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Hansraj College
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ABOUT THE COLLEGE

Hansraj College is one of the largest constituent colleges of the University of Delhi. The college was founded by the D.A.V. College Managing Committee on 26th July, 1948 in the sacred memories of Maharshi Dayanand Saraswati and Mahatma Hansraj who spent their magnificent lives emphasizing the importance of knowledge. It is one of the leading lights in the D.A.V. family of over 700 institutions.

Hansraj College is a premier institution dedicated to teaching and research. It has highly qualified academicians who impart education in Science, Commerce, and Arts at undergraduate and graduate levels to more than 5000 students. The college has consistently demonstrated outstanding performance in academics, sports, and extracurricular activities.

The college has completed 76 years in the realm of imparting higher education. It has made significant and unparalleled contributions in terms of producing scholars, bureaucrats, intellectuals, and sportsperson serving in different domains not only in our own country but even at international levels.

Hansraj College stands at the cusp between the past and the future today. While it retains inspiring facets of its proud history, with an equally sharp gaze it looks ahead, assimilating the exciting world of new knowledge as it unfolds in front of it, holding the promise of an experience seeped with exhilarating learning and holistic growth for all those who enter its portals.

About the Journal

The ***HRC Journal of Economics and Finance*** is a **double-blind peer–reviewed academic journal** for students, researchers, and faculty to showcase their research pertaining to the discipline of economics and business. It is an international journal. Our mission is to provide a platform through which scholars can publish their scholarly findings to showcase them with the research community at large. We invite research papers and articles on topics related to the field of economics, business and management for its quarterly journal publication.

Message from the Principal

The launch of the *HRC Journal of Economics and Finance* is a milestone that marks our dedication towards providing a platform to young researchers in the field of economics and finance. It is even more fortuitous that the launch has been manifested in the Platinum jubilee year of the college, the Centenary year of the University of Delhi and the 75th year of India's independence.

The New Education Policy, 2020 has launched a paradigm shift that encourages research both at the faculty and student level. Accordingly there is a growing need to provide credible platforms to present research outputs at all levels. This journal fills a significant gap and will contribute to fostering a research ecosystem thereby advancing the objectives of the NEP 2020. This journal will provide an opportunity to students, teachers and scholars, around the world to come together and showcase the links between classroom teaching and their practical training.

I congratulate the authors whose papers/articles have been published in the journal and encourage others to contribute to future issues. Appreciation is due to the Editor In-Chief of this journal, Dr. Apoorva Gupta who has worked tirelessly for the successful launch of this issue of the journal. My best wishes for the success of this venture.

Prof. (Dr.) Rama
Principal
Hansraj College

From the Editor's Desk

Dear Readers,

It is my great pleasure and privilege to present the second issue of the third volume of the Journal of Hansraj College, the *HRC Journal of Economics and Finance*. The journal provides a platform to young researchers in the field of economics, business, social sciences, finance and management to publish their scholarly articles. Our inclusive nature ensures that we cover the wide range of issues in the field. This issue features a diverse range of articles that provide insightful analyses and innovative perspectives on various contemporary economic topics.

We have received around thirty papers relevant to the field of development economics, political economy, macroeconomic policy, financial markets, international trade, and behavioral economics. All the papers went through three rounds of review process, first by the editors and then by the review board. All the papers have gone through double blind peer review process. The authors were communicated with the revisions. The papers were accepted only after the satisfactory revisions were being made. We strictly follow the research ethics and do not tolerate plagiarism. All the selected papers were tested for plagiarism before publication. We have worked tirelessly to bring out this issue of the journal with high quality research work.

Writing quality research papers takes a lot of time and effort, and the authors must be congratulated for writing their research papers for the journal, which is launched in the Platinum Jubilee year of the college, the Centenary year of the University of Delhi and the 75th year of India's independence. We also take this opportunity to congratulate the review board of this issue for their constant academic support for the timely release of the journal. We also thank the support received from the Principal of the college, Prof. (Dr.) Rama, the Advisory Board and the Editorial Board.

We hope that readers find the articles interesting, informative and engaging, and enjoy reading it. We believe that this effort of ours will stimulate further research and discussion in the field of economics and finance, and encourage readers to write for further issues of the journal. We look forward to receiving your feedback and suggestions for future issues.

Disclaimer: The opinions expressed in this journal belong to the contributors and do not necessarily reflect the viewpoints of the college, the editors, the Advisory Board, the Editorial Board, and the Review Board of the *HRC Journal of Economics and Finance*.

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Macroeconomic Determinants of Indian Outward FDI – Is Corporate Tax Rate an Influencing factor?

Dr. Pooja Khanna[1], Associate Professor, Department of Economics, Daulat Ram College, University of Delhi, Delhi- 110007, India

Abstract

The post-1991 reforms not only spurred a significant increase in Indian Outward Foreign Direct Investment (OFDI) but also laid the groundwork for empirical investigations into the macroeconomic determinants driving this trend. While India's OFDI grew remarkably over the years, a more striking change was witnessed in the character of India's overseas investment flows. The last decade has witnessed a growing percentage of outward Indian investment flowing into countries like Mauritius, British Virgin Islands and Cayman Islands, considered as tax havens of the world. Given that corporate tax rate in India has been historically very high and trans-shipping and round-tripping of funds by the Indian firms are favoured means to escape capital gains or other taxes, this study identifies the macroeconomic determinants of Indian OFDI, including corporate tax rate. Macroeconomic and policy related factors include level of economic development, inflows of FDI, trade openness, human capital, exchange rate that are assessed as determinants of Indian OFDI in this study using Granger Causality framework. Furthermore, corporate tax rate is also assessed as a determinant for Indian outflows of FDI to assess if investing overseas by the Indian firms is more likely an exit strategy than entry strategy into the international markets. Results show that besides economic development, openness to trade, exchange rate, human capital, corporate tax rate also, Granger causes OFDI flows from India raising a concern whether learning by doing is the only underlying motive to undertake OFDI by these firms.

Keywords- Outward FDI, India, Determinants, Corporate Tax Rate, Granger-Causality

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1. Introduction

Before the 1990s, India's restrictive macroeconomic, trade, and industrial policies significantly shaped the country's inward-oriented business environment. After the fundamental economic reforms of 1991, India slowly opened up its markets through economic liberalization.

The trade policy reforms initiated in India during the early 1990 involved abolition of import licensing system, reductions in tariff rates and removal of non-tariff barriers (NTBs), etc. The 1995 guidelines articulated by the Ministry of Commerce included the objectives of government in permitting OFDI – promotion of exports and augmenting the asset base through acquisition of technology and other resources and market seeking. These policy changes drew more and more Indian firms to invest in the global market. With policies restructured, foundations for better international presence of Indian firms were laid in this period of economic liberalisation (Amann and Virmani, 2015).

Liberalisation followed by globalisation led to increased outward investments from India in the 1990's although the real take-off was witnessed after 2000, when outward investments from India reached 95 billion USD as compared to 700 million USD during 1990s. This higher growth of overseas investments was due to higher inward FDI flows, financial sector reforms and simplification of regulations for overseas investments (Khan, 2012). Significant changes in Indian OFDI policies included major relaxations in the rules and foreign exchange regulations including replacing FERA, with FEMA in June 2000, raising the limit of investments under automatic approval route, and gradually phasing out annual ceiling system with the size of investor. The OFDI flows reached their highest point at $21 billion in 2008-09. Following this peak, there was a noticeable slowdown in OFDI due to the global financial crisis.

The dynamics between international production and investment advantages is explained by Dunning (1981), through the Investment Development Path (IDP) approach. It links the level of economic development of a country with the OLI (ownership, location and internalisation) advantages, such that taking ownership and location advantages at various stages of economic development, countries begin to invest in foreign countries (Dunning 1981, 1998).Mathews (2006) explains Leverage and Linkage and Learning Mechanism (LLL) framework which highlights how emerging multinationals navigate the global

landscape differently, focusing on collaboration and learning rather than just ownership advantages. MNEs often seek to acquire advanced technologies, brands, or management expertise that are not readily available in their home markets by using overseas expansion as a springboard so as to overcome their latecomer disadvantages (Luo and Tung, 2007). The home country macroeconomic environment along with country's liberal external policy structure are found to be significant factors explaining outward FDI from emerging markets (Nayyar and Mukherjee, 2020; Verma and Brennan, 2013). In the Indian case, rapid economic growth led major Indian firms e.g. Tata group, Infosys, Ranbaxy etc. to become a part of global OFDI scenario investing heavily overseas.

A recent phenomenon that has emerged is investing overseas to avoid taxes in the domestic country. Investments into the foreign markets are also done for tax evasion and sometimes for round tripping of capital in the form of inward FDI (Chen et al, 2016). It is revealed by data that Singapore and Mauritius are the top two sources of inward FDI for India, with the former accounting for 27% and the latter accounting for 16 % of inward FDI flows into India in 2020-2021 (WIR 2022, UNCTAD).Whereas overseas investments from Indian firms have been classified as strategic asset–seeking and trade-supporting types of investment (Pradhan, 2017), the last decade has witnessed a growing percentage of outward Indian investment flowing into countries like Mauritius, Cayman Islands and British Virgin Islands, known to be tax havens of the world. A well - known fact is that corporate tax rate in India has been historically very high and trans-shipping and round-tripping of funds by the Indian firms are favoured means to escape capital gains or other taxes. Hence, institutional factors such as corporate tax rate seem to have an important bearing on OFDI from emerging economies rendering inclusion of this factor extremely important in identifying country specific determinants of OFDI.

Very few research studies have examined country level determinants for Indian investments overseas (Nayyar and Mukherjee, 2020; Amann and Virmani, 2015; Singh, 2017). To the best of my knowledge, the role of corporate tax rate in determining Indian OFDI flows has not been examined in any of the previous studies. Inclusion of this factor can have important bearing on policy formulations that may be required to channelize OFDI flows from India in real sectors rather than tax havens. Given the limited previous literature on the effects of macroeconomic variables on the outward investments for India, this study seeks to fulfil the research gap by examining the role of factors such as economic development

(gross domestic product per capita), exchange rate, trade openness, inward FDI, human capital and corporate tax rate, on explaining the outward FDI flows after economic reforms. A time-series analysis is employed to examine the impact of these factors. This is done for the period 1991-2019. Specifically, this study adopts the Granger Causality framework to assess the relationship between OFDI and factors specific to home country.

The study is organized as follows: the next section reviews the literature. Research objectives are specified in Section 3. Section 4 presents the analytical framework for the choice of home country variables for the study. Data sources, methodology, model specification and results are presented in Section 5. Section 6 presents the methodologies used for the study. Section 7 concludes.

2. Literature Review

In the Indian context, research on the influence of domestic macroeconomic factors on outward FDI is indeed limited.

Tolentino (2010) investigates the impact of trade openness, exchange rate and rate of interest on outward FDI. The study is for India and China. Tolentino depicts the endogenous structure of system variables and shows that this structure and time path of the variable differs for both countries. Results indicate that external factors pertaining to the domestic country can have a partial impact on the competitive advantage of firms.

In a recent study, Nayyar and Mukherjee (2020), use time series (ARDL) to examine the impact of macroeconomic factors and domestic policies on Indian outward FDI flows for the period 1984-2015. Trade openness and inward FDI flows are found to be significant determinants of Indian OFDI. The development of the stock market and banking sector are found to significantly affect outward foreign direct investment. However, they fail to find evidence of any long run relationship between economic development (GDP per capita) of the country and outward FDI flows. They also do not find any long run impact of exchange rate and outward FDI flows. Singh (2017) finds a cointegrating relationship between exports and GDP, and outward FDI for India. Whereas exports are found to be significant determinants of OFDI affecting OFDI positively, GDP is found to be insignificant in explaining OFDI from India.

Testing the IDP (Investment Development Path) theory for India, Amann and Virmani (2015), find a significant relationship between economic development and Indian OFDI position. They also find evidence of joint significance of exports, inward FDI and human capital jointly determining Indian OFDI.

In a study for India, Rajan's (2009) studies the determinants of outward FDI flows. He employs the gravity model for the period of 2000-2005. Employing panel data techniques he finds that a rise in the real exchange rate of host countries negatively impacts OFDI flows from India and Indian firms are particularly sensitive to the market size of potential host countries.

The methodologies used in the above studies vary. Tolentino (2010) employs multivariate time series analysis for his study on OFDI from India and China. Nayyar and Mukherjee (2020) examine the impact of macroeconomic factors and internal policies on Indian OFDI using time series (ARDL) techniques. Amann and Virmani (2015) use Granger causality and cointegration analysis for their study. However, Rajan (2009) employs a panel data analysis to examine determinants of Indian outward FDI.

Mixed conclusions emerge from the above literature review. While openness of home countries is generally found to have important bearing on overseas investments of firms, role of exchange rate, rate of interest and knowledge infrastructure in explaining the same is varied.

3. Research Objectives

It emerges from the above review on macro-economic determinants of Indian OFDI, that very few studies have been conducted in Indian context with no uniformity in results. They also suffer from the limitations of relevant time period of study. Either they have considered time period which does not include the time of the real take-off of Indian OFDI years or have been limited to initial years of growing Indian OFDI. More importantly, large outward FDI flows from India are going to tax havens of the world. Avoidance of high corporate tax rate could be one of the reasons resulting in such flows. Inclusion of corporate tax rate in this analysis is warranted by the consideration that a higher tax rate might be a

burden on firms which might then resort to outward FDI as an escape route to avoid taxes in home countries. However, no study has examined if corporate tax rate could be one of the factors determining outward FDI from India.

Hence, the objective of this paper is to identifying macro-economic determinants of Indian OFDI and also to test if corporate tax rate is a factor that identifies as a macro-economic determinant of Indian OFDI. This study is based on time series analysis that also takes into account the structural break, that has been neglected in most of the studies on Indian OFDI. Ignoring the structural break can produce misleading results, which is taken into account by this study.

4. Analytical Framework for the Study- Macroeconomic Factors

4.1. Economic Development

The Internationalization Development Path (IDP) approach emphasizes the critical role of economic development through location advantages in facilitating OFDI flows (Dunning 1981, 2001). As countries progress economically, the nature of location advantages evolves, influencing how firms perceive and leverage these advantages for international expansion. Effective location advantages can attract inward FDI, which further develops the local economy and enhances the capabilities of domestic firms to invest overseas.

Economic development is a significant driver of OFDI as is well-documented in various empirical studies. Studies by Andreff (2002), Das (2012), Bhasin and Jain (2013), Dunning (2001, 1981), consistently highlight economic development as a crucial factor influencing OFDI. Study by Kalotay and Sulstarova (2010) on Russia specifically identifies the size of the market in the domestic country as an important determinant of OFDI. They found that an increase GDP by 1% leads to an increase in Russian OFDI by 0.9%.

Testing the IDP theory for India, Amman and Virmani (2015) also find economic development is found to be an important determinant in explaining OFDI for India. Similarly, Verma and Brennan (2013), find GDP per capita as a significant determinant of OFDI from India. Thus, incorporating economic development as a proposed explanatory factor for outward foreign direct investment (OFDI) aligns well with existing research.

4.2. Exchange Rate

One of the factors that can significantly influence its ability to invest abroad is the domestic exchange rate. Countries with strong currency can positively affect overseas investments as compared to countries with weaker currencies. A stronger currency implies lesser amounts of foreign currency required to purchase assets abroad, leading to higher outward FDI and fewer exports (Aliber, 1970). Although, for India, studies have found a that a strong currency can lead to higher OFDI without impacting exports (Bhattacharya and Mukherjee 2014). Other studies have found a positive impact of a stronger currency on OFDI (Buckley et al., 2012; Tolentino, 2010; Varma, Bhasin and Nayyar, 2015).

4.3. Trade Openness and Inward FDI

Previous studies like Banga (2007), Dasgupta (2009), Buckley et al. (2007) and Gao et al. (2013) suggest that economic development is supported by other factors such as trade openness, and investment agreements that facilitate operation of foreign firms and increases transparency. They facilitate cross border expansions due to low trade barriers and local content requirements. In addition to that, knowledge gained through foreign export linkages is expected to lead to ownership advantage for firms attempting to venture abroad (IDP, Dunning 2001).

The relationship between trade openness and outward FDI is well-documented in literature (Amann and Virmani, 2015; Buckley et. al., 2007; Banga, 2007; Das, 2009). Policies that promote trade significantly enhance outward foreign direct investment. By allowing greater imports, trade policies intensify competition in the domestic market. Further, companies that engage in exporting often develop skills and capabilities that ease the transition to foreign direct investment. Their exporting experience can inform strategic decisions about market entry and operational management abroad (Banga, 2007; Dasgupta, 2009; Vernon, 1966). Trade flows are therefore included in the present analysis.

As posited by IDP, IFDI flows are also found to have a bearing on outward FDI mainly due to O-advantages enjoyed by domestic firms. These can be the spill- over effects of foreign firms to domestic firms through demonstration effects, enhancing their management skills and adding to technological advancements which positively affect their overseas investment capabilities (Durán and Ubeda, 2001; Dunning, 1981).Whether increase in OFDI promoting

advantages were gained from increased IFDI in India has been studied by a few scholars (Nayyar and Mukherjee, 2020; Amann and Virmani, 2015; Dasgupta, 2009). Inward FDI flows are included as another explanatory variable in present study for further insight into the relationship.

4.4. Human Capital

According to Banga (2007), existence of trade related drivers that facilitate OFDI may not be sufficient to invest overseas; the firms should also have the capability to undertake OFDI. Knowledge and information about host countries, managerial, entrepreneurial and marketing abilities and cutting-edge skills are required to compete and invest in the global market. A robust knowledge infrastructure equips firms with the necessary tools and capabilities to effectively engage in OFDI, leveraging their ownership-specific advantages in global markets (Dunning 1981). Gao et. al. (2013) that integrating knowledge capital into the IDP framework enriches its applicability and effectiveness, equipping firms to navigate the complexities of global markets more successfully. Liu et al. (2005) emphasize that to better understand outward foreign direct investment (OFDI), it is essential to advocate for a special theory that incorporates human capital alongside traditional economic indicators like gross domestic product (GDP). Studies on India also confirm the proposition that economic development has to be supported by other factors such as openness of the economy reflected in trade and inward FDI flows and human capital (Amann and Virmani, 2015; Verma and Brennan, 2013). This is particularly important for multinationals in the emerging economies like India who are latecomers in the global scenario, and aggressively seek assets to augment their knowledge base and acquire competitive skills. Both asset acquiring and asset augmenting aspects of OFDI flows require knowledge absorption and diffusion capabilities of the firms. Education and skilled personnel are therefore prerequisites for a firms' competitive advantage that is looking to venture in overseas markets (Verma and Brennan, 2013). Hence, human capital is incorporated as an explanatory variable for the study.

4.5. Corporate Tax Rate

Inclusion of corporate tax rate in the present analysis is warranted by the consideration that a higher tax rate can impose significant regulatory burdens on firms, potentially leading them to resort to outward FDI as an escape route to avoid taxes in home countries. It has been shown for a country like Malaysia where higher corporate tax rate has caused firms to invest overseas as an exit strategy rather than a global entry strategy (Chen et al., 2016). India is one of the countries which have a history of high, corporate tax rate with surcharges. Tax revenue has been the primary source of government revenue, required to fund larger scale public investments in India (Pattnaik et al., 2009). Although, the tax structure was simplified, and corporate tax rate was reduced in 1991, it has still been very high (close to 25%) in comparison to the countries that are like India in terms of development. Moreover, it has been established that the inefficiently high tax rate, led to large scale tax induced distortions in investment and financing decisions in the private sector in India (Poirson, 2006). As already entailed earlier, large outward FDI flows from India are going to tax havens of the world. Avoidance of high corporate tax rate could be one of the reasons resulting in such flows. Therefore, corporate tax rate is included in this study to examine if this could be one of the policy related factors determining outward FDI from India.

Based on the above discussion, the next section gives the definitions of variables chosen for the study and also presents the important trends in these variables.

5. Variables, Data Sources, Period of Study and Methodology (Macro-economic Determinants)

The variables, used in the study are defined as follows:

- rofdi: OFDI flows are measured as real outward FDI flows, at constant 2012 USD million
- rgdppc: economic development as measured by real GDP per capita
- rifdi: Inward FDI flows measured as real inward FDI flows, at constant 2012 USD million
- exchange: Exchange rate as measured as direct quote of Indian rupee against USD
- trade: Trade volumes measured as Merchandise Trade (exports+imports) to GDP ratio

- humancapital: Human capital as measured by enrolment in tertiary school
- tax rate: Corporate tax rate

Nominal values of outward and inward FDI flows have been deflated by the relevant price indices. RBI Handbook of Statistics provides data for real GDP per capita, trade, tax rate and exchange rate whereas data for real inward FDI and outward FDI flows and human capital are obtained from the World Development Indicators, World Bank, for the period 1991-2019.

