



# JOURNAL OF ECONOMIC SCIENCE

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ARTICLES / 1

**" Knowledge Multiplier in the Indian Economy: Do Market Imperfections Slow Growth?"**.

**NMP Verma\***

**Abstract:**

*The present paper confines to contemporary discourse on growing imperfections in the goods and service markets with special focus on the Indian market. One of the emerging economic problems is related to growth of imperfect market. The reason of imperfect market is poor interactive performance of knowledge among the three agents'- producers, government, and households. The reasons of poor interactions depend on percentage of literacy, consumers' awareness, knowledge disseminations channel, technology and their frequent updating. Therefore, market needs perfections for efficient performance through these mechanisms. The purpose of this paper is to highlight imperfections in market of developing economies including India and some factors which restrain knowledge multiplier to work swiftly.*

**Contribution/Originality:** *The constrained knowledge multiplier affects supply of goods and services, demand of goods and services and trade cycle along with resultant price level. These cause occasional deficit or surplus in the market and bring volatility. The paper primarily is a theoretical one. In the beginning, it highlights theories of knowledge generation and factors portraying its multiplication. Then a critical analysis is done to highlight mixing of polluted knowledge because of ethical erosion, optimizing motive of profit and minimization of cost strategy. In the end, the paper discusses how knowledge generation should be standardized through quality improvement, better consumer literacy, producer's ethical values, labor relations and government regulations. Lastly, some views have also been given for future directional approaches and strengthening the discourse.*

**Keywords:** *Market Imperfections, Knowledge Multiplier, Indian Economy, Growth*

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\*Former Senior Professor, Department of  
Economics and Former Vice Chancellor,  
Babasaheb Bhimrao Ambedkar University, Lucknow-226025, India.  
Email: [nmpverma@gmail.com](mailto:nmpverma@gmail.com) Mobile; +91 7905123950

## **1. Introduction**

Indian economy is facing chronic problems of larger population size, low employment and income generation, low human development index, lower empowerment of women, low per capita income, low literacy rate, poor enrolment rate, use of old and obsolete technology, lower productivity in sectors and subsectors, weak transporting networks, weak IT logistics and infrastructure base and many other in addition to low capital and large labor. A good size of population is poor. Their consumption behavior is mainly of necessary goods and services. Income inequality is also very high as measured by Gini coefficient. Since the people are living in such an environment, the interactive behaviour of people is also of low level. Not only the above, even knowledge generation, have its dissemination and transmission remained at the lower ebb. Market is a place where three agent's producers, business and households are supposed to have complete knowledge. Unfortunately, market is not transparent in developing economies and whatever producers are doing, what government machinery are doing and what households are doing hardly perfectly known to each other. If there is no transparency and understanding, market will remain constrained, knowledge multiplier will remain low, interactive synergy will be non-amicable and hence economy will not grow rapidly. Therefore, in this paper, importance of knowledge generation and subsequently its transmission is highlighted. Secondly, knowledge multiplier is slow in developing economies and thirdly, rationality will be analyzed for fast market behavior. Ways to improve the knowledge for smooth, secured, and sustained market is also strived to be covered in the paper.

## **2. Knowledge Formation: Review of Theoretical Concepts**

There are a few theories relating to knowledge origination, generation, and multiplication such as Blank Slate, Empiricist, Paradigmatic, Innovative Imaginative, and Rationality (Verma 2015, 2021).

- i. Blank Slate:** British philosopher John Locke said that human minds are empty. Ideas begin by sensation. It grows denser through revision of thoughts. All persons are born with zero idea in brain. However, they acquire knowledge through experience. The mind is a "blank slate" at birth unable to process any data. This is added up through sense organs. The human brain is born blank. It also emphasizes on the freedom of individuals to author their own opinions. People are free to analyze the content of an object. However, the basic features of the human species cannot be altered. Thus self made mind leads to the doctrine of "natural" rights. Thus Locke's idea of tabula rasa is often viewed similar to Thomas Hobbes's arguments of human nature, in which human being is endowed with inherent mental content—especially selfishness. Ahead of it, Freud depicted personality traits as being formed by generational fluctuations. People lack freedom. Genetic influences on personality are quite low. In Freudian psychoanalysis, individuals' attributes are also largely determined by prevalent environment (Verma, 2015).

- ii. Empiricist Theory:** After birth, the second stage, a baby mind starts working through visual and audible modes. The sense organs and work organs start working. Empiricist theoretically opined that experience improves and refines knowledge. People learn through their perceptions. Error brings perfection in knowledge. Perfection in knowledge without experience is hardly possible. Occasionally, hereditary genes may be also exceptionally be considered as a store of knowledge. There are at least three types of empiricists – classical, radical, and moderate. Classical empiricists reject the value of knowledge by birth. The mind in post birth period grows with data and reasoning prevailing around. Radical empiricists feel that knowledge is obtained through sensing. It is almost impossible to say about something which is hardly sensed. Statements which we give are justified if supported by our experiences. Radical empiricists prevent religious or spiritual contributions in knowledge generation. We also realize increasingly that no matter how central beliefs and world views are, culture itself does not furnish the last word on contexts (NMP Verma and Asha Srivastava: 2012). Locals focus on variables like ecology, technology, socioeconomic and cultural; adds in knowledge diversity. Understanding these changes practically and fundamentally are required for regionally perceived responses. Rational thinking and deliberation on crucial issues like early ageing, marginalization, malnutrition and the rise of unequal economy within the global economy take on different thinking. Moderate empiricists agree that in some cases, the senses do not ground our knowledge. Unknown knowledge basically comes to us through experience and in-depth thinking. Important knowledge is obtained through books, reports, electronic and print media and interaction with younger or older people. For collecting data, proper method is required. To learn difficult things, we need special expertise and knowledge.
- iii. Paradigmatic Theory:** Paradigm theory was developed by Kuhn (1962). It shows an example that forms the base of a method of fundamental research. Kuhn hardly maintained the value of paradigm as appropriate for social thinkers. He classified the social science knowledge and brought the concept of natural sciences. He observed that social scientists normally having subjectivity and hence disagrees on certain fundamental concepts. It was accepted that there cannot be paradigms in social sciences. It is true to mention that classifications in the social disciplines do not depend on paradigm. Developing digital tools for research, individual or collaborative, proves to be of competitive importance. The libraries and documentation centers, archive materials for dissemination of knowledge. Bilingualism or even multilingualism may be promoted if we look at domestic and global market demands. Appropriate funding is definitely required for getting success. Programmes and schemes enhance the mobility of ideas and reduce the negative brain drain. There are heterogeneity among regions, countries and institutions relating to access to knowledge. This needs to be of less disparity. As a consequence, equality in knowledge spread is feasible.
- iv. Innovative Theory:** The need of society is diverse and dynamic and so is the market need. The academicians` deliberations on aggregate demand and supply in the market, pre market operations, post market operation, innovation at every stage

of production and processing are crucial issues of innovation. Schumpeter in his contribution on innovation felt that innovation is the most relevant factor for generating market power. Knowledge is not static. It is dynamic and keeps on improving. Knowledge is not always permanent. As human need arises, curiosity to add knowledge also rises. It improves through historical knowledge and some addition to it. Invention is a new search or creation of a new product or technology. Opposite to it is innovation which refers to bring changes to the existing product or the process by introducing new ways or ideas. Thus invention is all about creating or designing some items, innovation is the process of turning a creative idea into practice. New technology production is invention and its adoption is innovation. Schumpeter (1934) linked innovation to business cycle of the economy. Thus it is clear that invention is confined to R&D of an industry but innovation is a broader term spread all over the industry. This theory can be analyzed in a different way now. Fundamental knowledge generation is invention and make this knowledge adaptable by economic agents in the market is innovation. Thus invention is knowledge generation and innovation is knowledge multiplication. If the multiplier of practicality of innovation is high then knowledge multiplier will be also very high. It will benefit all concerned and even those who are feeling concerned after awareness. Market gets imperfection because knowledge does not multiply quickly in developing nation. This is because of a few factors such as lower level of illiteracy in general and of consumers in particular, drop-out ratio in educational enrolment, lack of education infrastructure, insecurity for girls and mindset of dependence on government. For innovation entrepreneurship is required. Somehow in developing and in SAARC countries entrepreneurship is lacking. People do not want to take risky knowledge. That is why knowledge transmission gets constrained.

- v. **Imaginative Potentials:** Knowledge breeds from imagination. Imagination involves knowledge and creativity. For example, while sitting under an apple tree Isaac Newton observed that apple falls on ground. This prompted him to think about these phenomena and later he propounded a new theory that earth has some gravitational power which attracts apple down to earth. At that time, Newton faced a static situation and so it was easy to conclude. But market situations are dynamic in nature and it changes very quickly among the imagination of producer, distributor and households including the government. Because of this dynamism, it is not easy to imagine and conclude a result. As we can see contemporary economic theories assign a very little role to imagination because economic activities are a dynamic process. Apart from imagination there are many factors which define the process of economic activity. Imagination is the ability to conceptualize a mental image about some items; that is not through the five senses. It is the ability of the mind to make mental scenes, objects, or events that do not exist nor is present or have occurred in the past. Everyone possesses some degree of imaginative ability. The imagination is reflected in various degrees in different people. In some, it is highly developed while in others it is observed in a weaker form. Historically, the hominids made basic levels of imagination in their tool making abilities, group hunting skills, social interaction, and colonization. Their level of imagination was

limited with respect to their brain size and their thinking. As modern humans are evolved, scientists have reported an increase in brain quality, advancement in technical skills and creativity and a development in social complexities. Farming, old tool making ability, complex language structuring, the performance of social rituals and the display of art and craft; all requires frequent thinking, development of thought and mental interaction i.e. Imagination. It permits us to explore possibilities beyond the constraints of our social environment and our facts, into a world of dreams, where creativity and invention are at their strongest. The major difference between creativity and imagination is that imagination is thinking of something – whether it's an object, place, time, etc. – that is not present, while creativity is doing something meaningful with your imagination. Thus imagination may be unproductive sometimes but creativity is productive and knowledge augmenting..

- vi. **Rational Knowledge:** Rational expectations theory defines expectations as being the best estimates of the future that uses all available information. It is all perfect information that helps estimate optimal prediction or forecast. It is assumed that predicted outcomes do not differ systematically from the market balancing results. As a result, rational expectations do not differ systematically or predictably from equilibrium results. That is, it assumes that people do not make systematic errors when predicting the future, and deviations from perfect foresight are only random. In an economic model, this is typically modeled by assuming that the expected value of a variable is equal to the expected value predicted by the model. For example, suppose that  $P$  is the equilibrium price in a simple market, determined by supply and demand. The theory of rational expectations says that the actual price will only deviate from the expectation if there is an 'information shock' caused by information unforeseeable at the time expectations were formed. In other words, *ex ante* the price is anticipated to equal its rational expectation: Rational expectations theories were developed in response to perceived flaws in theories based on adaptive expectations. Under adaptive expectations, expectations of the future value of an economic variable are based on past values. For example, people would be assumed to predict inflation by looking at inflation last year and in previous years. Under adaptive expectations, if the economy suffers from constantly rising inflation rates (perhaps due to government policies), people would be assumed to always underestimate inflation. Many economists have regarded this as unrealistic, believing that rational individuals would sooner or later realize the trend and take it into account in forming their expectations. The rational expectations hypothesis has been used to support some strong conclusions about economic policymaking. An example is the policy ineffectiveness proposition developed by Thomas Sargent and Neil Wallace. If the Federal Reserve attempts to lower unemployment through expansionary monetary policy economic agents will anticipate the effects of the change of policy and raise their expectations of future inflation accordingly. This in turn will counteract the expansionary effect of the increased money supply. All that the government can do is raise the inflation rate, not employment. This is a distinctly New Classical outcome. During the 1970s rational expectations appeared to have made previous macroeconomic theory largely obsolete, which culminated with Lucas (1973). However, rational expectations theory has been widely adopted

as a modeling assumption even outside of New Classical macroeconomics. Thanks to the work of New Keynesians such as Stanley Fischer. If agents do not (or cannot) form rational expectations or if prices are not completely flexible, discretionary and completely anticipated economic policy actions can trigger real changes. Rational expectations are expected values in the mathematical sense. In order to be able to compute expected values, individuals must know the true economic model, its parameters, and the nature of the stochastic processes that govern its evolution. If these extreme assumptions are violated, individuals simply cannot form rational expectations and then knowledge would be full of errors. Therefore, rationality plays a crucial role in purity of knowledge derivation with forecasting.

3. **Knowledge Multiplier Channel:** Schools, colleges, universities, and institutes are linked to education and knowledge multiplication so is family and society. In the present structure there is a qualitative difference in teaching/research. Given the income inequality in the system there is hierarchy of educational system. For example, in India this needs to be standardized. So should be evaluation process of examination materials and systems. It is important to reinstate the significance of the social sciences by not only highlighting its increasing relevance for a job in the rapidly expanding subsectors, but by pointing to its necessity in laying the foundations for an analytical and creative mindset. It is often presumed that only natural and physical phenomena lend themselves to scientific inquiry, and that knowledge pertaining to the social sciences cannot be, by their very structure so “scientific”. But it is necessary to understand that the social sciences stick to scientific inquiry just as much as the natural and physical sciences do. The methods employed by social sciences are analytical and unique to those of the natural and physical sciences (Verma & Srivastava, 2009). It is through this non-coercive and participatory mode that children and teachers stand best chance of making teaching and learning interesting as well as enjoyable. All the diverse disciplines of social science have distinct methodologies that often justify the preservation of boundaries. The boundaries of disciplines need to be well thought and a plurality of approaches may be applied in order to understand a given phenomenon (NCERT, 2006).

#### **Derivation of Knowledge Multiplier**

Suppose  $k$  is knowledge so

Knowledge in past year =  $k_{t-1}$

Knowledge in the current year =  $k_t$

Change in Knowledge =  $(k_t - k_{t-1})$   
 =  $\Delta k$

Knowledge growth  $k_g = f(I)$

Where  $k_g$  is knowledge growth

$I$  is investment in education, educational infrastructure, manpower, labs, reading materials, interactions, skilling and so on.

So  $I_t - I_{t-1}$  = Change in investment on knowledge in t period =  $\Delta I_t$

So change in knowledge per unit of investment in education =  $\Delta K_t / \Delta I_t$

#### **4. Knowledge Applications**

There is enough peoples' perception that social sciences carry little value. As a consequence, during the classroom-transaction, both faculties and students feel uninterested to comprehend its social relevance. From the initial stages of education, people brief students that the technical education, economics, management, and key basic science subjects are superior to the social sciences, and are the major field of meritorious students. Therefore, there is need to highlight that the social sciences are essential to provide social, cultural, developmental and analytical skills required to adjust to an increasingly integrating economy and to handle political and economic realities. Science hardly transmits information which is required to be memorized for examinations. The textbooks are considered to be unconnected to daily socioeconomic values. In addition, social science is believed to provide irrelevant details. It is also felt that the examination rewards varies largely with evaluation by different teachers. There is a perception that not many desirable job options are open to students specializing in the social sciences. Job potentiality of social science disciplines in corporate sector has not gone up. Any effort to address the information burden the social sciences will have to review the contemporary evaluation system. Additionally, it is largely felt that the social sciences are deprived of the 'skills' required to function in the real world. This gives the impression that the subject is redundant. It is important to enhance the importance of the social sciences by not only highlighting their increasing relevance for jobs in the rapidly expanding sectors, but also by pointing to their indispensability in laying the foundations of an analytical and creative mind relating to employment, distribution of asset and wealth, governance and safety. This is urgently required in the growing capitalist environment and ethical erosion. This may further improve employability for the students and scholars of other discipline. The social sciences deal with a normative responsibility in order to create and widen the popular base for human values. It suggests what should happen in the society. Given these, social science teachings should aim at inculcating a critical moral and mental strength to make the society aware to the social factors that destroys these values. These are possible through the discussion on these numerous indicators. Here is also a need to choose subthemes where different disciplinary focuses can facilitate an in-depth and multiple understanding. Here consensual deliberations and consequent conclusions are essential.

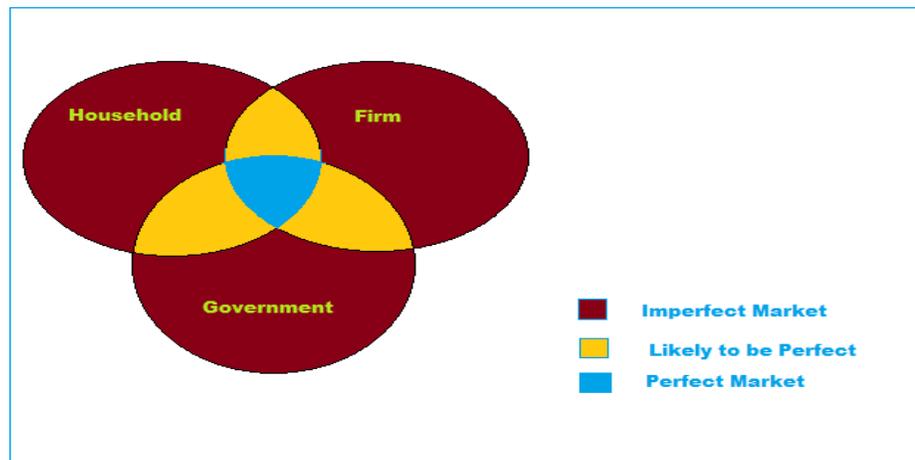
#### **5. Transmission Mechanism**

One of the criticisms of state financing of higher education has been that it exacerbates inequality within society in temporal and spatial manner because students in higher education come from the most socially disadvantaged backgrounds. Although no single model of financing higher education is

appropriate still India has to balance the challenges of higher education access with higher education funding. The balance in the division between state and private funding is also related to other important dimensions within each society. These dimensions include the proportion of students seeking higher education and the social background of students as well as scholars; the resource and taxation structures; the drivers of disparities; the fiscal policy of the government; the nature of students' educational loan facilities; and the externalities in higher education. In the context of an emerging national focus on quality in education, providing high quality teacher education is seen as the most important single parameter for meeting out the challenges and wider access to teacher education (NCERT, 2006: Alamelu et.al.2012). The idea and information they generate can therefore make a precious contribution to the formulation of effective policies to shape our world for the greater good. Yet, social scientific knowledge is at risk in developing nations. The huge disparities in research capacities across Indian states and the qualitative heterogeneity in knowledge creation hamper the capacity of understanding about the market. While we may be building a rational and transparent knowledge society', it is one that looks very different depending on one's regional perspective. Social scientists produce work of outstanding quality and tremendous practical value, but, social scientific knowledge is often the least developed in those parts of the world where it is most keenly needed. Such educational divides reproduce themselves in each generation, in our institutions and in our methods of creating and using knowledge. All such findings are definitely challenging – they emphasize that without conscious and coordinated efforts. The global social science structure is fractured and lacks pluralism (Shapere, D. 1964).

- 6. Consumers, Firms and Government Interface:** As mentioned above the three market agents try to interact in the market as per knowledge availability. Given in the figure below, brownish colour shows imperfect market because this space is in no interactive zone. Yellow colour shows likely to be perfect market because two agents interact to that extent. Blue colour shows complete interactions among the three agents. Here all agents have complete knowledge about the market. The market is heavily constrained because of knowledge deficit. Knowledge multiplier worked very slowly. A very small space shown bluish is transparent, and perfect. Thus developing nations face a big challenge of knowledge formation relating to market. In numerical terms bluish multiplier carries perfect knowledge and hence value 1, yellowish has one about fourth knowledge hence knowledge multiplier value is about 0.25. Brownish has knowledge deficit of two third in firm, households and the government. Here, multiplier hardly works and its value would be almost zero.

**Figure 1- Showing Features of Indian Markets**



## 7. Market Failures

The symptoms of the market failures include incomplete information. The key causes of incomplete information are:

Enrolment deficiency

Dropout rate

Helping the household opinion

Paying less attention to workable, and behavioral quality knowledge, and Interactive shortages.

Gross Enrolment Ratio (GER) in Higher education in India is 27.1, which is calculated for 18-23 years of age group. GER for male population is 26.9 and for female, it is 27.3. For Scheduled Castes, it is 23.4 and for Scheduled Tribes, it is 18.0 as compared to the national GER of 27.1.

Total enrolment in higher education has been estimated to be 38.5 million with 19.6 million boys and 18.9 million female. Female constitute 49% of the total enrolment.

About 79.5% of the students are enrolled in Undergraduate level programme. 2,02,550 students are enrolled in Ph.D. which is about 0.5% of the total student enrolment.

Pupil Teacher Ratio (PTR) in Universities and Colleges is 28 if regular mode enrolment is considered whereas PTR for Universities and its Constituent Units is 18 for regular mode.

If we analyse the Indian data then we observe that enrolment ratio is very less and skewed among states. The Indian census data reveal that enrolment at primary, secondary and graduation level are low in general and more so among girls. At the post graduation and professional level it is further lower (Census 2011).

Once enrolment has been done we further observe that the discontinuation rate is very high may be because of poverty, lack of environment, opportunity costs and teachers/infrastructure in government schools and colleges especially in rural areas (Verma, 2015, 2016).

Being a poor country the rate of fertility is very high in India. Children are hardly promoted for schooling in poor and low income group families. Rather children are encouraged for household care, child labor, animal husbandry and low paid jobs.

This way knowledge acquisition becomes less among such children (Verma & Srivastava, 2012).

Technical and professional education is very expensive in the reputed Indian institutions. Poor households' children are hardly affording such education. Further, there are rampant problems in conduct of examination and evaluation of answer books. Publication of substandard books, unfair means during examinations and carelessness in evaluation of answer books are some of the reasons of low quality education (Verma, 2015).

If the teaching and research are substandard then this may lead to interactive shortages. This deficit is mainly because of heterogeneousness among students based on language, income, and motivation (World Bank, 2010, NCERT, 2006).

Lastly we observe negative externalities and rising inequalities in the Indian Economy. There is prevalent inequality which encourages shyness towards interaction and group discussions. The Gini coefficient has gone up beyond limit (Verma & Srivastava, 2020, Verma, 2021). Major share of informal market and difficult to digitalize non-metro markets are additional causes of concern for slow movements in knowledge multiplier.

In addition to the above, the labor market is also imperfect because all the labours do not have enough understanding about the working of the macro market such as

impact of inflation on wages. Inflation comes first but wages do not increase for many months and years. The real wages will fall but workers do not realize this real loss for few months and years. This is mainly seen in unorganized sector, a vast sector absorbing 90 per cent of people in India.

## 8. Empirical Evidences

### 8.1 Enrollment Ratio

**Gross Enrolment Ratio (GER)** or **Gross Enrolment Index (GEI)** is a [statistical measure](#) used in the [education](#) sector, and formerly by the [UN](#) in its [Education Index](#), to determine the number of students enrolled in school at several different grade levels (like elementary, middle school and high school).

If we look at table 1(Gross Enrollment Ratio at Decadal Intervals) from 1971 to 2011 we will have Gross Enrollment Ratio in Primary school continuously increasing as we have 78.5 G.E.R. in 1971 and in 2011 it becomes 108.3 but in 2020 It becomes 99.9 due to pandemic proportion of GER in 2020 had reduced to 99.3.

GER in secondary education also provides a significant improvement in enrollment of students from 23.4 in 1971 to 75.4 in 2020. If we look at the same table in tertiary sector or in Higher education; enrollment percentage in 1971 was 4.9 and over the passage of time in 2011 GER in higher education was 22.8 and in 2020 it was 29.4 which shows significant improvement in higher education.

