally Khanna are some of the names which began their investment as retail

investors in 1990 to 2005 and today owns of more than 10,000 crores. One must remember that there are large number of looser as well. But the important lesson is that wealth creation is only possible through investment in stock market and is not possible by depositing money in banks, post office or insurance. Another important fact is that now giving time to investment (sleeping on investment) is more important than timing your investment. This tortoise like patience is must if anybody wishes to create wealth which is always one of the important objectives of investor. Therefore, what one finds is that even during period of great uncertainty, people withdraw their money from fixed assets and continue investing in stock market. Stock investment is the way of wealth creation could be sum from following table

Table 4: Nifty Midcap 150, Nifty 100 , Nifty Small Cap 250 and Nifty 500 Index Performance.

	CAGR returns (%)				Volatility (%)				Return-risk			
Period	Nifty Midcap 150	Nifty 100	Nifty Smallcap 250	Nifty 500	Nifty Midcap 150	Nifty 100	Nifty Smallcap 250	Nifty 500	Nifty Midcap 150	Nifty 100	Nifty Smallcap 250	Nifty 500
Since Inception	17.0%	15.4%	15.7%	15.0%	21.8%	22.3%	22.3%	21.6%	0.78	0.69	0.70	0.69
15 years	15.4%	13.2%	12.9%	12.9%	21.6%	22.1%	21.9%	21.4%	0.71	0.60	0.59	0.60
10 years	18.4%	14.9%	15.2%	15.0%	17.5%	17.1%	18.9%	16.8%	1.05	0.87	0.80	0.89
7 years	17.9%	13.3%	13.8%	13.8%	18.0%	17.3%	19.8%	17.1%	0.99	0.77	0.70	0.81
5 years	17.2%	15.5%	13.6%	15.5%	18.5%	18.0%	19.9%	17.8%	0.93	0.86	0.68	0.88
3 years	16.1%	14.4%	14.0%	14.6%	20.8%	21.5%	21.6%	21.0%	0.77	0.67	0.65	0.70
1 year	70.0%	52.8%	84.7%	56.9%	17.0%	15.7%	18.4%	15.4%	4.11	3.36	4.61	3.69
6 months	22.3%	19.3%	29.0%	20.3%	15.8%	13.6%	17.7%	13.6%	1.41	1.42	1.64	1.49
3 months	10.8%	10.4%	11.0%	10.5%	11.6%	8.4%	15.3%	8.5%	0.93	1.24	0.72	1.23
YTD	37.3%	24.3%	46.6%	27.4%	16.4%	15.8%	17.0%	15.4%	2.27	1.54	2.74	1.78

Source: NSE Indices. Data as of Aug 31, 2021. Returns based on TRI values. Post Apr 1, 2016, stocks in the Nifty 100, Nifty Midcap 150 and Nifty Smallcap 250 indices are selected based on 6m Avg. Full MCap. Prior to April 1, 2016, there may be overlap between the portfolios of these indices.

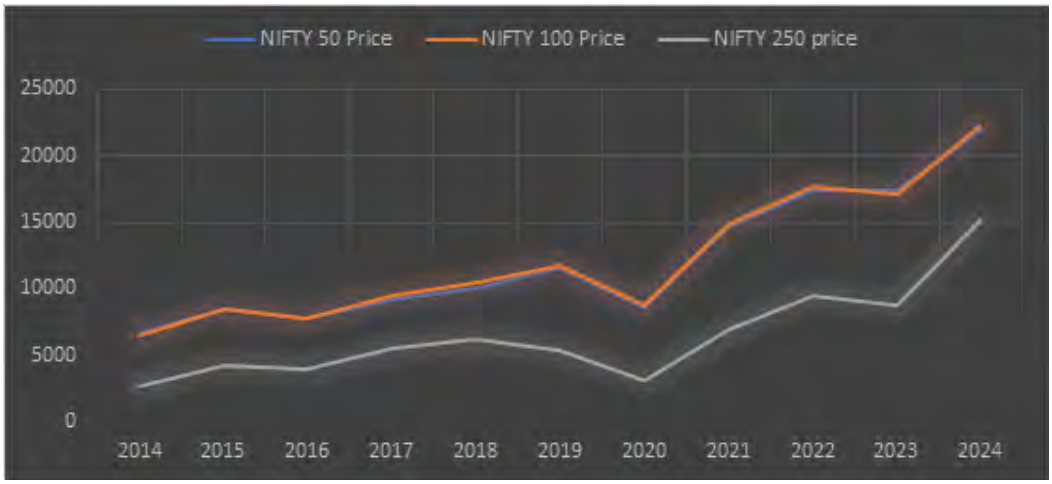
Long Term (15 years) returns on Small cap / Mid cap and Large Cap average more than 15% while long term results in PPF, FD, Government securities are between 7% to 8%. Although there is volatility in stocks but if one invests in long run, the returns are stable and high.