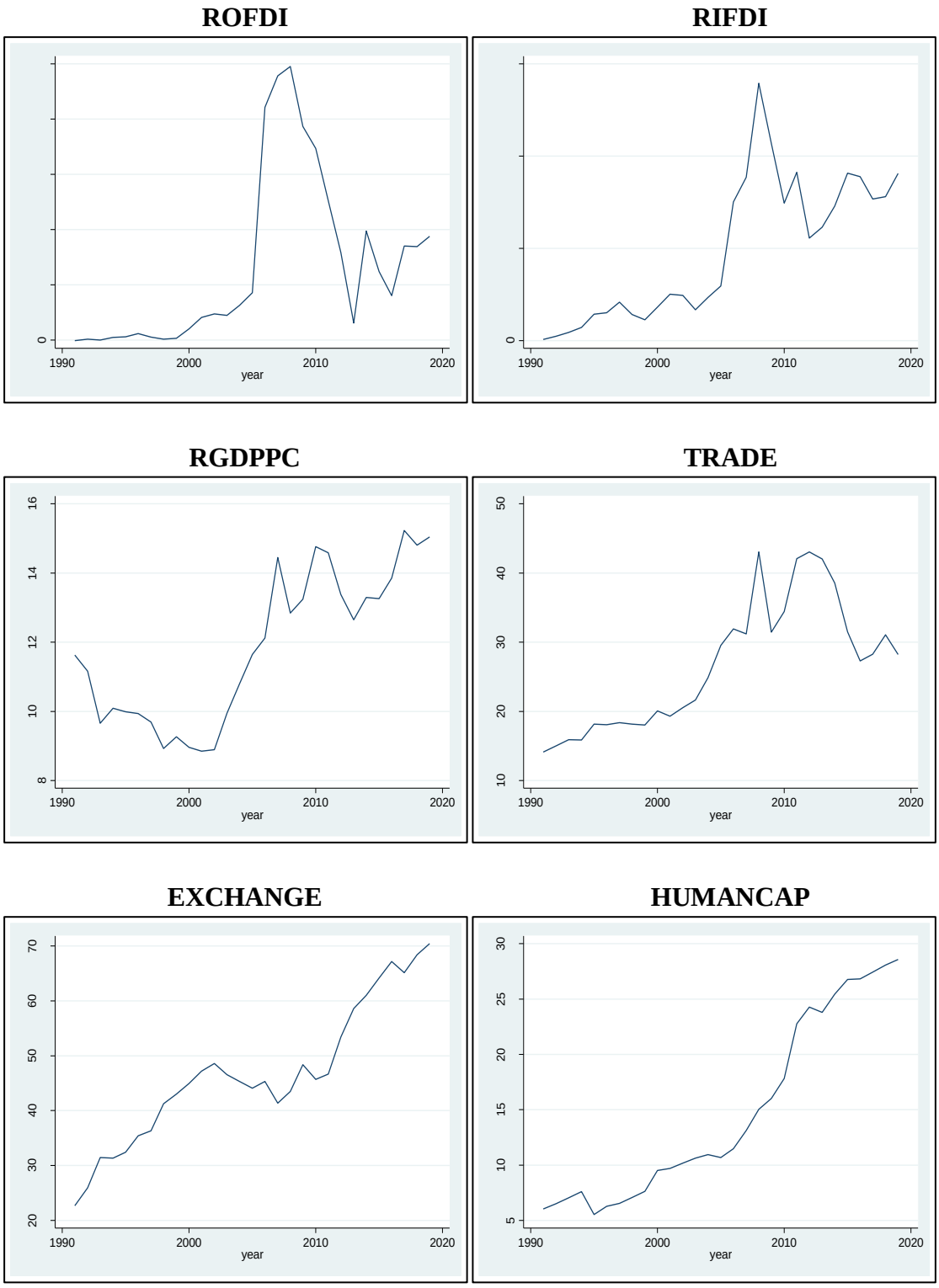
The period of study chosen, 1991-2019, is the post reforms period, when significant domestic and structural changes were initiated in the Indian economy. The study employs multivariate time series technique on the yearly data for the time period of 1991-2019.

The study uses Granger Causality tests after testing for the presence of unit root by Augmented Dickey Fuller and Phillips- Perron tests and Chow test for a structural break. When conducting time series analysis, it's crucial to address the issue of non-stationarity, as using standard regression techniques can indeed lead to spurious results. Since vector autoregression (VAR) requires the series to be stationary, therefore, the test for unit root for each of the variables is conducted.

5.1. Variable Trends Following Policy Reforms in India (1991-2019)

Figure 1 shows the trends in each variable series used for the study. It also indicates all series to be non-stationary. Following the fundamental economic reforms of 1991, India gradually progressed towards a market-oriented economy. Reforms including abolition of licensing policy, lower import tariffs, privatisation, financial sector reforms, with major relaxations in controls of current and capital accounts, changes in exchange rate regime and major changes in OFDI policies since 2000's paved the way of Indian integration with the world economy. Country was firmly on the path to economic growth and development indicated by growth trends in GDP, trade and foreign investment. India's GDP rose from 274.84 billion USD in 1991 to 2831.55 billion USD in 2019. *Real GDP per capita* rose from 11.6 to 15.03 in the same period. With the initiation of trade liberalisation, trade as % of GDP nearly quadrupled from 14% in 1991 to nearly 43%in 2008. It stood at 28.2% in 2019 (Figure 1).

Figure 1: Yearly Data Trends of Variables: 1991-2019



TAX RATE

Figure Source- Author's own Calculations

Through liberalised exchange rate management system rupee was made partially convertible in 1992-1993. Full convertibility in trading account was further brought in 1993-1994 and complete convertibility in current account was brought in by the year 1994 to create a business-friendly environment and to promote foreign trade and investment (Jayanthi, 2015). Gradual removal of the licensing restrictions, facilitative measures for Indian and foreign firms and reduction in import duties over the years led to growing and intense competition in Indian markets, which prompted Indian firms to diversify globally. Inward FDI flows increased from nearly 74 million USD in 1991 to 50610.64 million USD in 2019, registering an average annual growth rate of 37.8 % (UNCTAD, 2021). Accordingly, major changes in the OFDI policies were initiated in 2000's such as replacing FERA with FEMA, introducing the automatic approval route and doing away with the annual investment ceiling under this route, raising the financial commitment in automatic route gradually up to 100 percent of the net worth of the investor in 2004. These changes significantly expanded the OFDI flows from India (Figure 1). OFDI flows witnessed a sharp fall after 2009, and have been showing a cyclical pattern, though with a rising trend. As can be seen from figure above, the period also witnessed changes in the institutional factors associated with economic growth and development such as human capital. Tertiary school enrolment ratio, a measure of the same, rose from nearly 6% in 1991 to 28.5 % in 2019. Post tax reforms initiated in India, corporate tax rate was reduced from an average rate of 50% in 1990's to 35% on an average, in 2000's. The average tax rate is still very high as compared to India's contemporaries, for example, corporate tax rate in Singapore is around 17%, in Thailand, it is 20%, and UAE has only recently imposed 5% tax on corporations.

5.2. Methodologies

Tests for Unit Root: Augmented Dickey Fuller (ADF) Test

The testing procedure for ADF is applied to the model

$$\Delta Y_t = \alpha + \beta t + \delta \Delta Y_{t-1} + \gamma \Delta Y_{t-1} + \cdots + \gamma \Delta Y_{t-p} + \in_t \quad (1)$$

In the ADF test the coefficient of interest is, δ in the above equation. α represents constant, β, represents coefficient of time trend, p is the lag order of the autoregressive process and $\in$ is the white noise error term. Lag length can be tested going down from high orders and examining the t-values on coefficients or an alternative approach is to examine information criteria such as the Akaike information criterion or Bayesian information criterion or Schwartz information criterion.

To carry out the unit root test, the null hypothesis is $\delta = 0$ against the alternative hypothesis of $\delta < 0$. Next step is computing the value for the test statistic as $DF_\tau = \delta$ / SE (δ), and comparing it to the relevant critical value for the ADF test. Since the test is asymmetrical, only the negative values of the test statistic are taken into consideration. If the calculated test statistic, DF_τ, is less (more negative) than the critical value, then the null hypothesis of $\delta = 0$ is rejected with the conclusion that no unit root is present (Enders, 2014).

The Augmented Dickey-Fuller (ADF) test is indeed a widely used tool for detecting unit roots in time series data, but it has certain limitations. The power of the ADF test can be limited, particularly in small samples. It may fail to detect a unit root when one is present. Performing the Phillips-Perron test in addition to the ADF test can enhance the robustness of the analysis regarding unit roots as it has less restrictive assumption for error terms (Enders 2014).Hence, this test is also performed for robustness.

Chow's Test for Structural Break

We compare two data sets. One is the 'primary' data set-i={1,...,n_1} ; other is the 'secondary' data set-i={ n_1+1,...,n}. The combined set is then defined as -i={1,...,n}. If there is no structural change between the primary and secondary data sets, combining them into a single regression model can be valid without worrying about biased estimators.

Consider the regression:

$$y_t = \beta_0 + \beta_1 x_{it} + \beta_2 x_{2t} + \cdots + \beta_k x_{kt} + \gamma_o D_t + \sum_k^{i=1} \gamma_i x_{it} D_t \quad (2)$$

Where i={1,...,n}.

D stands for dummy variable taking a value of 1 for i={n_1+1,...,n} and 0 otherwise.

When both data sets are explained fully by $\{\beta_0, \beta_1 \ldots\ldots \beta_k\}$ then there is no use in the dummy variable as the data set is explained fully by the restricted equation. That is, under the assumption of no structural change we have a null and alternative hypothesis of:

$$\left.\begin{aligned} H_0 &= \gamma_o, \gamma_1 \ldots\ldots \gamma_k = 0 \\ H_1 &= Otherwise \end{aligned}\right] \quad (3)$$

The null hypothesis of joint insignificance of D is tested by F-test with n- 2 (K+1) degrees of freedom (Chow, 1960). It is given by:

$$F = \frac{RSS(\text{restricted}) - RSS(unrestricted)/(K+1)}{RSS(unrestricted)/DOF} \quad (4)$$

Vector Auto Regression (VAR)

A VAR system contains a set of *m* variables, each of which is expressed as a linear function of *p* lags of itself and of all of the other *m* – 1 variables, plus an error term. With two variables, *x* and *y*, an order-*p* VAR would be the two equations (1.1)

$$\left.\begin{aligned} y_t &= \beta_{y0} + \beta_{yy1} y_{t-1} \ldots. + \beta_{yyp} y_{t-p} + \beta_{yx1} x_{t-1} + \cdots \beta_{yxp} x_{t-p} + \epsilon_t^y \\ x_t &= \beta_{x0} + \beta_{xy1} y_{t-1} \ldots + \beta_{xyp} y_{t-p} + \beta_{xx1} x_{t-1} + \ldots \beta_{xxp} x_{t-p} + \epsilon_t^x \end{aligned}\right] \quad (5)$$

where β*xyp* is the coefficient of *y* for *x* at lag *p*

Akaike information criterion or Schwartz information criterion can be used to ascertain the appropriate lag length in a VAR. The present study includes the year dummy variable to the set of equations to take the structural break into account.

The framework established by equation (1.1) is effective for both forecasting future values of *x* and *y*, and for exploring causal relationships through Granger causality analysis.

Granger Causality

A time series X is said to Granger-cause another time series Y if it can be shown, usually through a series of t-tests and F-tests on lagged values of X (and with lagged values of Y also included), that those X values contain statistically significant information about future values of Y. Testing for Granger causality in (1.1) amounts to testing the coefficients of past values in the regression equation is zero. The null hypothesis is that *x* does not Granger cause *y* or

$$H_0 = \beta_{yx1} = \beta_{yx2} = \ldots\ldots\ldots \beta_{yxp} = 0 \quad (6)$$

And testing the hypothesis that y does not granger cause x,

$$H_0 = \beta_{xy1} = \beta_{xy2} = \ldots\ldots\ldots \beta_{xyp} = 0 \quad (7)$$

Against the alternative hypothesis that null is not true. This can be tested using a standard Wald *F* or χ^2 test (Enders, 2014).

6. Results and Discussions

6.1. Results for Unit Root

The Augmented Dickey-Fuller (ADF) test is a key method for testing the presence of a unit root in time series data. Hence, this test is employed for empirical investigations. The test is conducted in the levels first and then in the first differences. For each series, this study uses the specification of the test equation that includes an intercept with zero lags. For robustness, testing by Phillips-Perron (PP) method is also carried out alongside ADF to test for the presence of unit root. Results for both tests are presented in Table 1.

Table 1: Results for Stationarity

Augmented Dickey Fuller Test for Stationarity					
Variables	**t-statistic(levels)**	**t-statistic (first difference)**	**Critical value (1%)**	**Critical value (5%)**	**Critical value (10%)**
rofdi	-1.592	-4.537	-3.73	-2.992	-2.626
rifdi	-1.363	-5.158	-3.73	-2.992	-2.626
trade	-1.598	-5.901	-3.73	-2.992	-2.626
exchange	-0.619	-4.572	-3.73	-2.992	-2.626
humancap	0.845	-3.977	-3.73	-2.992	-2.626
rgdppc	-0.532	-5.279	-3.73	-2.992	-2.626
tax rate	-1.095	-6.056	-3.73	-2.992	-2.626
Phillips- Perron Test for Stationarity					
Variables	**t-statistic(levels)**	**t-statistic (first difference)**	**Critical value (1%)**	**Critical value (5%)**	**Critical value (10%)**
rofdi	-1.774	-4.548	-3.73	-2.992	-2.626
rifdi	-1.386	-5.158	-3.73	-2.992	-2.626
trade	-1.56	-5.916	-3.73	-2.992	-2.626
exchange	-0.683	-4.547	-3.73	-2.992	-2.626
humancap	-0.651	-3.935	-3.73	-2.992	-2.626
rgdppc	-0.562	-5.224	-3.73	-2.992	-2.626
tax rate	-0.917	-6.378	-3.73	-2.992	-2.626

Notes: Number of observations – 28 (ADF), 27(PP)

Both the measures have given the same result. The tests confirm that all variables are non-stationary at levels and stationary at their first differences. All variables are therefore integrated of order one i.e. I(1).

Once the series are made stationary by first differencing, the next step is to perform VAR on these series and perform Granger causality tests. It is worth noting that the graph for OFDI flows in figure 6 above points to the presence of a structural break in 2009. Therefore, before doing the Granger causality tests, Chow test is conducted to test for the presence of a structural break for the same year.

6.2. Chow Test for Structural Break

Following the global financial crisis in 2008, existence of a structural break during that time period is expected. Chow's test conducted for the current analysis for the year > 2009, reported the following statistics: $F(2, 20) = 4.61$; $Prob > F = 0.0226$.

The results validate the presence of a structural break in the mentioned year. Hence Granger causality tests are done by running a vector autoregression (VAR) with a year dummy[2] to account for this break.

[2] Dummy takes the value 0 for years 1991-2009 and 1 for years, 2010 onwards.

6.3. Results of Granger Causality Tests

The results of Granger causality tests show that economic development, openness to trade, exchange rate, human capital and corporate tax rate, granger cause OFDI flows from India (Table 2). The results are consistent with Amann and Virmani (2015) and Singh (2017) who find a positive relation between economic development (GDP per capita). Results are also in line with Dasgupta (2009) and Amann and Virmani (2015), who also find insignificant effect of inward FDI flows on OFDI.

Studies show that trade openness plays a crucial role in predicting Indian OFDI. Therefore, liberalised government foreign trade policies in India, manifested in the form of higher imports and exports may have affected OFDI. This may be the result of increasing competition with higher imports and by the process of enhanced international exposure with exports (Banga, 2007). Further, as explained by Mathews 2006, the Linkage-Leverage and Learning (LLL) mechanism can also promote OFDI flows from emerging economies like India. External linkages such as trading networks enable learning process of firms investing overseas by providing access to foreign knowledge and skills. Results are consistent with Amann and Virmani (2015), Singh (2017), Nayyar and Mukherjee (2020), who also find trade openness to be a significant factor determining Indian OFDI flows.

LLL mechanism posits that firms benefit from investing abroad, depending upon their capacity to absorb knowledge and skills implying that human capital can be a significant factor in predicting OFDI flows (Mathews, 2006). This is confirmed by the results obtained in this study. Results are consistent with Amann and Virmani (2015).

A significant finding of this study is that corporate tax rate Granger causes Indian OFDI. This result emerges out of several facts about Indian OFDI. In the first decade of the period under study, Indian OFDI had only started growing. Hence, expected factors such as economic development, trade openness, and human capital led to Indian firms investing overseas in developing countries such as Sri Lanka, UAE and Hong Kong, China. These countries had nearly 50% share in Indian OFDI with respect to developing economies during 1990-1999 (Pradhan, 2017), a period of economic growth and development and also when Indian economy opened up to the global world. But this pattern changed drastically in

favour of tax havens like Mauritius, Cayman Islands, British Virgin Islands, with Mauritius alone accounting for nearly 35 % of flows within the developing countries and 18% in the overall Indian outflows (RBI database) over the period 2009-2019. Shares of countries like Hong Kong (China) and Sri Lanka which stood at 24.7% and 5% in 1990-1999, fell significantly to 1.3% and 0.5% during 2000-2019 (RBI database). This change in pattern can be attributed to higher outflows from India to avoid high corporate tax rate and higher inflows to countries which have a much lower tax rate and an advantageous fiscal tax haven like Mauritius and Singapore, which are amongst the top 10 host countries for Indian outflows currently (RBI database). Further, largest proportion of inward FDI flows into India come from Singapore (27%) and third- largest from Mauritius (16%). To the extent, that outflows are targeted to these countries offering low tax rates and investor friendly climate and OFDI is channelled into productive sectors, the higher outflows may be beneficial for the multinational firms, but if they are meant for money laundering and round tripping, they may be redirected back to India as inward FDI flows, as indicated by reverse causality results which show that OFDI granger causes inward FDI.

Reverse causality results show that outward FDI flows granger cause trade. This is in line with the theory that outward FDI can promote exports of intermediate goods that can originate in the home economy from the host markets. Parent firms can ship intermediate goods to their subsidiary firms overseas (Blomström and Kokko, 1994).

Reverse causality is absent for all other variables which can be due to the fact that though Indian OFDI has witnessed growth in recent years yet it remains small compared to the other countries like China. Also, since Indian OFDI flows have a preference for the tax haven countries, they may not have a significant impact on country level factors like GDP per capita or human capital. Results are consistent with Amman and Virmani (2015) who also find one way causality from GDP per capita, exports and human capital to OFDI and do not find reverse causality except in case of R&D expenditures.

Table 2: Granger Causality Results

	Chi- square(dof)	**p-value**
IFDI→ OFDI	4.2013 (2)	0.122
OFDI→ IFDI	14.654 (2)	0.001***
IFDI does not Granger cause OFDI but OFDI Granger causes IFDI		
TRADE→ OFDI	9.8346 (2)	0.007**
OFDI→TRADE	29.134 (2)	0.000***
Trade Granger causes OFDI and OFDI Granger causes Trade		
RGDPPC→ OFDI	15.313 (2)	0.005***
OFDI→ RGDPPC	3.414 (2)	0.181
RGDPPC Granger causes OFDI but OFDI does not Granger cause RGDPPC		
EXCHANGE→OFDI	8.8658 (2)	0.012*
OFDI→ EXCHANGE	2.5927 (2)	0.274
Exchange Granger causes OFDI but OFDI does not Granger cause Exchange		
HUMANCAP→OFDI	28.03 (2)	0.000***
OFDI→ HUMANCAP	0.5091 (2)	0.775
Humancap Granger causes OFDI but OFDI does not Granger cause Humancap		
TAX RATE→OFDI	6.7848 (2)	0.034*
OFDI→ TAX RATE	1.0513 (2)	0.591
ALL→OFDI	51.355 (12)	0.000***
All variables granger cause OFDI		

Notes: * denotes 10% level of significance, **denotes 5 %significance level and *** denotes 1 %significance level. Lag length was chosen to be 2 as selected by AIC; VAR regression includes dummy variable for structural break.

6.4. Robustness Check

Results for Granger causality are also confirmed by Wald tests. As seen from Table 3, all variables except inward FDI are found to be significant in explaining OFDI flows as suggested by the p-values.

Table 3: Wald Test for Robustness Check

	Chi-square(Dof)	**P-value**
rifdi	4.21 (2)	0.1218
trade	9.83 (2)	0.0073
rgdppc	15.31 (2)	0.0005
exchange	10.72 (2)	0.0047
humancap	28.03 (2)	0
tax rate	6.78 (2)	0.0336

Source- Author's calculations

7. Conclusion

The present study brings forward the necessity to include not only the macroeconomic factors such as economic development but policy linked factors in determining Indian OFDI. In the light of economic reforms in 1991 and the more recent destination pattern changes in OFDI flows, the study attempts to identify the determinants for the Indian OFDI over the last three decades using Granger causality framework. Chow's test confirms the existence of a structural break after global recession in 2008-2009. Incorporating the year dummy, the empirical evidence in this chapter indicates the presence of one-way causality from economic development, trade openness, human capital, exchange rate and corporate tax rate to OFDI. Reverse causality is found from inward FDI flows and trade.