Table- 1: Gross Enrollment Ratio at Decadal Intervals

YEAR	Gross Enrollment Ratio		
	Primary	Secondary	Tertiary
1971	78.5	23.4	4.9
1981	84	29.9	5.2
1991	91.1	NA	6
2001	94.1	44.8	9.7
2011	108.3	66.1	22.8
2020	99.9	75.4	29.4

Source: World Bank Estimates 2020

### 8.2 Expansion of Institutional Infrastructure

Table 2 shows population per unit institutions since 1950-51 to 2000-01. If we look at table we will get that in 1950-51 primary section there were one primary school on 1722 number of populations; with passage of time in 2000-01 it came to 1611 means on 1611 number of populations there was one primary schools.

In upper primary in 1950-51 there was one school at 26551 numbers of populations and with passage of time it came to 4987 in 2000-01 which shows magnificent improvement over the period of time. In senior secondary in 1950-51 there was one senior secondary school at 48796 numbers of population and in 2000-01 means after fifty years there was a senior secondary school available on 26790 number of population.

Table 2 also shows availability of colleges and universities on what proportion of population.

Initially in 1950-51 there was one college at 624720 number of population while in the same year one university available on 13373633 number of population with the

passage of time over the five decades in 2000-01 there was one college available on 101333 number of population where one university available on 4050147 number of population.

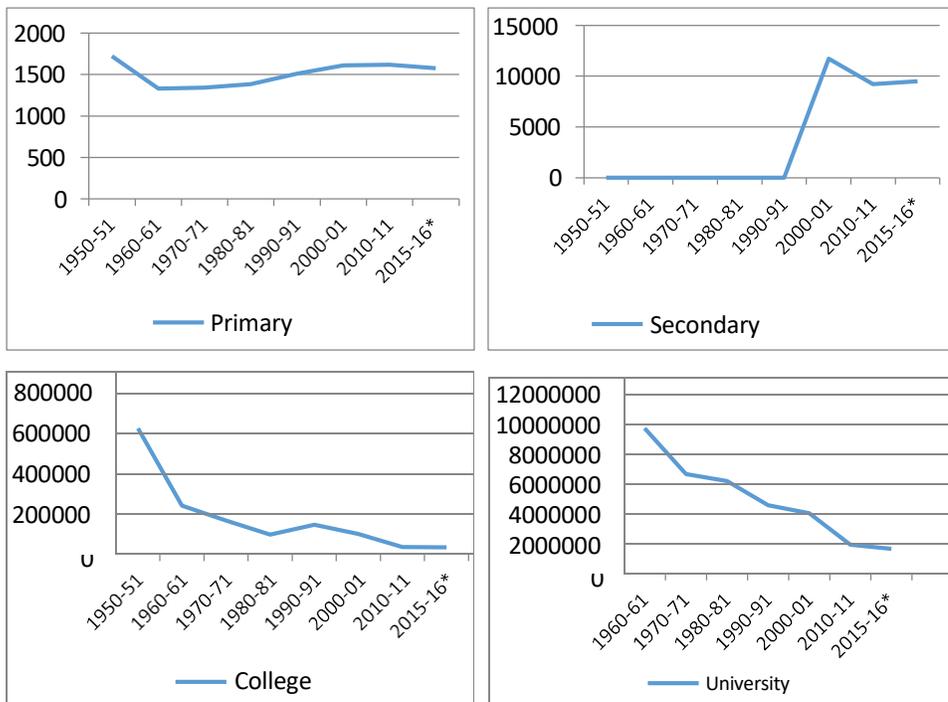
Table-2: Population per Unit Institution

Year	Primary	Upper Primary	Secondary	Senior Secondary	College	University
1950-51	1722	26551	NA	48796	624720	13373633
1960-61	1329	8838	NA	25389	241470	9760773
1970-71	1342	6050	NA	14775	167275	6684874
1980-81	1382	5762	NA	13243	98137	6212083
1990-91	1509	5587	NA	10607	147255	4600114
2000-01	1611	4987	11730	26790	101333	4050147
2010-11	1618	2705	9229	16817	36722	1949847
2015-16*	1576	3083	9495	11763	33900	1657719

Source: Educational Statistical at a Glance, Department of School Education & Literacy, Ministry of Education, GoI, 2018

- Figure 2 shows population per unit Institutions (Decadal positions) of both Gross Enrollment on decadal interval and Expansion of Institutional Infrastructure in all education sector of society (Primary, Secondary and tertiary sector of educational institutions).
- Figure 2 shows in availability of primary school initially one primary school available above 1700 population and over the time of period nearly in 2015-16 it has come to 1576, means 1 primary school available on 1576 population.
- For secondary schools if we look at figure there is stagnant growth of secondary schools from 1950-51 to 1990-91(it was due to merger of secondary institutions into senior secondary) but after that significant growth could be seen.
- If we look at figure 2 for college institutions, there is significant improvement for establishment of colleges. Initially there was 1 college available at 624720 number of population and with passage of time in 2015-16 there was 1 college on 33900 populations.
- Tremendous growth could be seen for universities growth. There are 10 times growth for universities establishment in last six decades.

Figure-2: Population per Unit Institution (Decadal Position)



Source: Educational Statistical at a Glance, Department of School Education & Literacy, Ministry of Education, GoI, 2018.

- 9. Conclusion and Policy Options:** The paper discusses around key parameters for knowledge formation and augmentation with reference to market agents namely consumers, producers and the government. The paper theoretically derives stages
- 10.** of knowledge origination, formation, and augmentation. At the stage spurious knowledge is also created that wrongly interferes in the market economy. Further there are enough knowledge deficits in the Indian economy because of enrolment deficiency, dropout rate, helping the household, paying less attention to workable and behavioral quality knowledge and interactive shortages. As a consequence, consumers have very poor information about the market price, quality of products, profit margins, and logistics. Producers always try to hide information from consumers and government in order to enhance profit. The government machinery often has connivance with the firm for revenue sharing and supports each other. Thus there is always larger scope of imperfect market building. This fabrication
- 11.** needs to be broken for establishing market transparency and perfection. That is why, knowledge multiplier works very slowly in developing economies. World digital databases are essential tools for overcoming knowledge divides. A critical analysis highlights mixing of polluted knowledge because of ethical erosion, optimizing motive of profit and minimization of cost strategy.
- 12. Suggestions:** The knowledge generation should be standardized through quality improvement, better consumer literacy, producer's ethical values, labor relations and government regulations. In future, for faster economic growth, it is essential to make market almost perfect and transparent through meaningful knowledge generation and making multiplier to move quicker. Digitalization of economic activities can make it more coherent and transparent for multiplier functioning and GDP growth.

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**Appendix Table**

**Table 1: Age Band Wise Representation of Social Groups (Absolute Numbers)**

Source: Educational Statistical at a Glance, Department of School Education & Literacy, Ministry of Education, GoI, 2018

**Table 2: Age Band and Category Wise Educational Attainment (Numbers in .....**

Age group (In Years)	2015			2016			Corresponding Level of Education
	ALL	SC	ST	All	SC	ST	
6-10	130401	23248	12922	130155	23212	12872	Primary (I-V)
11-13	73614	12996	6966	72827	12867	6856	Upper Primary (VI- VIII)
6-13	204015	36244	19888	202982	36078	19728	Elementary (I- VIII)
14-15	49363	8646	4509	48928	8569	4459	Secondary (IX-X)
6-15	253378	44890	24397	251910	44647	24187	I-X
6-17	297764	52501	28307	295951	52191	31730	School (I-XII)
18-23	141291	24134	11970	141537	24164	24164	Higher Education

Source: Educational Statistical at a Glance, Department of School Education & Literacy, Ministry of Education, GoI, 2018

**Table 3: Educational Programme Wise Gender Distribution**

Programme	Male	Female	Total
B.A.-Bachelor of Arts	28.13	34.98	31.38
B.Sc.-Bachelor of Science	13.48	13.75	13.6
B.Com.-Bachelor of Commerce	12.54	11.9	12.24
B.Tech.-Bachelor of Technology	9.66	3.9	6.92
B.E.-Bachelor of Engineering	8.66	3.81	6.35
M.A.-Master of Arts	3.65	6.16	4.84
B.A.(Hons)-Bachelor of Arts (Honors)	3.94	4.86	4.38
B.Ed.-Bachelor of Education	1.11	2.36	1.7
M.Sc.-Master of Science	1.5	2.43	1.95
M.B.A.- Master of Business Administration	2.06	1.38	1.74
B.C.A.-Bachelor of Computer Applications	1.71	1.31	1.52
B.Sc.(Hons)-Bachelor of Science (Honors)	1.73	1.48	1.61
B.B.A.-Bachelor of Business Administration	1.45	0.99	1.23
M.Com.-Master of Commerce	1.04	1.65	1.33
L.L.B.-Bachelor of Law or Laws	1.26	0.62	0.96
Others	8.07	8.42	8.24
Total	100	100	100

Source: Educational Statistical at a Glance, Department of School Education & Literacy, Ministry of Education, GoI, 2018

**Table 4: Distribution of Educational Level (Absolute Numbers)**

Level/ Year	(in hundred)	(In absolute number)
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	Primary	Upper	Secondary	Senior	College	University
		Primary		Secondary		
1950-51	2097	136	NA	74	578	27
1960-61	3304	497	NA	173	1819	45
1970-71	4084	906	NA	371	3277	82
1980-81	4945	1186	NA	516	6963	110
1990-91	5609	1515	NA	798	5748	184
2000-01	6387	2063	877	384	10152	254
2005-06	7726	2885	1060	536	16982	350
2006-07	7849	3056	1122	574	19812	371
2007-08	7878	3252	1138	592	23099	406
2008-09	7788	3656	1221	642	27882	440
2009-10	8199	3941	1222	717	25938	436
2010-11	7485	4476	1312	720	32974	621
2011-12	7143	4788	1283	841	34852	642
2012-13*	8539	5778	2189	1224	35525	667
2013-14*	8589	4215	1335	1036	36634	723
2014-15*	8471	4251	1353	1093	38498	760
2015-16*	8405	4296	1395	1126	39071	799

Source: Educational Statistical at a Glance, Department of School Education & Literacy, Ministry of Education, GoI, 201

**ARTICLES / 2**

**“Analyzing 75 Years of India’s Economic Development  
on Selected Macro Economic Variables and Way Forward”**

**Dr.S.R.Keshava ♦**

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**Abstract**

The renowned economic historian Angus Maddison’s (2001) monumental work ‘The World Economy: A Millennial Perspective’ highlighted India’s dominance in the economic history of the world. India, from 0 to 1000 CE, was the economic superpower of the world, followed by China, it had a 32.9 per cent share of the world GDP in the first century and 28.9 per cent in the 11th century. From 1000 to 1700 AD Indian economy was the second largest economic power after China. The Britishers systematically drained India's wealth. India inherited a crippled economy. Agriculture was the primary source of livelihood for the majority. Around 85 per cent of the country’s population lived in static Rural India when India attained Independence. India took 29 years after attaining Independence for its GDP to become \$100 billion in 1976; it took 60 years after attaining independence to become a \$ one trillion economy in 2007, thereafter it gained momentum and took just seven years to add one more trillion to become \$ 2 trillion economy by 2014. The GDP thereafter took just five years to add one more trillion with a three trillion economy by 2019.

In order to analyse India’s performance on various economic indicators over 75 years, multiple linear regression model was applied, which revealed that a 0.97 per cent increase in Agriculture sector would increase GDP growth by 1 per cent, a 0.99 per cent increase in Industrial growth would increase GDP by 1 per cent, a 1.27 per cent increase in the service sector would lead to GDP growth by 1 per cent, a 0.10 per cent increase in the labour force will lead to increase in the GDP by 1 per cent, a 0.24 per cent increase in the literacy would increase GDP by 1 per cent and a 0.33 per cent increase in Gross fixed capital Formation would raise GDP by 1 per cent. The coefficients of exports and imports are also significant.

The chi-square results for the service sector and labour force contribution to GDP revealed that Service Sector and labour force have significantly contributed to GDP growth in the Post reform period in India as the p-value is less than 0.05.

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♦ Senior Professor of Economics, Department of Economics, Bangalore University, Bangalore 560056, e mail: sr\_keshava@yahoo.com , Mobile; 99020 38232

Amrit Kaal is crucial to regain the lost glory. If we can invest 6 per cent of GDP in imparting quality skill education, 4 per cent GDP in providing quality health; increases the domestic capital formation to 40 per cent, create world-class infrastructure, create more employment opportunities, eradicate poverty and casteism, reduce inequality and corruption within the time frame, then India can surge ahead to its potential and celebrate the 100th year of the country's independence as a World Economic Superpower.

**Key Words:** 75 years of India's Independence, GDP, Per capita Income Growth, Capital formation, Savings, Foreign Trade, Agriculture, Industry, MSME, Services, Infrastructure, Poverty, Inequality,

### **Introduction**

India is one of the most ancient and living civilizations, at least 10000 years old. It is the largest democracy in the world. India is the 7th largest country in the world, with a landmass measuring around 3.28 million sq. km. The country has only 2.4 per cent of the world's total geographical area and is the home to 141 crores population (World Bank, 2022). *Historically* "India is the Cradle of human race, the birthplace of human speech, mother of history, grandmother of legend, great grandmother of tradition, whose yesterday's bear date with the shouldering antiquities of the rest of the nations...India had the start of the whole world at the beginning of things. She had the first civilization, she had the first accumulation of material wealth, she has the populous with deep thinkers and the subtle intellects; she had mines and woods and fruitful soil"

(Mark Twain, [https://www. indiancentury.com/accolades.htm](https://www.indiancentury.com/accolades.htm))

The renowned economic historian Angus Maddison's (2001) monumental work 'The World Economy: A Millennial Perspective' highlighted India's dominance in the economic history of the world. India, from 0 to 1000 CE, was the economic superpower of the world, followed by China, it had a 32.9 per cent share of the world GDP in the first century and 28.9 per cent in the 11th century. From 1000 to 1700 AD Indian economy was the second largest economic power after China.

In 1700, when the Mughals ruled the majority of India's geographical area, India had a 24.4 per cent world GDP share, higher than the entire Europe's 23.3 per cent. However, thereafter, British colonization of India and the industrial revolution

in Europe let India to fall in its share of the World's GDP to less than 4 per cent by 1952 (Angus Maddison,2001)

India's wealth was systematically drained. India inherited a crippled economy from the British. Agriculture was the primary source of livelihood for the majority. Around 85 per cent of the country's population lived in static Rural India. The agriculture sector faced stagnation and constant deterioration due to a low level of productivity and a high degree of vulnerability. Britishers followed the systematic destruction of the Indian handicraft and cottage industry.

India, which was once an exporter of finished products, became a supplier of raw materials and a consumer of finished goods for the factories of Britain. Except for a few cotton and jute textile mills, there was hardly any development of modern industries TISCO was the only basic and key industry when India got independence. The Government's participation in the process of modern industrialization was minimal. During the colonial period, basic infrastructure such as railways, ports, posts and telegraphs were developed in a few areas, but the roads constructed were not fit for modern transport. The other essential features were 1) overall literacy level was less than 16 per cent, and female literacy was just 7 per cent. 2) Public health facilities were inadequate and not available to the masses. 3) Infant mortality rate was 218 per thousand. 4) Life expectancy was only 44 years. 5) Birth rate was very high at 48 per thousand and the death rate was 40 per thousand persons.

The majority of people at the time of India's independence were poor, India lacked capital and technology. The Indian economy was weak. As per the World Poverty Clock.; India's rank is 66 out of 109 countries in United Nations Global Multidimensional Poverty Index 2021: India ranked 101st out of 116 countries in the Global Hunger Index 2021. India ranked 131 out of 189 countries on the UN Human Development Index 2020; India ranked 139 out of 149 countries in UN World Happiness Index 2021 (Keshava, S. R. 2022). But the aspiration of Indians was high, and so were that of our spirited leaders! India from 1951 went for a mixed economy with a tilt toward socialistic characteristics, and from 1991, continued as a mixed economy tilted towards capitalist characteristics.

As India celebrated the 'Azadi Ka Amrit Mahotsav' to commemorate 75 years of a progressive nation and the glorious history of its people, culture and achievements. At this juncture, it is time to retrospect the journey, trace the challenges and plan for Amrit Kaal.

### **Objectives of the study**

1. To analyse India's performance on selected macro-economic variables over 75 years.
2. To identify the significant factors that are contributing to GDP growth.
3. To examine the challenges to India's economic development.
4. To suggest the way forward for attaining higher economic development.

### **Hypothesis**

1. The service sector has significantly contributed to the GDP Growth in the Post Reform period in India
2. The labour force has significantly contributed to increase GDP in the Post Independent India
3. Literacy has significantly contributed to increase GDP during the Post Independent India

### **Methodology**

The Study is based on secondary data collected from NSSO Reports, the government of India's Economic Surveys, World Bank reports, ILO Reports, IMF Reports, United Nations Reports, the World Inequality index, etc.

An attempt is made to analyze the variables contributing to economic growth (GDP) through a multiple linear regression model. To identify the factors that contribute positively or otherwise to economic growth, the contribution of Agriculture Sector to GDP, industrial sector, service sector, Labour force Literates, Gross Fixed Capital Formation, Exports, Imports are considered.

The data is analysed using statistical tools like percentage growth rate, multiple linear regression and Chi-Square.

### **Multiple Linear Regression Model and Results**

A Multiple Linear Regression model was fitted to explain the factors contributing to GDP growth. The reference period of this study relates from 1950-51 to 2021-22

$$Y = A + X1 \alpha + X2 \beta + X3 \gamma + X4 \lambda + X5 \Delta + X6 \mu + X7 \omega + X8 \rho \quad (1)$$

Where,

Y = GDP

X1 = the contribution of the Agriculture Sector to GDP

X2 = the contribution of the industrial sector to GDP

X3 = the contribution of the Service sector to GDP

X4 = Labour force

X5 = Literates

X6 = Gross Fixed Capital Formation

X7 = Exports

X8 = Imports

Further, A is the total factor productivity that explains output growth i.e. not accounted by all the eight factors listed,  $\alpha, \beta, \gamma, \lambda, \Delta, \mu, \omega, \rho$ , are the respective elasticity coefficient of the concerned variables as usual.

That is

$$Y = 2.795 + 0.969 + 0.999 + 1.272 + 0.105 + 0.240 + 0.331 + 0.186 + 0.126$$

$$(4.683) (2.601) (2.669) (5.547) (9.260) (4.117) (1.743) (1.140) (1.138)$$

$$R^2 = 1.000, \quad F = 350565.836 \quad \text{Durbin-Watson} = 1.766$$

$R^2$  for the model as a whole is 1.00, which indicates that regression explains 100% of the variance in the GDP growth rate can be predicted from the variables such as contributions of Agriculture Sector, Industry sector, Service Sector, labour force, literacy, Gross Fixed capital formation, exports and imports. It means an excellent and positive linear relationship between variables, a perfect fit data. F value is significantly high, revealing the significance of the model's fitness. D-W Statistics for the model is 1.766, revealing that the auto-correlation problem has been fairly solved, or we can assume that there is no first-order linear auto-correlation in the data.

The model shows that a 0.97 per cent increase in Agriculture sector contribution would increase GDP growth by 1 per cent, a 0.99 per cent increase in Industrial growth would increase GDP by 1 per cent, a 1.27 per cent increase in the service sector would lead to GDP growth by 1 per cent, a 0.10 per cent increase in the labour force will lead to increase in the GDP by 1 per cent, a 0.24 per cent increase in the literacy would increase GDP by 1 per cent, a 0.33 per cent increase in Gross fixed capital Formation would increase GDP by 1 per cent. Coefficients of exports and imports (0.18 & 0.12) respectively are also significant.

**Individual Components Determining GDP growth rate**

Individual components for contribution from Agriculture Sector, Industry sector, Service Sector, labour force, literate, Gross Fixed capital formation, exports and imports were analyzed.

**Table–1: Results of B Co-efficients for Components of GDP Growth Rate**

<b>GDP components</b>	<b>B Coefficients</b>	<b>Significance Level</b>
Agriculture Sector	6.542	0.974 – (97.4%)
Industry Sector	3.783	0.999 – (99.9%)
Service Sector	1.975	0.999 – (99.9%)
Labour Force Participation	0.16	0.841 – (84.1%)
Literates	32.35	0.871 – (87.1%)
Capital formation	9.198	0.996 - (99.6%)
Export	4.242	0.984 – (98.4%)
Import	3.693	0.979 – (97.9%)

The results of the B Co-efficient for Components of GDP Growth Rate are positive for all independent variables individually. GDP growth is influenced to the maximum by the contribution/growth of industry and service sector to the extent of 99.9 per cent. It is followed by Export (98.4%), Import (97.9%), Agriculture Sector (97.4%), Labour Force Participation Rate (84.1%), and Literacy rate (87.1%).

**Table–2: Results of Partial Coefficients with respect to GDP Components**

<b>Variables</b>	<b>Constant</b>	<b>β- coefficients</b>	<b>R<sup>2</sup></b>	<b>F</b>
Agriculture	-2601459 (0.181)	6.542** (2.085)	.948	1302.287
Industry	266952.8	3.783*	.998	31161.012

	(1.021)	(3.037)		
Service	554733.2 (2.140)	1.975** (3.178)	.997	26512.579
LFP	926023.9 (3.321)	0.16* (1.419)	.708	169.501
Literates	-4111710 (2.180)	32.35** (5.846)	.759	220.201
GFCF	174323.556 (0.999)	9.198* (5.834)	.992	8615.902
Export	1140255 (1.921)	4.242* (1.040)	.967	2106.802
Import	1138700 (0.192)	3.693* (1.177)	.958	1635.146

Note: \* - Significant at 1% level

\*\* Significant at 5% level

Table-2 furnishes estimates of relationship of the selected individual variables with GDP Growth. R2 has been significantly high for Industry (.998), Service (.997), GFCF (.992), Export (.967), Import (.958), Agriculture (.948) except for literacy (.759) and Labour force participation (.708). The signs are also as expected, and the coefficient is statistically significant. Therefore, from an individual variable angle, GDP is significantly affected by different variables. However, several other factors also affect GDP, so the results should be cautiously read. The results do not indicate each variable's exact 'contribution' to GDP.

### **Hypothesis**

1. The service sector has significantly contributed to the GDP Growth in the Post Reform period in India

2. The labour force has significantly contributed to the increase of GDP in the Post Independent India
3. Literacy has significantly contributed to the increase of GDP during the Post Independent India

Table–3: Chi-Square Test Results and analysis

<b>Chi-Square</b>	<b>Value</b>	<b>df</b>	<b>Asymp. Sig. (2-sided)</b>
Service	2.438	4	0.023
Labour Force	5.125	6	0.033
Literates	2.543	7	0.240

Chi-square results for Service Sector contribution to GDP revealed that Service Sector significantly contributed to GDP growth in the Post reform period in India as the p-value is less than 0.05. Hence the alternative hypothesis is accepted, and the null hypothesis is rejected

Chi-square results for Labour force contribution to GDP showed that the Labour force has significantly contributed to GDP growth in the Post Independent India as the p-value is less than 0.05. Hence the alternative hypothesis is accepted, and the null hypothesis is rejected

The chi-square results for Literacy contribution to GDP demonstrated that Literates have not significantly contributed to GDP growth in the Post Independent India as the p-value is greater than 0.05. Hence the alternative hypothesis is rejected, and the null hypothesis is accepted

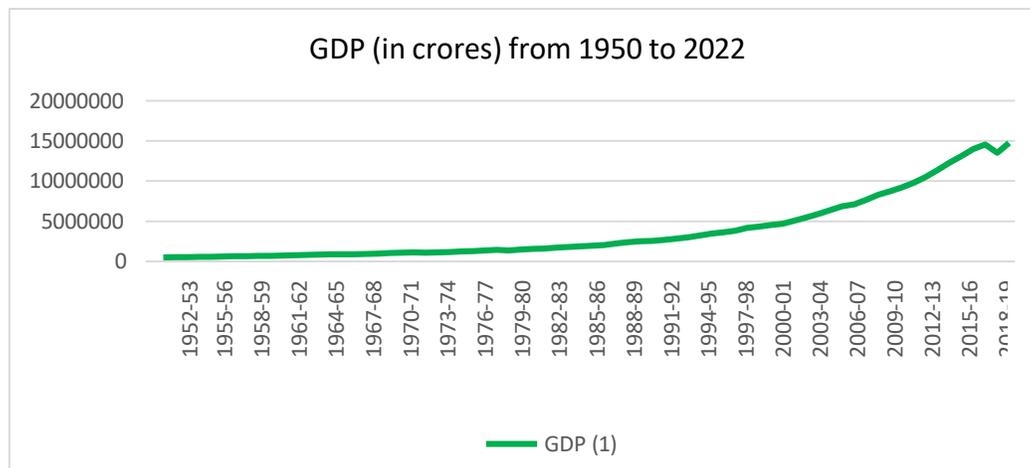
### **Analysis of other Macro Economic Variables**

#### **GDP Growth**

British flourished at the expense of the Indian Economy. India’s GDP, on average, grew less than one per cent, i.e., 0.9 per cent per annum during British rule. GDP declined in 17 of the 47 years from 1901 to 1947 (Reddy Y.V, 2000). According to

the World Bank (2022), India’s GDP increased to \$3.18 trillion in 2021 from \$ 30.6 billion US Dollars in 1950.