Table 5: Price of NIFTY 50, 100 and 250

Year	NIFTY 50 Price	NIFTY 100 Price	NIFTY 250 price
2014	6704	6598	2682
2015	8491	8519	4318
2016	7738	7832	4012
2017	9173	9467	5596
2018	10113	10478	6270

2019	11623	11789	5438
2020	8597	8731	3201
2021	14690	14807	6952
2022	17464	17660	9441
2023	17359	17186	8787
2024	21853	22199	15175

Figure 1: Price of NIFTY 50, 100 and 250



Groups	Count	Sum	Average	Variance
NIFTY 50	10	127101	12710.1	23511380.8
NIFTY 100	10	128668	12866.8	23585407.1
NIFTY 250	10	69190	6919	12379644.2

Source of Variation	SS	df	MS	F	P Value	F crit
Between Groups	229792396.5	**2**	114896198	5.79538118	**0.00805166**	3.35413083
Within groups	535287888.5	**27**	19825477.4			
Total	765080285	**29**				

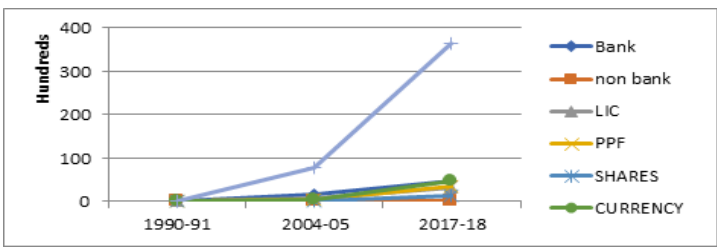
A simple glance at the table is enough to find out that growth of nifty 50 and nifty 100 is much lower than that of nifty 250. It must be remembered that nifty 50 are top large cap companies where risk is comparatively less because the companies have better management, inventory, liquidity ratio and surplus reserves. The next hundred companies, nifty 100 are Mid Cap companies, the risk grows only by little because only very good, stable and long standing companies trying to take place in the upper group. In both these companies, the growth in last 10 years (2014 January to 2024 January) is almost similar 32.6% and 32%. But incase of Small cap there is quite significant difference.

Ho: There is no significant difference among the returns and PE ratio of large cap, midcap and small cap.
H1: Ho: There is significant difference among the returns and PE ratio of large cap, midcap and small cap.

Analysing the table by using Anova, the P value is very much less than .05. Thus, null hypothesis is rejected and alternate hypothesis is accepted.

Generally, investors invest in large cap and mid cap because of their stability and management. So, it is expected that investors are not risk averse but also not risk loving, it is somewhere between them. This movement is quite predictable in a period where government savings scheme/ bonds, interest rate were low (sometimes even lower than interest rate). Investors/ mutual fund managers invest in them to get positive returns. If one looks at the policies of RBI during the period (2014 to 2018) one finds this behaviour of investors quite appropriate. RBI enforced operation twist (purchasing high rate bond./ securities and issuing low interest securities) . Repo rate were also between 4.5% to 6% . FD, Sukanya Samriddhi Yojana, PPF, EPF rates were decreased. So, investors movement towards the stock market could be explained by Economic theory. But Investors' attitude towards small cap cannot be explained. Small cap investments are riskier than mid-cap and large cap. The graph clearly shows that investors are floating towards small cap. Its dividends are quite low. According to table, Small caps grew at a rate double than large and middle cap which means that it is against the traditional behavioural finance theory but the fact is, now investors are opting, more and more risk loving instruments. Small cap is preferred to large cap which is being preferred to risk free government bonds while traditional economics suggests that individuals should prefer FD to large cap, large cap to midcap and midcap to small caps.

Figure 2: Savings in different Financial Instruments



Source: RBI handbook on statistics

Conclusion

In India, stock markets were considered out of bounds for common men. In various Hindi films, Seths were shown to become pauper or vice versa in a day due to stock market operations. In 1964, first mutual fund company, UTI was created in public sector because people had little faith in direct./ indirect investment. In UTI, the returns were guaranteed and were kept above government led deposit schemes so that investors could have faith in it. In gross domestic financial savings, banks and post office had a share of 85%. Since 1980s, financial market was slowly opened to private and foreign companies yet up to new millennium, the share of mutual fund industry was less than 3% and the stock market, a little over 10%. Rest of financial savings were with banks, insurance and post office. Since new millennium, especially after 2005, investment in stock markets, debt market and mutual fund increased at a rapid speed. In first 10 years growth was main Metro centric, then moved into tire II and tire III cities. Post 2014, direct investment capital market and indirect investment through mutual funds widened and deepened (still it's quite low in rural areas). Meanwhile, various government policies and nudge adopted through advertisements and other methods have changed the thinking of investors. Sensex is now not based on sensitivity and is no more emotional investment. It's a new kind of rationality. As participants have increased on both sides (supply and demand) it has become more a case of perfect competition where price discovery is based on real information. Although sometimes (like a report on Adani) market still affects by report/ emotions but in general investors have now a complete belief in capital market and macroeconomic fundamentals as well as financial and fiscal stability. So, investors as mentioned, do not believe in the theory of hit and run rather they believe that giving time to investment is necessary for wealth creation and markets have demonstrated the stability so that even foreign investors are flocking in Indian capital markets. Bears are gone only bulls remain. This transformation from Bear to Bull is the paradigm shift in the attitude of investors.

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