Results confirm that for emerging economies like India, economic development has to be supplemented with other factors such as trade openness and human capital and that internationalization strategies of firms are not only affected by home macroeconomic environment, but also on internal home policies (Saad et al., 2014, Stoian, 2013, Amann and Virmani, 2015). Policies that boost and promote trade and enhance knowledge infrastructure can go a long way in motivating firms to venture abroad. By building knowledge infrastructure and fostering trade linkages, countries can enhance their firms' capabilities, facilitating outward FDI through the capability development and leverage and learning process (LLL).

However, significance of corporate tax rate in explaining OFDI from India raises concern about whether OFDI flows have become an exit strategy rather than entry strategy into the global world. High corporate taxes in India have probably led to firms investing in countries that have a much lower tax rate. Some of these investments can be purely for tax avoidance and can therefore not result in any productivity or knowledge gains that OFDI can generate. A revision of the corporate tax rate or the introduction of targeted incentives could significantly strengthen the internationalization strategy of Indian firms. It is also suggested that international tax reforms can promote international tax parity which can perhaps mitigate the complexity of the problem (OECD, "Action Plan on Base Erosion and Profit Shifting").

References

- Aliber, R. Z. (1970). A theory of direct foreign investment. CP Kindelberger (Ed.), *The International Corporation: A Symposium*, MIT Press, Cambridge, Massachusetts (1970), 17-34.
- Amann, E. and Virmani, S. (2015), 'Is the evolution of India's Outward FDI consistent with Dunning's Investment Development Path Sequence?' Economics Working Paper series, 019, Lancaster
- Amiti, M., and Wakelin, K. (2003). "Investment Liberalization and International Trade", *Journal of International Economics*, Vol. 61: 101-126.
- Andreff, W. (2002). The new multinational corporations from transition countries. *Economic Systems*, 26(4), 371-379.
- Athreye, S., and Kapur, S. (2009). Introduction: The internationalization of Chinese and Indian firms—trends, motivations and strategy. *Industrial and Corporate Change*, dtp007.
- Banga, R. (2007, July). Explaining Asian Outward FDI. In presentation at UNCTAD-India ARTNeT Consultative Meeting on Trade and Investment Policy Coordination (pp. 16-17).
- Bhasin, N., Jain, B. (2013). Home Country Determinants of Outward FDI: A Study of Selected Asian Economies. Retrieved from http://ssrn.com/abstract=2206739.
- Bhattacharjea, A. (1985). Trade liberalization in India: Attempts and Consequences, *Social Scientists*, 13(4), 11-16.
- Buckley, P. J., Clegg, L. J., Cross, A. R., Liu, X., Voss, H., and Zheng, P. (2007). The determinants of Chinese outward foreign direct investment. *Journal of International Business Studies*, 38(4), 499-518.
- Buckley, P. J., Forsans, N., and Munjal, S. (2012). Host–home country linkages and host– home country specific advantages as determinants of foreign acquisitions by Indian firms. *International Business Review*, 21(5), 878-890.
- Chow, Gregory C. (1960). 'Tests of Equality Between sets of coefficients in Two linear Regressions *(PDF)*. *Econometrica*. 28 (3): 591–605.
- Das, K. C. (2013). Home country determinants of outward FDI from developing countries. Margin: *The Journal of Applied Economic Research*, 7(1), 93-116.
- Dasgupta, N. (2009). Examining the long run effects of export, import and FDI inflows on the FDI outflows from India: A causality analysis. *Journal of International Business and Economy*, 10(1), 65-88.
- Dunning, J. H. (1980). Toward an eclectic theory of international production: Some empirical tests. *Journal of International Business Studies*, 11(1), 9-31.
- Dunning, J. H. (1980). Toward an eclectic theory of international production. Thunderbird International Business Review, 22(3), 1-3.
- Dunning, John H. (1981). Explaining the Investment Position of Countries: Towards a Dynamic and Development Approach, *Weltwirtschaftliches Archive*, 117, 30-64.
- Durán, J. J., and Ubeda, F. (2001). The investment development path: a new empirical approach and some theoretical issues. *Transnational Corporations*, 10(2), 1-34.
- Enders, W. (2014). Cointegration and Error-Correction Models, Chapter 6, ―*Applied Econometric Time Series*‖, Third Edition, Wiley publication.

- Engle, R.F, Granger, C. W. (1987). Co-integration and Error Correction: Representation, Estimation and Testing. *Econometrica*, 55(2), 251-276.
- Gao, G. Y., Murray, J. Y., Kotabe, M., and Lu, J. (2010). A ―strategy tripod‖ perspective on export behaviours: Evidence from domestic and foreign firms based in an emerging economy. *Journal of International Business Studies*, 41(3), 377-396.
- Gao, L., Liu, X., and Zou, H. (2013). The role of human mobility in promoting Chinese outward FDI: A neglected factor?. *International Business Review*, 22(2), 437-449.
- Globerman, S., and Shapiro, D. (2003). Governance infrastructure and US foreign direct investment. *Journal of International Business Studies*, 34(1), 19-39.
- Globerman, S., and Shapiro, D. M. (1999). The impact of government policies on foreign direct investment: The Canadian experience. *Journal of International Business Studies*, 30(3), 513-532.
- Goh, S. K. (2011). Malaysia's outward FDI: The effects of market size and government policy. *Journal of Policy Modelling*, 33(3), 497-510.
- Kalotay, K., and Sulstarova, A. (2010). Modelling Russian outward FDI. *Journal of International Management*, 16(2), 131-142.
- Luo, Y., and Tung, R. L. (2007). International expansion of emerging market enterprises: A springboard perspective. *Journal of International Business Studies*, 38(4), 481-498.
- Mathews, J. A. (2006). Dragon multinationals: New players in 21st century globalization. *Asia Pacific Journal of Management*, 23(1), 5-27.
- Nayyar, R. and Mukerjee, J. (2020), Home country impact on Outward FDI from India, *Journal of Policy Modelling*, (42)385-400.
- OECD, "Action Plan on Base Erosion and Profit Shifting," http://www.oecd.org/ctp/BEPSActionPlan.pdf
- Pradhan, J. P. (2011). Emerging multinationals: A comparison of Chinese and Indian outward foreign direct investment. *Institutions and Economies*, 3(1), 113-148.
- Pradhan, J.P. (2017): *Indian outward FDI: A review of recent developments in Transnational Corporations* (UNCTAD) 24 (2), pp. 43–70.
- Rajan, R. S. (2009). Outward Foreign Direct Investment from India: Trends. In Determinants and plications", ISAS Working Paper No. 66, Institute of South Asian Studies.
- Rasiah, R., Gammeltoft, P., and Jiang, Y. (2010). Home government policies for outward FDI from emerging economies: lessons from Asia. *International Journal of Emerging Markets*, 5(3/4), 333-357.
- Saad, R. M., Noor, A. H. M., and Nor, A. H. S. M. (2014). Developing countries' outward investment: Push factors for Malaysia. *Procedia-Social and Behavioral Sciences*, 130, 237- 246.
- Stoian, C. (2013). Extending Dunning's investment development path: The role of home country institutional determinants in explaining outward foreign direct investment. *International Business Review*, 22(3), 615-637.
- Tolentino, P. E. (2010). Home country macroeconomic factors and outward FDI of China and India. *Journal of International Management*, 16(2), 102-120.

- Uddin, M., and Boateng, A. (2011). Explaining the trends in the UK cross-border mergers and acquisitions: An analysis of macro-economic factors. *International Business Review*, 20(5), 547-556.
- World Bank Data, 2021. www.worldbank.org
- World Investment Report, United Nations, 2021 and 2022

What is Right Economic Way of Thinking?

A Short Story of Two Contrasting Views

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Abstract

This essay is an attempt at educational storytelling about two contrasting ontological views governing economics-learning. It points to mainstream economics based on the paradigm of methodological individualism vis-a-vis non-mainstream economics based on the alternative paradigm of methodological holism. The purpose, in light of this, is to draw the attention of economics teachers as to how they can negotiate the challenge set by the 2020 National Education Policy of sifting or integrating relevant understandings from different methodologies of inquiry about the socio-economic world so that economic pedagogy is oriented to tackling complex challenges in the real world. The essay suggests that Post Keynesian economics as a representation of non-mainstream economics should be *favoured because of* empirical evidence in its favour as also the need for socially progressive capitalism.

Keywords: Ontology, Mainstream economics, Non-mainstream economics, Individualism, Holism, Post Keynesianism

JEL Classification: B4, B41, B5

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1. Introduction

Economists differ in describing social reality due to differences in the "first commands" that guide the procedures of their 'scientific' investigations. This is what is known as social ontological difference. As Maki (2001) has pointed out, it refers to economists not holding the same "beliefs or ontological presuppositions—fundamental ideas about nature of being—which direct their thinking about economic behaviour and convictions about the way the economic world works." Little wonder that there is no single economic worldview.

Consider two stories in this connection that dramatize the concern of this essay. First, there is a story of a frog that lived in a well. There are different versions of it (e.g. Nandipati, 2022; Tzu and Palmer, 2006). One telling of it goes like this. "The frog was born and brought up there and spent its entire life believing its small well to be the entire world. One day, another frog came and fell into the well. Where are you from?, the first frog asked. I am from the sea, the second frog responded. The sea! How big is that? Is it as big as my well? Asking this, the first frog took a leap from one side of the well to the other. My friend, said the frog of the sea, how can you compare the sea with your little well? Then the first frog took another leap and asked, Is your sea so big? The frog of the sea exclaimed, What nonsense you speak, to compare the sea with your well! Well, then, said the frog of the well, nothing can be bigger than my well; there can be nothing bigger than this; this fellow is a liar, so turn him out."

The typical undergrad-econ-teachers, who are restricted by the mainstream economic curriculum, appear to be the "frog in the well" in the above story in that they are trained in mainstream economics and are restricted to teach only mainstream economic curriculum offered to the students, which has to be completed in little time frame designated to them. The frog of the sea represents non-mainstream economic learning shunned by the dominant mainstream economists.

Secondly, there is a story titled "The Croaking Frogs" (Akinbi, Undated). In this, the frogs in a swamp get into a croaking contest, and the cacophony of their simultaneous croaking disturbs not only the other resident creatures but also the smallest frog among them, who does not participate in the competition. The croaking frogs are an assortment

of mainstream and non-mainstream economists *creating* variegated noises about the social and economic realm they think they know. The silent frog can be taken as the econ-teacher wondering about the veracity of what all the other frogs are saying.

How can this smallest frog interface itself with the surrounding noises? Like the frog in the well in the first story above, it can reject the non-mainstream noises unknown to it. Or, it can listen to the unknown noises and experience the discomfort of 'cognitive dissonance' (Mcleod, 2023), involving conflicting attitudes, beliefs or behaviours, whereby most likely it chooses to fall back onto the beliefs already known to it because homeostasis is better by surrendering to the beliefs of dominant intellectuals. The third response of this frog can be that it evaluates the beliefs of economists by empirical evidence in direct relation to the theories and models they hold. This essay supports this as the optimal response. There can be a fourth response which is that it can think about reconciling the differences and thereby put forward a better approach as some scholars have proposed (Bunge, 2000; List and Spiekermann, 2014), but this is not *our* concern.

2. The Heart of the Problem

Now the ontological problematic taken up here can be elaborated as follows. The mainstream and non-mainstream economists do not see eye to eye because their ontological methods differ, with the former following methodological individualism and the latter methodological holism. The mainstream economists, also called as atomists or individualists, believe that individualism is a robust, valuable and successful approach to explaining economic and social phenomena (Bulle, 2024; Neck, 2022). All explanations of social phenomena will have to be based on "individual beliefs, wishes, intentions and actions" (Bellido, 2024).

The non-mainstream economists, also known as holists, condemn this approach as dogmatic refusal to examine the "social structure or institutional or psychological forces which are involved in the moulding of individual preferences and purposes" (Hodgson, 1986). Much of the individual behaviour is shaped by factors outside the individual concerned. The "high-level social entities or properties such as states, institutions or cultures are ontologically or causally significant". As such, they go by what Asch (1952)

had brilliantly said long time ago thus: "The unit is not an individual but a social individual, one who has a place in the social order…To understand the individual we must study him in his group setting; to understand the group we must study the individuals whose interrelated actions constitute it."

It is interesting to note how Bresser-Pereira (2003) highlights the difference *between individualists and holists in terms of their preferred method of inquiry*. The former have adopted the hypothetical-deductive method of methodological sciences like logic, mathematics and statistics which have no object other than the rationally constructed. The latter have embraced the empirical or historical-deductive method which is suitable to the substantive sciences such as economics. It facilitates the analysis of the real economic systems.

Lawson (2012) endorses this point saying that holism permits "elaboration of the real nature of social reality by tailoring its methods to that nature unlike individualism which determines methods a priori without consideration of the nature of the task". The problem is that "whatever the question or object of analysis, mainstream economists insist in advance that certain sorts of methods of mathematical modelling are always the appropriate tools." Consequently, the individualists do not exhibit "real engagement and debate over the nature of the social world and how it works".

In light of this, this essay is in consonance with the ontological grounding of the holists even as the dominant individualists never stop ignoring and disparaging the economic worldview of the holists.

3. Individualism and Holism in Some Detail

Hodgson (2025) is the best guide to make sense of the individualists and holists in some more detail. By this source, we can find the individualistic frogs croaking as follows:

"Economics is the science of choice in terms of specific core assumptions and analytical techniques. And it can be applied to any living organism. There is no need to learn from other disciplines. The best way of understanding a phenomenon is to build a model about it that can make correct predictions. In doing so, mathematical precision is a supreme

virtue. History does not matter. Rationality in terms of consistency of self-interested behaviour is a foundation stone of economics. Individual preferences are taken as given. Individuals are identical or similar in information processing. The individual is always the best judge of her interests. There is no uncertainty because it does not fit into mathematical models. Scarcity is a central concept. Human decision making and computational capacities are massive or infinite. Technology is given. The focus is always on equilibrium outcomes. Diminishing returns are assumed to model equilibrium processes. The market is the universal context of all human interactions. Financial markets are self-regulating and efficient. Free trade is beneficial for both developed and developing countries. Economic development materializes with the spread of free markets. All welfare recommendations must be Pareto-efficient. All moral issues are reducible to individual preference or utility. Utility-based welfare analysis has universal applicability."

By contrast, the holistic frogs do profound croaking thus: "Economics is the study of a real object called the economy which is a part of human society concerned with the production and distribution of wealth. Ideas in other disciplines regarding psychological and other mechanisms behind human decision making and how institutions work are taken into account to understand economic phenomena. Mathematical models are of limited value when phenomena are more complex. Causal explanation is the purpose of science. Prediction is difficult to make with complex phenomena and non-linear interactions. Being roughly right is better than being precisely wrong. Social sciences should integrate in their pursuit of a common object of enquiry. Understanding of economic history, history of economics and the philosophy of economics are essential. Understanding and questioning of basic assumptions is vital. Humans are not entirely self-interested, even in the business sphere. The rhetoric of rationality is a diversion from the complex analysis of the psychological and other dispositions and mechanisms that drive human behaviour. We are not born with a fixed preference function at birth. Nor do we act as if we had one. Economic phenomena cannot be understood without taking into account the diversity within populations of human characteristics and dispositions. There is uncertainty. Human decision making and computational capacities are highly limited. Faced with complexity, humans use intuition and rules of thumb and they know that others do likewise. Individuals are not identical or similar in information processing. This

is not all. Whether spontaneous or designed, the creation or development of institutions is difficult and costly in terms of time and resources. Innovation and technological evolution matter for economic change. History does matter. There are positive feedback, increasing returns, disequilibrium, cumulative causation, and path dependence. Markets are historically specific social institutions that organize ongoing exchange. They differ by their trading rules and outcomes. Rarely do they emerge spontaneously and they are difficult and costly to create. Financial markets are unstable due to uncertainty and bounded rationality. Without adequate national and market institutions, free trade in practice can result in commercial swamping of nascent enterprise by big foreign corporations. Economic development requires national and other institutions as foundations for economic activity. Individual is surely not the best judge of her interests due to limited access to information and limited cognitive capacities. Neither the individual nor the state should be the uncontested judge of individual welfare. Democratic processes are required for identifying and evaluating real needs. Pareto criterion is not the only standard of welfare. All societies have some moral imperatives that limit rampant individualism. Utility-based models are useless for adequate evaluation of ecological sustainability. Basic needs, egalitarian concerns and problem of limited information do matter in areas of health and education."

It follows from above that the holistic method of inquiry into social reality is not only more comprehensive but also has better sense and sensibility as compared to its individualistic counterpart. In fact, there is no scope for realism at all, *let alone critical realism*, about the economy in the individualistic or atomistic camp. Only fairy tales are concocted.

4. Argumentative Holism

Some holistic arguments as collated in Bose (2020; 2021a and b; 2022) reinforce the above points with some explanatory power apart from unearthing some new points about the pitfalls of individualistic thinking. Consider Gylys (2017), who has highlighted the following criticisms. Individualists have failed to forecast the future of real-world events and so have become the butt of popular jokes.

The individualistic position that collectivities do not exist or that they exist but could be understood through the analysis of the behaviour of their individual members is misleading. "Take, for example, the individualistic model of public choice. Here the presumption is that all participants of public life, beginning with an ordinary voter and ending with an elected politician, are driven by their own personal interests. They have the same motivation as market participants—they are essentially driven only by the search for private gains. The antinomy of this model is evident in two irreconcilable postulates—first, there is the acknowledgement and recognition that public life, with its regime of public choice, does exist; and secondly, the public figures, however, pursue not the goals of the public, but ones of their own private greed. There are no concepts of public life as public goods, solidarity, social capital, free riding in the individualistic models. As such, it is nothing but a bad theory."

The individualists believe in "a universally homogeneous historic reality" reduced to capitalism based on self-interest, private gain and perfect competition. They are "not bothered about the national specificities of the economic life of different countries. They have no respect for the history, culture or institutional arrangements of a country in question. Actually, they have no interest in how a market embedded in a particular social life operates in practice, or how a market is intertwined with social, political, cultural and other aspects of society. The holist approach is better in this regard."

Individualists believe that "the market where private goods (i.e. goods meeting private needs and wants) are produced, is the only productive, effective economic regime. The more the market, the more the economy so much so that economic reality is reduced to the model of a pure market. From this, it is proposed with absolute *certainty* that an unfettered, laissez-faire market can resolve all economic problems and that any collective action or any interventionism will hamper the smooth, elegant, and elastic functioning of the market forces. The natural economic order will be distorted to result in economic losses. Neoliberalism, monetarism, and the Washington Consensus are largely based on this set of beliefs. Their ideologues ignore the public aspects of wealth creation and suspiciously observe all regimes of non-individual governance as unnatural and non-economic. Their eternal, religious belief in spontaneity—the invisible hand—stems from 'naturalistic' thinking that the economy functions like nature. Since the market is the most natural regime, all non-market elements spoil the economy. But this naturalistic premise

contradicts and denies the whole course of historical development as a process of evolving public arrangements and institutions that had helped people to cope with the problems of procurement of security, justice and other public goods. In the same vein, monopoly and monopsony are seen as not natural elements of the market as they do not represent regimes of self-regulation. It is ironic that the individualists prefer private visible hands rather than public ones! No activity can be justified by the individualists if it is not privatized and marketized."

The individualists neglect the "impossible problem of implementing the preconditions of perfect and fair competition even as the real economic market actors are striving exactly for the opposite! Little wonder that such concepts as public goods, public interests and needs, public governance, public finances and the like required to set right the real-world are avoided".

With regard to the theory of the firm, suppose these questions are asked: "Is the business firm a sum of employees, with each of them of equal status? Can we reduce a firm's real activities to the actions of separate individual employees? Are the needs, interests, and goals of an individual employee identical to the ones of the firm? Are the interests of the owner of the firm the same as those of the hired employees? Are they equals, not connected by relations of subordination and domination?" The individualists usually sidestep these questions as the logical answers to these questions do not fit in their individualistic picture of the world. The super individual realities of a firm's performance are not revealed. Also, the socially irresponsible behaviour of businesses is hidden.