- The real GDP growth rate rose from 0.9 per cent on average from 1900 to 1947 to an average annual rate of 5.75 per cent during 1950-51 to 2019-20.
- During the post-economic reform period, India’s real GDP growth peaked in March 2010 when it scaled 13.3 per cent. The nominal GDP at that point was over 16.1 per cent and was at its lowest in 2020-21, when real GDP contracted by 6.9 per cent.
- India took 29 years after attaining Independence for its GDP to become \$100 billion in 1976; it took 60 years after attaining independence to touch \$ one trillion mark in 2007, thereafter the economy gained momentum and took just seven years to add one more trillion and become \$ 2 trillion by 2014. The economy thereafter took just five years to add one more trillion to reach a three trillion by 2019. Despite the severe impact of Covid-19, the Indian economy is marching ahead to become a five trillion economy by 2027.
- In the case of PPP GDP (in current international prices), India took 66 years to cross 6 trillion (2013), and within six years, it added 60% of it to reach 10.22 trillion by 2021.

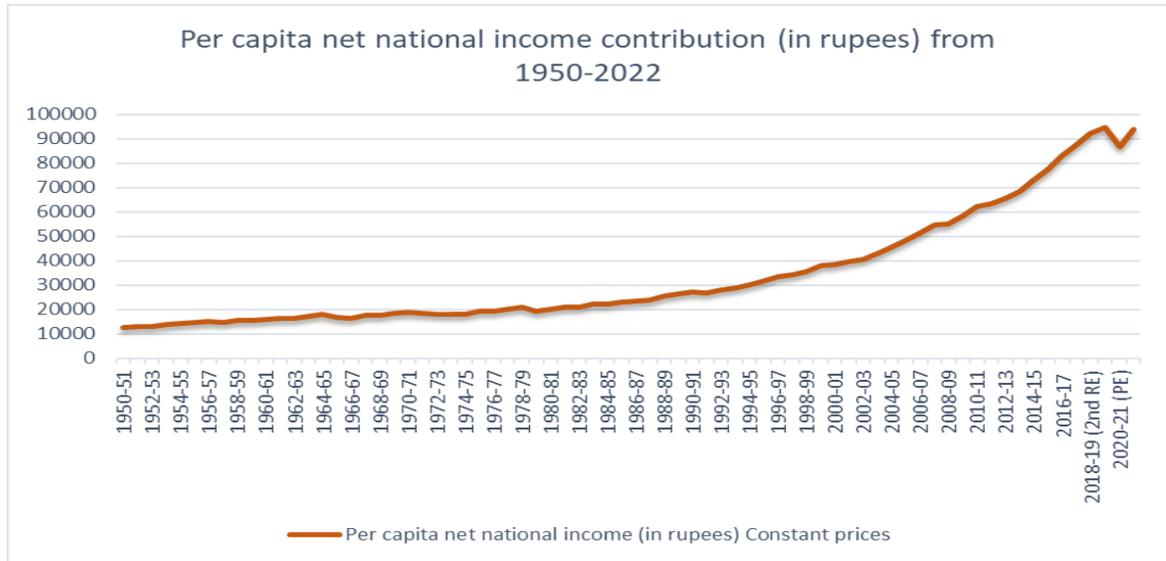


Source: Economic Survey of relevant years, Ministry of Finance, Government of India.

- India was ahead of China's GDP till 1960s and was almost comparable till 1979 whereas at present India's GDP is lagging as China's GDP is 5.46 times higher than India's GDP in 2021. On a PPP basis, the GDP of China is 2.61 times higher than that of India

### **GDP Percapita Income**

- The real GDP per capita grew meagrely at an average rate of 0.1 per cent. Real per capita GDP was Rs. 224 in 1900-01, increased by Rs.9 in forty-six years and was Rs. 233 in 1946-47. GDP per capita declined in 26 years out of the 47 years from 1901 to 1947 (Reddy Y.V 2000)
- At current prices, the per capita income increased from Rs.274 in 1950-51 to Rs.150326 in 2020-21. On average, Indians today have seven times better Per capita than those in 1950-51. The considerable rise in real per capita income despite population growth from 359 million to 1.41 billion over these 75 years reflects an even faster rise in national income.
- The per capita income of India was almost equal to China and South Korea till 1960, whereas by 2020, India's GDP per capita income was 1901 US dollars which are challenging to compare with the per capita income of 10,484 US dollars in China and 31,637.30 US Dollars in South Korea (statisticstimes.com and nationmaster.com).

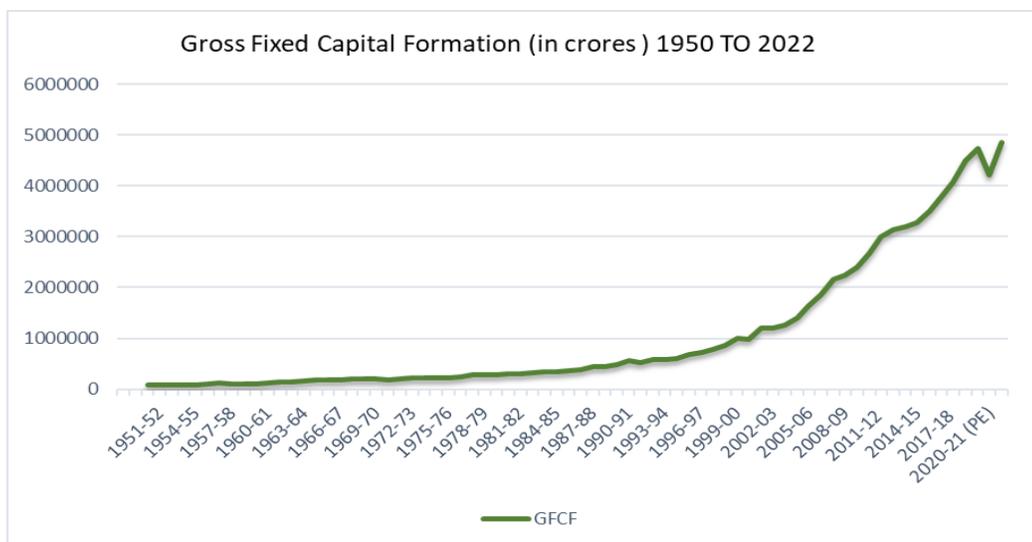


Source: Economic Survey of relevant years, Ministry of Finance, Government of India.

### **Capital formation and Savings**

At the time of independence, India was regarded as a capital-scarce country. It is yet to reach its potential in capital formation despite 75 years of independence.

- The gross domestic capital formation as a per cent of GDP has increased from 9.5 per cent in 1950-51 to 30.1 per cent in 2018-19, whereas the gross domestic capital formation as a percentage of GDP rose from 9.3 per cent in 1950-51 to 28.6 per cent in 2018-19. It increased to 29.6 per cent in 2021-2022, (Economic Survey 2021-22).
- The significant cause of worry is that domestic Capital formation in India has been declining since 2008-09 after it reached the recorded peak of 38.1 per cent of the GDP.



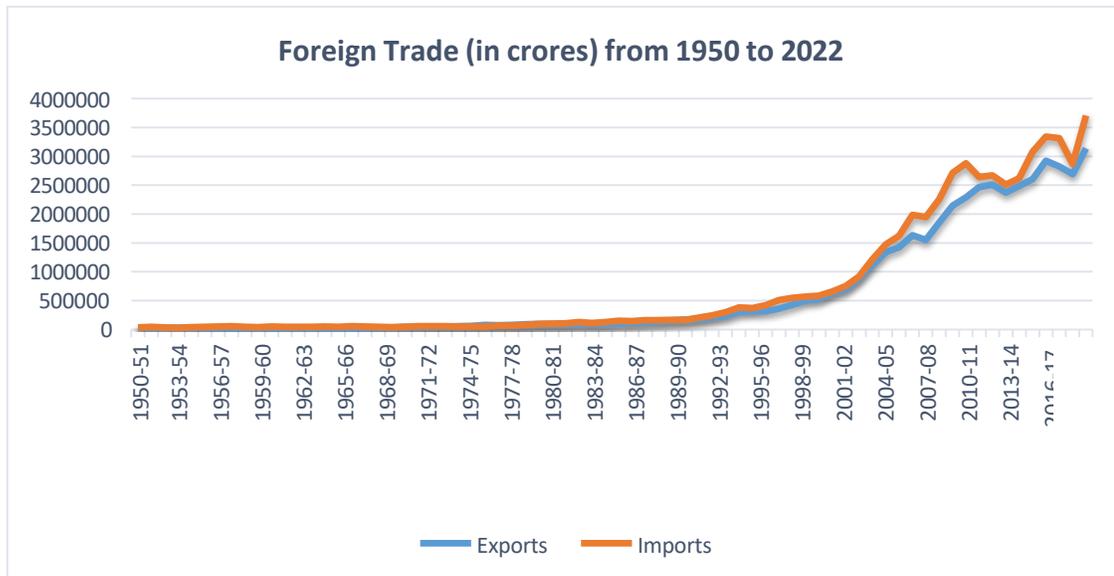
Source: Economic Survey of relevant years, Ministry of Finance, Government of India.

Without an increase in capital investment, one cannot expect more industrialization and higher growth. Efforts should be made to increase domestic capital formation to 40 per cent of the Gross Domestic Product every year for a minimum of another 10 years to catch up with China’s growth.

### **Foreign Trade**

India’s share of foreign trade is less and has to be increased with more prominence to growth in manufactured and value-added goods exports.

- India's share of world trade in 1950 was 1.78 per cent. But later on, it decreased considerably, and till 2000, the share of India in world trade was just 0.75 per cent.
- India’s share in total world trade increased to 2.6 per cent in 2020-21, whereas China contributed around 17 per cent to global trade.



Source: Economic Survey of relevant years, Ministry of Finance, Government of India.

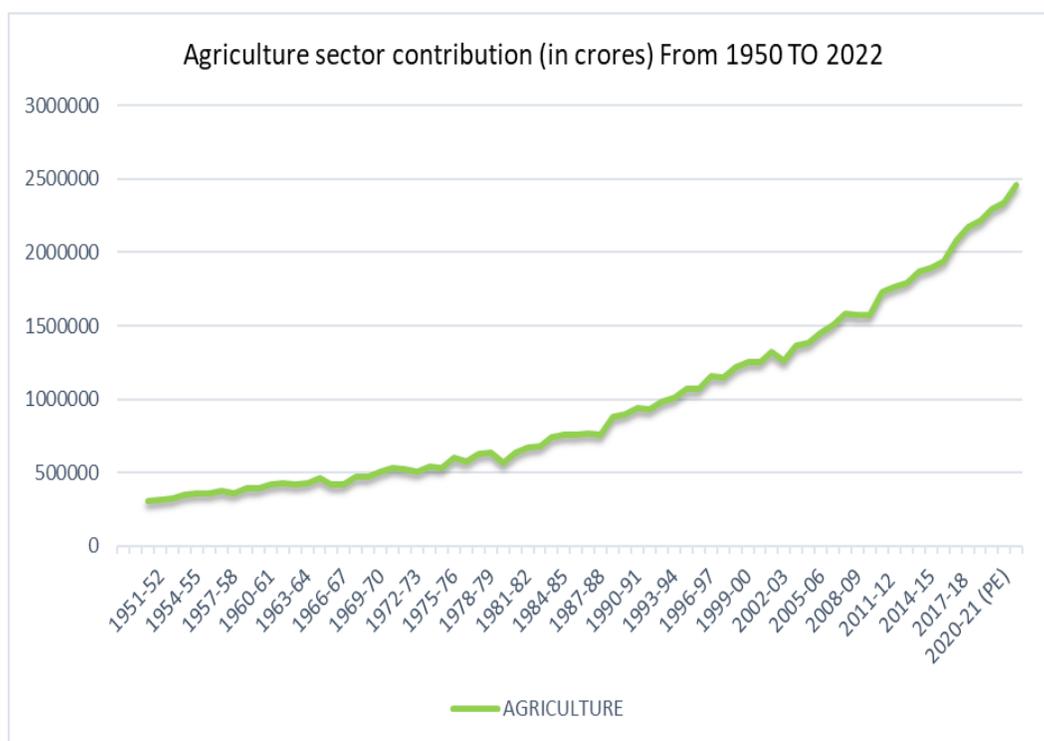
India's foreign trade (more so exports) should increase to 15 per cent of the global trade.

### **Agriculture**

Agriculture is still regarded as the backbone of the Indian Economy as it is the source of livelihood for the majority of the workforce in India.

- Agriculture is the backbone of Indian Economy. The Contribution of Agriculture to GDP which was 51% in 1950-51 declined to 26% in 2003 and during 2006-07 it further declined to 18.5%. It is said that more the development, Lesser will be the share of Agriculture to GDP. (Keshava S.R 2010).
- The share of agriculture in GDP has reduced from 54 per cent in 1950-51 to 17.8 per cent in 2019-20, and it increased to 19.9 per cent in 2020-21. It was the highest since 2003-04 when the contribution was around 20 per cent. In recent years the contribution of agriculture to GDP was between 16 per cent and 18 per cent.
- 60 per cent of India depended on agriculture for their livelihood in 1947, but now one out of two in the workforce depends on agriculture for their livelihood directly or indirectly.

- Indian farmers raised India from a food-deficit country to a food-surplus country. Indian farmers today are growing 296.7 million tons of food grains from a mere 46.2 million tons of food grains production in 1950-51.
- Indian farmers grew 296.7 million tons of food grains in 2020-21 from a mere 46.2 million tons of food grains production in 1950-51. The average yield per hectare of food grains increased from 505 kgs in 1950-51 to 2325 kgs in 2019-2020. The per capita availability of cereals has increased from 334.2 grams per day in 1951 to 464.6 grams in 2020 and pulses during the same period declined from 60.6 grams per day to 47.9 grams per day.
- Efforts should be made to shift the surplus workforce in agriculture to MSMEs and the average yield per hectare has to be increased along with other measures



Source: Economic Survey of relevant years, Ministry of Finance, Government of India.

**Indebtedness**

Indian farmers who gave food security to India are still struggling and suffering. More than three and a half lakh farmers committed suicide in India from 1995 to 2019.

According to NSSO 59th round, 48.6 per cent farmers are in the debt trap. They take 80 per cent of the new loans to repay the old debts. 22 per cent farmers do not get credit from any sources. 29 per cent farmers depend on money lenders for their credit needs who charge exorbitant interest rates, 12 per cent from traders, 18 per cent from friends and relatives, only 27 per cent of the agricultural households depend on commercial banks, 26 per cent on the cooperative bank, and 5 per cent on others. Even now, this is more or less true of the Indian farmers.

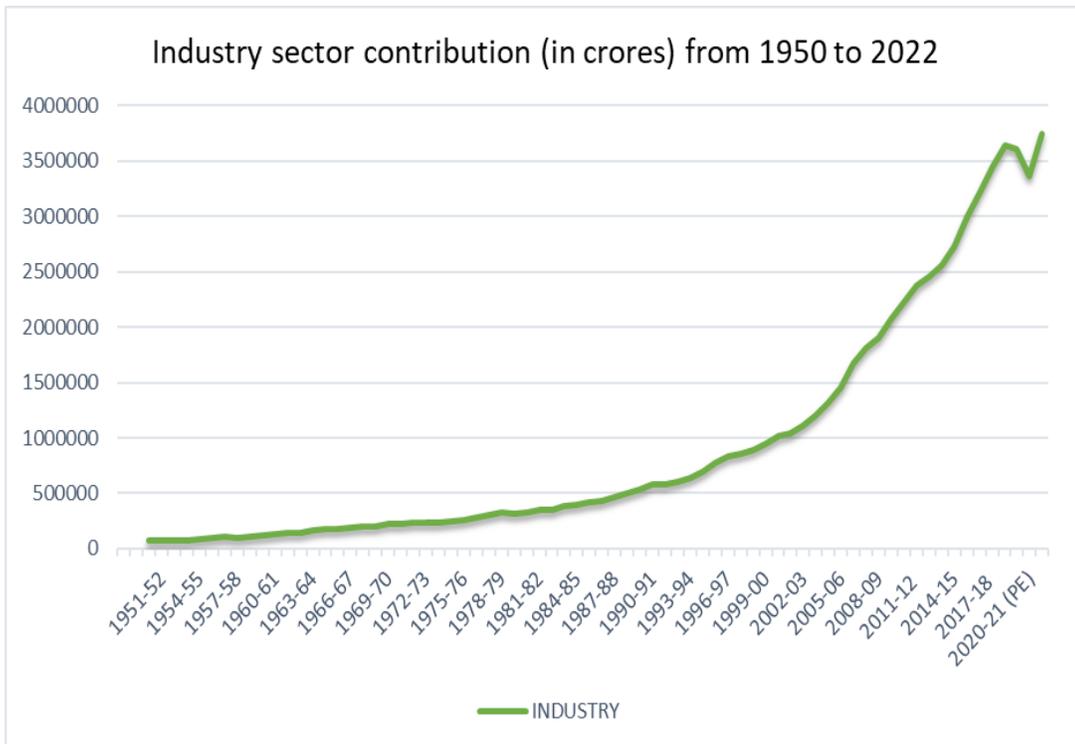
## **Industry**

Public sector industries played a significant role in India's Industrialization. In 1951, there were only five Public Sector Enterprises with Rs 29 crores of investment. As per the Public Enterprises Survey 2018-19, there were a total of 348 CPSEs as of 31st March 2019, out of which 249 were operational.

- The remaining 86 CPSEs were under construction, and 13 CPSEs under closure or liquidation. Total paid-up capital in all CPSEs as of 31.3.2019 stood at Rs. 2,75,697 crores showing a growth of 8.55 per cent.
- Total financial investment in all CPSEs stood at Rs.16,40,628 crore as of 31.3.2019 compared to Rs.14,31,008 crore as of 31.3.2018, recording a growth of 14.65 per cent.
- Total gross revenue from the operation of all CPSEs during 2018-19 stood at Rs. 25,43,370 crores compared to Rs. 21,54,774 crores in the previous year, showing a growth of 18.03 per cent.

The disinvestment process, which began in 1991-92 with the sale of minority stakes in some PSUs, shifted focus to strategic sales during 1999-2000 to 2003-2004. At present, the Narendra Modi government has decided that central

public sector enterprises will exist only in the ‘strategic sectors’ where the government role will be significant, and the rest will be privatized.



Source: Economic Survey of relevant years, Ministry of Finance, Government of India.

### **MSMEs**

In-financial year 2020, the total number of MSMEs in the country was more than 63 million. According to DGCIS data, the value of MSME-related products in India is 147,390.08 million dollars, contributing 48.56 per cent of total export during 2017-18. MSMEs exposed to higher integration with global value and supply chains play a critical role in global trade systems. MSMEs contributed 29 per cent to the overall GDP in 2019.

Covid-19 pandemic has affected MSMEs very hard. Due to this, some of the MSMEs were closed or nearing closure. Despite the Government's measures for revival, many MSMEs are still struggling.

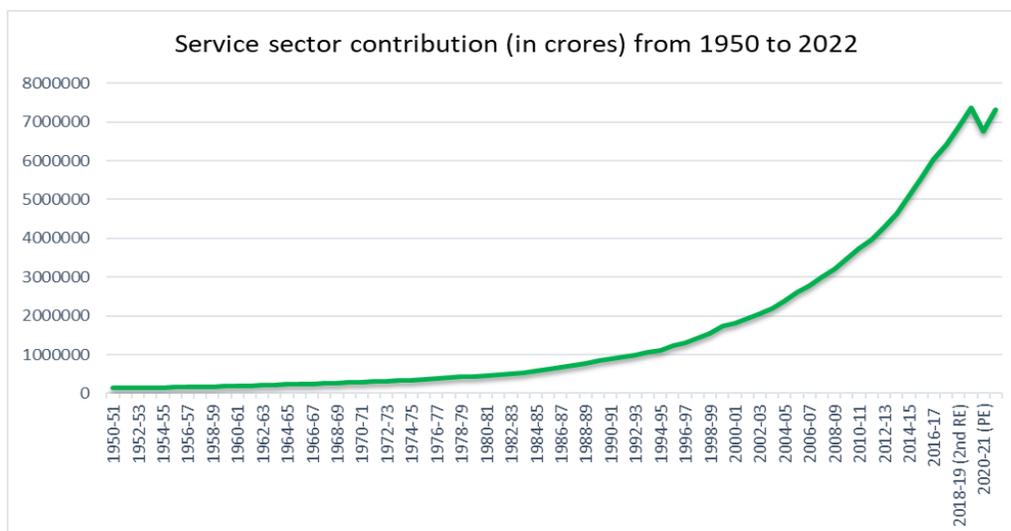
### **Infrastructure**

With Every passing year, India's infrastructure is increasing. Though marching firmly in creating quality infrastructure, India has miles to go in creating world-class infrastructure.

- India's railway network is recognized as one of the largest railway systems in the world under single management.
- The length of railway lines at the time of independence in 1947 was 25170 kilometres of Broad Gauge (BG), 24153 kilometres of Meter Gauge (MG), and 5370 kilometres of Narrow Gauge (NG).
- Indian Railways is among the world's largest rail networks in 2021, and its route length network is spread over 67,956 km, with 13,169 passenger trains and 8,479 freight trains, plying 23 million travellers and 3 million tonnes (MT) of freight daily from 7,349 stations.

Road transportation has gradually increased over the years with improvements in connectivity between cities, towns, and villages in the country

- The total length of national highways in India was around 21,000 km in 1947, which has increased to 136,440 in 2021. In FY21, 13,298 km of the highway was constructed across India. ([statista.com/statistics/729992/india-length-of-national-highways/](https://www.statista.com/statistics/729992/india-length-of-national-highways/)).
- The government has proposed in the central Budget for 2022-23 that they will expand national highways by 25,000 kilometres during 2022-23.
- Today India has the second-largest road network in the world, spanning a total of 5.89 million kilometres. The road network transports 64.5 per cent of all goods in the country, and 90 per cent of India's total passenger traffic uses the road network to commute ([www.ibef.org/industry/roads-India.aspx](http://www.ibef.org/industry/roads-India.aspx)).



Source: Economic Survey of relevant years, Ministry of Finance, Government of India

## Poverty

Poverty has significantly reduced in the country, and efforts must be made to eradicate it completely.