The individualists apply their theory to the family: "A family is a market phenomenon. Each marriage should be considered as an exchange between a wife and a husband as entrepreneurs maximizing their own benefits. Such a conception leads to substantial cognitive, practical, social and economic losses. Such a theory is devoid of elements like love, devotion, affection, family duty and responsibility. There is no romantic and spiritual side of family life at all. There is competition and there is no cooperation and solidarity. Family cohesion, norms, rites and traditions, which originate from the family itself and from the communities or societies at large are neglected. The individualists are happy to present us with a parody of the family, instead of analyzing the true family in terms of the combination of the elements of egoism and altruism, and of competition and

solidarity. People who internalize individualistic thinking of family are found to be hardly leading full-fledged family lives, since they put emphasis on competition, not on cooperation between spouses and between family members. Children growing up in such families have amputated souls as domestic altruism, family solidarity, readiness to make sacrifices for the common good of the family and other virtues, are marginalised and neglected. Individualistic thinking has exerted a substantial influence on the instability and unsustainability of families in Western societies. It has led to the loss of the social capital in families, a waste of limited family resources, and consequently, the loss of sustainability and vitality in such social entities."

There is empirical evidence belying a number of ridiculous assumptions underlying individualistic enquiry (Davey, 2015). Individuals do not have independent preferences that give rise to choices. "In fact, individual choices are governed by social, interpersonal or community processes, that is, by group psycho dynamics. Markets do not have all the information that market actors need. The market players do not have God-like powers to make accurate assessments of the future. In fact, the market is almost always shot through with a lack of information and/or information asymmetry. People have so much influence on each other precisely because of the absence of information and the uncertainty in which many economic decisions are taken. They are influenced and swayed by social trends. But for individualistic economists and politicians, there is no such thing as society even as it is now well-known that only collective psychology explains the mentality of bubbles in asset markets and speculation."

Market actors are dishonest. "There is rampant fraud and opportunism, secrecy and misleading accounts of product quality. Speculative manias have exposed such corruption. Instead, we have individualistic models which assume the reverse and they are taught to students."

Perfectly competitive markets (where there is no market power) are glorified for delivering wonderful outcomes like optimal allocation of resources and monopoly power is opposed. But this is paradoxical because "competitive success leads to the weaker companies being driven out and/or taken over by the stronger ones thereby accumulating more monopoly power. Without *Schumpeterian* competition, the Darwinist struggle between businesses does not deliver the benefits advertised in the textbooks, such as,

cheaper products for all. For that reason, some capitalist countries have competition policies and there is policing against secret agreements between companies that restrain trade in favour of higher prices at the consumers' expense. However, a closer examination of some of these policies often reveals that the intended result is the opposite of the stated one. Moreover, the ideology of competition through free trade is intended to clear the field for those companies emerging in the first place and consolidating global dominance. Throughout economic history, the ideology of competition has been used to open up markets to the strongest market players and enable them to accumulate further market power. These are the players who will be most influential in political lobbying in the corridors of power. These are the very private sector players who will be influential to university departments of economics."

The assumption of self-interested and rational economic man ignores the findings of psychologists about what motivates people around the world in different cultures. "There are ten broad categories of human values, viz., universalism, benevolence, tradition, conformity, security, power, achievement, hedonism, stimulation and self-direction. Each of us is motivated by all these ten categories, albeit to varying degrees. In many actions taken by people, we see conflicting interests, self-sacrifice for moral reasons, genuine anguish about their difficult decisions, and doing things because they ought to, not because they give them satisfaction at all. People act altruistically, get depressed, act out of compassion, and do crazy things which do not fit into the individualistic models."

Moreover, "people behave like a herd; they do fear losses more than they do hope for gains; and rarely can our brains process all the relevant facts or information." More importantly, the individualists do not reckon with the real-world people, as neither purely selfish nor purely altruistic. They overlook the historical truth that people "do oblige social preferences by way of mutualistic/altruistic concerns and actions." The latter truth signifies a large solidaristic reality of people not explored by the mainstream frogs (Bowles and Gintis, 2011).

Keen (2011) has argued against the individualistic camp's obsession with equilibrium as follows. This is rather a long sub-story of holism, cut short as follows. "Economics as a discipline arose at a time when English society was in the final stages of removing the controls of the feudal system from its mercantilist/capitalist economy. In this climate,

economic theory had a definite (and beneficial) political role: it provided a counter to the religious ideology that once supported the feudal order, which still influenced how people thought about society. In the feudal system, the preordained hierarchy of king, lord, servant and serf was justified *based on* the divine right of kings. The King was *God's* representative on earth, and the social structure which flowed down from him *reflected* God's wishes. This structure was nothing if not ordered, but this order imposed severe restrictions on the now dominant classes of merchants and industrialists. At virtually every step, merchants were met with government controls and tariffs. When they railed against these imposts, the reply came back that they were needed to ensure social order. Economic theory—then rightly called political economy—provided the merchants with a crucial ideological rejoinder. A system of government was not needed to ensure order. Instead, social order would arise naturally in a market system in which each individual followed his own self-interest. An essential aspect of this market social order was equilibrium. From the outset, economists presumed that the market system would achieve equilibrium. Indeed, the achievement of equilibrium was often touted as an advantage of the free market over any system where prices were set by fiat. Equilibrium was therefore an essential notion of the economic defense of capitalism: the equilibrium of the capitalist market would replace the legislative order of the now defunct feudal hierarchy. More importantly, whereas the feudal order endowed only the well born with welfare, the equilibrium of the market would guarantee the best possible welfare for all members of society. The level of individual welfare would reflect the individual's contribution to society: people would enjoy the lifestyle they deserved, rather than the lifestyle into which they had been born. If instead of equilibrium, economists had promised that capitalism would deliver chaos; if, instead of meritocracy, economists had said that the market would concentrate inequality, then economists could have hindered rather than helped the transition to capitalism (though they more likely would have been ignored). By the middle of the nineteenth century, the transition to capitalism was complete; what was left of feudalism was a mere vestige. But rather than the promised equilibrium, nineteenth century capitalism was racked by cycles and economic disparities of wealth. A major depression occurred roughly every twenty years, workers' conditions would improve and then rapidly deteriorate, prices rise and then fall, banks expand and then collapse. New robber barons replaced the barons of old. It appeared that, while promising a meritocratic equilibrium, capitalism had instead delivered unbalanced chaos. These realities have

continued up to our times. Today, most economists imperiously dismiss the notion that ideology plays any part in their thinking. The profession has in fact devised the term positive economics to signify economic theory without any value judgements while describing economics with value judgements as normative economics—and the positive is exalted far above the normative. Yet ideology innately lurks within positive economics in the form of the core belief of equilibrium…economic theory has contorted itself to ensure that it reaches the conclusion that a market economy will achieve equilibrium. The defense of this core belief is what has made economics so resistant to change, since virtually every challenge to economic theory has called upon it to abandon the concept of equilibrium. It has refused to do so, and thus each challenge…has been repulsed, ignored, or belittled."

Keen's central point, thus, is that what makes individualistic economics different from, and inferior to, other sciences is the shameless "irrational tenacity with which it holds to its core beliefs in the face of either contrary factual evidence or theoretical critiques that establish fundamental inconsistencies in its intellectual apparatus."

Lastly consider the very disturbing argument that the individualistic camp is frighteningly inadequate by being amoral (WEA, 2012; Bose, 2018)

The World Economics Association has exposed not only corruption in the economists' advisory role in terms of conflicts of interest but also, in the aftermath of the 2008 financial meltdown, "the primary fraud in the economics profession—the intellectual fraud that is perpetrated whenever economists arrogantly pretend or presume to know more than they do know, or possibly can know, and when they claim the authority provided to them by their science to dictate how others must live".

Mainstream frogs are found to be indeed working as "hired guns for business interests without revealing their funding". That greed is good is conveyed succinctly by the individualistic-godfather Milton Friedman's quotable quote that the "social responsibility of business is to increase its profits", i.e. profit over people without moral awareness, moral judgement and moral action. This ideology has ruled the roost for long in the name of neoliberalism among the mainstream professional economists of the American Economic Association—the dominant body of mainstream, professional economists—

although the 2008 financial crisis has shown that an economic system (call it unbridled capitalism or self-regulating market economy) that "rewards amoral self-interest, creates economic instability, fractures economic security, fosters concentrations of economic power, exacerbates economic inequality, and violates ecological sustainability. This is the ethical deficit of the individualists in that they have not stopped being apologists for current economic arrangements and they are not explicitly concerned with how ethical issues necessarily intervene between economic means and social ends. Thus, the unmanaged market outcomes have materialized as immoral".

It follows from above that holist frogs are justified in attacking individualistic frogs thus (Syll, 2023): "Stop pretending that we have exact and rigorous answers on everything. Because we don't. We build models and theories and tell people that we can calculate and foresee the future. But we do this based on mathematical and statistical assumptions that often have little or nothing to do with reality. By pretending that there is no really important difference between model and reality, we lull people into thinking that we have things under control. We haven't. This false feeling of security was one of the factors that contributed to the financial crisis of 2008. Stop the childish and exaggerated belief in mathematics giving answers to important economic questions. Mathematics gives exact answers to exact questions. But the relevant and interesting questions we face in the economic realm are rarely that kind. Questions like "Is 2 + 2 = 4?" are never posed in real economies. Instead of a fundamentally misplaced reliance on abstract mathematical-deductive-axiomatic models having anything of substance of real economies, it would be better if we pursued thicker models and relevant empirical studies and observations. Stop pretending that there are laws in economics. There are no universal laws in economics. Economies are not like planetary systems or physics labs. The most we can aspire to in the real economies is establishing possible tendencies with varying degrees of generalizability. Stop treating other social sciences as poor relatives. Economics has long suffered from hubris. A more broad-minded and multifarious science would enrich today's altogether too autistic economics. Stop building models and making forecasts of the future based on totally unreal micro-founded macro models with intertemporally optimizing robot-like representative actors equipped with rational expectations. This is pure nonsense. We have to build our models or assumptions that are not so blatantly in

contradiction to reality. Assuming that people are green and come from Mars is not a good—not even as a successive approximation—modelling strategy."

The holistic frogs are also justified in attacking the individualistic frogs as ethically deficient or willfully harmful people like DeMartino (2022) has revealed thus: "First, well-trained economists contribute to serious or even devastating harm. Only very rarely does public policy benefit everyone. Instead, public policy that benefits some members of society almost always harms others. In communities facing rising unemployment because of trade, people suffer increased morbidity, mortality, violent crime, domestic abuse, alcohol and drug abuse, and social isolation. Yet the vast majority of economists continue to press for free trade. Second, economists have a lot of influence but no control because they face irreparable ignorance. We can't ever know enough to reliably forecast the inflation rate one year out, or the long-term effects of policy. This is because, we simply do not know, and we can't ever know all the causal processes that operate in the social world. We won't ever know all of the relevant background conditions against which those causal processes operate. Even if we knew them today, that knowledge would be obsolete by tomorrow because the world is always changing in unpredictable ways. Policymaking is just one experiment after another. Third, economists are trained to trivialize harm. They are taught that all harms that people suffer from policy decisions, no matter how severe, can be fixed through monetary compensation. This is nothing but fictitious bullshit. For example, economists are taught to use a compensation test to judge policy. It is a simple test which says that a policy is good if those who gain from it gain more than the losers lose. Are the gains greater than the losses: that's the test. Economists do cost-benefit analysis to make the comparison of gains and losses. But is that the right way to decide if it's ok to harm one group of people to benefit another group of people? Would you go to a doctor who looked at you and thought that snatching some of your organs would help someone else more than it would hurt you? Economists get away with making that calculation every day. In that calculation, it doesn't matter if those being harmed are already the worst off in society. In fact, the compensation test doesn't pay any attention at all to inequality. Fourth, economists deny the significance of social harm which does extraordinary damage. The economics profession needs to do better—it should hold up a mirror to society and highlight the irreparable harms of deprivation. Too many economists continue to follow Milton Friedman in dismissing social harm, and that

represents a profound moral failure. Fifth, economists can do better at confronting harm. Some economists today are joining non-economists in revising their thinking and practice around harm. For instance, those working in the new tradition called Decision Making Under Deep Uncertainty (DMDU) are managing the harms that come from public policy far more responsibly than has been the norm in economics. Practitioners who pursue DMDU presume that the future is unknowable—that we often can't predict the effects of policy. So, rather than trying to predict, the approach looks to discover policies that are apt to be robust—meaning policies that will do well enough, regardless *of* how the future unfolds. A second feature of the DMDU is that it empowers stakeholders rather than economists to evaluate policies. The stakeholders—those with skin in the game—are the ones who will wrestle with the question of which risks to take to promote their visions of the future. Instead of a compensation test there's an effort to find common ground among those with different interests and values. Here, those who might be harmed by policy have a direct voice in decision making. This approach does not always work, but neither does the current norm in which economists have unwarranted influence over policy that will cause substantial harm. DMDU represents one path forward for an economics profession that has done poorly facing up to its ethical duties."

5. Post Keynesianism

The Post Keynesian frogs are diverse. It is not easy to talk about them. And yet there are some salient common points that signify them as quintessential and exemplary representatives of holism (Aboobaker et al., 2016; Lavoie, 2014; Murphy, 2024; Keen, 2024).

Social structures or macroeconomic phenomena cannot be reduced to the behaviour of individuals. On the contrary, individuals always act in a certain institutional context which shapes their beliefs and actions, and connects different classes of agents or types of economic units with each other. Social structures and macroeconomic phenomena may exert causal powers that affect human behaviour, which then in turn determines macro-phenomena. Macro-phenomena and institutions might even exhibit emergent properties that cannot be fully explained by aggregating individual actions.

There are macroeconomic paradoxes. The term paradox means that what might seem reasonable for one single person, firm or state can lead to unintended, adverse or even irrational collective behaviour and outcomes when all individuals, firms or states act in a similar way. It is thus important to study macro-phenomena and their properties in their own right, and to look at how they in turn affect individual behaviour.

For example, there is 'Paradox of Thrift' in terms of higher saving rates leading to a reduction in total saving. This happens because when people save, they spend less, therefore businesses realise less revenue and reduce investment. Thereby, aggregate *expenditure and thus* income declines, *as* does total saving. There is 'Paradox of Debt' in terms of efforts to de-leverage leading to higher leverage ratios. This happens because when everybody saves more out of their income to repay debt, aggregate income declines and leverage (debt to equity) ratios rise. And there is 'Paradox of Tranquility' by way of stability *being* destabilizing! This results as a stable economy makes people more optimistic, leading to higher risk taking and higher gross debt-income ratios, which creates instability. These macroeconomic paradoxes are important building blocks of a thorough explanation of the recent financial crisis. The central point is that macroeconomics cannot be built on individualism.

Consumption, investment (residential or educational) and financial/portfolio allocation decisions are often strongly interdependent amongst individuals. Owing to psychological reasons and fundamental uncertainty, individuals compare themselves to others and base their decisions partly on rules of thumb and habits. *Herd* behaviour is at the heart of their explanation of the 2008 financial crisis. Because human behaviour is socially determined, they emphasize the role of different classes (workers, capitalists, rentiers) and institutions in society in shaping social reality. Their institutional analyses, by storytelling, describe the structure, operation and connections of economic institutions and organisations, and what kind of regularities and emergent tendencies arise from their interactions. Collective institutions such as monopolistic and monopsonistic firms, labour unions, wage and credit contracts and government regulation determine economic behaviour. Economic activity in a capitalist economy is demand-determined and there is no built-in-mechanism that guarantees full employment and full utilization of capacities. They build alternative economic theories for analysing the inherent features of modern capitalist economies such as unemployment, financial crisis, business cycles, depression, technological change and

uneven development. It is the task of empirical science to collect and systematize statements about the world that should reflect reality as adequately as possible. Both empirical observation and logic are required to construct good economic theories. *Plausible stories about the real world economic system must start from stylized facts.*

Most Post Keynesian economists subscribe to the idea of achieving a more socially just system, with full employment, low levels of income inequality and high levels of individual freedom. In general, they do not wish to eliminate capitalism but wish to tame it and envisage an economic system which would constitute some middle *path* between liberalism and socialism. Lately, they have started addressing the climate change issues by collaborating with ecological economists and examining the role of energy in production (Keen, 2024; Beker, 2020).

To sum up and reiterate, among the holists, the economic worldview of the Post Keynesian frogs is appealing on three grounds (Aboobaker et al., 2016). First, while Post Keynesians stress the importance of realism--trying to tell relevant stories about the economy, based on facts--individualists follow the view of instrumentalism--which does not care about the degree of reality reflected in their assumptions, as long as they will *permit* precise predictions. Mainstream economists therefore use the concept of a perfect optimising agent. Also known as homo economicus, this concept allows them to make seemingly accurate predictions about the future economy, while not *considering* that humans do not behave like this agent in *the real world.* In contrast, Post Keynesians use the concept of satisficing agents. Like real humans, these follow rules of thumb and make decisions that suit an environment with fundamental uncertainty. Humans are thus social beings living in a complex system of institutions, gender, culture etc. In this view, sensible behaviour by individuals at the micro level can lead to unintended consequences on the macro level. Mainstream economics follows the idea of individualism where individual behaviour is simply aggregated to form a measure of macroeconomic level, ruling out any micro-macro paradoxes.

Secondly, the economic core of mainstream economics is scarcity of resources, namely capital and labour. Therefore, mainstream economists focus on the allocation of these resources and hence view prices as an *index* of scarcity. In contrast, Post Keynesians consider empirical evidence and regard the economy to be generally *operating* below full

capacity. This shapes their view of the economy being in abundance. Their main concern is rather how to employ all the idle labour and capital. They understand prices as indicators of the unit production costs.

Finally, the political core of mainstream economics is based on the belief that unregulated markets lead to an optimal allocation of scarce resources. Post Keynesian frogs, although acknowledging the positive entrepreneurial effects, are highly suspicious of unfettered markets and tend way more toward tight regulation. Kolodko (2014) has endorsed this point. Governments must meddle to prevent situations where "entities willing to take immoral but profitable actions…pay the costs of their own pursuit of the highest possible profit. Would water be clean and grass green if this sphere becomes extremely commercialized and if we allow unbridled market speculation in waste, emission quotas, and particularly, in sophisticated financial derivatives, which is most profitable to some though not very beneficial to mankind as a whole?"

6. Concluding Remarks

We are all like frogs in a swamp croaking about something or the other as if we are the final arbiters. This essay is a sketchy story about how not to be a frog in the well. It has put forward how the economic worldview of the individualistic frogs differs from that of the holistic frogs. With regard to exploring the truth, knowledge and the degree to which we can obtain good knowledge of economic reality, the holists are immensely superior to their individualistic counterparts, in terms of their ontological presuppositions and real-world related theories.

The Post Keynesian frogs among the holistic frogs stand out as economists of the future by being honest, progressive, more socially minded than mathematical, descriptive and normative, pragmatic, heterodox and interdisciplinary, and dynamic (Kolodko, 2014). Both empirical evidence and logical reasoning are in their favour as is eminently demonstrated and coherently advocated, for example, by Komlos (2023). If individualistic microeconomics is replaced by Behavioural Economics and Economic Psychology along with study of imperfect markets, and individualistic macroeconomics by Post Keynesian Economics, it is possible to design social and economic policies that

can transform capitalism to work for the welfare of everyone and planet. It is a feasible dream worth giving to students. And pedagogy based on this dream will also reduce the increasing academic adrift of the students.

Most importantly, if we just *concentrate on* inequality and environmental destruction *as the critical problems awaiting resolution*, we can just heed what Wisman (2024) has argued. The individualistic frogs, albeit unrealistic, do eminently serve the purpose of promoting a particular ideology. They have predilection for laissez-faire ideology the rhetoric of which makes the following claims: the government is incompetent and corrupt and must be minimized; the economy should be deregulated to let businesses and households freely pursue their own interests in unfettered markets; taxes, especially on the rich and corporations should be cut to stimulate investment and economic growth; welfare, including unemployment benefits and social security, must be eliminated to force the unemployed to seek jobs and poor workers to work harder and longer and responsibly save for retirement; in a free market economy, meritocracy rules such that all get their just rewards—the rich earn their wealth and the poor their poverty.

Such an ideology needs to be delegitimated in the current economic world of extreme inequalities wherein democracy is rapidly being eroded by the polarization of politics resulting from extreme inequality. Wealthy elites (billionaires and multimillionaires) are using the free market ideology to increase their political muscle to further undermine a weakened democracy that increasingly resembles a plutocracy. They do so because, in principle, democracy can lead to public policies that reduce, even dramatically, their wealth, income, and privileges. It is this threat that throughout history has led elites to oppose sharing political power with those below. This is not all. The death of democracy has many deleterious effects on society. It enables public policies that would further increase inequality and degradation of life conditions for non-elites. It also impedes implementation of the measures necessary to avoid ecological Armageddon, arguably the greatest challenge humanity has ever faced. Wealthy elites oppose environmental measures because they would not be in their short run interests. Consequently, they use their disproportional political power to stymy implementation of such measures. With continually weakened democracy or its disappearance, the necessary ecological measures are not likely to be enacted.

In light of this, the road ahead for humanity is forked. In one direction, the robust survival of laissez-faire ideology of the individualistic frogs takes us toward the death of democracy and environmental Armageddon; the other follows a path toward an alternative vision of employment security, freedom, and democracy in the workplace, dignity, and renewed community. It is a vision that conforms to what the Post Keynesian frogs call socially progressive or humanistic capitalism.

In the Indian context, the National Education Policy 2020 wants education to play the role of promoting higher order skills of critical thinking and problem solving in conjunction with enhanced social and emotional skills, not just basic cognitive skills among students. This means that economic education in the country, dominated by individualism-based curriculum must be replaced by holist perspectives. But such curriculum change is conspicuous by its absence.

This essay is, therefore, a plea to the economics teachers and their students and the authorities in charge of curriculum to abide by and ardently press for the holistic search for truth and knowledge to solve at least the problems of the real world such as inequality crisis and ecological doom.

The inspiring conclusion in general that follows from this essay is owed to Lagardien (2014) thus: “We owe it to our students, the next generation of leaders, to provide an education that opens their minds, and give them instruments with which to reach their own conclusions. This means we should, first, not produce clones of ourselves and, second, expose students to ways of thinking that will question and undermine the processes that have produced the vast inequalities in society, and the overall iniquities that poverty, unemployment, violence and marginalisation produce. To do so, we may have to break the existing frames of instruction and reevaluate the curricula we teach. Nowhere is this more necessary than in economics. Any intellectual challenges to the orthodoxy that underpins the discipline have tended to provoke the ire of those who benefit most from the status quo, or the reproduction of dominant ideas.”

It is desirable that our students should aspire to be economists in the spirit of what John Maynard Keynes had said thus: “If economists could manage to get themselves thought of as humble, competent people on a level with dentists, that would be splendid.”

Students should not be kept in the dark about the ontology, epistemology and methodology of the standard economics they are learning and of the Post Keynesian Economics they ought to learn.

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References

- Aboobaker et al. (2016). Post-Keynesian Economics. *Exploring Economics*. December https://www.exploring-economics.org/en/orientation/post-keynesian-economics/
- Akinbi, Ayokunle Mathew (Undated). *Frogs on a Swamp, Kids Bedtime Story Book*. Kindle Edition. https://www.youtube.com/watch?v=KFkvKVVRLcE
- Asch, S.E. (1952). *Social Psychology*. Prentice-Hall.
- Beker, Victor A. (2020). *Alternative Approaches to Economic Theory: Complexity, Post Keynesian and Ecological Economics*. Routledge.
- Bellido, Francisco J. (2024). The Research Programme of Methodological Individualism: Back to Its Foundations. *Journal of Philosophical Economics*. 17. Annual Issue.
- Bose, Annavajhula J.C. (2018). Moral Failure in Economics: Journey Toward Feminizing Alternatives? *Management Today*. 8 (2). April-June.
- Bose, Annavajhula J. C. (2020). Amoral and Chaotic Economics Profession, in www.ecosocsrcc.com, January 25.
- Bose, Annavajhula J. C. (2021a). The Neoclassical Imagination, in www.ecosocsrcc.com, June 29.
- Bose, Annavajhula J. C. (2021b), Cognitive Frameworks in Economics, in www.ecotalker.wordpress.com, October 21.
- Bose, Annavajhula J. C. (2022). *Economic Stories for Undergrads: More than an Education*. Orange Books Publishing.
- Bowles, Samuel and Herbert Gintis 2011. *A Cooperative Species: Human Reciprocity and Its Evolution*. Princeton University Press.

- Bresser Pereira Luiz Carlos (2003), Economics' Two Methods, Paper presented at the European Association for Evolutionary Political Economy, 15th Annual Conference. Maastricht. November 7-10. https://www.bresserpereira.org.br/papers/2005/05.3.TwoMethods.i.pdf
- Bunge, Mario (2000), Systemism: The Alternative to Individualism and Holism. *The Journal of Socio-Economics*. 29.
- Davey, Brian (2015), *Credo: Economic Beliefs in a World in Crisis*. FEASTA Limited.
- DeMartino, George F. (2022). *The Tragic Science: How Economists Cause Harm* (Even as They Aspire to Do Good). The University of Chicago Press.
- Gylys, Povilas (2017). On the Irrelevance of Methodological Individualism. *EKONOMIKA*. 96 (1).
- Hodgson, Geoff (1986). Behind Methodological Individualism. *Cambridge Journal of Economics*. 10.
- Hodgson, Geoff (2025). https://www.geoffreymhodgson.uk/what-is-wrong-with-mainstream economics#:~:text=The%20history%20of%20economics%20is,than%20a%20narrative%20of%20mistakes.
- Keen, Steve (2011), *Debunking Economics: The Naked Emperor Dethroned?* Zed Books.
- Keen, Steve (2024). *Rebuilding Economics from the Top Down. Budapest Centre for Long Term Sustainability*.
- Kolodko, Grzegorz W. (2014). *Whither the World: The Political Economy of the Future*. Palgrave Macmillan.
- Komlos, John (2023). *Foundations of Real-World Economics*. Third Edition. Routledge.
- Lagardien, Ismail (2014). Help Students Challenge Economics. Mail & Guardian. *Africa's Better Future*. March 7.
- Lavoie, M. (2014), Post-Keynesian Economics: New Foundations. Edward Elgar.
- Lawson, Tony (2012). WEA Interview with Tony Lawson on Ontology. *World Economics Association Newsletter*. 2 (4). August.
- List, Christian and Spiekermann, Kai (2014). Methodological Individualism and Holism in Political Science: A Reconciliation. *LSE Research Online*. July. https://eprints.lse.ac.uk/53455/1/List_Spiekermann_Methodological-individualism-and-holism-in-political-science_2013.pdf
- Maki, Uskali eds. (2001), *The Economic Worldview: Studies in Ontology of Economics*, Cambridge University Press.
- Mcleod, Saul (2024), What is Cognitive Dissonance Theory?, *Simply Psychology*. October.
- Murphy, Richard (2024). Macroeconomics Cannot be Based on Microeconomics. Funding the Future. UK. https://www.taxresearch.org.uk/Blog/2024/08/22/macroeconomics-cannot-be-based-on-microeconomics/
- Nandipati, Snigdha (2022), The Well Frog, Medium, January 27. https://medium.com/a-case-of-culture/the-well-frog-f7d89cf5834b
- Neck, Richard (2022), Methodological Individualism: Still a Useful Methodology for the Social Sciences?, *Atlantic Economic Journal*, 49 (4). March 21.

- Syll, Lars P. (2023). *The Poverty of Fictional Storytelling in Mainstream Economics*. World Economics Association Books.
- Tzu, Chuang and Palmer, Martin (2006). *The Frog in the Well. The Book of Chuang Tzu* (Zhuangzi). Penguin.
- WEA (2012). Conference on Economics and Society: The Ethical Dimension. World Economics Association.
- Wisman, Jon D. (2024), The Urgent Need to Delegitimate Laissez-Faire Ideology, in Komlos, John eds. *Neoliberal Economic Policy and the Rise of Right-Wing Populism: Western Civilization at the Crossroads*. Palgrave Macmillan.

Climate Action and Sustainable Development

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Abstract

Sustainable Development Goals (SDGs) are development goals to be attained with attention to sustainability in terms of inter-generational equity. The human development gap between developed and developing countries is large. Associated with this is the larger per capita ecological footprint[2] of the developed countries compared with the developing world though the aggregate emission of High-Income Countries (HICs) is declining. The HICs have larger international spillovers which pose a serious threat to sustainable development. This paper asserts that the high Human Development Index (HDI) and SDG scores of the HICs have been achieved at the cost of a large per capita carbon footprint and high international spillovers thus imposing a huge cost on the environment. Therefore coordination between the sustainability and climate action in a synergistic manner is essential to attain all the SDGs.

Key words: SDGs, Climate Action, Ecological Footprint, International Spillovers, GHGs

JEL classification: Q54, Q56

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[2] Ecological Footprint (EF) is defined as the difference between *how much nature we have* and *how much nature we use* (GFN, 2024). It measures the gap between the rate of consumption of resources and generation of waste and the rate of absorption of this waste and the ability of nature to regenerate itself. It is a measure of the amount of land needed to provide for a country's consumption and waste disposal. It measures the impact of human activity on nature (Radasci and Szigeti, 2024). This also includes the emissions of Green House Gases (GHGs) comprising carbon dioxide, methane, nitrogenous oxide and Flouride-based gases. Ecological deficit occurs when countries use more nature than what their ecosystems can regenerate or the bio-capacity. Further, they also consume resources of other countries reflected in International Spillovers. EF is measured in global hectares per person (gha/person) or in terms of the Number of Earths. The GFN notes that humans live on an average as if there are 1.7 Earths available and resource demand far exceeds the Earth's capacity for biological regeneration.
(https://www.footprintnetwork.org/ (accessed in April, 2025)

1. Introduction

"We may choose to deglobalize, but we cannot deplanetize".

Human Development Report (2023-24, p. v)

The United Nations (UN) member countries adopted 17 Sustainable Development Goals (SDGs) in 2015 to be achieved by 2030. The aim was to achieve economic development with social inclusion and environmental sustainability. Agenda 2030, though not legally binding, is a road-map of development based on a human rights-based approach. The 17 goals are dis-aggregated into 169 quantitative and implementation targets, tracked by measuring the performance of more than 240 indicators as part of the Global Indicator Framework. The SDGs are an inter-governmental agreement of what development ought to mean for people around the world by making it inclusive, green, fostering global partnerships, sharing technology, funds and building local capacities and resilience. The guiding principle of SDGs is to 'not leave anyone behind' and that there is no plan B because there is no planet B.[3] SDGs are development goals to be attained with attention to sustainability in terms of inter-generational equity. Human development aims to enhance well-being in all its forms - economic, social, environmental and political to assure the freedom to choose. It is essential to understand that the goals are not numbered in the order of importance. Rather, the framework recognizes inter-dependence and intersectionality among the goals. This implies that the non-attainment of even a single goal will derail the plan. The SDGs aim to provide all humanity a life of dignity and equity based on sustainable production and consumption. Unfortunately, the Sustainable Development Report (SDR, 2023) notes that the SDGs are off track; only 17 percent of the goals are on the path towards success. Multiple geopolitical conflicts, the aftermath of the pandemic, diversion of funds and climate change have jeopardized the sustainability of SDGs. Associated with this is the larger per capita ecological footprint of the developed countries even though their aggregate emissions as a group are on a decline. The movement towards environmental sustainability is slow. While the per capita footprint is small for larger emerging economies like China and India, their aggregate emissions are rising with the highest rate in India. The HICs also have larger international spillovers which extend their carbon footprint beyond national boundaries. Globalization,

[3] UN Secretary General, Ban Ki-Moon's statement in 2014 before the Climate Summit of 2014.

fragmentation of production and integration via global value chains also increase the generation of spillovers.

The HICs have high HDI and SDG indices but this comes at the cost of a larger carbon footprint[4]. The HICs consume immense global resources to cater to their wasteful consumption. They rely heavily on fossil fuels to power energy-intensive lifestyles. In contrast, low middle income and low income countries (LMICs and LICs) have lower SDG and HDI scores and smaller per capita ecological footprints. Past the half-way mark of achieving the time-bound Agenda 2030, the hiatus between HICs and LICs in terms of quality of life remains the same. Obviously, prosperity since the early 1990s has not trickled down anywhere. This is exacerbated by environmental degradation which inflicts an asymmetrically larger adverse impact of ecological damage on LMICs and LICs. These gaps will continue to persist if corrective climate action is not addressed seriously by all the countries.

Section 2 traces the history of SDGs and establishes the synergy between the SDGs and climate action. It provides evidence that the HICs have achieved their high standards of living at an immense cost to the people the world over especially the poor countries. Further, growth in the emerging economies and LICs has a huge ecological cost manifest in health crises, food shortages, droughts and floods. The loss of lives and livelihoods is borne more by the LICs which ironically have the smallest per capita carbon footprint. The SDGs can be sustainable only if production and growth objectives are scaled down in favour of distribution, poverty alleviation and provision of decent work and gender equality. Reliance on technology to overcome the loss of natural capital by man-made capital reflects a flawed understanding of SDGs (Pelenc, 2015). For growth to be inclusive, green and resilient, cooperation and policy coherence between developed and developing countries on technology, funds[5] and human capital formation is seen as 'global imperatives' (IMF 2019, 3).

[4] In 2022, 70 per cent of GHG emissions comprised fossil CO_2 emissions. The EU has reduced its share since 1990 from 14.8 per cent to 6.7 per cent. However, their per-capita shares remain large (Crippa et.al. 2023; EDGAR, 2023).

[5] Mohieldin et al. (2023) note that LICs have 8.4 per cent of world's population and less than 1 per cent of world's investment. LMICs have 42.9 per cent of word's population and only 15 per cent of world's investment spending. On the other hand the HICs have only 15.8 per cent of world's population and have more than 50 per cent of world's investment spending.

Section 3 speaks of synergizing climate action and sustainability. Section 4 concludes the paper.

2. Climate Action for Sustainability of SDGs

2.1. The Context

The SDGs define development as a multi-dimensional concept. Development is not confined to higher per capita incomes and higher rate of economic growth but includes the social, economic and environmental aspects in simultaneity. The yearly progress across the SDGs by regions and individual countries are traced in the Sustainable Development Reports (SDRs). More recently SDR (2023) observes that the SDGs are "seriously off-track" and the gains made between 2015 and the start of the pandemic have been considerably lost, aggravated by geopolitical tensions and conflict as well as climate change (SDR 2023, p. vi). It further notes the rise in inequalities between the rich and the poor countries reflected in the performance of the multi-dimensional SDGs. The only countries which have made significant gains in terms of the individual and aggregate SDG scores and have the top ranks out of a set of 193 countries are the high income countries (HICs). However, these countries have performed poorly on the environment-related goals comprising the SDG 12, 13, 14 and 15[6] even though the rich developed countries control 85-90 per cent of the global fiscal outlays and investments. This demonstrates that rich countries continue to control and spend larger amount of global resources on their material welfare to the exclusion of the poorer nations.[7] The low middle income countries (LMICs) and low income countries (LICs) have borne the largest brunt of environmental degradation in terms of food crisis, precarious survival and loss of employment opportunities, higher incidence of heat waves, droughts, wildfires and loss of biodiversity and extinction of many species in oceans and on land which has implications for the well-being of people in the developing countries especially the coastal communities. These countries face severe fiscal constrains to cope with these crises and have limited capacity to borrow.

[6] Appendix A presents the list of the 17 SDGs.
[7] Mohieldin et al. (2023) note that LICs have 8.4 per cent of world's population and less than 1 per cent of world's investment

The Human Development Report (HDR, 2023-24) notes that "inequalities in Human Development Index (HDI) values—which measure a country's health, education and standard of living—are growing between countries at the bottom and countries at the top of the index" especially in the post Covid-19 world (HDR,2023-24, p. v). Also, the aggregate SDG and HDI indices for the rich countries are positively related. The scores for individual SDGs are also directly related with the other goals, which imply that the attainment of one goal reinforces the attainment of other goals. The only exception are the scores for the environment related goals, SDG 12 and 13, and the international spillovers in trade. Further, the SDR (2023) notes that the SDG index gap between HICs and LICs for in the year 2015 and for 2022 is unchanged at 28 percentage points and is projected to increase to 29 percentage points in 2030. It also projects that global warming at 0.3 degree Celsius per decade will cross the upper limit of 1.5 degree Celsius to 2.8 degree Celsius by 2100.[8] Further, decline in bio-diversity, extinction of species, industrialization, excessive use of fossil fuels, urbanization with the associated urban sprawl and rise of slums, deforestation, loss of marine life especially fish stocks due to over-fishing, plastic pollution in oceans and seas, presence of micro-plastics in all of marine life and our food chains, food wastage and reduced access to food and inadequate nutrition all result in under-nutrition, malnutrition, wasting, stunting and anaemia especially in women and children in LMICs and LICs. This affects provision of quality education and learning and deficient access to digital technology as was experienced during the pandemic in developing countries. All this makes international, regional and local cooperation imperative to build human, business, social, urban, cultural and natural capital.

In terms of green house gases (GHGs) emissions, the aggregate CO_2 emissions per annum form 70 per cent of GHG emissions. The US, India and China have the largest share in these emissions (Richie et al., 2023[9]). Food sector contributes 26 per cent to global GHG emissions (Richie 2019). A 43 per cent reduction in GHGs emissions has to be achieved by 2030, 57 per cent by 2035 and Net Zero[10] target by 2050[11] to keep the rise in temperatures below 1.5 degree Celsius (Emissions Gap Report 2024). The rate at which the sea levels are rising has doubled over the past ten years. It is predicted that the GHG

[8] SDR (2023, p. 4)
[9] https://ourworldindata.org/co2-and-greenhouse-gas-emissions (Accessed April, 2025)
[10] Net Zero implies that the GHG emissions especially CO_2 should be limited to only as much that can be removed or stored in the nature and therefore reduces it to zero levels in the atmosphere.
[11] https://www.un.org/en/climatechange/net-zero-coalition (Accessed in April, 2025)

emissions will lead to a change in weather patterns and all life on land and in water shall be affected by it. The current plans and pledges regarding climate action will only manage to reduce GHGs by 2.6 per cent by 2035 as against a target of 43 per cent. Sixty-three per cent of GHGs come from the US, China, India, Brazil, Russia and the EU, 77 per cent come from G20 nations and 3 per cent is contributed by 45 least developed countries (EGR, 2024). The poorer nations are 15 times more vulnerable to the ill-effects of climate change.[12] These changes have drastic consequences for increased conflict due to global shortages of water and food, loss of gainful work and decline in human productivity, mass migrations, increased vulnerability of the poor especially women and children, loss of human and non-human lives and unprecedented loss of bio-diversity and extinction of species. The worst affected are the LICs and the poorest in all countries. The health sector is particularly vulnerable to the ill-effects of climate change; a paltry 2 per cent of multilateral finance for climate change is earmarked for health projects. The energy sector[13] contributes 75 per cent of GHGs to the atmosphere. Climate change is singularly responsible for multiple crises like wildfires, heat waves, droughts and floods affecting sustenance, health and food security of 3.6 billion people living in vulnerable regions. Acidification and eutrophication of water bodies and deforestation with destruction of bio-diversity are also anticipated. During 2010-2019 there has been a rise of forest fires, droughts, floods and hurricanes across the globe and the decade witnessed maximum warming up the world over (UN, dept of global communications 2023).

2.2. Early Warnings

An early and serious warning regarding climate change was made in the 1970s in the *Limits to Growth* [LTG] which noted that the natural resources would deplete faster than their rate of regeneration (Meadows et al. 1972). This was reflected in the acceleration of global production and consumption since the 1950s. This warning was not taken seriously. The pursuit of high growth and a simultaneous ecological degradation continued unabated. Further, the benefits of growth were appropriated by the top one

[12] https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health (Accessed April, 2025)
[13] Energy sector includes emissions from fossil fuels, manufacturing/industry, electricity generation, heat production, transportation, construction and buildings. (https://www.wri.org/insights/4-charts-explain-greenhouse-gas-emissions-countries-and-sectors). (Accessed in June 2025)

percent of the global population in developed and developing countries. This resulted in the increase of the ecological footprint beyond the bio-capacity and planetary bounds of the ecosystem (GFN). Economic inequality had been criticized and redistribution underlined by the LTG. The UN Conference on the Human Environment in Stockholm in1972 followed by the Brundtland Conference of 1987, the Rio conference of 1992 and the adoption of the Millennium Development Goals (MDGs) in 2000 to be attained by 2015 derive their essentials from the LTG. The Paris Agreement (2015) was a legally binding commitment on part of the countries to keep the rise in global temperature to less than 1.5 to 2 degrees Celsius above the pre-industrial levels. By 2015, the MDGs had impacted poverty and hunger, increased access to quality education and health but the struggle for attaining gender equality, ecological restoration and many other targets were far from complete. This was then rolled over into a more elaborate set of 17 SDGs adopted in 2015 to be achieved by 2030. The 17 SDGs are listed in Table A1 in the Appendix.