- At the time of Independence, the incidence of poverty in India was about 80 per cent, about 250 million. NITI Aayog (2021), based on the data from the National Family Health Survey-4 (2015-16), identified 25.01 per cent of the population in India in 2015-16 as Multidimensionally poor calculated based on the headcount ratio.
- NITI Aayog has calculated the National multidimensional poverty index using 12 indicators, namely nutrition, child and adolescent mortality, antenatal care, years of schooling, school attendance, cooking fuel, sanitation, drinking water, electricity, housing, assets and bank account, which are grouped under three dimensions namely, health, education and standard of living.
- The highest number of the deprived in India were in cooking fuel to extent of 58.5 per cent, sanitation at 52 per cent, housing at 45.6 per cent, nutrition at 37.6 per cent, maternal health 22.6 per cent, drinking water 14.6 per cent, assets 14 per cent, years of schooling 13.9 per cent, electricity 12.2 per cent, bank account 9.7 per cent, school attendance 6.4 per cent, and child and adolescent mortality 2.7 per cent.

- Bihar is the poorest state, with 51.91 per cent of the state's population falling under the multidimensionally poor category, followed by Jharkhand at 42.16 per cent and Uttar Pradesh at 37.79 per cent. Whereas Kerala registered the lowest population poverty levels, with 0.7 per cent of its population multidimensionally poor, followed by Puducherry at 1.72 per cent., Lakshadweep 1.82 per cent, Goa 3.76 per cent, and Sikkim 3.82 per cent.
- United Nations Development Programme (UNDP) MPI for 2021, showed that 27.9 per cent of India's population was multidimensionally poor. The country ranked 62nd out of 109 nations on the index. This index was based on 10 indicators, whereas NITI Aayog based its National MPI based on twelve indicators
- **International Poverty Line:** The poverty rate in India, as per the World Bank's international poverty line of 1.9 dollars in PPP terms, increased to 12.3 per cent in 2021 from 9 per cent in 2020. It is likely to reduce by around 10 per cent in FY 2022 (World Bank (2021)).
- Covid-19 has further led to an increase in poverty in India. Pew Research centre estimates that 75 million more people in poverty will rise to 134 million in 2020.
- The increase in India accounted for nearly 60 per cent of the global increase in poverty in 2020 defined as those who live on \$2 or less daily. Before Covid-19, the poor in India had decreased from 340 million in 2011 to 78 million in 2019. It would have further decreased to 59 million in 2020 without the pandemic.
- There was a drastic reduction in India's middle-class population due to the covid-19 pandemic. Pew research centre defines the middle class as people with incomes of \$10.01 to \$20 a day and estimates that the middle-class population grew from 29 million in 2011 to 87 million in 2019. But due to the Covid-19 recession, the middle-class population shrunk by 32 million and is expected to fall to 66 million in 2020 (Pew Research Centre 2021).
- poverty levels have declined drastically, extreme poverty (\$2.15/day) dropped from 16.2% in 2011–12 to just 2.35% in 2022–23, a reduction of nearly 86% in terms of proportion. Moderate poverty (\$3.00/day) saw a similar sharp decline, from 27.12%

to 5.25%, a fall of over 80%. The absolute number of poor people fell from 205.9 million to 33.6 million (extreme poverty), and from 344.47 million to 75.2 million (moderate poverty). This shift represents more than economic change—it symbolises hope, empowerment, and growing social justice. (Keshava S.R. & Hanumantharayappa B. H 2025).

### **Increase in inequality**

India during 1858-1947 (British rule) had wide income equality as the top ten per cent of the population had around 50 per cent of the national income. (World Inequality Report, 2022). The situation has worsened in recent years as inequality has further widened.

- The introduction of New Economic reforms, unfortunately, increased not only economic growth but also economic inequalities. Covid-19 has further increased inequality in India.
- As per the 'World Inequality Report 2022', India is among the unequal countries in the world, with rising poverty and an 'affluent elite.
- As per the report, the bottom 5 per cent of the households owns only 1 per cent. The middle class owns 29.5 per cent of the total wealth as compared with the top 10 per cent holding 65 per cent, and the topmost one per cent owns 33 per cent of the total wealth in India.
- The average national income of the Indian adult population is Euro (€) 7,400 or Rs 204,200 in 2021 on a purchasing power parity basis. The Average wealth of India stands at €4,200, which is six per cent of the total. The middle class owns an average wealth of only €26,400 or Rs 723,930. The top ten per cent own on an average €231,300 or Rs 6,354,070, and one per cent on average own over €6.1 million or Rs 32,449,36.
- Oxfam India's Survival of the Richest: India Story states that Inequality in India is increasing. The top five per cent of Indians own more than 60 per cent of the country's wealth, while the bottom 50 per cent of India's population possess only three per cent of the wealth.

- The top one per cent of the rich population in India took away 40 per cent of the wealth created in India, and the bottom 50 per cent got only 3 per cent of the wealth from 2012 to 2021. The richest 21 Indian billionaires have more wealth than 700 million Indians.
- The billionaire's wealth in India has increased by 121 per cent or Rs. 3608 Crores per day since the Covid-19 pandemic began in India in March 2020 to November 2020.
- Another shocking fact is that the majority of GST collection, which is 64 per cent comes to Rs 14.83 Lakh crore, is paid from the bottom 50 per cent of the population, whereas the top 10 per cent paid only 3 per cent.
- India's number one rich person's wealth increased by 42 per cent in 2022. The number of billionaires increased from 102 in 2020 to 166 billionaires in 2022. The combined wealth of the 166 billionaires in India reached \$660 billion or Rs. 54.12 lakh crore, which could fund the Union Budget for more than 18 months.

### **Challenges**

**Inclusive Growth:** The real challenge in front of India is to increase the growth and make it more inclusive or 'Sabka ka Sath, Sab ka Vikas'. India has been enjoying the demographic dividend since 2018 and will last till 2055. India today is reaping the demographic dividend. More than  $\frac{3}{4}$  of its population will be in work force shortly. The average age of India is 24, in order to attain inclusive growth, the government was forced to create more jobs and utilize its youth power towards economic development. (Keshava., S.R., 2014). India has to utilize the demographic dividend for the country's economic development. Otherwise, it will be committing a Himalayan blunder, which will be irreversible.

**Imparting and Improving the Skills:** The biggest Challenge is imparting and improving the skills of the youths in the country. The following table shows the quality of human capital in India. India lags behind emerging markets (EMs) peers and is at the bottom of the G20 pile on quality of human capital.

Table–4: Quality of Human Capital in India

<b>Indicator</b>	
<b>Median age in years</b>	28.7% (2020)
<b>Population under 20 years of old</b>	34.8% (2020)
<b>Life expectancy in years</b>	70.2% (2020)
<b>Mean years of schooling (Human Development data)</b>	7 years (2020)
<b>Share of youth not in education, employment or training, total (% of youth population)</b>	31.2% (2020)
<b>Government expenditure on education total (% of GDP)</b>	4.5% (2020)

**Source:**

World Bank - <https://data.worldbank.org/indicator/SE.XPD.TOTL.GD.ZS?locations=IN>

World Bank - <https://data.worldbank.org/indicator/SL.UEM.NEET.ZS?locations=IN>

<https://www.worlddata.info/average-age.php>

**Quality of Education and Health:** Quality of education and health services is to be improved significantly. The socio-economic evils, namely corruption, casteism, exclusion of masses, blind beliefs, ignorance, lack of work culture, and lack of professionalism, must be addressed, eradicated and eliminated. So are:

**Implementation of the policies and programmes:** Implementation of the policies and programmes is weak, the best and holistic policies framed for the welfare of the masses have failed to take off due to corruption and red-tapism.

**Removing dominance of Caste in the Public Spear:** The major challenge is removing the caste influence in the public spear. Caste consciousness has increased in the past 75 years of India's independence, and the practice of superior and inferior castes in one form or another is hampering the country's economic development.

**Climate Change and Sustainable Development:** In 2008, the global population was 6,609 million, with total CO<sub>2</sub> emissions of 28,962 MT, averaging 4.38 tons per capita. Developed countries had much higher emissions: The U.S. led with 19.10 tons per capita, followed by Russia at 11.24 tons. China was the top emitter at 6,071 MT, but its per capita emission was 4.58 tons due to its large population. India emitted only 1,146 MT, with a low per capita emission of 1.18 tons. Despite its small share, India must adopt green, inclusive, and sustainable development. This will ensure long-term environmental and economic resilience. (Keshava., S.R., 2014).

Energy is responsible for the majority of climate change-causing greenhouse gas emissions, mostly from the burning of fossil fuels. Despite efforts to reduce these emissions, the trajectory of CO<sub>2</sub> emissions globally remains far higher than what is needed to avoid the worst effects of climate change. Share of global emissions is 7.4% of CO<sub>2</sub> emissions from combustible fuels, 2022.

In year 2022, CO<sub>2</sub> emissions from fuel combustion in India is 2 516.967 Mt CO<sub>2</sub>, with Trend increase of 182% change from 2000-2022 And Per-capita energy-related CO<sub>2</sub> emissions tend to be higher in more economically-developed countries, but can also vary greatly depending on the structure of the economy and the energy system. For example, per-capita emissions will be higher in countries that rely more on carbon-intensive modes of transportation (like driving and flying), have a higher share of energy-intensive industries (like steel or chemicals) or depend heavily on fossil fuels for power generation. In Year 2022, CO<sub>2</sub> emissions per capita in India is 1.776 tCO<sub>2</sub> / Capita with Trend increase of 111% change from 2000-2022 (International Energy Agency IEA – 2022)

### **Way Forward**

1. **Education:** Investment of 6 per cent of GDP every year on education, strengthening the education infrastructure and imparting quality education, setting up of more world-class institutions.

**Indian Education Service:** Selecting the best brains in the country through competitive exams by implementing a new Indian Education Service on the lines of Indian administrative services and giving rigorous training to teachers.

2. **Health:** Strengthen the health infrastructure by investing 4 per cent of GDP annually. The main aim must be to provide quality Health care to the masses at public hospitals.

**Diploma in Medicine:** A diploma in medicine for two years, after the 12th standard, can be initiated to strengthen the health infrastructure in rural areas. They can be primary health attendants at the village level. The villagers who are aware of local ayurvedic medicines may also be roped in with formal training for a year.

3. **Health Insurance:** Provide universal health insurance to all Indians
4. **Increase Domestic Capital Formation:** Increase domestic capital formation to 40 per cent of the Gross Domestic Product every year for a minimum of another 10 years to catch up with China's growth.
5. **Remove Casteism:** Casteism poses a major hurdle to economic development. Hence steps should be taken to eliminate caste in a time-bound manner. First, ban the caste in the surnames and on all official transactions.
6. **One Nation-One Caste of Humanity:** A proper time frame and effective implementation of removing casteism must be implemented. To begin with, classification should include only GM, OBC, MBC, SC/STs and empower each section on par with each other.
7. **Remove Corruption and encourage Honesty:** Corruption is so rampant that is universalised in India. Punish the corrupt through special courts, and promote honesty by creating awareness among the public. Corrupt should never be selected

for any public office and should be shamed in society. Honesty and integrity should be incentivised and universalised in India.

8. **Increase the Tax base:** Promote honesty in paying taxes. Industrialists, businessmen, pharmaceutical companies and others who have made huge profits even during covid-19 pandemic should be encouraged to voluntarily come forward and sponsor the country's health infrastructure and education infrastructure, otherwise impose super-rich tax.
9. **Higher Transparency:** Bring higher transparency in governance and avoid unproductive public expenditure so that sufficient funds can be invested in providing quality health and education
10. **Workers in the Unorganised: Sector:** Register all Unorganized workers, link them to JAM and extend all social security benefits.
11. **Eliminate Poverty and economic inequality:** Eliminate poverty and economic inequality within time bound manner. Universalize food security to all, remove malnutrition Make education, health care, food, and employment as people's rights. Encourage philanthropists to contribute to improving health and education infrastructure, research and development
12. **Increase Investment in Research and Development**
13. **Empower youth:** Empower youth with up-to-date skills and knowledge in the area of their interest.
14. **Effective Implementation:** The problem in India has always been implementation. Implement all programmes and policies as per the plan in a time-bound manner. Fix the responsibility and punish those who derail the development process
15. **Stakeholders join Hands:** All Indians should join to strengthen India economically. The corrupt, red-tapism should be eliminated.

### **India can become World Economic Superpower!**

Analyzing the major socio-economic indicators of the Indian economy, one would find the path of the 75 years' journey of the Indian economy as gratifying as

India has become an emerging economy of the world from a backward economy. Though India's growth has become more steady, diversified and resilient, it can be sustained in the long run, provided that it is inclusive. Steps are to be taken to make the economic growth more inclusive or Sab ka Saath, sab ka Vikas. (Keshava., S.R., 2022). Amrit Kaal is crucial to regain the lost glory. If we can invest 6 per cent of our GDP in imparting quality skill education, 4 per cent of GDP in providing quality health; increases the domestic capital formation to 40 per cent, create world-class infrastructure, create more employment opportunities, eradicate poverty and casteism, reduce inequality and corruption within the time frame, then India can surge ahead to its potential and celebrate the 100th year of India's independence as a World Economic Superpower.

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ARTICLES/3

**Impact of GDP, Inflation and Population  
Growth on Income Inequality in India**

**Jyoti\*, K. N. Bhatt\*\***

**ABSTRACT**

*Income inequality has a negative impact on quality of life and as such there has been an intense on this subject both economically and politically. This study is an attempt to investigate the relationship between income inequality, Gross Domestic Product Growth Rate (GDPGR), inflation, and population growth rate. GINI coefficient is taken as a dependent variable and Growth rate of GDP is the main independent variable. Other independent variables are inflation rate (Consumer Price Index) and population growth rate. Inequality data as a form of GINI coefficients is taken from World Inequality Database by World Bank and other independent variables data have been extracted from World Development Indicator by World Bank. All the data is collected on annual basis consisting the period from 2001 to 2020. GDP growth rate and inflation have positive and significant relationship with the dependent variable, which is GINI coefficient here, while population growth rate has negative and significant relationship with GINI. All the coefficients are highly significant as probability value is less than 1 per cent. This suggests that the excessive population growth in India is one of the most crucial variables in leading to income inequality and deprivation.*

**JEL: E1, E310, J110, D60**

**Keywords**

*GDP growth rate, inflation, population growth rate, inequality*

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\*Research Scholar, Govind Ballabh Pant Social Science Institute, Central University of Allahabad, Prayagraj, India

\*\* Professor, Govind Ballabh Pant Social Science Institute, Central University of Allahabad, Prayagraj, India

\*\*Corresponding author

**Email:** [knbhatt1@rediffmail.com](mailto:knbhatt1@rediffmail.com)

**Contact number:** 9454951081

## **1. INTRODUCTION**

There has been an intense debate on the subject of income disparity economically and politically with claims made about its overall impact on society. Income inequality leads to a negative impact on quality of life, some argue that increased inequality raises moral concerns since it reduces opportunities for underrepresented groups and minorities. Many others think that the biggest problem with this concern include morals when looking at it traditionally; along with economic deprivation too. If social mobility has decreased due to financial inequality, underprivileged groups have suffered. Consequently, economic growth becomes slower, and people with low incomes invest less in their human capital.

American citizens in the top 10 per cent bracket have an average income that is more than nine times higher than those at the bottom 90 per cent, claims UC

Berkeley economist Emmanuel Saez. Due to the stark economic gaps that existed in the early 1900s, reforms were made by legislators, such as raising taxes on the wealthy and boosting unionisation for those at the bottom. However, these changes started to dissolve in the 1970s, which resulted in the current difference, which is

even greater. Aside from its rapid growth, Asia has experienced the greatest success in the world in terms of its ability to reduce poverty. However, there is a significant increase in income inequality and the majority of people reside in nations with high levels of inequality. In spite of high economic growth, countries like India continue to be classified as "developing" nation. With a greater emphasis on the ideas of inclusive growth and shared prosperity, this scenario further stoked the debate on growth and equality. Although, the relationship between GDP and inequality has been the subject of extensive research for many years, there is still no conclusive answer to this question. One of the key justifications for why more disparity is advantageous is because it encourages people to put in more efforts. For instance, if those with higher education levels are more productive, income disparities will motivate more people to pursue greater education, improving overall output. The trend that people with higher incomes are more likely to save and invest than their counterparts is another reason why it results in more economic growth through investment.

There are very few scientific works in the field of economics that particularly explore the connection between macroeconomic issues and inequality. Moreover, earlier research has produced conflicting results as there is no agreement on macro issues and inequality are related. Specifically, the parabolic link between

income and inequality was noted by Kuznets (1955). By outlining the well-known theory known as the Kuznets Curve, it is claimed by Fishlow (1995), Deininger and Squire (1997), and Bruno et al. (1996), that there is no discernible connection between inequality and income. Similarly, some studies have only looked at a small number of macroeconomic parameters, such as government debt, inflation, and currency rates (Bulir and Gulde 1995; You and Dutt 1996). Through the change in the real value of wages, salaries, rents, interest, dividends, and profits, inflation causes a redistribution of income and wealth. The debtor-creditor route is another important one. While high-income classes have more money to invest in diverse assets, low-income groups typically store their assets in cash that comes from their pay checks. As a financial phenomenon, inflation has a negative impact on the poor since it reduces their purchasing power and leaves them dependent only on their own income. The poor get poorer because of inflation. Inflation thus encourages income inequality by widening the gap between various income groups. In this regard, Tarapore Committee (1997) opined that 3 % inflation in India is acceptable, while Chakravarty. S Committee (1985) finds that an increase in the price of not more than 4per cent is acceptable, whereas Rangarajan. C (2012) regards 2 to 3 % of inflation as acceptable, and 5 % inflation as threshold inflation for India. RBI targeted inflation is 4 % with 2% variation on either side. Hence the acceptable range of inflation in India lies between 2% to 5 %. The continuous increase in prices or inflation causes the heart burn to majority of Indians as the Indian employment structure is tilted towards informal unorganized sector. (Keshava S.R 2022) Social unrest may develop when income inequality becomes a more serious issue.

## **2. LITERATURE REVIEW**

This section offers a brief review of literature of the empirical research that has already been done, with a special emphasis on inequality and macroeconomic factors that influence it. In fact, growth is one of the most important macroeconomic elements, accordingly ~~thus~~ many scholars have extensively looked at the relationship between inequality and growth; nevertheless, there is still no agreement. A historical perspective has been provided for the subject by the well-known study by Kuznets (1955), which showed a parabolic relationship between income and inequality as noted above. According to the parabolic relationship, an increase in income serves to worsen inequality initially before eventually reducing it. Researchers, like Persson and Tabellini (1994), Alesina and Rodrik (1994), who discovered a negative association between income and inequality, dispute this relationship.

Barro (2000), on the other hand, argued in favour of a nonlinear link between economic growth and inequality and emphasised how economic expansion has an adverse impact on impoverished countries while having a favourable impact on rich nations. It has been claimed by Bruno et al. (1996), Ravallion (1995), and Deininger and Squire (1997) that there is no meaningful connection between income and inequality. According to Calderon and Servén (2004), government spending on infrastructure boosts economic growth, which in turn has a major impact on lowering inequality. In addition, Chatterjee and Turnovsky (2012) found that government spending may improve inequality in short-term while in long-term increase inequality. On the contrary, Maestri and Roventini (2012), found that

increased government spending is linked to greater economic disparity, notably in some European nations. Sarel (1997) demonstrated cross-sectionally that government spending had no appreciable effect on income disparity.

In addition, government development assistance, education, and labour force participation reduced inequality whereas inflation, political risk, terms of trade, and unemployment increased inequality in Asian nations, Deysappriya (2017). According to Sieroń (2017), the acceleration of inflation just after the Bretton Woods system collapsed in 1971 may have contributed to the rise in economic disparity in the USA since the 1970s.

Islam et al. (2017) made an effort to identify the causes of poverty and inequality in Bangladesh using the Household Income and Expenditure Survey from 2010. The researchers concluded that gender and religion had little bearing on whether a household was poor or not and noted that factors such as age, rural-urban

distribution, education, marital status, disability, remittance, region, and others had a notable impact on the poverty situation as opposed to gender and religion. According to Balcilar et al. (2017) used semiparametric instrument variable estimator covering the period 1976 to 2007 for the US, concluded that inflation lowers income inequality below the threshold level and increases inequality over that level.

Trinh (2016) found that inward Foreign Direct Investment (FDI) tended to narrow income gaps using the Gini coefficient as the dependent variable, inward FDI as the primary independent variable, other control variables like secondary

education, domestic investment, trade openness, annual inflation rate, GDP per capita, and population size. The panel data was analysed with pooled OLS model and fixed effects model. This was done over the period of 2002–2012 in 63 provinces of Vietnam. The equality of income distribution was expected to thrive as secondary education and trade openness did. On the other hand, the population, GDP per capita, and inflation rate widened income gaps and revealed little impact of domestic investment on incomes.

According to Matin (2015), over the time period under review, rising inequality was correlated with rising growth. Inflation, unemployment, export, labour force, and population were found by Škare and Stjepanovic (2014) to be the major factors of the income distribution. According to Ali (2014), growth increased inflation, FDI, remittances, and manufacturing value added in Pakistan, whereas there was a negative correlation between income disparity and growth.

Walsh and Yu (2012) distinguished between food and non-food inflation and considered whether or not food inflation worsens income inequality. Non-food inflation had an increasing influence on income inequality in rural and urban regions, however in rural areas, food inflation had a neutral to positive impact on income inequality, whereas food inflation had a mixed role in Indian states.

Thalassinos et al. (2012) discovered that inflation had a significant positive impact on income inequality between 2000 and 2009 in 13 European countries, using the Gini inequality index as the dependent variable and the growth rate, employment level, and openness of the economies as the independent variables. Yue (2011) from Korea noted that there is no long-term co-integrated behaviour

between inflation and income distribution, while there is a long-term co-integrated behaviour between income inequality and economic growth.

Konya and Mouratidis (2006) used a cross-sectional analysis of two types based on the six-year average fix effects panel data analysis and all available annual observations of country averages. In cross-sectional analysis, inequality and growth volatility appeared to be correlated across 70 countries between 1960 and 2002, with irrational indications of many significant coefficients, while inequality had an indirect impact on growth volatility in panel data analysis.

In a political economics model developed by Albanesi in 2007, equilibrium inflation was found to be positively correlated with the degree of income inequality,

particularly for low-income households. Although inflation's quantitative impact of inflation was economically insignificant, Heer and Süssmuth (2003) pointed out that it contributed to an unequal distribution of income and that it had a smaller welfare cost than projected inflation. Negative and negligible impact of inflation on the income shares of the poor and middle class was demonstrated by Li and Zou (2002) who discovered that inflation raises income inequality and slows economic growth.

In view of the above debate, this study becomes quite relevant as there haven't been many investigations into the effects of GDP growth rate, inflation and population growth rate on income inequality in India. The current study is directed to add a valuable contribution in the existing literature on the subject.

### **3. DATA AND METHODOLOGY**

The study uses GINI coefficient as dependent variable in order to examine the relationship between GDP and income inequality. The coefficient is an instrument that assesses the disparity in frequency distribution values and income inequality within a country. The coefficients range from 0 to 1, with 0 denoting a perfect equal distribution and 1 denoting a perfectly inequal distribution. The value cannot be greater than 1 as doing so would imply a loss of income. The GINI index contains the largest amount of data that is readily accessible online, which is the major reason using it to gauge income inequality. Growth rate of GDP is the main independent variable and other independent variables are inflation rate (Consumer Price Index), population growth rate. Inequality data as a form of GINI coefficients is taken from World Inequality Database by World Bank, and other independent variables data have been taken from World Development Indicator by World Bank. All data was collected on annual basis consisting the period from 2001 to 2020. Regression equation for the model can be represented as:

$$G_t = \xi_0 + \xi_1 W_t + \xi_2 I_t + \xi_3 P_t + \varepsilon_t, \quad (1)$$

Where,  $G_t$  denotes the GINI coefficient at time  $t$ ;  $W_t$  denotes the GDP growth rate at time  $t$ ;  $I_t$  denotes the inflation rate at time  $t$ ; and  $P_t$  is population growth rate at time  $t$  and  $\varepsilon_t$  is the disturbance term.

#### **4. RESULT DISCUSSION**

**Table 1 Regression results**

Dependent Variable: GINI
--------------------------

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDPGR	0.001348	0.000376	3.582404	0.0025
INFL	0.002987	0.000458	6.519151	0.0000
POP_GROWTH	-0.161112	0.005334	-30.20730	0.0000
C	0.784528	0.007833	100.1571	0.0000
R-squared: 0.984798, Durbin-Watson stat: 1.823582				
F-statistic: 345.4895, Prob(F-statistic): 0.000000				

**Source:** *Authors' own.*

The data relating to all the cited variables is given in Appendix 1. Results of the regression are depicted in Table 1. GDP growth rate and inflation have positive and significant relationship with the dependent variable, which is GINI here. While population growth rate has negative and significant relationship with GINI. All the coefficients are highly significant as probability value is less than 1 per cent. R-squared value and D-W statistic is 0.9847 and 1.8235 respectively. F-statistic is also highly significant at 1 per cent level which, indicates the robustness of the model.

## **5. DIAGNOSTIC TESTS**

To further check the reliability of the estimated model the study has employed few tests. Breusch–Godfrey Lagrange multiplier test for the residual serial correlation, Breusch–Pagan–Godfrey test and white test for heteroskedasticity in the model, Jarque–Berra test for normality and multicollinearity test to check whether independent variables in the model are independent from each other or linked to each other. The results suggest that the model is free from the serial correlation,

heteroskedasticity, and non-normality issues as p-value is greater than 5 per cent which is for the rejection of null hypothesis having serial correlation, heteroskedasticity, and non-normality in the model.

**Table 2 Breusch-Godfrey Serial Correlation LM Test**

F-statistic	1.902853	Prob. F(2,14)	0.1858
Obs*R-squared	4.274704	Prob. Chi-Square(2)	0.1180

Source: Authors' own.

**Table 3 Breusch-Pagan-Godfrey Heteroskedasticity Test**

F-statistic	3.213178	Prob. F(3,16)	0.0511
Obs*R-squared	7.519274	Prob. Chi-Square(3)	0.0571
Scaled explained SS	2.663849	Prob. Chi-Square(3)	0.4464

Source: Authors' own.

The study employed one more test named white test for heteroskedasticity because in Breusch-Pagan-Godfrey heteroskedasticity Test probability values are approximately 5 per cent (though greater than 5 per cent). To get a clear idea of heteroskedasticity problem the study conducted white test and results are robust as probability value is very high to reject the null hypothesis of heteroskedasticity.

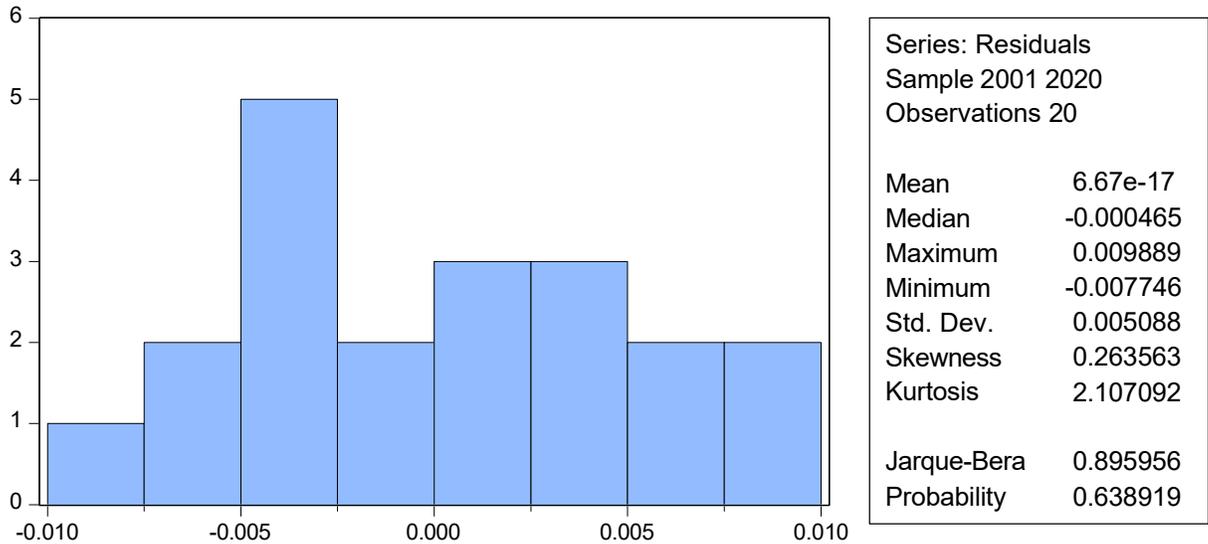
**Table 4 White Heteroskedasticity Test**

F-statistic	2.213219	Prob. F(9,10)	0.1159
Obs*R-squared	13.31528	Prob. Chi-Square(9)	0.1489

Scaled explained SS 4.717197 Prob. Chi-Square(9) 0.8582

Source: Authors' own.

**Table 5 Jarque-Bera Normality Test**



Source: Authors' own.

**Table 6 Multicollinearity Test**

Variance Inflation Factors			
Variable	Coefficient Variance	Uncentered VIF	Centered VIF
GDPGR	1.42E-07	4.304036	1.079669
INFL	2.10E-07	6.490940	1.013272
POP_GROWTH	2.84E-05	34.08804	1.092984
C	6.14E-05	39.91463	NA

Source: Authors' own.

To test the multicollinearity in the model The study employed variance inflation factor test to work out the multicollinearity in the model. Table 6 represents that

centered VIF values approximately 1 for all the independent variables GDPGR, INFL, POP\_GROWTH which is less than 10. According to the rule VIF value is less than 10 indicates no severe multicollinearity exists in the model. Thus, this model is free from multicollinearity.

## **5. CONCLUSION AND RECOMMENDATION**

The study examines the effect of GDP growth rate, inflation and population growth on income inequality in India. It finds that there is positive relationship between GDP growth rate and income inequality indicating that share of India's increasing growth rate is centred among rich people rather than poor but, in this analysis the coefficient of GDPGR is 0.0013 means one per cent increase/decrease in GDPGR will cause only 001 per cent increase/decrease in income inequality. Inflation rate has also positive relationship with inequality which is in line with the previous studies. On the other side, population growth has negative relationship with income inequality. According to the result one per cent increase/decrease in the population growth rate will cause 16 per cent decrease/increase in income inequality. Increasing population growth rate reduce income inequality which could be the reason of more hands for job for the poor or increasing productive population which can enhance earnings of poor by job diversification. India needs to focus on redistribution of income as GDPGR is causing inequality although it is mild. Therefore, very high inflation needs to be controlled. Access to good opportunities for increasing population need to be the agenda to reduce income inequality as India have great advantage of youth population.

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**Appendix 1.**

Time	GINI	GDPGR	Infl	POP growth
2001	0.517804	4.823966	3.779293	1.728769
2002	0.527212	3.803975	4.297152	1.689562
2003	0.536751	7.860381	3.805859	1.651491
2004	0.546416	7.922937	3.767252	1.615308
2005	0.556198	7.923431	4.246344	1.579709
2006	0.565972	8.060733	5.796523	1.545696
2007	0.575956	7.660815	6.372881	1.509222

2008	0.586134	3.086698	8.349267	1.46489
2009	0.59649	7.861889	10.88235	1.410583
2010	0.607006	8.497585	11.98939	1.350338
2011	0.620348	5.241315	8.858361	1.288513
2012	0.626373	5.456389	9.312446	1.231485
2013	0.627859	6.386106	11.06367	1.182904
2014	0.633618	7.410228	6.6495	1.145673
2015	0.633618	7.996254	4.906973	1.116896
2016	0.633618	8.256306	4.948216	1.090459
2017	0.633618	6.795383	3.328173	1.063359
2018	0.633618	6.532989	3.945069	1.037828
2019	0.633618	4.041554	3.723276	1.013261
2020	0.633618	-7.25175	6.623437	0.989414

**ARTICLES/4**

**INVESTMENT IN AGRICULTURE IN INDIA:  
GROWTH, COMPOSITION, PATHWAYS  
AND POLICY DIRECTIONS\***

**S. BISALIAH\***

**1. The Backdrop to the Study Theme:**

Recurring food crisis, food inflation, persisting poverty, failure of many countries to achieve MDG goal of halving proportion of poor and hungry people by 2015, deepening rural-urban development divide-all these have led to renewed interest in developing agriculture/rural sector. But for long, agriculture was treated as an inferior partner in development (even in China until the mid 2000s). The pattern of growth – accelerated growth in service sector, marginal growth in industrial sector and decelerated growth in agriculture sector – that has emerged in India during the last two decades or so is a case in point. On the other hand, developed countries like Japan and Republic of Korea have treated agriculture as an integral part of their development strategy. China since mid 2000s has realized the growth of agriculture/rural sector, as a building block for successful economic growth. In fact, long ago development economists have recognized the importance of development of agriculture and rural sector in supplying labour force to different sectors, producing low cost food, production of fiber and other. Crops for industry, foreign exchange earnings and in raising rural income (Bisaliah, 2012).

A brief reference to the major concerns and challenges of Indian agriculture

is in order (Bisaliah 2009.b and Ramesh Chand et. al 2011). These are technology fatigue, productivity fatigue, degradation and depletion of natural resource base, stagnation in area under irrigation, growth lagging regions and farm groups, inadequate rural infrastructure, lack of diversification of rural economy, falling investment (especially public sector investment) in agriculture, and low and falling Total Factor Productivity (TFP). It is realized now that accelerated agricultural growth is not only needed to meet global demand for food, fiber and energy, but is also considered as the main pathway out of poverty for people of many countries (Hazell, et. al 2011). In

India, agri-food production sector has to move on to high growth trajectory so as to sustain high GDP growth through supply and demand routes, in addition to many other reasons for placing agriculture on top of development agenda.

Among many priority policy and investment options, investment in agriculture and policies and programmes associated with it are considered as the most critical ones. Against this backdrop the present paper focuses on four major issues.

- What do theoretical constructs and empirical evidences (both international and national) suggest about the nexus between investment and agricultural growth, and agricultural growth and poverty alleviation?
- How has been the investment growth cycle in India during the last six decades? What have been the trends in composition of agricultural capital stock in India?
- What lessons we can learn from the cross country experiences on capital formation in agriculture?

- What could be derived from the analysis as package of policy and programme directions for investment in agriculture?

## **2. Investment, Growth and Poverty Alleviation: Some Evidences**

A review of both theoretical constructs and empirical evidences suggests some useful perspectives which could provide the basis for identifying policy directions. **First**, various versions of growth models have recognized capital (in the broad sense) as one of the major deep drivers of growth (Bisaliah 2010 and Bisaliah et. al 2013). **Second**, growth accounting studies with growth regression statistical models have provided three useful results which are quite valuable for developing countries in their policy and programme designs: (a) Capital accumulation is by far the most important contributor to measured output growth, in addition to labour, human capital and TFP. (b) Variations in TFP have been explained in terms of human capital, physical capital, natural capital, macroeconomic management, governance, R&D, institutional factors like land distribution and land tenure, and economic integration with outside world. (c) The observed positive interaction between technological advance, capital accumulation and TFP catch-up contributes for “bridging” idea gap between countries to facilitate move towards growth convergence. **Third**, there are enough evidences to suggest the nexus between capital formation and agriculture growth and poverty alleviation In India the poverty is much complicated and complex issue. It not only the requires integrated approach of developing skills among the poor, providing employment, increasing nutrition level, providing health facilities and infrastructure facility. But also require proper will on the part of the policy makers and the bureaucrats to implement the well prepared polices. (Keshava S.R 2013) & (see Bisaliah 2004 and 2010 for evidences on Indian experience). Capitalization of agriculture (i.e capital deepening to provide more capital for labour engaged in

agriculture to work with) in some countries of Asia and Africa is quite essential for increasing productivity of land and labour and thereby to address the problems of poverty and hunger. This result could also be placed in the perspective of a major result derived in a global/regional study by Stephan (2009): There is a tendency for low Agricultural Capital Stock (ACS) per worker, low labour productivity and high prevalence of undernourished population to 'co-exist'. The level of ACS intensity is found to be the highest in the regions with lowest prevalence of hunger and poverty. The ACS intensity is the least in countries with the highest prevalence of hunger and poverty. Yet in another study (Bisaliah, 2010) it is documented and analysed the nexus between ACS and agriculture growth, ACS and agriculture labour productivity, and labour productivity and prevalence of hunger.

**Fourth**, there has been a shift of work force from farm to non-farm sectors such as construction, service and manufacturing in developing countries, and this has led to decline in supply of labour to agriculture. It is for this reason also, there is a need for increasing capitalization of agriculture, making it more important than before. Any inadequate investment in agriculture would lead to low productivity of land and labour with direct bearing on poverty and hunger.

**Fifth**, the debate on growth maximizing approach to poverty reduction is still inconclusive (Bisaliah et. al 2013), but agriculture is treated as a pro-poor growth sector. Because, poverty responds more to inclusive rural growth than to urban growth, leading to the inference that high GDP growth is only a necessary condition for poverty alleviation; what matters is the pattern of growth, the very origin of GDP.

**Sixth**, the need for simultaneous growth of agricultural production and the value chain to which it is linked is very well articulated by Hazell et. al

(2011). In creating value chain, there are wide range of partners such as farmers, and those who are engaged in farm input supply, processing, storage, distribution, wholesaling, retailing, and exporting farm products. This is suggestive of the strong farm and agro-industry development alliance and of complementarity between agriculture and agro-industry. The study by Hazell e. al (2011) has knitted together investment, farm production, creation of value chain by agro-industry, factors governing on-farm capital stock, and complementarity between public investment and private-farm household investment and agro-industry investment (Details in Bisaliah 2012). This kind of agriculture development complementarity raises many policy questions: what policies would create an enabling environment for partners (viz farmers, public and corporate sectors) in creating value chain so as to motivate them to invest? What is the right role of private corporate sector investment in agriculture? What kind of public investment would induce farmers and agro-industrial sector to invest in agriculture? (Details under Section 5).

**Seventh**, the study by Nelson et. al (1999) has derived another important development experience: It is immensely important to recognize the difference between capital accumulation and capital assimilation. The growth, development experiences of South Korea, China and Singapore suggest that in these countries there has been not merely rapid capital growth of physical capital stock, but also high rate of investment in human capital to facilitate capital assimilation through entrepreneurship, learning by doing, and innovation.

### **3. Growth and Composition of Capital Stock in Agriculture:**

This section analyses trends in growth of investment/capital formation in

agriculture, and shifts in composition of capital stock in terms of the share of public and private sector in total capital stock. Under private sector, there are two entities. Corporate/agro-industry sector (either domestic or foreign or joint venture), and farm household sector. The farm household component of private investment is estimated to be 90% of private investment (HLC, 2009). Given the importance of farm household investment in agriculture, FAO (2011) has identified some broad areas of farm household investment such as fixed capital investment and property rights, factors governing investment at farm level, and policy options for forging the link between public and private investment. The investment made by corporate sector consists mainly of production and marketing of farm inputs such as fertiliser, seeds, pesticides and farm machinery and agro-processing and trade. In case of public sector investment, irrigation would account for almost 90% of gross public capital formation in agriculture (Bisaliah et. al 2013). A brief reference to the distinction made by Dantawala (1986) as between investment/capital formation in and for agriculture is in order (Details in Bisaliah et. al 2013). Investments made for production of pesticides, fertilizers and agriculture machinery, development of agriculture markets, rural roads and communication, agricultural education and research, rural electrification and so on could be treated as investments made for agriculture. However, no such detailed empirical analysis is attempted in this paper (some details in Bisaliah et. al 2013).

### **3.1 Investment Growth Cycle:**

Based on empirical analysis, an important theorem on investment growth cycle in Indian agriculture has been derived (Bisaliah 2004 and Bisaliah et. al 2013): There appears to be an investment growth cycle during the last six decades or so, encompassing a period of rising trend, a subdued phase, a peak

epoch, persistent deceleration and recovery. These are examined with macro level estimates as displayed in Table 1:

Table 1: Distinct Growth Epochs in Aggregate GCF and GCFA in India

Period	Annual Compound Growth Rates (%)	
	Aggregate	Agriculture and Allied Sectors
Broad periods		
1960-61 to 1980-81	4.35	6.20
1980-81 to 1999-00	5.85	1.83
Decades		
1960s	4.43	6.39
1970s	5.14	6.08
1980s	4.86	-0.40
1990s	5.99	2.64

Notes: 1. Based on CSO data series

1. Estimated at 1993-94 prices

2. Source: Bisaliah (2004).

It is observed that the annual compound growth rates of aggregate GCF had increased from 4.35% during 1960-61 and 1980-81 to 5.85% during 1980-81 and 1999-2000. During the same period, the growth rates in agriculture and allied sectors decreased from 6.2% to 1.83%, with implications for growth of agriculture and allied sector, and of non-agriculture sector. The decadal growth rates would lead to the same inference i.e fall in the growth rates of GCF in agriculture and thereby lagging agriculture growth rates.

It is also appropriate to examine trends in the growth rates of capital stock, technology, electricity use, gross irrigated area and cropping intensity in agriculture during a period of 25 years: 1980-81 to 2005-06.

Table 2: Trend Growth Rates of Net Fixed Capital Stock and other Items Related to Agriculture: 1980 – 81 to 2005 – 06

<b>Item</b>	<b>1980/81 to 1990/91</b>	<b>1990/91 to 1996/97</b>	<b>1996/97 to 2005/06</b>
Net fixed capital stock	2.00	2.06	1.28
Technology	3.3	2.81	0.00
Gross irrigated area	2.28	2.62	0.51
Electricity use in Agriculture	14.07	9.44	-0.53
Cropping Intensity	0.51	0.39	0.12

Sources: Kapila (2009).

In broad turns, during the period of 25 years there was a deceleration in the growth rates of all the six items which could be termed as proximate factors for increasing agricultural productivity and production. All these decelerated growth rates tend to impact adversely growth performance of agriculture and tempo of poverty alleviation.

Yet another way of understanding the trend of investment deceleration in agriculture sector is to examine the share of agriculture in total GCF.

Table 3: Share of Agriculture in Total GCF

<b>Year</b>	<b>% Share</b>
1952 – 1953	23.5
1953 – 1983	20 to 14
1995 – 1996	6.2
2002 – 2003	9.0

Notes: 1. Source: Bisalialah et. al (2013)

It is noticed that from about one-fourth of the share of total GCF accrued to agriculture in 1950s, it decreased to about 6% in 1995-96, and the recovery started in 2002-03 (Bisalialah 2014). With the share estimated with 2004-05 prices, the share of agriculture sector in total GCF has remained around 7 to 8 percent between 2004-05 to 2012-13.

Investment growth cycle could also be discussed by examining the trends in share of GCFA in overall GDP and agriculture GDP (AGDP):

Table 4: Trends in Capital Formation in Indian Agriculture: At Constant Price of 2004-05

Year	% Share of GCFA in	
	Overall GDP	AGDP
1990 – 1991	3.79	12.84
1994 – 1995	2.25	8.11
1999 – 2000	3.05	13.12
2005 – 2006	2.4	14.6
2011 – 2012	2.14	20.8

Notes: 1. AGDP = Agriculture GDP

2. GCFA = Gross Capital Formation in Agriculture and Allied Sectors

3. Source: Central Statistical Organisation, Government of India.

The inferences that could be drawn from Table 4 are: Between 1990-91 and 2011-12, the share of GCF in agriculture (GCFA) in overall GDP has been hovering around less than 3%. In fact, it had decreased from about 4% in 1990-91 to about 2% in 2011-12. On the other hand, the share of GCFA in AGDP has been experiencing an increase from about 13% in 1990-91 to about 21% in 2011-12. This is measure of increase in investment mainly by millions of farms households (Details in the next section).

### **3.2 Micro Evidences on Growth Rates of Capital Stock Between 1994 – 95 and 2007 – 08:**

A farm level data set with a sample of 800 farmers across the country (see Bisalialah et. Al 2011 for details on data set and analytical tools, and deflator used to arrive at real growth rates) has been analysed to estimate growth rates of four items of capital stock viz land, animal capital (A.C), form machinery (F.M), and irrigation capital (I.C).

Table 5: Growth Rates of Capital Stock

<b>Capital Assets</b>	<b>Overall Growth Rates</b>
Land	-0.06
A.C	-0.74
F.M	-2.13
I.C	1.56

All Non-Land Capital Stock	-0.74
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Notes: Only overall growth rates, ignoring land-size, are reported. Details in Bisalialah et. al 2011.

It is observed from Table 5 that growth rates of three items capital assets are found to be negative, with only I.C recording positive growth, and positive growth of I.C is encouraging because irrigation is a land substitute and thereby land augmenting. Negative growth rate of land is of course understandable, in view of use of some land for non-agriculture purposes. Hence micro level evidences on capital stock at farm level between two points of time are suggestive of deceleration in capital stock at farm level during the period of study, again with implications for productivity and production in agriculture sector.

From the preceding analysis the substantive conclusions are: The experience of India with respect to investment in agriculture almost validates the investment growth cycle discussed earlier. The annual growth rates of GCF in the economy has been increasing, but annual growth rates of AGCF has been on the decline during a considerable period of time, impacting adversely agriculture productivity and production and thereby poverty alleviation. Share of agriculture sector in total GCF has been either on the decline or stagnating with recovery during 2000s. Between 1990-91 and 2011-12, the share of GCFA in overall GDP has been less than 3%, and in AGDP it is found to be increasing from about 13% in 1990-91 to about 21% in 2011-12. Micro level (farm level) study of growth rates of capital stock between 1994-95 and 2007-08 leads to the inference that there was a negative growth rates

of Land, A.C and F.M Capital Stock, but positive growth rate in case of I.C, with implications for land augmentation.

### 3.3 Composition of Investment in Agriculture: Public vs Private Sector

Following the analysis of investment growth cycle, the next issue is to examine trends in the composition of AGCF in terms of share of public sector and of private sector as evidenced in Table 6:

Table 6: Trends in Percentage Share of Private and Public Sector in Total GCFA

Year/Decade	% Share of				
	Public Sector		Private Sector		
I Decadal:	<b>1960s</b>	<b>1970s</b>	<b>1980s</b>	<b>1990s</b>	<b>2000s</b>
Private	57	67	58	76	81
Public	43	33	42	24	19
II Annual:	2009 – 10	2010 – 11		2011 – 12	
Private	83	85		85	
Public	17	15		15	

Notes: Developed from data sources of CSO, Bisaliah et. al (2013), and Pahlavi (2014).

Analysis of shifts in the composition of GCFA as between public and private sector suggests that: There has been a continuous fall in the share of public

sector from 43% in 1960s, to 15% in 2011-12, increasing the share of private sector from 57% to 85% during the same period of time. For private sector to increase its share, investment finance from institutional sources, among other factors, is found to have played a significant role. For example, the investment credit formed about 40% of total private investment in 1999-2000, and it increased to 63% in 2013-14. During the period of 1999-2000 to 2013-14, the average share has been around 68%. Hence long-term credit from financial institutions is found to be a major driver of the private sector capital formation in agriculture. Yet in another micro level study (Bisaliah et. al 2013), credit is found to have positive impact not only on capital formation in agriculture at farm level, but also on productivity of labour engaged in agriculture and gross value of farm output.