The SDGs also aim to create strong institutions to ensure good governance and rule of law. It resolves to forge global partnerships to reduce poverty, hunger, fear, violence, disease and discrimination and achieve peace, justice, inclusion and prosperity for all by keeping human activity within the planetary bounds. To assure physical and mental well-being for all requires commitments on part of the rich nations towards the poor nations. SDR (2023) has already declared that the SDGs may not be achieved by 2030. If the goals have to be realistically achieved, despite the effects of geopolitical conflict and wars, the after-effects of Covid-19 pandemic and climate change due to unsustainable GHG emissions, action has to be taken now to attain net zero emissions target by 2050. Since 1950 the rate of growth of global output has accelerated at an unprecedented pace compared to a stable rate between 1750 and 1950 (Dasgupta et. al. 2021). This has been associated with a decline in natural resources, a rise in human and physical capital and an increase in GHG emissions made up of carbon dioxide, methane, nitrous oxide and flouride-based gases (Managi and Kumar, 2018). There arises ecological deficit as a direct conflict between growth and environment or the bio-capacity. The latter provides resources as well as absorbs the waste generated by human actions. There is a need to limit growth as the natural resources available to humanity are far short of the demand being made on these resources, which the resource economists call as the age of sixth

mass extinction or the Anthropocene era. This is different from the previous events of extinction because it is due largely to human activity and "unsustainable use of land, water and energy use and, climate change".[14]

The SDGs are a timely reminder to de-grow, de-couple, pursue circularity and adopt mitigation and adaptation measures, and cope with the loss and damage that has already been occurred to avoid unfavorable consequences of over production. It is of essence to preserve the endurance of people at the bottom of the pyramid and protect them from food shortages and loss of work opportunities particularly in the developing world associated with the destruction of life and bio-diversity in marine resources and on land mainly to augment food production. It is anticipated that the effects of climate change are and will be asymmetrically borne by the developing world even though their per capita emissions of GHGs is negligible. Notwithstanding the low per capita share of GHG emissions the aggregate emissions are high and rising for China and India.

3. Create Synergies between Climate Action and the Sustainability Agenda

Climate change involves a change in weather patterns, rise in sea level and extreme natural events like floods, droughts and cyclones. The main cause of climate change is the increase in GHGs[15] due to human action, which has attained historically high levels. These actions include livestock farming and food production which entails increased mechanisation and irrigation, intensive fertilizer use, conventional energy and water resources and wastage in consumption. Processed foods lead to dependence on energy and water resources. Energy-intensive manufacturing and nonviable architecture requires artificial cooling and heating increasing the GHG emissions. It is predicted that temperatures will exceed 1.5 degrees Celsius by 2035 and we shall experience warming of 2.5 degrees Celsius by 2100.[16] This has been singularly responsible for the rise in temperatures above the pre-industrial levels to more than 3 degrees Celsius within this century.[17] It is predicted that many countries will suffer heat waves, floods, droughts and

[14] https://www.worldwildlife.org (2023, p. 2) (accessed in April,2025)
[15] These comprise carbon dioxide, methane, nitrous oxide and fluorinated gases.
[16] https://www.un.org/sustainabledevelopment/wp-content/uploads/2023/08/2309739_E_SDG_2023_infographics-13-13.pdf (accessed in April, 2025)
[17] https://www.un.org/sustainabledevelopment/climate-action/ (accessed in April, 2025)

loss of bio-diversity.[18] The brunt will be borne more by the poorer nations. Of the fifteen cities predicted to be the hottest globally, 10 will be in India and 7 of these in the Vidarbha region of Maharashtra. There is a pressing need for Climate Action to aim for clean technologies and make economies more resilient to the effects of GHG emissions. The imperative is to reduce carbon emissions and pursue the SDGs in a synchronised manner to address issues related to climate change to successfully achieve sustainable development in all its dimensions. Climate change is perhaps the biggest threat and in urgent need of concerted attention of all governments, policy makers and members of the society, else it is a potential threat to long term sustainability of people and the planet. Previous efforts to address global warming go back to the UNFCCC of 1992 followed by the Kyoto Protocol of 1998 and the meeting in Copenhagen in 2009. The last one bound the members to restrict global warming to an average of less than 2 degree Celsius and made them commit funds towards addressing and minimising the loss and damage and mitigation and adaptation. Not all impact of climate change can be either prevented or adapted to. Loss and damage centre on economic and non economic losses. The former comprises loss of infrastructure, businesses, property and livelihoods, and the latter deals with displacement of communities and cultural losses. These efforts culminated in the Paris Agreement of 2015 which is an international legally binding agreement, signed by 198 countries, with a commitment to contain the rise in temperature to below 1.5 degree Celsius above the pre-industrial levels.

The production and consumption ecosystems directly impact the extent and the nature of climate change and climate action thus comprises mitigation and adaptation efforts with the support of necessary and effective institutions and global partnerships in sharing funds and green technology with developing countries to facilitate their transition to low-carbon systems. Climate Action involves three outcome targets of the need to build capacity and resilience, integrate this goal into national policy and planning and develop institutional capacity via human capital formation and education. The onus of achieving SDG 13 rests more on the rich and the developed countries who have committed funds and technology with appropriate capacity building support to the developing countries so as not to leave

[18] The year 2023 was recorded to be hottest year and the subsidies for the use of fossil fuels exceeded $1.5 trillion in 2022 due to the pandemic and the conflict between Ukraine and Russia (SDR, 2024).

them behind. The latter are highly vulnerable to the perils of climate change even though historically they have the lowest per capita carbon footprint.

Many SDGs affect the attainment of Climate Action. They include SDG 7 on clean and affordable energy, SDG 11 on sustainable cities, SDG 12 on responsible production and consumption and SDGs 14 and 15 on life below water and life on land respectively. There is a need to evolve clean and renewable energy policy across the globe, reduce the use of biomass for fuel and timely transfer of low-carbon technologies to the developing and LICs for which the provisions of sufficient climate finance is imperative. However, in COP 29 held in Baku only $300 billion annually in climate finance was committed by developed countries for helping the developing countries. With the rise in migration, both intra- and inter-country, there is a need for secure, affordable and climate friendly housing and provision of public transport systems to create safe space particularly for women and children and avoid mushrooming of slums. There is also a need for judicious use of material and natural resources while ensuring sustainable and inclusive growth and development of infrastructure and employment or decent work. There is a need to move to a circular economy and reuse, reduce, refuse, refurbish and recycle to reduce material and carbon footprint. The UNFCCC notes that developing countries need $6 trillion for their climate action adaptation and mitigation plans by 2030 (SDR 2024).

Climate change has hastened the loss of bio-diversity on land and in water and impacts the earning capacity of mostly low-wage women workers in coastal communities. Marine pollution caused by leakage of plastics and other forms of litter has led to a rise in micro plastics in our food chain. Deforestation due to pressures of growing food and rearing livestock has also accelerated the loss of species and bio-diversity. Agricultural practices and increase in the livestock have resulted in the rise in GHGs especially methane and brings into focus the need for effective institutions, incentives and innovations to pursue and evolve sustainable and resilient agricultural practices (Gulati and Juneja, 2021). Sustainable development aims to increase people's well-being and raise opportunities to allow them to acquire capabilities and have the freedom to choose a life they value. This directly depends on the pace of growth and creation of decent work which in turn have implications for reduction in poverty, inequality and hunger. The pursuit of relentless growth has resulted in a crisis of over-production in the presence of poverty and inequalities which constrain demand. Overuse of resources with direct impact on GHG

emissions in the use of energy and capital, knowledge and skill-intensive technologies in turn has an adverse impact on climate and causes extreme weather conditions including floods, cyclones and droughts and an increment in temperatures which threaten the food security of the vulnerable poor in developing countries. The latter have limited foreign exchange reserves to rely on food imports. Increase in heat and droughts are bound to make a large mass of people food-insecure in terms of decline in availability, entitlements and nutrition leading to health issues like stunting and wasting, malnutrition, under-nutrition and anaemia especially in women and children. Unsustainable production and agricultural practices lead to an overuse of scarce ground water, fertilisers and pesticides and dumping of industrial effluents result in water pollution. This adversely impinges on the goal of providing clean water and sanitation. Climate change and global warming makes the poorer nations vulnerable to droughts, floods and affects the availability of drinking water. It also affects the productivity of people in the regions experiencing extreme heat. The SDGs on good health and well-being and access to quality education can contribute in providing solutions to climate crisis. Provision of quality education helps create skills and knowledge to address these crises.

Climate change mitigation and adaptation to attain sustainable development are global public goods. This requires all the rich countries to come forward and partner with the poor nations in sharing technology, funds, expertise and help build local capacity and exploit local knowledge systems. Efforts of one country to successfully combat GHG emissions are not sufficient to curtail overall global level of emissions unless other countries follow suit because the latter's emissions will not be confined within their geographical bounds and will substitute for the control of emissions by the focus country. There is thus a need to follow a systemic approach to mitigate climate change effects and ensure equity and well-being for all in an inclusive and a sustainable way.

It is estimated that timely action can curtail 250,000 extra deaths per annum due to heat and water borne diseases between 2030 and 2050 (UN Climate Action Fast facts). Mitigation of GHGs due to better and sustainable transportation facilities, food systems including packaging and distribution and shift to alternate, renewable energy is expected to contribute to large physical and mental health benefits and major financial savings to the tune of $ 8 billion per day.

Transformative changes in all ecosystems with the use of cleaner and less energy-intensive industry and agriculture technologies, renewable energy sources, green public transport options and climate smart agriculture is the imperative that has to be adopted to attain inter-generational, sustainable and resilient development. Barbier and Burgess (2020) and Jackson et al. (2019) argue that fossil fuel subsidies and fertiliser and irrigation subsidies should be redirected towards provision of clean water and sanitation and clean energy. Climate finance to developing countries has to increase from the average US $ 803 billion in 2019-20 to an aggregate of US $ 6 trillion by 2030.[19]

3.1. Data, Methodology and Empirical Results

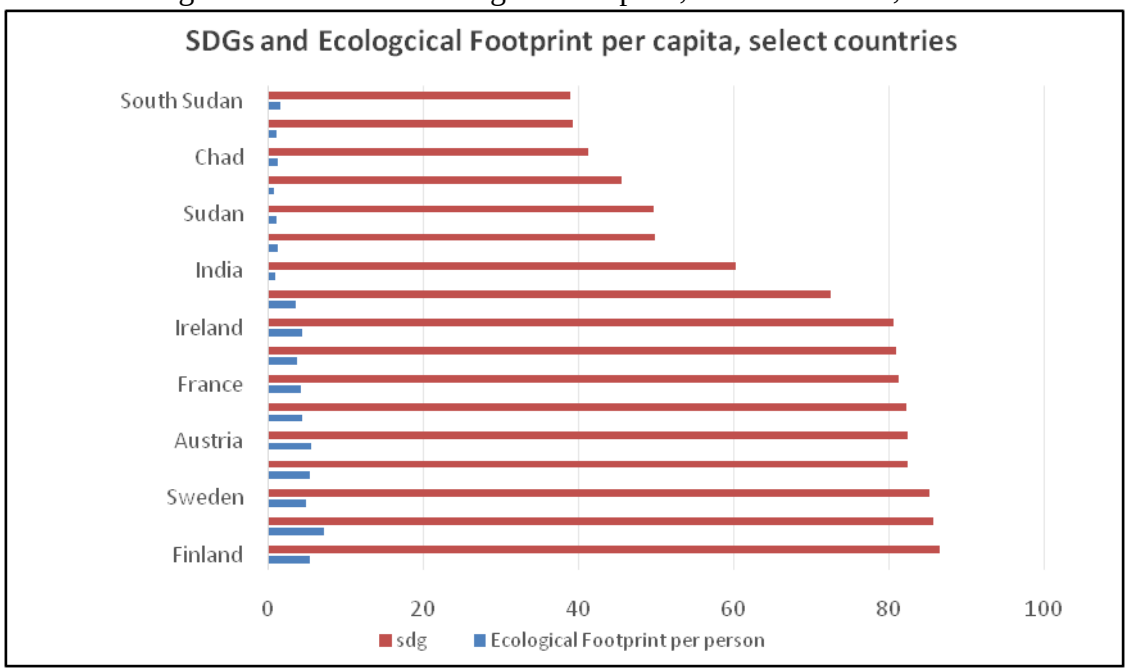
The SDG dashboard[20] provides data on all the aggregate and individual SDGs, by countries and by regions. We look at the relation between the overall SDG score with ecological footprint for a select group of countries given in Figure 1. It shows that countries with lower SDG scores have a lower per capita footprint and the top SDG scoring countries have a larger per capita footprint. Hence there is greater resource and energy intensity of economic activity in top ranking countries. Radacsi and Szigeti (2024) note that LICs have the lowest aggregate and individual SDG scores exacerbated by poor infrastructure and weak governance structures (SDG 16) excepting SDGs 12 and 13. The HICs have high aggregate and individual scores except for the SDG 12 and 13. Next we compare HDI with planetary adjusted HDI[21] and aggregate SDG index with SDGs 12, 13, 14 and 15 across regions. We also look at the inverse relation between the aggregate SDGs score and international spillover index. All the results are presented for geographical regions and also by countries classified according to income levels - HICs, LMICs, HMICs and LICs.

Figure 2 shows that the gap between SDG 12 and 13 between the LICs and HICs is the largest suggesting that LICs have higher achievements on these two goals compared to HICs which have not managed to contribute to climate action and reduce their carbon

[19] https://www.un.org/sustainabledevelopment/wp-content/uploads/2023/08/2309739_E_SDG_2023_infographics-13-13.pdf (accessed in April, 2025)
[20] Data source: https://dashboards.sdgindex.org/downloads (accessed in April, 2025)
[21] In an ideal scenario where there are no pressures on the planet, the PHDI equals the HDI. However, as pressures increase, the PHDI falls below the HDI. In this sense, the PHDI measures the level of human development when planetary pressures are considered.

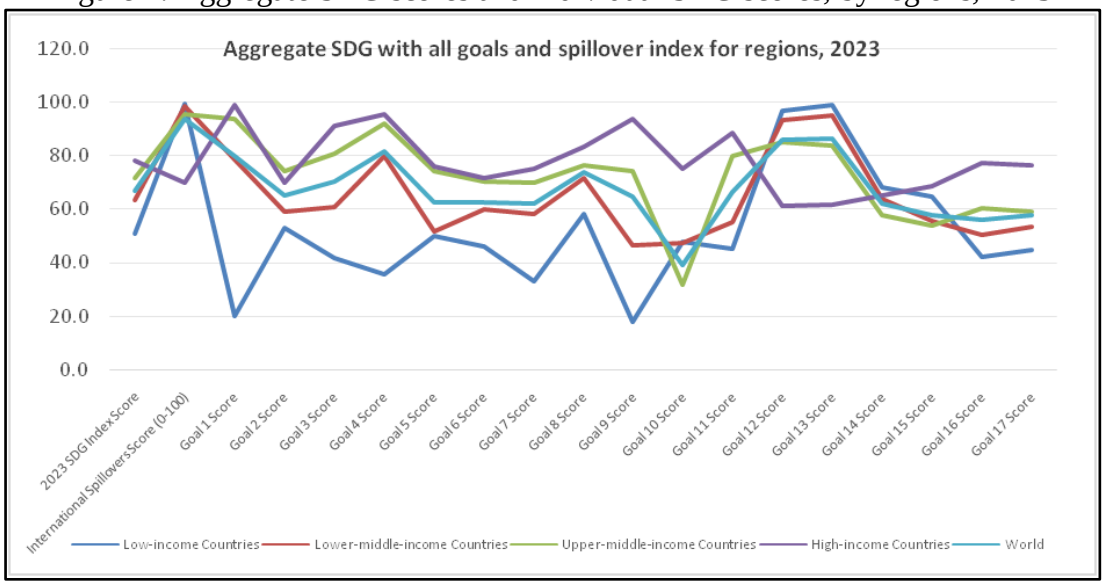
footprint. Both Figures 3 and 4 show the environment related SDGs which show the same pattern of the lowest SDG 13 scores for OECD and HICs and Figure 4 shows the pattern very clearly that regions with highest SDG scores have the lowest scores on SDG 12 and 13.

Figure 1: SDGs and Ecological Footprint, select countries, 2023



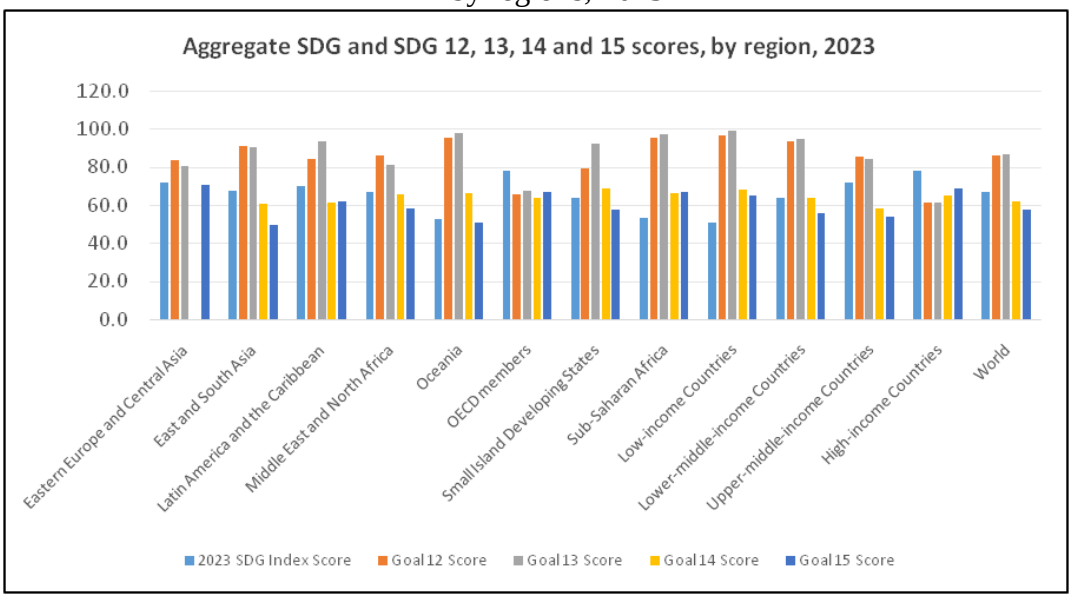
Source: SDG Dashboard and Global Footprint Network (GFN)

Figure 2: Aggregate SDG scores and Individual SDG scores, by regions, 2023



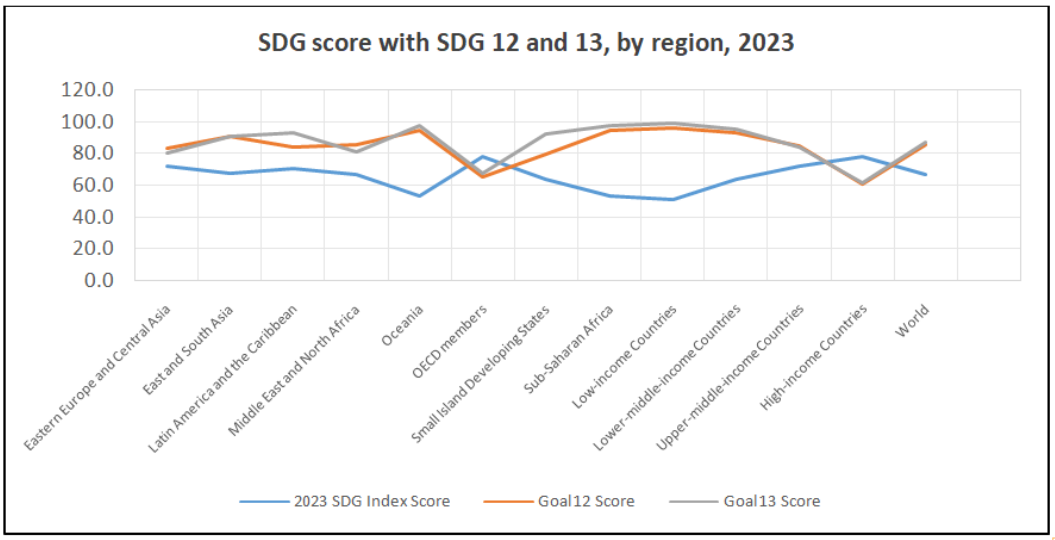
Source: Data obtained from SDG dashboard

Figure 3: Aggregate SDG scores and Environment related SDGs (12, 13, 14 and 15), by regions, 2023



Source: Data obtained from SDG Dashboard

Figure 4: Comparisons of aggregate SDG scores and SDG 12 and 13, by regions, 2023

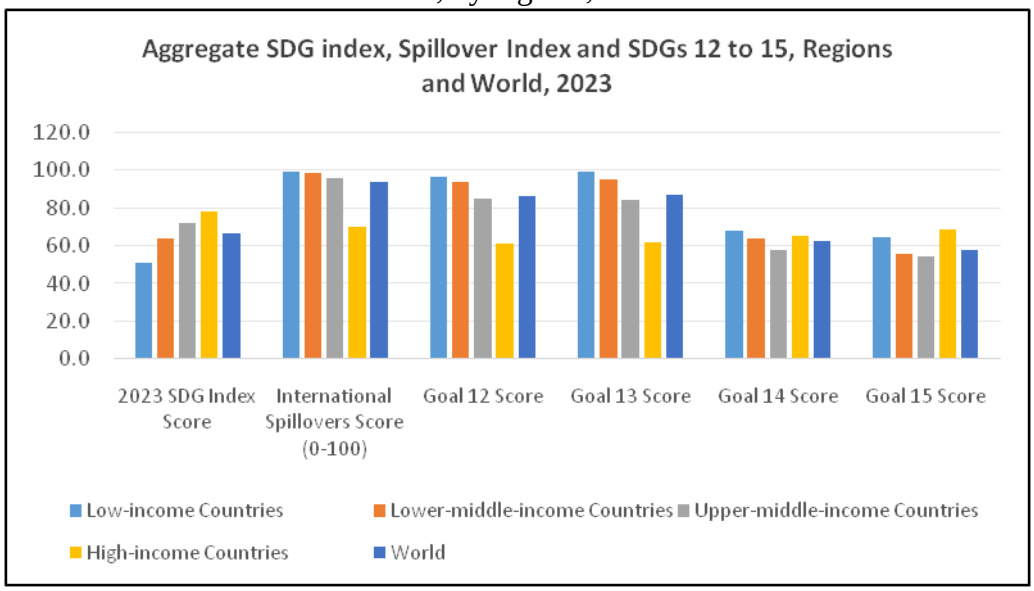


Source: Data obtained from SDG Dashboard

Figure 5 shows that the HICs which have the highest SDG score followed by UMICs, LMICs and LICs have the lowest international spillover index in conjunction with lowest scores on goals 12 and 13 following the same gradation for the other three income groups.

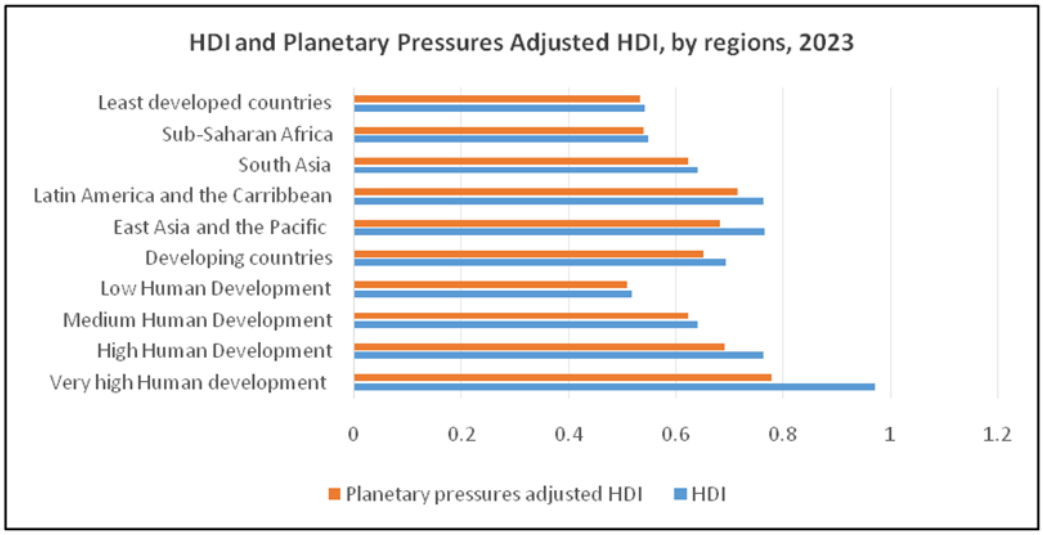
HDI gives the standard of living in terms of an equal weighted index using per capita income, education and health indicators. HDR (2023) also publishes planetary pressures adjusted HDI[22] as shown in Figure 6.

Figure 5 SDG score (aggregate) and SDG 12, 13, 14 and 15 with International Spillovers Index, by regions, 2023



Source: Data obtained from SDG Dashboard

Figure 6: HDI and Planetary Adjusted HDI, by regions, 2023



Source: Data obtained from SDG Dashboard and HDR, 2023

[22] Planetary pressures-adjusted HDI or PHDI is obtained by adjusting the value of HDI by CO_2emissions and the per capita material footprint. This takes into account the impact of human pressures on the planet (HDR, 2023).

The impact of HDI on the environment is reflected in the gap between the two measures which clearly appears to be the largest for countries with very high and high human development as well as for the countries in East Asian and the Pacific.

We further estimate the impact of international spillovers[23] and carbon footprint on SDG scores empirically. We took data of 140 Countries for the year 2024 from the SDG dashboard. Table 1 presents the summary statistics of the three variables and Table 2 presents the OLS regression for:

$$sdgscore = f(eco\_footprint\_percapita, international\_spillover\_index) \quad (1)$$

We expect to see that countries which have attained higher SDG score have done it at the cost of the environment both in terms of GHGs and spillovers. This is confirmed in the results presented in Table 2 with the two variables having a significant influence on SDG scores with correct signs.

Table 1 Summary Statistics

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
eco_footprint_percapita	140	3.229	2.35	0.6	12.3
sdgscore	140	67.8	10.02	40.1	86.4
international_spillover_index	140	83.9	15.18	28.5	98.7

Source: Author's calculations

The correlation coefficients between the three variables are significant at 5 percent level of significance. The correlation of SDG scores with per capita footprint is positive (0.57) and with international spillovers is negative (-0.57). The results for a simple linear regression of the SDG score (sdgscore) as the dependent variable on per capita ecological footprint (eco_footprint_percapita) and the international spillovers index (international_spillovers_index) are presented in Table 2. The coefficient of per capita ecological footprint is positive and that of international spillovers is negative which supports the result that those countries which have higher SDG scores have lower

[23] The spillover index ranges between 0 (worst case) and 100 (best case).

spillovers index which is less preferred to a higher value of the index and also have a larger ecological footprint.

Table 2: OLS estimates for SDG scores, 2024

VARIABLES	sdgscore
international_spillover_index	-0.170**
	(0.0698)
eco_footprint_percapita	1.592***
	(0.451)
Constant	76.91***
	(7.057)
Observations	140
R-squared	0.351
F-Stat	37.1
Prob > F	0

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: Author's own calculations

3.2. Smart solutions

The above exposition brings to the fore the idea that the LICs, and LMICs are being left behind. This pattern of growth and environmental degradation needs to be reversed to overcome food insecurity, decline in health, poor work opportunities, poverty and other associated challenges which are a direct consequence of climate change. There is a need for the members of the civil society to work towards reducing their individual footprint and influence governments to adopt policy solutions to reduce the overall footprint of the country. By 2050, 70 to 80 per cent of the world's population will be living in the cities and hence sustainable housing, public transport and efficient energy solutions are all required to curtail the footprint alongwith cleaner industrial and agricultural technologies. Resort to the use of renewable energy is imperative to address climate change. Reduction in food waste and processed foods are a crucial way to ensure sustainability. Aspects of gender equality in women's access to family planning and increase their labour force participation to achieve social, economic and political empowerment also contributes to

find sustainable solutions to food security, use of renewable energy and reduce malnourishment, stunting and wasting in children.

4. Conclusion

The difference between the HICs and LICs is manifested in low SDG scores and low HDI in the LICs. Prosperity in HICs has created a huge ecological footprint the cost of which is borne by the poorer parts of the world. Addressing these disparities requires international policy cooperation to create global partnerships, share ideas, technology, resources and build local capacities especially in finance and resource-constrained low-income countries in the presence of a real and binding ecological constraint. It is essential to deliver the 'global public goods'[24] to overcome the excesses beyond planetary bounds to preserve biodiversity and mitigation and adaptation efforts of changing weather conditions and carbon emissions. The imperative is to decouple[25] and encourage circularity to reduce humanity's ecological footprint. All stakeholders must de-grow and end irresponsible production and consumption.[26] The empirical results firmly establish that countries which have experienced high SDG scores have depleted nature more than the sustainable levels, contributed to global warming and have extended their carbon footprint beyond their national boundaries. Ten years of Agenda 2030 has failed to close the development gap between the countries at the top and the bottom of the list of SDG scores which will continue to persist if global partnerships are not forged and the developed coutnries fail to provide timely and adequate climate finance, technology and assistance to the developing world. The LTG paradigm with which the story of the SDGs began is more relevant to the survival of humanity today than it was in the 1970s.

[24] HDR (2023-24, p. v.)
[25] This refers to economic growth with minimum or no adverse impact on the environment by improved efficiency in various activities, reduce consumption especially of natural resources, evolve sustainable and clean technologies and adopt the use of renewable energy, land restoration and conserve the exploitation of bio-capacity to make practices sustainable (Radacsi and Szigeti, 2024).
[26] HDR (2023-24, p. v.)

Appendix

Table A1: Sustainable Development Goals

SDG	Name	SDG	Name
1	No poverty	10	Reduced inequalities
2	Zero hunger	11	Sustainable cities and communities
3	Good health and well being	12	Responsible consumption and production
4	Quality education	13	Climate action
5	Gender equaity	14	Life below water
6	Clean water and sanitation	15	Life on land
7	Affordable and clean energy	16	Peace, justice and strong institutions
8	Decent work and economic growth	17	Partnerships for the goals
9	Industry, innovation and infrastructure		

Source: UN SDGs, https://www.un.org/sustainabledevelopment

References

- Barbier, E. B. and Burgess, J. C. 2020. "Sustainability and Development after COVID-19", *World Development*, Nov. 135.
- Brundtland Commission Report. 1987. '*Report on the World Commission on Environment and Development: Our Common Future*'. OUP. UN.
- COR. 2024. "Shock as warming accelerates, 1.5°C breached faster than forecast", 27 February 2024, The Club of Rome, https://www.clubofrome.org/blog-post/dunlop-spratt-global-warming/
- Crippa, M., Guizzardi, D., Pagani, F., Banja, M., Muntean, M., Schaaf E., Becker, W., Monforti-Ferrario, F., Quadrelli, R., Risquez Martin, A., Taghavi-Moharamli, P., Köykkä, J., Grassi, G., Rossi, S., Brandao De Melo, J., Oom, D., Branco, A., San-Miguel, J., Vignati, E. 2023. *GHG Emissions of all World Countries*, Publications Office of the European Union, Luxembourg. DOI:10.2760/953332, JRC134504.
- Dasgupta, P., Dasgupta, A. and Barrett, S. 2021. Population, Ecological Footprint and Sustainable Development Goals. *Environmental and Resource Economics*. 84. 659-675. https://doi.org/10.1007/s10640-021-00595-5
- EDGAR. 2023. *Emissions Database for Global Atmospheric Research, Community GHG Database*, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA).
- GFN. 2024. Global Footprint Network. https://www.footprintnetwork.org/(AccessedApril,2025)
- Gulati, A. and Juneja, R. 2021. Indian Agriculture towards 2030. https://www.fao.org/fileadmin/user_upload/FAO-countries/India/docs/Full_Paper-1.pdf(Accessed April, 2025)
- HDR. 2022. *Human Devlopment Report, Bridging the Gaps towards Sustainable Well-being.* UNDP. Geneva.
- HDR. 2023. *Human Development Report, Breaking the Gridlock*. Geneva: UNDP.
- IMF. 2019. *World Economic Outlook, Growth Slowdown, Precarious Recovery*. International Monetary Fund. Washington DC. April.

- Jackson R.B, Le Quéré, C., Andrew, R. M., Canadell, J. G., Korsbakken, J. I., Liu, Z., Peters, G. P., Zheng, B. and Friedlingstein, P. 2019. *'Global Energy Growth Is Outpacing Decarbonization*'. A special report for the United Nations Climate Action Summit, September. Global Carbon Project, International Project Office, Canberra Australia.
- Managi, S. and Kumar, P. 2018. *Inclusive Wealth Report: Measuring progress towards sustainability*. New York: Routledge.
- Meadows, Donella H, Meadows, Dennis L, Randers, Jørgen, Behrens III, William W. 1972. *The Limits to Growth; A Report for the Club of Rome's Project on the Predicament of Mankind*. New York: Universe Books.
- Mohieldin, M., Wahba, S., Gonzalez-Perez, M. A. and Shehata, M. 2023. *Business, Government and the SDGs, The Role of Public-Private Engagement in Building a Sustainable Future*. Switzerland: Palgrave-Macmillan.
- Paris Agreement. 2015. United Nations Framework Convention on Climate Change, Paris, France, Dec. 12.
- Pelenc, J. 2015. "Weak versus Strong Sustainability". Technical Report, UN.
- Ritchie, H., Rosado, P. and Roser, M. 2023. *CO_2 and Greenhouse Gas Emissions.* Published online at OurWorldInData.org. https://ourworldindata.org/co2-and-greenhouse-gas-emissions(Accessed April, 2025)
- Ritchie, H. 2019. "Food production is responsible for one-quarter of the world's greenhouse gas emissions" Published online at OurWorldInData.org. Retrieved from: https://ourworldindata.org/food-ghg-emissions(Accessed April, 2025)
- SDR. 2022. Sachs, J., Lafortune, G., Kroll, C., Fuller, G. and Woelm, F. *Sustainable Development Report 2022. From Crisis to Sustainable Development: The SDGs as Roadmap to 2030 and Beyond.* Cornwall: TJ Books Limited. DOI 10.1017/9781009210058
- SDR. 2023. Sachs, J.D., Lafortune, G., Fuller, G., Drumm, E. Implementing the SDG Stimulus. *Sustainable Development Report 2023. Implementing the SDG Stimulus*. Paris: SDSN, Dublin: Dublin University Press, 2023. 10.25546/102924
- UN. 2015. *Transforming our World: The 2030 Agenda for Sustainable Development*. A/RES/70/1. United Nations.
- UN SDG Dashboard. https://dashboards.sdgindex.org/(Accessed April, 2025)
- UN Sustainable Development. https://sdgs.un.org/goals(Accessed April, 2025)
- UN, Dept. of global communications 2023
- UNDP. 2019. *World Population Prospects 2019: Highlights*. New York: UN
- UNDP. 2022. United Nations Department of Economic and Social Affairs, Population Division. *World Population Prospects 2022*: *Summary of Results*. UN DESA/POP/2022/TR/NO. 3.
- UNEP. 2011. United Nations Environment Programme, Annual Report.UN.
- UNESCO. 2022. https://oceanliteracy.unesco.org/plastic-pollution-ocean/(Accessed April, 2025)
- WWF. 2024. "What is the sixth mass extinction and what can we do about it?" World Wild Life Fund (US) https://www.worldwildlife.org/stories/what-is-the-sixth-mass-extinction-and-what-can-we-do-about(Accessed April, 2025)

Review of Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)

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Abstract

The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) was introduced on February 2, 2006, making it the first of its kind globally to provide an economic safety net and a right to work for around two-thirds of India's population. One of the Sustainable Development Goals (SDGs) of the Decent Work and Economic growth by the year 2030 is to attain full and productive employment and decent work for all women and men, including for youth and equal pay for work of equal value. Decent work comprises all the aspirations of persons throughout their working lives. It comprises work opportunities that is profitable, delivers a decent wage and social security to everyone, better opportunities for personal development and societal integration, the rights of citizens to state their views, organize and participate in decision-making which has an influence on their lives as well as equal treatment between women and men. This research evaluates the growth rate of average employment days provided and average wage rate under MGNREGA during 2011-12 and 2021-22. By considering the growth of employment of 100 days and real wage rate per day, MGNREGA caters to the objectives of eight Sustainable Development Goal (SDG) of decent work to some extent. The major findings of this study are that funding by government for the MGNREGA scheme increased in 2021-22 due to the overwhelming impact of COVID-19 and reverse migration, leading to an increase in demand. Most states experienced a sharp decline in

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families completing 100 days of work, with Kerala and Tamil Nadu recording a 100% fall. Real wage trends were inconsistent, which exhibits program's failure to warrant sustained employment for the poor.

Key words: Decent Work, Wage rate, Employment, Growth, Unskilled Worker

1. Introduction

The employment program the National Rural Employment Guarantee Act (NREGA) was passed on August 25, 2005, but it was initially implemented in 200 selected backward districts on February 2, 2006. After April 1, 2007, it was extended to 130 more districts. After April 1, 2008, this Act was prolonged to all districts of India. Finally in 2009, its name was changed to Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA). Under this Act, 100 days of assured employment are provided to the rural poor. It also offers an extra 50 days of unqualified physical work, over and above the 100 days assured to job card holders, residing in the areas prone to drought and natural calamities (Singh, 2017). Under MGNREGA Act, within 15 days of obtaining a job application, the applicants must be provided with the work; otherwise, the applicants will be eligible to get unemployment benefits from the state government. It is the Gram Panchayat's responsibility to search the suitable work that is beneficial for the welfare of the villagers (Dutta et al., 2012). Under MGNREGA, 2005, four categories of works are provided, named as A, B, C, and D. Category A includes public works such as natural resource management, water conservation, afforestation, restoration of dried water resources, irrigation facilities, common land development and watershed management are provided. Category B includes provision of community and individual assets for the most unshielded households. The unshielded households include Schedule Caste (SC), Schedule Tribes (ST), Below Poverty Line (BPL), denotified tribes[2], nomadic tribes, women headed households, and households headed by the physically challenged, beneficiaries of land reforms and Pradhan Mantri Awas Yojana (PMAY) and traditional forest dwellers. Category C makes available common infrastructure for the National Rural Livelihood Mission-Complaint Self-Help Groups (SHGs) that promote agricultural

[2] Locally known as *Banjaras*

productivity by building infrastructure for bio-fertilizers, warehouses for post-harvest storage and common work sheds for livelihoods activities of SHGs. Category D comprises the facilitation of rural infrastructure such as all-weather roads, rural sanitation-related works like individual household's latrines, school toilets, playgrounds, surrounding walls for schools and building of Gram Panchayat structure etc. (Pankaj & Bhattacharya, 2022). This Scheme has covered about 193 million beneficiaries (16 percent of population) in 2013 and it has been considered the largest social safety net program (World Bank, 2014). The Union Budget had allocated Rs.480 billion for this scheme during the financial year 2017-18 (2017).

The government-run program MGNREGA by providing the employment to rural needy people ensures a minimum level of economic activities to the poorest in the rural areas. This is the largest government-run program for the welfare of rural unemployed people and it is implemented by considering the Keynesian macroeconomic of public expenditure. There was an expectation of an increase in the income of rural people many times greater than what has been spent by government through the multiplier effect in rural India. The work provided under this program is devoted to the conservation of natural resources, irrigation, plantation, horticulture, land development, renovation of traditional water bodies, work for controlling floods and providing drainage connectivity, etc. By conserving natural resources, this program contributes to the environmental sustainability (Panda & Mishra, 2015).

There are 17 goals in Sustainable Development Goals (SDGs) and it consists of 169 targets which focus on ending poverty without imposing heavy cost on Earth's life-support systems. The eighth SDG goal is "Decent work and economic growth" (Gaffeny, 2014, as cited in Kreinin et al., 2022). As per the (ILO, 2018), the decent work is a work that is productive for men and women and it also ensures the conditions of liberty, fairness, security and human prestige.

The Goal of the Decent Work and Economic Growth by 2030 is to achieve complete and creative engagement and decent work for all persons, including youth, and identical pay for work of equal value. Decent Work contains all the aspirations of people throughout their working lives. It includes opportunities for work that is profitable, delivers a decent wage and social security to everyone, better opportunities for personal development and

societal integration, the rights of citizens to express their views, organize and take part in decisions which have an impact on their lives as well as equal treatment between women and men. A work is regarded decent in the following conditions: (1) when fair income is provided by the employer; (2) when it provides secure employment and safe working conditions; (3) when it ensures equal chance and treatment irrespective of gender, race and color; (4) when it provides social security to workers along with their families; (5) when it focuses on personal development and social integration; and (6) when workers are given the right to express their concern and to organize themselves (International Labor Organization, 2018).

This study aims to show the impacts of MGNREGA in providing employment to rural people and the growth of real wage rate of workers. It also analyzes the growth rate of 100 days of employment completed under the Mahatma Gandhi National Rural Employment Guarantee Act during 2011-12 to 2021-22 in major states in India. This paper provides a descriptive analysis of MGNREGA in terms of number of days of employment, wages given to the workers and the budget allocated to the program.

This paper has been organized into five sections. Section 1 had discussed the overview of the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) and eighth goal of Sustainable Development Goals (SDGs). Section 2 provides a review of literature; Section 3 describes the data sources; and Section 4 describes the result and data analysis of the MGNREGA workers. Section 5 provides the conclusion and suggestions.