However, fall in the share of public investment in agriculture is a disquieting feature, because the objective of public sector investment and the choice of project portfolio by public sector are different. Public investments in rural infrastructure like rural roads, in social sector like schools, drinking water and health, and in irrigation, rural bridge, rural markets, agriculture science and technology are crucial for inducing both farm households and corporate sector to invest. The “paradox” of increase in the share of private investment and decrease in the share of public investment challenges the hypothesis of complementarity between public and private investment (Debate on the issue of complementarity in Bisaliah et. al 2013). Further, the Rural Infrastructure Development Fund (RIDF) operated by National Bank for Agriculture and Rural Development (NABARD) since 1995-96 to support State Governments for developing rural infrastructure and corporate sector especially to invest for creating value chain (processing) is yet to gather

momentum. This kind of investment is for agriculture, in addition to investment in agriculture.

In a study by Bisaliah et. al (2011), it is estimated that land would form about 95% of total farm capital stock of Indian farmers, and the remaining capital assets form only 5%. In another study (Bisaliah et. al 2014), it is estimated that land would form 92% of total farm business assets. This would imply that Indian farmers have less non-land capital stock to work with.

#### **4. Cross Country Experiences on Investment in/for Agriculture**

A major study on capital formation in agriculture initiated by FAO through TCSP in four South Asian Countries viz Bangla Desh, China, India and Nepal, in four African countries viz Ethiopia, Burkina Faso, Mali and Egypt, and one in Latin America viz Bolivia has provided useful insights into agriculture investment and business models. From a synthesised report (Bisaliah, 2012), following insights and lessons are extracted:

- In general there has been a structural transformation reducing the share of agriculture in national GDP, low crop diversification, low AGDP (excepting China), perceptible share in total employment, low or negative TFP grow rate in almost all the study countries excepting China, and food insecurity and hunger in most of the study countries.
- The major institutional and policy constraints are: Insecurity of land tenure with implications for on-farm fixed capital investment, dualistic agricultural system like the one in Bolivia, ineffective governance in agriculture development administration, huge amount of financial outlay towards subsidies instead of development of agricultural capital stock through public investment, low value addition, and inadequate development of non-farm development, excepting China.

- With respect to investment in agriculture, China alone has experienced accelerated investment in agriculture from 1.5% per annum to 21% per annum i.e quite a big push. In all other countries growth rates of ACS have been moderate and falling. India represents a case of falling public investment in agriculture, whereas in China there is a dominance of public investment. Almost all the countries have experienced inducement effect of public sector investment on farm level investment and investment by corporate sector.
- Both price and non-price factors are said to be determinants of private investment: Security of land title, credit, terms of trade, subsidies, public investment, infrastructure macroeconomic environment, migration and remittances, and development alliance between farmers and corporate sector.
- **Major policy directions and business models in study countries are:**

❖ **Public policy for increasing public investment:**

- : Government to treat agriculture as an equal partner in development.
- : Increase public investment in agriculture, using rising tax income from service and industrial sectors.
- : Public investment to increase TFP by investing in rural infrastructure and knowledge system so as to induce farm households and corporate sector for more investment.
- : Public investment to help farmers to adapt to climate change.
- : Shift public expenditure under current to capital account for investing in irrigation, rural roads, research and extension, market development, rural electrification and so on.

❖ **Public policy support to induce private investment:**

- : Accept agri-business as an engine of growth.

- : Joint ventures between farmers and corporate sector, land lease for agri-business companies, and contract production system for value creation through processing.
- : Policy support for input and service providers, and risk management institutions (like insurance companies), private irrigation water providers, credit providers, and other types of technical service providers.
- : Support business models of farmers' groups as a development unit (Ex: Peasants' Association in Bolivia for collective ventures).
- : Ensure security of land tenure and consolidation of land holdings.
- : Diversification of rural economy by supporting the development of rural non-farm sector.

## **5. Pathways and policy directions for public and private investment**

Substantive inferences derived from the preceded analysis are extracted, and these are suggestive of pathways for policy directions for public and private investment in agriculture in India. **First**, it has been realised that agriculture is not an inferior partner in development, but an equal partner. High growth rate of agriculture sector is essential to sustain high growth rate of the economy. It is considered as the main pathway out of poverty, because agriculture is pro-poor sector. **Second**, the major concerns and challenges of Indian agriculture sector are: technology fatigue, low and falling TFP, productivity fatigue, degradation and depletion of natural resource base, inadequate rural infrastructure, low and falling investment (especially by public sector) in agriculture, and so on. Investment in agriculture is to be considered as a major policy option to facilitate realization of development policy goals. **Third**, there are enough evidences and experiences to suggest positive association between investment and agriculture growth, and

agricultural growth and poverty alleviation. **Fourth**, development experiences suggest the need for on-farm investment and investment for agriculture to facilitate value chain creation. **Fifth**, macro level trends in agriculture investment in India over a period of half a century have validated the investment growth cycle, encompassing a period of rising trend, subdued phase, a peak epoch, persistent deceleration and recovery. Further, micro (farm) level evidences also lead to the inference, there has been a negative growth rates of all non-land capital asset group, but positive growth rate is observed in case of farm level irrigation capital stock among non-land capital asset group. Further, there has been a decline in non-land capital stock per unit of land and labour. **Sixth**, with respect to composition of agriculture investment as between public and private sector, the share of public sector in total capital stock in agriculture sector had declined from 43% in 1960s to 15% in 2011-12, and of private sector had increased from 57% to 85% during the same period. Investment credit from financial institutions to private sector has been a major driver of this trend. Further, out of the total investment in private sector, about 90% has been from millions of farm households. However, fall in the share of public investment in agriculture is a disquieting feature, because the objective of public sector investment and the choice of project portfolio by public sector are different. **Seventh**, it is estimated in micro level studies (Bisaliah 2011 and 2014) that land alone forms over 90% of the capital stock at farm level, implying that Indian farmers have less non-land capital stock to work with. **Eighth**, the cross country study suggests: Excepting China, in all other eight study countries, there has been either low or declining rates of capital formation in agriculture. All the study countries have experienced positive inducement effect of public investment on private investment by both farm household and agro-industrial sector. Security of land tenure, credit, terms of trade,

public investment, rural infrastructure, and development tie up between farmers and corporate sector are said to be major determinants of capital formation at farm level. Shifting some amount of public expenditure under current account to capital account, and public investment for increasing TFP in agriculture, joint ventures between farmers and corporate sector, and public policy support for input and service providers, for security of land tenure and consolidation of land holdings, for diversification of rural economy, and for business models of farmers' group are some of the major policy directions derived from the cross country study.

**5.1** Based on the recapitulation of substantive inferences from the analysis, it is argued that declining/low investment in Indian agriculture is one of the binding constraints on the performance of Indian agriculture. Further, the disquieting trends in capital formation both at macro and micro level have slowed down the pace and pattern of agriculture growth and poverty reduction. Hence the need for identifying pathways and policy directions for accelerating investment in agriculture as a prime trigger for achieving a 'desired' rate of growth of rural sector. Pathways and policy directions are identified under two major heads: Public Investment: Policies and priorities, and Private Investment: Public policy support (Bisaliah 2004 and 2012, Bisaliah et. al 2013, 2014 and 2015, Saifullah et. al 2013). It needs made explicit that there are many areas of interfaces between these two classifications of policies for public and private investment, and hence these are very much related.

## **5.2 Public Investment: Policies and Priorities**

Some major areas of public investment policies and priorities are examined in this section:

**First**, the policy debate on provision of subsidies to agriculture has drawn the attention of researchers (Bisaliah 2004, Bisaliah et. al 2013). It is true that subsidies to agriculture in India are far less compared to many developed countries. Subsidies, especially on fertilizer, power and irrigation have become unsustainable, because subsidies are crowding out public investment and public budgetary resources are required to put subsidy bill by the government with less of resources available for capital expenditure by government on public capital projects. Added to this effect are fiscal deficit, cropping pattern, environmental and equity “undesirable” effects. For example, a modest 20% reduction on subsidies could enable the government to double its investment in agriculture (Kapila 2009). Further, it is also estimated (Ramesh Chand et. al 2004) that instant return on one rupee subsidy is about three rupees (in terms of impact of subsidy on AGDP), and less than one rupee return on one rupee public investment in capital stock. This impact on return is just for a year, but if return during the expected life of the capital stock is considered, the total impact is estimated to be more than double the impact of subsidies. These results are suggestive of downsizing subsidies in a phased manner and plough back the saved resources for public investment in agriculture, say for irrigation, rural infrastructure and other public good type of public investment. But political economy compulsions are still strong enough to slowdown the move towards subsidy downsizing.

**Second**, in formulating policies towards public investment, many priority areas have been identified: irrigation, rural electrification, technology development and transfer, rural economic diversification, marketing system, roads, sunrise sectors like horticulture and animal husbandry, dry land agriculture, reduction in agriculture development distance between regions, farm size groups and social groups and rural human capital (Panagariya

2008, Ramesh Chand et. al 2011, Bisaliah et. al 2013 and 2015, and Saifullah et. al 2013). To examine some of these in detail:

- Public investment in rural public goods such as education, infrastructure (like roads) health care and social services, nutrition, agricultural research and extension, and so on are rated as drivers of agricultural productivity and production. Added to all these is the complementary role of public investment like in rural roads which could induce private investment.
- Large sized irrigation projects, a major driver of agricultural productivity and private investment, are possible to be undertaken only in public sector. In addition to public investment in irrigation, some reforms in irrigation management are needed: reduction in the gap between irrigation potential created and its utilization, pricing of public irrigation water, adequate public investment for increasing the operational efficiency of public irrigation projects, promotion of institutional structures like farmers' water user associations, and rehabilitation of traditional water bodies like irrigation tanks. All these may reduce the gap between outlay and outcome.

It has been established (Ramesh C et. al 2011) that TFP could be a major source of productivity and output growth in crop and livestock sectors in India. With an increase in TFP, unit cost of production decreases, benefiting both producers and consumers, and augmenting competitive edge of Indian agriculture. But TFP growth has been falling over a period of time (Bisaliah et. al 2013). Hence agriculture growth in India has been mainly conventional-inputs-led. The main sources of TFP growth are agriculture R&D, education, extension, infrastructure, irrigation and natural resource management. Of these sources, investment in agriculture research is considered as crucial for developing land, labour and capital augmenting technologies by increasing their productivity leading to upward shift in production function and downward shift in unit cost functions. It is estimated that returns to

investment in agriculture research would come to 42%, suggesting that public investment in agricultural research is a priority area. But the public investment as of now is around 0.5% of AGDP. Raise in public funding by at least one percent of AGDP could be a big push for agriculture research in the country.

- Rural electrification impacts agriculture productivity through the development of irrigation by farmers, in addition to impacting quality of life in rural areas and development of non-farm rural economy. Hence this is yet another priority area of public investment. Public investment is equally required for eliminating transmission and distribution losses (estimated to be as high as 40%), and in encouraging solar and wind energy individually or as a farmers' group through subsidies for these non-conventional energy sources.
- Rural economic diversification is another important priority area (Bisaliah et. al 2013, Planning Commission 2010) for public investment to support rural non-farm sector (RNFS). China has demonstrated that rural economic diversification with the support of public policies and public investment is a major driver of job creation and poverty alleviation. The term 'rural' is no longer synonymous with agriculture. The major premise of Chinese Model of rural transformation is that public investment for developing towns (not cities) can contribute for job creation, occupation mobility, food security and for improving public service delivery model for rural areas. Rural economic diversification has been promoted through support to Township and Village Enterprises (TVEs). Brazil has initiated public support to agro-based enterprises, and South Africa follows the policy of subsidy for light manufacturing in rural areas. The diversification of rural economy in China has been facilitated by public investment in the provision of infrastructure,

information and communication technologies, small scale manufacturing and agro-processing. Public investment focusing on institutions, innovation, market reform and infrastructure have provided public investment and enabling policy environment for rural economic diversification.

A recent micro level study in India (Bisaliah et. al 2015) has provided empirical evidences on the engagement of rural households in non-farm business activities such as trade, manufacturing of items like bricks, wooden and iron implements, transport services and the like. But the Chinese Model of Township and Village Enterprises (TVEs) is yet to make a dent in rural areas in India. Skill development of rural people, institutional credit, and market support should be priority of public investment policy.

- Affirmative development initiatives through public policy and investment are needed for bringing into the development orbit the lagged regions, farm groups, and social groups. Some of the affirmative actions are already in place, but outcome does not match the outlay due to ineffective governance especially at the stage of implementation. It is argued that public investment in less “favoured regions” like areas of dryland agriculture (confronted by agro-climatic hostility), not only offers the largest poverty reduction per unit of public spending, but also leads to the highest economic returns (HLC 2009). Further small land holders who form over 80% of land holdings in the country are the priority group to ‘claim’ a large share in the public investment package. Even though public investment package accords importance to small holders, innovative institutions like “development cluster”, and farmers’ group as a development unit to get linked with agro-industrial sector for a win-win game are yet to be in place. If public investment focuses on the

development of these institutional structures, small holders could be participants profitably in a competitive market environment.

Yet another priority of affirmative public investment is to create wage employment for small holders, and for households belonging to lower social strata of Indian society. Since wage income is the dominant source of income for these groups, public investment for generating employment in rural areas could be a source of livelihood for these households (Bisaliah et. al 2015). Right-based Employment under Mahatma Gandhi Rural Employment Guarantee Act is already in place, but it is yet to create productive employment by adequately directing public investment for the development of community projects like rural roads, rural godowns, rehabilitation and revival of traditional irrigation community structures, and development of irrigation facilities for a cluster of small holders with the formation of water user associations.

One more priority area of affirmative action is to use public investment as a tool to support the farmers belonging to lower social strata of India society. This kind of public investment is needed to prevent the perpetual development distance between upper and lower social strata of Indian society. It has been empirically established (Bisaliah et. al 2015) that saving and investment availability (saving plus credit availment from institutional sources) vary directly with social strata to which farmers belong. Further, it has also been established (Bisaliah et. al 2015) that levels of saving and investment fund availability are very much related to financial deepening (the extent of financial inclusion): Higher the level of financial deepening, higher the levels of saving and investment fund availability. Lower the level of financial deepening, lower the levels of saving and investment fund availability. It has been again empirically established (Bisaliah et. al 2015)

that the levels of saving and investment fund availability are low among small holders, socially lower strata of Indian society, low productivity regions, and owners of low productivity farms. In general, these segments of Indian farmers have less access to institutional credit and less of institutional fund availability. Hence financial deepening of these households through affirmative development initiative becomes crucial through financial inclusion drive (Bisaliah 2015).

### **5.3 Private Investment: Public Policy Support**

Four results from the preceded discussion are recalled to place the present section in perspective. **First**, there has been a decline in public investment from 43% in 1960s to 15% in 2011-12, and rise in private investment from 57% to 85% during the same period. **Second**, on-farm investment by millions of farmers would constitute about 90% of private investment. Another stakeholder in private investment is agro-industrial sector. **Third**, the inducement effect of public sector investment on private sector investment (both by farm households and agro-industries) has been identified in cross country studies. **Fourth**, under Section 5.2, there has been a discussion on lines of public investment like irrigation, rural electrification, rural economic diversification, technology development, public goods like roads, education, markets and health services, investment for augmenting TFP, and affirmative development initiatives for rainfed farming, small holders, and farmers' belonging to lower social strata. All these are in a way for inducing private investment. Added to these four results are: The trend of increased share of private investment has been accompanied by decrease in Incremental Capital – Output Ratio (ICOR), a measure of increased efficiency of investment in agricultural sector (Bisaliah et. al 2013). The possibility of considerable like in public investment in agriculture is not high, because of the resource

commitment of government for a broader development agenda. Hence government has to create an enabling environment through policies for private investment. Further, there has already been a paradigm shift in public sector dominance in infrastructure investment to public-private sector partnership. Then what are the other directions in which policy support is needed for private investment.

**First**, the policy directions derived from cross country study are equally relevant to India: Security of land tenure, consolidation of land holdings, policy support for private input and service providers, joint ventures between farmers and corporate sector, and formation of peasants associations as in Bolivia through policy support for value addition. In this regard, the study by Saifullah et. al (2013) has outlined three essential conditions for enhancing the capacity to invest by private sector. Ensure ownership, transferability and transformability of capital through good governance and rule of law. Establish security of property rights, fixed capital and financial institutions. Allow and facilitate land consolidation to ensure a level of income that is adequate for savings.

**Second**, public policy support is quite useful for social capital accumulation among farm household for collective management of agriculture development programmes such as water resource management, extension service, credit delivery, development alliance with corporate sector, and value addition through collective processing and marketing. The formation of social capital could be an institutional arrangement for agriculture development and rural transformation.

**Third**, policy support for influencing the saving and investment propensity of farmers is quite essential (Bisaliah et. al 2015). It is argued (HLC, 2009)

that the relationship between saving and investment, and investment and economic growth have been well established. Capital stock growth at farm level depends on savings by farm households and availment of institutional investment credit. To influence the saving propensity of farmers institutional innovations (like business correspondents linking farmers with banks), financial product designs which could meet the needs of small borrowers and depositors, and technological designs for financial inclusion (like mobile banking) are required (details in Bisaliah et. al 2015).

**Fourth**, terms of trade is one of the determinants of on-farm investment as discussed earlier. Further downsizing the subsidies in a phased manner, and ploughing back the saved amount for increasing supportive public investment (like irrigation) could tilt terms of trade in favour of farmers.

**Fifth**, farm level investment is also found to have been influenced positively by flow of institutional credit. Credit availment is found to have positive impact on output, productivity of labour engaged in agriculture and on capital formation. The time is ripe for public policy review of interest rate, credit limit for various purpose of credit availment by farmers, eligibility for credit availment, repayment schedule, and credit delivery system. In addition to this, if supervised credit system especially in case of investment credit is introduced under which farmers will get technical advice on choice of farm level investment projects.

**Sixth**, micro level studies (Bisaliah et. al 2013) have validated the premise that farmers' literacy could positively impact farm output, productivity of labour engaged in agriculture, and capital formation. Policy support is needed for enhancing budgetary support for general literacy as well as

technical literacy through skill development of farmers. Technical literacy for skill development could be an integral part of development education.

In addition to providing policy support for farmers to invest, the support is also needed to corporate sector (i.e agro-industrial sector) to engage in backward and forward linkages with agriculture sector. As discussed already, the investment portfolio of corporate sector is different from that of farmers and government. The portfolio consists of production and distribution of farm inputs, and processing and distribution of farm products. The agro-industrial sector is a stakeholder in supply chain, involving downstream (retail), mid stream (processing and wholesaling), and upstream (farming and input supply). A strong case has been made out through research (Minten 2011) for transformation of food supply chain in India. The main actors in unfolding “quiet revolution” during the last two decades are obviously in agro-industrial sector which handles over 90% of food economy in India. But if this food supply chain is to unfold further, policies on regulatory framework, and on spurring public investment in agriculture have to be put in place. Further corporate sector itself is entering into farming to produce high value crops in addition to its role in value addition through processing and distribution. Contract production system, with farmers and corporate sector as stakeholders, is emerging in the form of different models of contract production. But the effective regulatory frame and farmers associations to negotiate with corporate sector frame are yet to be in place.

Yet another development “experiment” (Raj, Ganguly, 2011) in value chain with the financial support from Asian Development Bank (ADB) has been conducted in Maharashtra (India). Under this project, farmers, producer companies, and cooperatives are the partners, and value addition is effected in case of vegetables, cashew, pomegranate, and cotton. Farmers under this project get access to technical advice and market information. As a result,

there has been an increase in returns per unit of land, labour and capital as compared to staple food crops, and in crop diversifications to build a pro-poor value chain, which benefits small holders also. These tie-up experiments between farmers and corporate sector in value chain with win-win outcome have to be replicated on a larger scale. This would require proper regulatory framework and public policy support. But public policy support should not end up with only tax holidays to corporate sector, and entry of corporate sector into farm sector is to be facilitated by infrastructure development through public investment. A recent study by Saifullah et. al (2013) has argued for enabling requirements to support agro-industrial sector. Essential enablers (the property rights, infrastructure and so on), important enablers (like financial services for agro-industries, regulations and so on), and useful enablers (like business development services, and business linkages). This classification of enablers for supporting agro-industrial sector could help in designing support architecture to motivate this sector to invest in/for agriculture.

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\* The paper draws heavily from the Consultancy Reports of the Author and his Associates to FAO, and their publications. All these are cited under Reference Section.

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ARTICLES / 5

**PERFORMANCE OF FOOD PROCESSING  
INDUSTRIES (FPI) IN INDIA**

***Dr. Y.EBENEZER\* & MIS.N.JENY\*\****

***Abstract:** Food processing industries are one of the important parts of the industrial sector in the Indian economy because they have been contributing to vital roles in food security, employment of rural and urban areas, export values, and a remarkable portion of the country's GDP. The performance of this sector will have an influence on the Indian economy. The study aims to examine the Gross Value Added, Revenue, and FDI on food processing industries in the current scenario in India. Using the secondary information and measurable apparatuses the study has been carried out. The study found and concluded that food processing industries have maintained almost the same performance in GVA and revenue generation, whereas the growth value of export and FDI inflow have shown a decline in performance in the post covid-19 scenario during the period of study. Finally, the study suggested that the Indian government should make legislative policy and fiscal policy for the assistance in order to improve the performance of food processing industries.*

*Keywords: COVID -19, Food Processing Industries, Export Value, FDI, GVA Indian Economy.*

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\* Assistant Professor of Economics, School Of Law, Vel Tech University, Chennai.

\*\*Assistant Professor of Economics, School Of management, Vel Tech University, Chennai.

## **1. Introduction**

Since ancient times, the food processing industry has been carried out by the people in India. They had used salt, sun-drying, and fermentation of food for a longer period of time. Nowadays, the food processing industry is doing the same thing but with the help of advanced technology and better food preservative chemicals. Food processing could be separated by primary and secondary products. The primary products are those that are prepared from the raw material after processing, such as vegetables and fruits, whereas the secondary food products are processed from primary food products to obtain a new food product, for example products like jam, butter, sauces, etc. The food process will be done to make new products by using the existing primary food products and also to enhance their shelf-life with the intention of staying fresh for longer. Likewise, all this food processing takes place in what is known as the food processing industry. It could be a large-scale industry or a small-scale home-based industry.

India, is an agriculturally prosperous nation, with more than 50% of its population involved in the agricultural sector. Hence, India has a surplus of raw materials for food processing industries. In the year 2018-19, the total production of horticulture products was 313.85 million tonnes in India. With the support of food processing industries, India could easily process raw products into processed foods. Since the

agricultural sector is the major supplier to the Indian economy of the entire allied sector, the food processing industry has been helping in creating employment and also benefiting the economy of the country.

As per as the Food Processing Minister in 2020-21 report, the food processing industry has contributed almost 12.8% to India's GDP. Moreover, it is the next step in sustainable development as processed foods are less likely to get rotten, thus reducing food wastage. As it is having the longer shelf life, processed food could be smoothly exported to different parts of the world.

The Indian Food Processing sector plays a quintessential role in connecting Indian farmers to consumers in the international and domestic markets. The Ministry of Food Processing Industries (MoFPI) has been making vital efforts to encourage investments across the value chain. These employ approximately 1.93 million people and account for 12.38% of all registered factory sector employment. According to the NSSO 73rd Round report, the unregistered food processing sector is supporting employment for 5.1 million workers. The food processing industry in India has been constituted of major sectors like grains, sugar, edible oils, beverages, and dairy products etc.

Globally, India holds the number 1 ranking in producing some of the major products such as mango, papaya, banana, milk, ginger, guava, etc. Besides, India has been producing products like sugar, cashew nuts, potatoes, rice, wheat, etc. as a mass producer in the global economy. Apart from food products, it also produces a significant amount of coffee and tobacco every year. Spices have been the most exported food product in India. With the help of FPIs, India has been making processed spices that can easily be transported with a shelf life of more than a year.

According to the data of IBEF (India Brand Equity Foundation), India being exported spices worth US\$ 4 billion in the financial year 2021. India has been producing different kinds of food throughout the year with the help of the diverse climatic conditions and availability of different kinds of soil. Furthermore, there are

the numerous sea coasts, rivers, and lakes that cater to the supply of non-veg- food items. In the rural economy, it is providing a significant amount of resources at the same place along with cheap labor to establish the FPI. In this connection, from 2014 to 2015, the Government of India issued a fund of Rs. 2000 crore via NABARD to support the food processing industries and food parks in the rural areas.

In addition, Indian farmers are able to directly sell their crops to the industry for better output with the support of the food processing industries in India. Since, the demand for food items is significantly increasing with the increased population, FPIs are needed more to meet the demand. The Government of India is making significant efforts towards the enhancement of FPIs in India. In this context, the paper is going to explore the performance of the Food Processing Industries (FPI) in India in the current scenario.

## **2. Objective and Methodology of the Study**

### **2.1 Objective of the study**

- To examine the Gross Value added and Revenue of Food Processing Industries on manufacturing sector in recent scenario of India.
- To assess the trend of Foreign Direct Investment Inflows on Food Processing Industries in recent scenario of India.

### **2.2 Study Methodology**

The study is based on subordinate data gathered from various reports such as the Ministry of Food Processing Industries (MoFPI) 2021, Ministry of Food Processing Industries (GoI)-Annual Report 2021-2022, Economic Time, and additional web sources. The study duration is from 2012 to 2021, and the accessible information has been handled and presented with appropriate tables and pi-charts.

## **3. Analysis and Clarification**

### **3.1 .FOOD PROCESSING INDUSTRIES (FPI)**

Table-1 explores the Share of FPI in Manufacturing GVA (in percent) in India in terms of the pre and post covid-19 growth of FPI from the year 2012 to 2020.

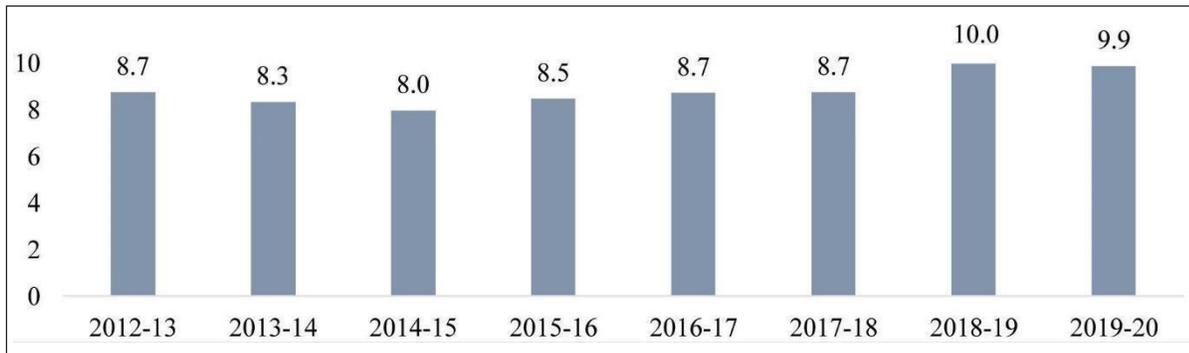
**Table – 1 Share of FPI in Manufacturing GVA (in per cent)**

<b>Pre – Pandemic Period</b>		
<b>S.No</b>	<b>Years</b>	<b>% of Share</b>
<b>1</b>	<b>2012-13</b>	<b>8.7</b>
<b>2</b>	<b>2013-14</b>	<b>8.3</b>
<b>3</b>	<b>2014-15</b>	<b>8.0</b>
<b>4</b>	<b>2015-16</b>	<b>8.5</b>
<b>5</b>	<b>2016-17</b>	<b>8.7</b>
<b>6</b>	<b>2017-18</b>	<b>8.7</b>
<b>7</b>	<b>2018-19</b>	<b>10.0</b>
<b>Post - Pandemic-Period</b>		
<b>S.No</b>	<b>Years</b>	<b>% of Share</b>
<b>8</b>	<b>2019-20</b>	<b>9.9</b>

Source: Based on data received from Ministry of Food Processing Industries (MoFPI)2021.

The Share of Food Processing Industry in Manufacturing GVA was at an average of 8.7% per year during the pre-pandemic period and has increased to 9.9% per year during the Post-Pandemic period.

**Figure 1: Share of FPI in Manufacturing GVA (in per cent)**



Source: Based on data received from Ministry of Food Processing Industries (MoFPI), 2021

Figure 1 indicates that the share of FPI in manufacturing GVA (in per cent) between the year 2012 to 2020. Between the periods of study, Share of FPI in Manufacturing GVA was below 10%. However, in the years 2018-19 and 2019- 2020, the share of FPI in manufacturing GVA has received the highest GVA. In the post covid -19, Share of FPI in Manufacturing GVA has been very low ranging from 10 to 9.9%. Remarkably, from 2012 to 2018, the Share of FPI in Manufacturing GVA was just 8% to 9 % during the period of study.

### **3.2 FOOD MANUFACTURING ENTERPRISES AND ITS REVENUE CONTRIBUTION**

The below Figure -2 bi-chart explores the food and beverage manufacturing enterprise in India (2016-2020). Chart-A reveals the total number of enterprises and total revenue (INR 100cr) and Chart- B shows the growth of exports in

percentage (%)

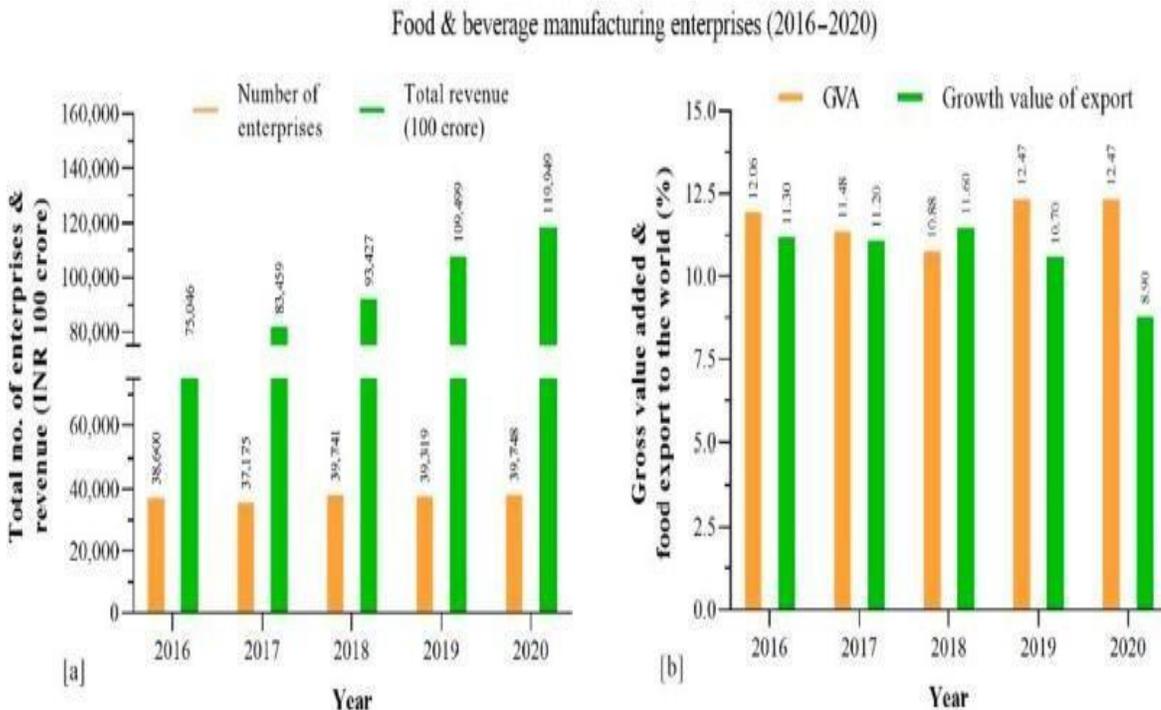


Figure -2 A indicates that food and beverage manufacturing enterprises in India between the years 2012 and 2020 are depicted. From 2018 to 2020, India’s total number of registered food and beverage manufacturing enterprises remained the same, but there were slight changes in their numbers. However, there is a significant improvement in the total revenue generated from the food and beverage industry in India. It being changed from 75,046 (100 crore Indian Rupees (INR)) to 119,949 (100 crore INR), (1 USD = 72.45, 28 March 2021). Surprisingly, in the year 2016, the total revenue generated was almost 75 000 INR crore, compared to more than 100000 INR crore in the year 2020 during the period of study.

Figure 2B indicates the growth value of exports (in percent) between the years 2016 to 2020. During the periods of study, from 2016 to 2017, the growth value of exports remained almost consistent. However, the value of exports declined from 11.60% in 2018 to 10.70% in 2019, and again dropped to 8.90% in 2020. This is because of the impact of COVID-19 in the country. Remarkably, in the post covid-

19 scenario, in the year 2020, the growth value of exports has gone below 8% during the period of study.

### **3.3. FDI IN FOOD PROCESSING SECTOR**

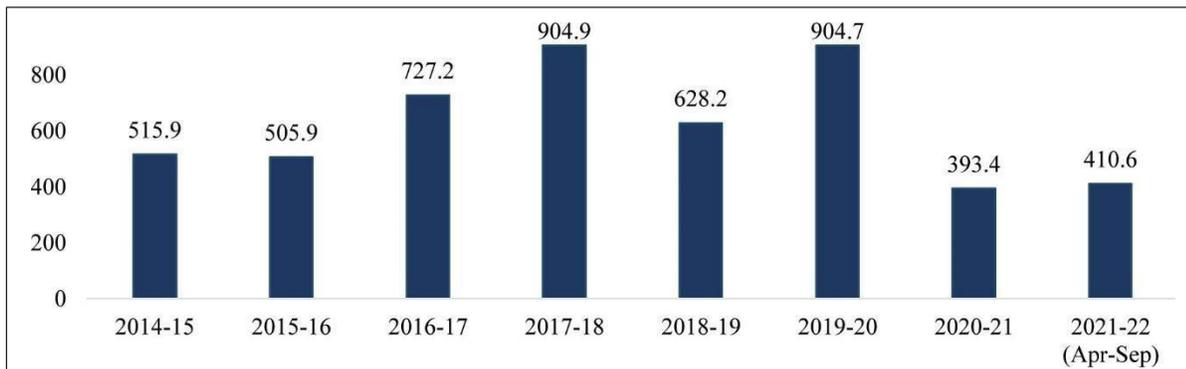
*Table – 2 FDI Inflows in Food Processing Sector in India (in US \$)*

<b>Pre – Pandemic Period</b>		
<b>S.No</b>	<b>Years</b>	<b>In Million US \$</b>
<b>1</b>	<b>2014-15</b>	<b>515.9</b>
<b>2</b>	<b>2015-16</b>	<b>505.9</b>
<b>3</b>	<b>2016-17</b>	<b>727.2</b>
<b>4</b>	<b>2017-18</b>	<b>904.9</b>
<b>5</b>	<b>2018-19</b>	<b>628.2</b>
<b>Post - Pandemic-Period</b>		
<b>S.No</b>	<b>Years</b>	<b>In Million US \$</b>
<b>6</b>	<b>2019-2020</b>	<b>904.7</b>
<b>7</b>	<b>2020-21</b>	<b>393.4</b>
<b>8</b>	<b>2021-22*</b>	<b>410.6</b>

Source: Based on data received from Ministry of Food Processing Industries (MoFPI).2021

*Table 2 reveals that FDI inflows into the food processing sector were at an average of 565.42 million US\$ per year during the pre-Pandemic period and have increased to 569.56 million US\$ per year during the Post-Pandemic period.*

**Figure 3: FDI Inflows in Food Processing Sector (in US \$ million)**



Source: Based on data received from Ministry of Food Processing Industries (MoFPI).2021

Figure 3 indicates the FDI inflow in the food processing sector between 2014 and 2021. In years like 2014, 2015, 2020, and 2021, the FDI inflow was below 650 US \$ million. However, in the years 2016, 2017 and 2019, the food processing sector received more than 650 US \$ million FDI inflow. Surprisingly, inflows have dropped to less than \$500 million in the post-COVID-19 period. This was the very lowest inflow during the period of study.

### **3.3 FOOD PROCESSING INDUSTRIES IN THE POST COVID-19 SCENARIO IN INDIA**

By the year 2025-26, India’s food processing sector will be one of the largest in the world and its output is going to reach \$535. There are some important key sub-segments of the food processing industry in India, such as fruits and vegetables, poultry and meat processing, fisheries, food retail, dairy industry, etc. In the Post-Covid-19 Scenario 2020–21, total horticulture production is estimated to be a record 334.60 MT, which has an increase of about 14.13 MT (4.4%) over that achieved in 2019–20. India has contributed 23 % of global milk production, growing at a CAGR of 6.2 % to reach 209.96 million tonnes in the years 2020–21. In the case of egg production at a global level, India ranks 3rd

and produced at least 122.11 billion numbers in the year 2020–21 and the per capita availability of eggs was 91 eggs per annum in the same year.

Fish production increased 10.87 percent from 2014–15 to 145 lakh tonnes in FY 2020–21, maintaining the country's position as the world's second largest fish producer. It is maintained and accounts for 7.56 percent of global output. The product, like sugar, in the year 2020-21, 70 LMT, has been exported. Furthermore, the contracts being signed in the sugar season 2021-22 amount to almost 30 LMT for export. Grocery retail in India has grown at a CAGR of more than 50% and is expected to reach USD 10 billion to USD 12 billion by 2025. However, the top five export destinations for Maine products are the United States, China, Japan, Vietnam, and Thailand, with a nearly 74% share, and the items' value last fiscal year (March, 2020-April, 2021) was USD 5.96 billion. In the case of other cereals, exports increased from 102 MT in 2019-20 to 521 MT in 2020-21.

On the other hand, meat production, it has increased from 6.69 million tonnes in the year 2014-15 to 8.80 million tonnes in the year 2020-21 and the country currently ranks 8th in meat production at the world level. Whereas the production of rice, wheat and nutri-cereals has been increased at compound annual growth rates (CAGR) of 2.7, 2.9 and 3.5% respectively during the last six years i.e. 2015-16 to 2020-21 the same period, the CAGR for pulses, oilseeds and cotton has been 7.9, 6.1 and 2.8 per cent respectively.

### **3.4 GOVERNMENT INITIATIVES TO IMPROVE THE FOOD PROCESSING SECTOR IN INDIA**

The trade liberalization in India has resulted in lessening of subsidies, importing of food stuffs, corporate farming, lessening of government budgetary support has led to the destruction of farmer's livelihood. It appears that Trade liberalization does not have any direct impact on poverty reduction in India. (Keshava S.R. 2013) There are major initiatives that have been taken by the government of India in order to progress the food processing sector in India.

- Leveraging reforms: 100% FDI in food product marketing and various incentives

at the central and state government levels provides a strong focus on supply chain infrastructure, with the goal of boosting growth in the food processing sector.

- In 2017-18 Union Budget on dairy processing infra fund: the Government of India has allocated a dairy processing infra fund worth Rs 8,000 crore (US\$ 1.2 billion).
- Relaxed foreign direct investment (FDI) norms: The Government of India is relaxing the foreign direct investment (FDI) norms and allowing up to 100 per cent FDI through automatic route in food product e-commerce.
- Plan Investment : The Food Safety and Standards Authority of India (FSSAI) has been allocated around Rs 482 crore as a planned investment (US\$ 72.3 million) in order to strengthen the food testing infrastructure, advance the 59 existing food testing laboratories, and start up almost 62 new mobile testing labs across India.
- National Mission on Food Processing: State governments, through the Ministry of Food Processing Industries, announced a scheme for Human Resource Development (HRD) in the food processing sector as part of the National Mission on Food Processing. There are four components to this scheme:
  - Creation of infrastructure facilities for degree/diploma courses in food processing sector.
  - The Entrepreneurship Development Programme (EDP)
  - Food Processing Training Centres (FPTC) Training at recognized institutions at State/National level

### **3.4.1 Union Budget 2022-23**

The Union budget allocation is largely supported by food processing sectors in order to boost farmers' income. The Budget allocation for the Ministry of Fisheries, Animal Husbandry and Dairying: government has been increased by 44 per cent to Rs 6,407.31 crore and for Food Processing Industries by the next fiscal to Rs 2,941.99 crore. The government would implement a rationalized and comprehensive scheme with the vision of inclusive development and increase domestic oilseed production by way of reducing the country's dependence on the

import of edible oils. In order to promote agro-forestry and implement a comprehensive package, the government will be making some legislative and policy changes and also adopt suitable varieties of fruits and vegetables. In addition, for crop assessment, digitisation of land records and spraying of insecticides, the government would be promoted by the use of 'Kisan Drones'.

This is to finance startups for agriculture and rural enterprises relevant to the farm produce value chain. The government will facilitate a fund with blended capital raised under the co-investment model through Nabard. Moreover, the government will promote chemical-free natural farming throughout the country with a focus on farmers' lands in five-kilometre wide corridors along the river Ganga in the first stage. The government will be launching a public-private partnership (PPP) model with the involvement of public sector research and extension institutions along with private agri-tech players and stakeholders in agri value chains with the aim of delivering digital and high-tech services to farmers. On the procurement of agri-crops, the government's procurement of wheat and paddy at the minimum support price (MSP) during 2021-22 will cover 1,208 lakh tonnes from 163 lakh farmers. The direct payment of MSP value to their accounts will be Rs 2.37 lakh crore.

Within the year 2023, the government will provide post-harvest support to enhance domestic consumption of millet products internationally. For the next fiscal, the government will be allocating an estimated budget of Rs 6,75,000 crore for PM-KISAN, Rs 15,500 crore for the crop insurance scheme, Rs 7,183 crore for the Krishonnati Yojana, Rs 10,433 crore for the Rashtriya Krishi Vikas Yojana (RKVY), and about Rs 1,500 crore for the Market Intervention Scheme-Price Support Scheme.

## **5. Findings of the study**

- The study indicated that Share of FPI in Manufacturing GVA has received the highest GVA in the years 2018-19 and 2019-2020 and also decreased from 10 to 9.9% the Share of FPI in Manufacturing GVA in the Post Covid -19. Remarkably, the Share of FPI in Manufacturing GVA was just 8% to 9 % between 2012 and

2018 during the period of study.

- It shows that India's total number of registered food and beverage manufacturing enterprises remained the same but there were slight changes in their numbers from the year 2018 to 2020. Remarkably, the total revenue generated was almost 75 000 INR crore in the year 2016, as compared to more than 100000 INR crore in the year 2020 during the period of study.
- The study reveals that during the periods of study, the growth value of exports remained almost consistent since 2016 till 2017. However, the value of exports dropped by 8.90% in 2020. Particularly in the post covid-19 scenario, the growth value of exports has gone below 8% in the year 2020 during the period of study.
- The study found that the food processing sector received more than 650 US \$ million FDI in the years 2016, 2017 and 2019. Surprisingly, after COVID-19, inflows dropped to less than \$500million USD, the lowest level recorded during the study period.

## **5. Conclusion & Suggestion**

Food processing industries have been contributing to a vital role in food security, employment of rural and urban areas, export values, and GDP share of the country. There is no doubt that this sector's performance every year will have an influence on the Indian economy's growth and development. This study uses secondary data to examine the Gross Value Added, Revenue, and FDI of Food Processing Industries on the manufacturing sector in recent India. It found that the Share of FPI in Manufacturing GVA was just 8% to 9 % between 2012 and 2018 and also received the highest GVA in the years 2018-19 and 2019-2020. Also, the study reveals that the total revenue generated was almost 75 000 INR crore in the year 2016 as compared to more than 100000 INR crore in the year 2020. Whereas, in the post covid-19 scenario, the growth value of exports has gone below 8% in the year 2020. Moreover, in the post covid -19, FDI inflow has gone to less than 500 US \$ million. Therefore, the study reveals that food processing industries have maintained almost the same performance in GVA and revenue generation, where

as the growth value of export and FDI inflow have shown a decline in performance in the post covid-19 scenario during the period of study. Hence, the Indian government should make legislative and fiscal policies for assistance in order to improve the performance of food processing industries. Only then, growth and development be sustained in the Indian economy.

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**Impact of Exchange Rate Fluctuations on  
India's Manufacturing Exports***Jyoti<sup>1</sup>***Abstract**

After the collapse of the fixed exchange rate system of Bretton Woods, the fluctuations of exchange rate and its impact on macroeconomic performance and trade in countries around the world become an increasing debate among researchers and policymakers. This study empirically investigates whether fluctuations in real exchange rate may affect real exports in the Indian context. To calculate the real exchange rate volatility Moving Average Standard Deviation has been used in this study. The study employed autoregressive distributed lag (ARDL) bound test procedure to analyse the long-run relationship among variables using quarterly data from 2005Q1 to 2017Q4. The results of the ARDL bound test reveals that real exports are cointegrated with relative prices, real exchange rate volatility, and world real GDP. The study has found negative but insignificant impact of exchange rate volatility on exports but world GDP as a proxy of foreign economic activity and real effective exchange rate as relative prices have positive and statistically significant impact on Indian manufacturing exports. Further, the ARDL short-run error correction model implies that while the model may temporarily deviate from its long-run equilibrium, the deviations adjust towards the equilibrium level in the long-run.

**JEL: F01, F31, F14****Keywords**

Exchange rate volatility, exports, bound test

**1. Introduction**

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<sup>1</sup> JyotiGovind Ballabh Pant Social Science Institute, University of Allahabad, Jhusi, Allahabad, India  
e-mail: jyotitripathi2215@gmail.com

International monetary system provides a framework within which countries can borrow, lend, buy, sell, and make payments globally. It's a structure, in which foreign exchange rates are determined, international trade and capital flows are accommodated, and balance of payments adjustments made. Exchange rate refers to the price of one country's currency expressed in terms of the currency of another country. The present situation of increased exchange rate volatility is one of the major changes in economic developments of past years. Although exchange rate volatility increases risk, it also provides profit opportunities for firms and investors. Policies for forecasting and reacting to exchange rate fluctuations are still evolving, as we improve our understanding of the global currency market for gains and losses and the economic effect of changes in foreign exchange. While focusing on global currency market it becomes important to discuss exchange rate volatility because it affects the global currency market. Modeling exchange rate volatility has gained great importance in the global currency market, especially after the collapse of the Bretton Woods agreement when major industrial countries have chosen to shift towards floating exchange rate from fixed exchange rate regime. Since then, exchange rate volatility has gained a great concern among policymakers and there has been an extensive debate about the topic of exchange rate volatility and its potential influence on welfare, inflation, international trade as well as its role in security valuation, profitability, and risk management, and investment analysis. Few researchers have done their studies to find out the impact of exchange rate fluctuations on India's export, Cheung and Sengupta (2013), used data of Indian non-financial sector firms' export, Panda and Mohanty (2015), used data of aggregate exports, have found negative significant relationship between exchange rate volatility and India's exports. Haider and Adil (2017), used disaggregated data of Indian manufacturing sector exports, and Bhattacharya and Rit (2018), used data of aggregate exports have found no significant relationship between exchange rate fluctuations and India's exports.

As India started opening up its economy after the balance of payment crisis in 1991 and shifted from a fixed exchange rate system to a floating exchange rate system. India became an open economy by implementing a set of market-oriented financial

sector reforms, the result of it can be seen in the increased share of India's exports in the global merchandise exports which increased from 0.6 percent in the early 1990s to 1.7 percent in 2017. At the same time, the share of the manufacturing sector export has also increased from 58.1 percent to 70.67 percent. As we know that a well-developed manufacturing sector can fulfill the basic needs of the population like employment opportunities, decreased dependency on other countries, and increased exports. In such a context the present study adds to the existing literature to examine the impact of exchange rate fluctuations on manufacturing export performance in India. From the review of the literature, it is clear that very few studies have been done on India especially in the manufacturing sector which share is approximately 70% in total exports, so we have used export of India's manufacturing sector as a dependent variable in our study.

During the 40 years' period (1951-91), the important trends in India's balance of payment are; 1) With the exception of only two years that is during 1976-77 and 1977-78, when there was a small trade surplus, India had always experienced deficit. 2) The trade deficit has been continuously widening, except during the fourth plan when the government made a great and successful effort to reduce imports and promote exports. 3) Net income from invisibles has generally been positive and since 1973-74 has been expanding very fast. (Keshava S.R. 2013)

This article is divided into five sections. First is an introduction, the second section is a literature review on the impact of exchange rate volatility on trade. The third section focuses on data and methodology adopted for this study. The fourth section is related to the interpretation and analysis of results. The final section is concluding observations of the study.

## **2. Literature review**

In 1973, the floating system of exchange rate attracted researchers and policymakers to investigate the impact of exchange rate volatility on trade. Some researchers have found no significant relationship between exchange rate fluctuations and trade e.g. Hooper and Kohlhagen (1978), De Grauwe (1988) examined the effects of exchange rate uncertainty on the volume of trade among

developed industrialised countries and found no significant relationship. Belanger et al. (1992) investigated sectoral U.S. imports from Canada and found no statistical significant impact of exchange rate volatility on trade. Franken and Wei (1993) investigated the relationship of exchange rate fluctuation on trade in the Pacific region using the gravity model and found a weak causal effect. Qian and Varangis (1994) found ambiguous relationship between exchange rate volatility on trade. Haider and Adil (2017) have used disaggregated data of Indian manufacturing sector exports and found real exchange rate has no significant impact on exports. Bhattacharya and Rit (2018) have examined the effect of nominal exchange rate volatility on Indian export and found there is no direct effect but through domestic prices nominal exchange rate affecting exports indirectly.

On the other hand, some researchers have found significant negative relationship among them: Arize (1997) and Arize et al. (2000) have found a negative significant impact of exchange rate volatility on trade in some less developed countries and some developed industrialized countries respectively. Chou (2000) has used industrial sector export of China and found significant negative effect of exchange rate volatility on trade. Cheung and Sengupta (2013) have found negative and strong significant impact of exchange rate volatility on trade using data of Indian non-financial sector firms. Panda and Mohanty (2015) have found negative significant effect of exchange rate volatility on real exports of India.

Some authors found positive relationship in their analysis among them Koray and Lastrapes (1989) have found a positive weak causal effect of exchange rate volatility on U.S. bilateral export. Asseery and Peel (1991) have found a significant positive effect of exchange rate volatility on exports. Mckenzie and Michael (1999) reviewed the literature for the last quarter of the 20th century and found mixed impact of exchange rate volatility on trade.

### **Model and methodology**

#### ***3.1. Model Specification***

The empirical analysis is based on traditional long-run equilibrium export demand

equation in the flexible exchange-rate environment followed by Arize and Malindretos (1998) where real export of India is taken as a dependent variable and the real exchange rate, real exchange rate volatility of India and world's real income as independent variables. The model can be described as:

$$X_t = \xi_0 + \xi_1 W_t + \xi_2 P_t + \xi_3 V_t + \varepsilon_t, \quad (1)$$

Where,  $x_t$  denotes the natural logarithm of real exports of goods at time  $t$ ;  $w_t$  is the natural logarithm of world income at time  $t$  (a proxy measure for economic activity of the importing country);  $p_t$  denotes the natural logarithm of relative prices and is measured by the real exchange rate at time  $t$ ;  $V_t$  denotes the exchange rate volatility at time  $t$ ;  $\varepsilon_{ijt}$  denotes disturbance term.

### ***3.2. Data source and Variables***

The analysis is based on quarterly data and covers a period of 2005Q1 to 2018Q4, comprising 56 observations. India's total manufacturing goods export and real effective exchange rate have been taken from Economic Outlook database of the Center for Monitoring Indian Economy (CMIE). Export Unit Value Indices data has been taken from Handbook of Statistics on Indian Economy published by the Reserve Bank of India (RBI). The study has used unit value indices of exports, as export price index for calculating real exports as in India no separate price index is available for export and import prices. The data from the year 2005 selected because quarterly data on India's total manufacturing goods export and real effective exchange rate is available from this year onwards, and export unit value indices data is available till 2018. World GDP at constant prices is taken from World Bank National Accounts Database. Unit value indices of export and World GDP at constant price data were collected on an annual basis and then converted

into a quarterly basis using quadratic interpolation method following Arize (2000, p. 16) due to unavailability of quarterly series.

The study has chosen 2011-2012 as a base year for all the series used in the model. All the variables transformed into logarithm except exchange rate volatility to compress the scale in which variables are measured Gujrati (1995).

The variables employed in this study are:

- (a) Real exports: - The real export from domestic country to world is defined as:

$$E_x = \left( \frac{ex}{exuvi} \times 100 \right)$$

Where,  $E_x$  denotes the real exports of domestic country to the world;  $ex$  is the quarterly nominal exports of domestic country to the world, measured by the US dollar;  $exuvi$  denotes the export unit value index of the domestic country.

- (b) Relative prices: - Relative prices are measured by the real effective exchange rate (REER).
- (c) Real foreign income: - Real foreign income is measured by World GDP at constant prices and is commonly used as a proxy measure for the economic activity of the importing partners.

(d) Exchange rate volatility: - The real exchange rate volatility in the study is calculated through Moving Average Standard Deviation, the formula is:

$$Vreer = \left[ \frac{1}{2} \sum_{i=1}^2 (lreer_{t+i-1} lreer_{t+i-2}) \right]^{\frac{1}{2}}$$

Where  $Vreer$  is the log-returns of real effective exchange rate and the order of moving average is 2. Moving average standard deviation is chosen over other volatility measures because it is a time-varying measure of volatility and suitable for low-frequency data (Poon and Granger, 2003; Srinivasan and Kalaivani, 2012; Arize et al., 2000).

### **3.3. Estimation strategy**

For empirical analysis the present study has used the ARDL bounds test approach of co-integration developed by (Pesaran and Shin, 1999; Pesaran et al., 2001), to estimate the impact of real exchange rate volatility on India's real export of aggregate manufacturing goods. The autoregressive distributed lag (ARDL) model has several advantages first, whether the series is stationary at level  $I(0)$  or stationary at first difference  $I(1)$  we can apply the ARDL model to test the long-run

relationship among variables. Another advantage is that ARDL model is more suitable for small samples (Boutabba, M. A. (2014).

Although in ARDL bound testing approach it does not matter whether the variables are I(0) or I(1) or mixture of both, variables should not be I(2) Pesaran et al. (2001). The study employed standard Augmented Dickey-Fuller (ADF) test Dickey & Fuller (1981) of unit root to test the stationary properties of each variable. In addition to this test, we have performed Bai-Perron Multiple Breakpoint test to check the structural breaks in the model. For the selection of optimal lag length, the study has used the Akaike information criterion (AIC).

### ***3.4. Co-integration Analysis***

ARDL bound test is based on the computed F-statistic and it is compared with the critical value tabulated by Pesaran, et al. (2001). The critical value of F-statistic is based on two sets, one set assumes that all the variables of the model are I(0), while another set assumes that the variables are I(1). There are three conditions based on F-statistic: first, if the calculated test statistic surpasses the upper bound critical value, then the null hypothesis of no co-integration can be rejected. Second, if the estimated F-statistic falls into the bounds then the cointegration test becomes inconclusive. According to Banerjee et al. (1998), if the bound test result is inconclusive the error correction term will be useful for checking cointegration. The third condition is that, if the calculated F-statistic is lower than the lower bounds value, then the null hypothesis of no cointegration cannot be rejected.

To find the long-run relationship among variables, with the ARDL approach the Eq (1) is rearranged as:

$$\begin{aligned} \Delta \ln(X)_t = & q_0 + \sum_{i=1}^j q_{i1} \Delta(\ln X)_{t-1} + \sum_{i=1}^j q_{i2} \Delta(\ln W)_{t-1} + \\ & \sum_{i=1}^j q_{i3} \Delta(\ln P)_{t-1} + \sum_{i=1}^j q_{i4} \Delta(V)_{t-1} + \delta_1(\ln X)_{t-1} + \delta_2(\ln W)_{t-1} + \\ & \delta_3(\ln P)_{t-1} + \delta_4(V)_{t-1} + \epsilon_t \end{aligned} \quad (2)$$

Where,  $\Delta$  denotes the first difference operator the terms with summation signs

represent the short-run error correction dynamics, while the second part of the

equation with  $\delta$  corresponds to the long-run relationship and the other variables of the equation are as defined earlier. This equation incorporates the time trend variable to capture the autonomous time-related changes. The ARDL method estimates  $(j+1)k$  number of regressions to obtain the optimal lag length for each variable, where  $j$  is the maximum number of lags to be used and  $k$  is the number of variables in the model. Having established the long-run relationship among variables in Eq. (1), the following short-run error correction model, Eq(3), is estimated:

$$\Delta \ln(X)_t = \alpha_0 + \sum_{i=1}^j \alpha_1 \Delta(\ln X)_{t-1} + \sum_{i=1}^j \alpha_2 \Delta(\ln W)_{t-1} + \sum_{i=1}^j \alpha_3 \Delta(\ln P)_{t-1} + \sum_{i=1}^j \alpha_4 \Delta(V)_{t-1} + \gamma ECM_{t-1} + \epsilon_1 \tag{3}$$

Where ECM represents error correction mechanism. The error correction term is used to measure the speed of convergence from the short-run to the long-run model.

### 3. Results and Discussion

#### 4.1. Unit-root Test

The study employed ADF test to check the stationary properties of all variables Table 1 reports the unit root test results. The tests are performed with trend and intercept and without trend (only with intercept). The results show that variables are the mixture of stationary at I(1) and I(0) so we can apply ARDL model.

**Table 1** Estimated Statistics of Unit Root Test

Augmented Dickey-Fuller Test Statistics				
Series	Test type	Level	First difference	Order of integration

lrex I(1)	With trend and intercept	-2.8978	-4.4184*	
	With intercept only	-2.9869**	-8.8832*	I(0)
lwgdp	With trend and intercept	-0.8090	-4.2232*	I(1)
	With intercept only	-2.1459	-2.2483*	I(2)
lreer	With trend and intercept	-3.4322***	-3.9067**	I(1)

	With intercept only	-0.6435	-3.8774*	I(1)
Vreer	With trend and intercept	-4.4903*	-5.9655*	I(0)
	With intercept only	-4.4408**	-6.0029*	I(0)

**Source:** Authors’ own.

**Note:** \*\*\*, \*\*, and \* denote the level of significance at 10 per cent, 5 per cent, and 1 per cent respectively.

#### 4.2. Test of Structural Break

The present study applied a test proposed by (Bai & Perron, 1998) to find unknown structural breaks in the model. It would help to understand multiple breaks at unknown dates endogenously when we are unable to easily explain a structural break by referring to a well-known, significant and disruptive event. The study found two significant structural breaks in the model one in December 2008 and another in March 2015. The first break at the end of 2008 might be the current result of the global crisis (RBI, 2010) and another in March 2015 which was a worse situation than 2009-10 might be dormant of contemporary measures to overcome global recession as well as a slowdown in the European Union which was a major destination for India’s manufacturing exports Chandrashekhar, C. P. & Ghosh, J. (2016). Table 2 shows the result of Bai & Perron multiple breakpoint test.

**Table 2** Results of Bai-Perron Multiple Breakpoint Test

<b>Break test</b>	<b>F-statistic</b>	<b>Scaled F-statistic</b>	<b>Critical values</b>
<b>Break dates</b>			
0 vs 1*	16.9966	67.9866	16.19
1 vs 2*	10.7533	43.0132	18.11
2 vs 3	2.5569	10.2278	18.93

**Source:** Authors’ own.

**Note:** \* denote the level of significance at 5 per cent, Bai-Perron (2003)

**4.3. Bound Test Results**

To estimate the long-run relationship among all the variables the study has used bound test. For the appropriate lag length, we have chosen Akaike Information Criteria (AIC) and, the lag for our model is ARDL (1, 0, 2, 0). Table 3 represents the results of the bound F-test which clearly shows that F-statistic calculated value is 8.732 which is more than the upper bound critical value of 5.61 at one per cent significance level. LREX is taken as a dependent variable and LWGDP, LREER, VREER as independent variable.

**Table 3** Estimated Statistics of ARDL Bound Test

Significance (In %)	Critical Value		F-Statistics
	Lower Bound	Upper Bound	
10	2.72	3.77	
5	3.23	4.35	8.732
2.5	3.69	4.89	
1	4.29	5.61	

**Source:** Authors' own.

**4.4. Long-run Results**

The study has conducted diagnostic and stability tests to examine the consistency of the ARDL model. The outcomes of the long-run relationship between real manufacturing exports, real-world GDP, real effective exchange rate, and real exchange rate volatility reported in Table 4. The results show that the real-world GDP and real effective exchange rate have positive and significant impact on India's manufacturing exports and exchange rate fluctuations have negative but not significant impact on real manufacturing exports in the long run.

**Table 4** Estimated Long-run Coefficients

Variable	Coefficient	T-Statistics	P-Value
LWGDP	0.01068 0.0114	2.6535	
LREER	1.3652 0.0047	2.9956	
VREER	-0.7554 0.5329	-0.6289	

Source: Authors' own.

#### 4.5. Short-run elasticity

The results of the short-run dynamics relationship are reported in Table 5. The coefficient of the error correction term has a negative sign and it is significant at the 1% level for the model, which support the evidence of a long-run relationship among the variables for the model. The coefficient of the error correction model determines the speed of adjustments towards equilibrium. As we can see in the table coefficient of ECM is -0.7054 so, we can conclude that any disequilibrium in the current period will be adjusted by 70 per cent in the following period. The model shows that REER with one lag and March 2015 structural break has a negative and significant impact on India's real manufacturing exports.

**Table 5** Short-run Error Correction Model

Variable	Coefficient	T-Statistics
D(LREER(-1))	-1.0093 0.0192	-2.4407

DUM(15-03)	-0.2782	-5.5076	
	0.0000		
ECM(-1)	-0.7054	-6.1275	0.0000
R-squared: 0.4809, DW-statistics: 2.2490			

**Source:** Authors’ own.

**4.6. Diagnostic tests**

The diagnostic tests based on the selected ARDL model are represented in Table 6. The study employed Breusch–Godfrey Lagrange multiplier test of residual serial correlation; and Breusch–Pagan–Godfrey test for heteroskedasticity and to check the normality of the Jarque–Berra test to check the reliability of the estimated model. The results suggest the model selected for the study is free from serial correlation and heteroskedasticity and non-normality as we can see insignificant probability value in Table 6.

**Table 6** Diagnostic Test

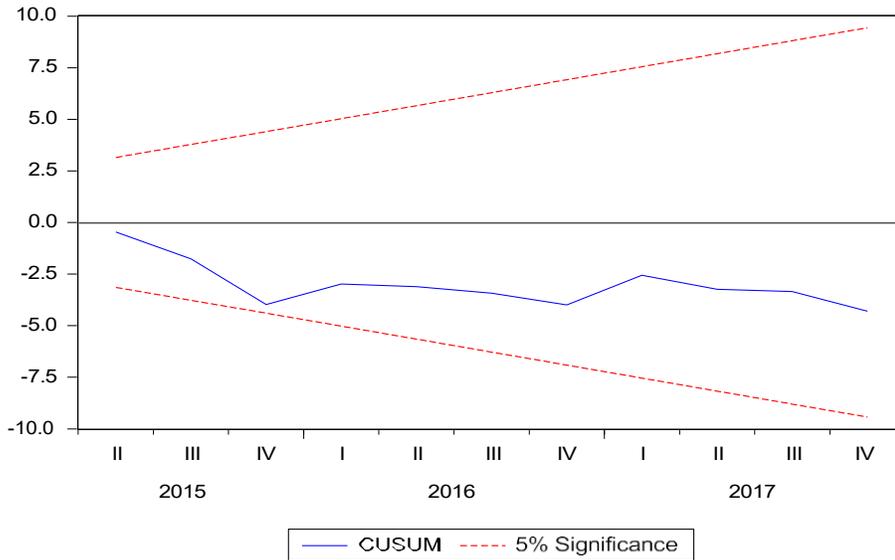
Test P-Value	LM-Version	P-Value	F-Version
Serial correlation 0.3494	2.6383	0.2674	1.01823
Heteroscedasticity 0.4341	8.3306	0.4019	1.02419
Normality <b>(Not applicable)</b>	0.9789	0.6129	<b>(Not applicable)</b>

**Source:** Authors’ own.

Finally, to examine the stability of the model, the study used CUSUM (cumulative sum of the recursive residuals) and CUSUM of Squares tests.

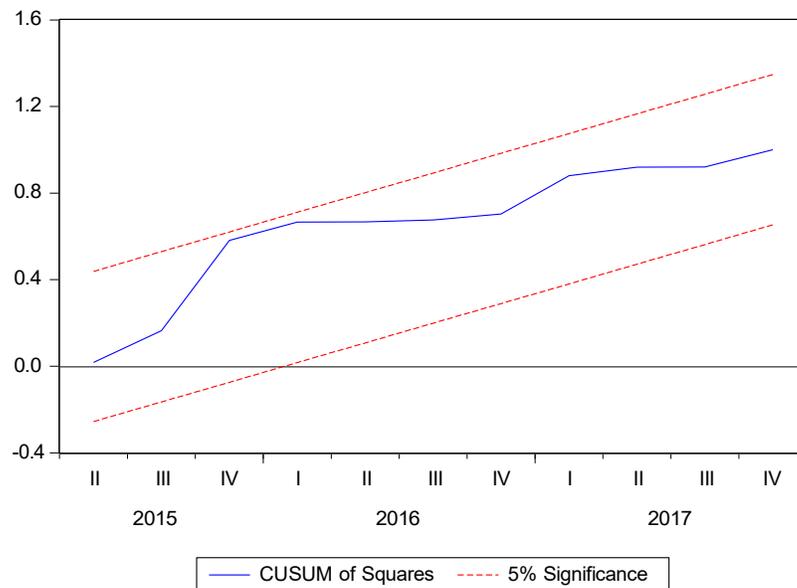
**4.7. CUSUM and CUSUM of Squares tests**

Figures 1, 2, represent the results of the CUSUM and CUSUM of Squares tests for the model. The result shows that the test results are located between the two red lines and could not exceed the critical value at a 5 per cent level of significance. Thus, we can conclude that the estimated ARDL model is reliable and stable.



**Figure 1** CUSUM Test,

**Source:** Authors’ own.



**Figure 2** CUSUM of Squares Test

**Source:** Authors' own.

The main focus of the study was to check the impact of exchange rate fluctuations on India's manufacturing exports and found that, exchange rate fluctuations are unable to explain the export performance of Indian manufacturing exports. The result of the study is in line with the recent papers that volatility in exchange rate doesn't have much effect on export performance. As we know that RBI uses direct intervention in the foreign exchange market by sales and purchases of foreign currency to curb the effect of rumor/panic-induced high volatility or lumpy demand and supply mismatches in the forex market. Indian forex market is quite developed after deregulation with current account convertibility and liberalisation in capital controls so corporates and traders have many options to hedge their transactions to protect themselves that could be the reason for no significant impact of real exchange rate fluctuations on India's manufacturing exports.

## **5. Conclusion**

The study investigated the impact of exchange rate volatility on exports using Indian manufacturing sector data and found negative but not significant results of the exchange rate volatility on exports but world GDP as a proxy of foreign economic activity and real effective exchange rate has positive and statistically significant impact on Indian exports. However, the study is unable to present significant empirical evidence on the negative impact of exchange rate fluctuations on Indian manufacturing exports. The logic of the results indicates that India's foreign exchange market is quite developed to hedge against uncertainty arises from exchange rate volatility. The study suggests, although liberalisation in Indian foreign exchange market is already initiated but yet not sufficient as India is relying on volatile foreign capital inflows to finance its consumption and investment needs, a careful reserve management policy is necessary for external sector balance in the long run. India's forex market also in need to be co-ordinated with the liberalised capital account.

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## **Book Review / 1**

**‘A Dialogue on System Change, an Initiative to make a New India’  
" Most Holistic book on Systemic Change".**

**Manohar Manoj \***

This book ‘A Dialogue of System-Change: An Initiative to make a New India’ gives a clarion call to bring an adequate and required change in our whole system including all facets of our public life and public institutions too. This book visualizes a ‘resurgent India’ comprising all ethos; It depicts a structural prospect of a ‘New India’. The book aims to make a new empowered society, where all its stakeholders have the equitable opportunity and environment to prosper; which can resemble in itself its glorious past, intact ethnicity, and undivided geography also. This book aspires for identity-less and pure competitive politics based on efficiency, honesty, and good governance composed of true secularism without any religious appeasement, greater social justice with all sorts of empowerment, and equal opportunity. It imagines an economy, which can avail opportunities by generating optimum productivity through enabling maximum utilization of the available resources and then spread prosperity to the millions of masses. The book strongly advocates for the formation of two dozen regulatory authorities for the key sectors of the economy with brilliant sort of modules covering both public and private sectors with an equal level playing field. It beholds a bureaucracy, which can go all out for rendering the services to the huge chunk of vulnerable. Finally, this book aspires all public institutions to deliver their work at par the best.

This book contains around 6 dozen enlightening and insightful articles and thousands of points of vision agendas, which are not only the path-breaking ones in their nature, rather these all have a broader perspective in order to deal with several perennial problems of the country including the country’s most crucial issue of ‘corruption’.

Author Manohar Manoj, who has been active in journalism for the last 30 years, is the senior journalist, columnist, and editor in print media and the author of the world's largest and most comprehensive book on corruption named 'A Crusade Against Corruption on the Neutral Path', and also the founder of the non-political organization *Bharat Parivartan Abhiyan*, on the banner of whom he made padayatra of 800 villages of Champaran district in Bihar.

Journalist Manohar Manoj delivers countrywide lectures on corruption and good governance and has undoubtedly given a profound perspective in his book pertaining to ethnicity, society, economy, polity, administration, and the functioning of various institutions of the country. We never have such a complete book on system change in any language.

A massive 480-page book titled "A Dialogue on System Change, an Initiative to make a New India" has made a very thorough work on 'The Creation of a New India and It is not an exaggeration that this book takes a scientific approach for bringing the improvement and change into every part of the public system.

This book begins with 51 solemn resolutions, which seem like a campaign and oaths to be taken for what should be the initiative of new change.

The author first of all in his resolutions clarifies the adoptive ideology of change which he states in these words, 'In our view, means of change should be neither through communism, nor capitalism nor socialism. This would be just through a reformist approach. He further says we don't need *jumlas*, we need to find out the issues and their honest solution.

This book, as I said earlier, covers a very large spectrum in totality. Therefore, if we discuss this book chapter-wise, then each chapter seems to be a book in itself.

There are 9 huge chapters, in which there are 114 topics. The beauty of the book is

that it doesn't have the burdensome conventionality of books as we find a routine tradition in thousands of books. This book is different from that. The book discusses several political, economic, social, administrative and institutional issues very comprehensively but in a very careful manner and with tangible substance.

An attempt has been made to see the several problems of the country through practical glasses; In-depth observation has been made on the working of all the ministries of different governments. The book brings the reform and remedies in a very thoughtful way so that the changes are not merely bookish or so idealistic but rather can't be brought down to the ground.

Although many times this book has been subjected to the criterion of tightness in its design. Different chapters have different colors inside the book. In many places, they also disrupt the course of our reading and that is why this book doesn't give us the stylistic enjoyment of novel kinds of books read in one sitting. But This book is probably like that of India which is full of diversity in which one color and one rhythm never get found.

**Title of the Book—‘A Dialogue on System Change, an Initiative to make a New India’**

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