2. Review of Literature

Fernandez (2015) investigates the execution of MGNREGA in Madhya Pradesh and its impacts on rural areas. The coverage of MGNREGA has been quite impressive in rural areas but still the enactment of this program remains inefficient. The social status of women has improved due to working outside as it is an addition in the household income. However, the study also accentuates the need for awareness of this program among rural population in the state. Ranware et al. (2015) have analyzed MGNREGA impact on Maharashtra. The outcome of the program has been fruitful in terms of creation of useful assets in rural areas. They explore that this program is conceived as anti-farmers due to

hiring of large number of workers. Therefore, work performed under this program is considered pro-agriculture and primarily benefit small and marginal farmers in a significant way. Bhaskar et al. (2016) have assessed the returns from investments in irrigation wells created under the MGNREGA program in Jharkhand. Nearly 95 percent of all fully constructed wells are used for irrigation purpose. Hence the agricultural income of irrigation well containing areas has almost tripled. The real rate of return of wells was about 6 percent. (Panda & Mishra, 2015) examines the effectiveness of MGNREGA and the results show that those who were working under MGNREGA are better than those who were not working, in terms of food security and annual income. The social networking, empowerment and awareness have increased significantly among workers who are working under MGNREGA. In the study, it is revealed that the MGNREGA workers had an edge over the control group in terms of children education, reduction of distress migration and better networking. Ghosh (2017) study examines those districts where MGNREGA was started early, the financial position of people of that area have improved significantly. The differential effect of program across districts has been witnessed in terms of gender composition, rural mix, and income profile. Pankaj & Bhattacharya, (2022) examines the importance of MGNREGA for increasing income and livelihoods through increase in the productivity of land. The rural households received benefits through creation of new sources of livelihoods, additional utility of their assets and increase in their income levels. The rural community benefitted due to increase in food security, increase in crop acreage and yields per acre and crop diversification etc. Lokhande & Gundimeda (2021) examine the effectiveness of MGNREGA in providing employment to returning migrants due to Covid-19 lock-down in India. For getting estimates of population, total migrants, and seasonal migrants for the year 2021 in each 595 districts linear extrapolation was used on the census 2011 data. In the month of November and December 2021, Azim Premji University did a survey with the National Consortium of Civil Society Organizations on MGNREGA and Collaborative Research and Dissemination (CORD) for analyzing the role of MGNREGA for providing employment to the needy people during pandemic. The study shows that 39 percent card holders have not received single day employment during pandemic while on average only 36 percent households received wages for work done. Although there are many shortcomings even then MGNREGA has played a significant role during pandemic for compensating the loss of income of households from 20 percent to 80 percent. Lokhande

and Gundimeda (2021) show that during the Covid-19 pandemic, approximately 7.5 million seasonal migrant workers approached to MGNREGA for employment. These workers were employed for about 23 days and they were able to compensate 28 percent of their lost income during the lockdown. The study explores that MGNREGA provided employment to one-third of the returning seasonal migrants while two-third were out of reach of MGNREGA.

3. Methodology

This paper is primarily based on secondary data. This is a descriptive analysis based on previous reports and articles. The sources of data are Ministry of Statistics and Programme Implementation, Government of India (GOI). The variables used in the study are Budget/Revised Estimates, Funds Released and Expenditure under MGNREGA in India (Rs. in Crore), Real wage rate per day, and number of family units who completed 100 days of employment. To analyze the real wage rate per day of MGNREGA workers during 2016-17 and 2022-23, State-wise Number of Family unit who accomplished 100 days of work (2011-12 to 2021-2022) under MGNREGA is used to calculate the compound annual growth rate (CAGR). The data such as actual release, budget estimates and revised estimates are available from 2009-10 to 2022-23.

4. Result and Analysis

Table 1 gives, the budget estimates, revised estimates and actual estimates for the years 2009-10 to 2022-23 for MGNREGA. The budget estimates have increased till 2010-11 and then fallen to Rs.33,000 crore in 2013-14 but after that, there was consistent growth till year 2022-23. Revised estimates starting with Rs.39,100 crores in 2009-10 and increased to Rs.40,100 Crore in 2010-11. Later, there was consistent growth till 2020-21 but declined after that. The similar trend has been followed by actual release funds. One important point is that budget estimate was always greater than the revised estimate. The budget estimate was greater than actual release during 2009-10 to 2014-15 but after that actual release is greater than budget estimate till 2021-22. The revised estimates and

actual release were Rs. 111,000 crore and Rs. 98,000 crore during 2020-2021 and 2021-22. This is the highest; the reason is devastating effect of Covid-19 and reverse migration. Therefore, the demand for employment under MGNREGA increased significantly during these two years.

Table 1: Budget/Revised Estimates, Funds Released and Expenditure under (MGNREGA) in India (Rs. in Crore) (2009-2010 to 2023-2024)

Year	**Budget Estimates**	**Revised Estimates**	**Actual Release**
(1)	(2)	(3)	(4)
2009-2010	39100	39100	33539.38
2010-2011	40100	40100	35841.49
2011-2012	40000	31000	29215.05
2012-2013	-	-	30274.69
2013-2014	33000	33000	32994.12
2014-2015	34000	33000	32977.43
2015-2016	34699	37345.95	37340.72
2016-2017	38500	48220.26	48219.05
2017-2018	48000	55167.06	55166.06
2018-2019	55000	61830.09	61829.55
2019-2020	60000	71001.81	71687.71
2020-2021	61500	111500	111170.86
2021-2022	73000	98000	98467.85
2022-2023	73000	89400	36677.793

Source: Ministry of Statistics and Program Implementation, GOI

Table 2 represents the number of households who have completed 100 days of employment under MGNREGA statewise in India during 2011-12 to 2021-2022. The compound annual growth rate (CAGR) has been calculated for each state and CAGR shows that each state experienced a decline in the 100-day employment during the given years. Andhra Pradesh and Maharashtra have experienced a drastic decline in the employment days after 2015-16, but all other states and Union Territories have experienced a decline soon after 2014-15. The southern states like Kerala and Tamil Nadu CAGR have a CAGR of 100 percent. It shows that the number of 100 days employment has fell to zero during the 10-year period. When looking at Bihar, Himachal Pradesh, Rajasthan and Uttar Pradesh, the CAGR is close to -60 percent. This means in these states the number of 100 days of employment has decreased by approximately 60 percent each

year. The CAGR value of Odisha is -36.6 percent, which is the lowest among the states. Hence, it shows that each year, the 100 days of employment declined at a constant rate of 36.6 percent. Other states have also experienced a constant percentage decline in the range of 45 percent to 55 percent.

Table 2: State-wise Number of Family unit Who Accomplished 100 Days of Work under (MGNREGA) in India (in Lakhs)

States/UT	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	CAGR
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Andhra Pradesh	948.87	1014.09	752.62	378.28	69.25	5.8	5.95	8.67	5.82	8.65	2.4	-45
Bihar	170.23	180.61	123.49	32.13	0.81	0.14	0.16	0.25	0.2	0.35	0.02	-59.5
Chhattisgarh	207.64	244.43	346.29	48.05	2.88	1.73	3.24	4.28	4.18	6.12	0.22	-49.6
Gujarat	41.77	52.32	29.32	16.48	1.08	0.08	0.11	0.34	0.13	0.17	0.1	-45.3
Himachal Pradesh	48.04	40.42	55.44	21.54	0.31	0.11	0.14	0.7	0.61	0.89	0.01	-57.2
Jharkhand	58.08	86.66	68.86	82.42	6.77	0.37	0.58	0.26	0.31	1.14	0.05	-50.6
Karnataka	45.14	104.36	117.73	41.71	0.44	1.96	0.3	2.11	1.87	2.41	0.05	-49.4
Kerala	124.82	340.48	406.61	98.43	0.01	1.13	1.17	4.41	2.51	4.7	0	-100
Madhya Pradesh	304.48	196.33	175.65	158.03	2.18	1.41	1.35	0.77	0.91	3.23	0.33	-49.5
Maharashtra	197.19	231.21	122.63	165.45	44.81	1.68	2.02	1.92	1.24	1.37	0.21	-49.6
Odisha	47.63	75.09	156.78	81.96	1.35	0.36	0.68	0.47	1.61	4.18	0.5	-36.6
Rajasthan	335.62	421.84	446.1	281.02	15.9	4.27	2.28	5.88	8.49	12.31	0.05	-58.6
Tamil Nadu	602.62	1348.72	920.78	332.24	2.99	13.21	1.5	2.6	1.21	1.79	0	-100
Telangana	-	-	-	160.84	19.07	1.75	2.04	2.27	1.76	3.42	1.17	-50.5
Uttar Pradesh	309.03	70.55	160.6	110.2	4.43	0.41	0.43	0.72	1.33	7.8	0.02	-61.9
West Bengal	119.6	253.09	280.63	158.29	0.45	2	5.58	13.37	3.66	6.79	0.08	-51.9
India	**4166.07**	**5173.8**	**4659.45**	**2488.73**	**173.91**	**39.91**	**29.55**	**52.22**	**40.47**	**71.77**	**5.25**	**-48.7**

Source: Ministry of Statistics and Program Implementation, GOI

Table 3: Per day real average wage rate of MGNREGA Workers (in Rs.) Base year 1986-87

States	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-22	2022-23	CAGR (%)
Andhra Pradesh	15.14	15.46	19.36	17.98	19.29	17.4	16.1	1.04
Bihar	24.31	24.35	23.6	21.37	22.79	40.76	28.74	2.84
Gujarat	62.28	63.5	82.03	84.1	84.61	42.68	56.02	-1.75
Haryana	39.02	38.35	28.77	25.41	26.94	95.5	51.31	4.67
Himachal Pradesh	36.09	37.79	37.55	36.5	37.82	35.9	32.73	-1.62
Karnataka	21.93	22.37	23.91	22.14	22.84	30.22	40.92	10.95
Kerala	26.11	26.62	27.36	26.25	27.72	26.55	25.92	-0.12
Maharashtra	19.25	19.74	19.61	17.69	19.1	20.1	17.48	-1.59
Odisha	23.03	22.59	22.3	21.61	24.43	22.12	21.86	-0.87
Punjab	22.71	23.53	23.64	22.44	23.52	23.16	22.35	-0.26
Rajasthan	13.07	14.41	13.77	13.38	15.6	15.9	15.04	2.36
UP	21.51	21.99	20.86	20.07	21.66	20.84	20.26	-0.99
Tamil Nadu	14.71	14.91	16.16	14.8	15.4	16.43	16.95	2.39
All India	**18.58**	**19.06**	**19.74**	**18.59**	**19.42**	**21.13**	**20.69**	**1.8**

Source: Ministry of Statistics and Program Implementation, GOI

Table 3 represents the average real wage rate and compound annual growth rate of real wage rate of 13 major States of India under the program MGNREGA during 2016-17 to 2022-23. The real wage rate has been calculated by using Consumer Price Index for Agricultural Labour (CPI-AL), base year 1986–87. As is visible, Karnataka, with a CAGR of 10.95 percent, is one of the best-performing states. This means there is a

constant yearly growth rate of real wages at 11 percent. The real wage rate has increased from Rs. 21.93 per day to Rs. 40.92 per day during the stated period.

The states such as Gujarat, Himachal Pradesh, Kerala, Maharashtra, Odisha, Punjab and Uttar Pradesh show a negative CAGR. It shows that real wage growth rate has declined constantly in these states over the given time periods. In the case of Gujarat, the negative growth rate of the real wage for MGNREGA worker is highest. When looking at the remaining states such as Andhra Pradesh, Bihar, Haryana, Rajasthan and, Tamil Nadu along with India, the value of CAGR is positive. These values indicate a consistently positive annual growth of real wage rate of MGNREGA workers over the given years. In the case of India the real wage rate has augmented from Rs. 18.58 per day in 2016-17 to Rs. 20.69 per day in 2022-23 and the value of CAGR is 1.80 percent. Based on CAGR, the performance of Karnataka and Bihar is better than other states. All-India average real wage rate CAGR of workers under MGNREGA is 1.80 percent only. Thus, these descriptive statistics show that there were some fluctuations in the growth of real wage rates of 13 given states under the Program. The performance of a few states is satisfactory, while some states show relatively fluctuating trends with some ups and downs. In the case of some states the growth rate is negative, that puts the question mark for the government of those states. Reddy et al. (2014) examine the impact of MGNREGS on rural labor markets and agriculture. This scheme has been helpful in raising agricultural wages, particularly for women, narrowing the gender wage gap. MGNREGA has led to an increased bargaining power, work conditions, and reduced distress migration among the rural populations. Although many small and marginal farmers benefit from this scheme but those excluded from the scheme face suffer due rising cultivation costs without support.

This paper provides a descriptive analysis of MGNREGA in terms of the number of days of employment, wages given to the workers and the budget allocated to the program. In the case of the actual release of funds for MGNREGA, there was little fluctuation until 2015-16 but after that there was steep rise in the actual release of fund and it reached at a peak of Rs. 111,170.86 Crores in 2021-22; however, after this, there was a sharp decline. Although employment provided under MGNREGA does not provide full employment throughout the year but it provides some kind of income security to the vulnerable households. When discussing the number of households who have accomplished 100 days

of work, then all states experienced negative growth. It means employment level have declined during 2015-16 to 2021-22. In the case of the average real wage of MGNREGA workers, the increase is a mix of rises and falls across different states. In some states the real wage rate has shown positive growth rate while others show a negative growth rate. But in the case of the all-India level, the real growth rate is positive during 2015–16 to 2022–23. Agrawal (2019) critically evaluates the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) and further identifies both design and implementation failures. The motto of this program is to provide 100 days of employment but it achieved only 50 days on average by 2018–19. The program faces structural contradictions, administrative inadequacies, and weak monitoring systems. Mallik & Paltasingh (2023) show that the Government run Scheme (MGNREGA) have affected the lives of underprivileged group. This scheme was not successful in increasing the income of marginalized households, reducing gender discrimination, empowering women and provision of food security to rural households. There are many problems faced by the MGNREGA workers such as discrimination in terms of gender, class and wages, poor planning, prevailing corruption, delay in wage payments etc.

Therefore, by considering budget estimates, actual fund releases for MGREGA, number of family circle who have completed 100 days of work, the average real wage rate MGNREGA workers during the given years, it is quite clear with that MGNREGA have provided employment to the vulnerable rural households. Further it can be asserted that the work provided under Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) caters to the objectives of the 8th Sustainable Development Goal (SDG) of decent work, to some extent.

5. Conclusion

The revised estimates and actual release were Rs. 111,000 crores and Rs. 98,000 crores during 2020-2021 and 2021-22. This is the highest; the reason is the devastating effect of Covid-19 and reverse migration. Therefore, the demand for MGNREGA increased significantly during these two years. In the case of actual release of funds for MGNREGA, there was little fluctuation until 2015-16 but after that, there was steep rise

in the actual release of funds and it reached a peak of Rs. 111,170.86 Crore in 2021–22. However, after this, there was a sharp decline. When discussing the number of households who have accomplished 100 days of work, all states have experienced a fall in the number of families, but in case of Kerala and Tamil Nadu, the CAGR is negative 100 percent over the study period. In the case of remaining states, the rate of decline is too high, except for Odisha the CAGR is in the range of -62 percent to -48 percent. In the case of average real wage of MGNREGA workers, the increase in the real wage is a mix of rise and fall in different states. Hence, and finally, it can be said that MGNREGA failed to provide employment to the poor who really need it. Therefore, the government should take the initiative to effectively utilize the funds and increase the fund allocation for providing more employment through MGNREGA.

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Declaration

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this work are solely those of the authors and do not reflect the official stance of any affiliated institution or organization.

Ravindra Kumar: Conceptualized the research, conducted the literature review, collected and analyzed data, and prepared the manuscript.

Prof. Sivasankar. V: Provided guidance throughout the research process, critically reviewed the manuscript, and contributed to the interpretation of results and final editing.

The data utilized in this research were drawn from publicly available government reports, such as the MGNREGA Management Information System (MIS), and datasets provided by the Ministry of Rural Development, Government of India. Primary data were also collected through field surveys and structured interviews conducted in select rural districts. While every effort was made to ensure the accuracy and reliability of the findings, this study acknowledges the limitations inherent in self-reported data and regional specificity. Further research is recommended to explore the long-term implications of MGNREGA in different socio-economic contexts.

Availability of Data and Materials

All data analyzed during this study are included in this published article. Additional information or materials can be made available upon reasonable request to the corresponding author at ravindran.kumar2013@gmail.com.

References

- Agrawal, G. K. (2019). Mahatma Gandhi National Rural Employment Guarantee Act: Design failure, implementation failure or both? *Management and Labour Studies*, *44*(4), 1–20. https://doi.org/10.1177/0258042X19871406
- Bhaskar, A., & Others. (2016). Well worth the effort: Value of MGNREGA wells in Jharkhand. *Economic & Political Weekly*, *51*(19).
- Dutta, P., Murgai, R., Ravallion, M., & van de Walle, D. (2012). Does India's employment guarantee scheme guarantee employment? *Economic & Political Weekly*, *47*(16).

- European Commission. (n.d.). *Employment and decent work*. Retrieved January 15, 2025, from https://international-partnerships.ec.europa.eu/policies/sustainable-growth-and-jobs/employment-and-decent-work_en
- Ghosh, S. (2017). Did MGNREGS improve financial inclusion? *Economic & Political Weekly*, *52*(12).
- International Labour Organization. (2018). *Decent work and the Sustainable Development Goals: A guidebook on SDG labour market indicators*. International Labour Office. https://www.ilo.org/global/statistics-and-databases/publications/WCMS_647109/lang--en/index.htm
- Kreinin, H., & Aigner, E. (2022). From 'Decent Work and Economic Growth' to 'Sustainable Work and Economic Degrowth': A new framework for SDG 8. *Empirica*, *49*(2), 281–311.
- Lokhande, M., & Gundimeda, H. (2021). MGNREGA: The guaranteed refuge for returning migrants during COVID-19 lockdown in India. *The Indian Economic Journal*, *69*(3), 584–590.
- Mallik, R., & Paltasingh, T. (2023). Effectiveness of MGNREGA on marginalized sections: Context and prospects. *Gandhi Marg Quarterly*, *45*(2), 171–190.
- Panda, S., & Mishra, S. (2015). National Rural Employment Guarantee Scheme: Development practice at the crossroads. *Economic & Political Weekly*, *50*(23), 126–131.
- Pankaj, A., & Bhattacharya, S. (2022). Income and livelihood promotion through individual assets under MGNREGA. *Economic & Political Weekly*, *57*(4).
- Ranaware, K., Das, U., Kulkarni, A., & Rasal, A. (2015). MGNREGA works and their impacts: A case study of Maharashtra. *Economic & Political Weekly*, *50*(13).
- Reddy, D. N., Reddy, A. A., & Bantilan, M. C. S. (2014). The impact of Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) on rural labor markets and agriculture. *India Review*, *13*(3), 251–273. https://doi.org/10.1080/14736489.2014.937271
- Singh, K. R. (2017). MGNREGA. *Proceedings of the Indian History Congress*, *78*, 1070–1077.
- Times of India Blogs. (n.d.). COVID-19 underscores MGNREGA's role as a safety net. *Developing Contemporary India*. Retrieved January 15, 2025, from https://timesofindia.indiatimes.com/blogs/developing-contemporary-india/covid-19-underscores-mgnregas-role-as-a-safety-net/

Economic Divergence of Madhya Pradesh and Uttar Pradesh during Economic Liberalization: Role of Agriculture

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Abstract

The paper attempts to address the issue of trend of economic disparity of the two big states of India: Uttar Pradesh (UP) and Madhya Pradesh (MP), from the all India average by measuring the divergence of per-capita income of these two states from the all India level per-capita income during the period of economic liberalization. The study takes the period from 1993-94 up to 2019-20, which is fairly a long run period during which India has gone through the process of economic liberalization. The Neoclassical model of economic growth, especially the Barrow's model proposes that when an economy grows at faster pace the regional disparity falls. Though the current study's findings, based on the data of per-capita income at constant price, show that economic disparity between backward states represented by UP and MP and developed states represented by an all India average has gone up. In the process of studying the rising economic divergence, the study finds that performance of agriculture sector has greater implication in deciding the extent of economic performance of Madhya Pradesh and Uttar Pradesh and further their divergence from all India level. The existing data show that better agricultural performance of Madhya Pradesh has led to better economic performance of Madhya Pradesh as compared to Uttar Pradesh and during better performance period the trend of economic divergence of Madhya Pradesh from all India level has slowed down. The role of state through Minimum Support Price (MSP) and better agricultural infrastructure has played major role in better economic outcome for Madhya Pradesh as compared to Uttar

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Pradesh. Madhya Pradesh has shown better agricultural parameters during the period after mid-2000s.

Keywords: Indian Economy, Regional Disparity, Uttar Pradesh, Madhya Pradesh, Role of Agriculture, Economic Growth, Sectoral Performance.

JEL Classification: O13, P25, P26, Q18, R11. R58

1. Introduction

Economic performance of Indian economy during the post-economic liberalization has improved if it is compared to the period before 1990-91. The market-oriented economic regime was adopted as an attempt to improve the efficiency of investments and production in the economy thereby enhancing the economic capability of the nation. In one of the large size countries like India, given the varying richness and diversity of resources across regions there is bound to be varying economic performance and with this understanding itself the centralized planning was in place to ensure that regional disparity remains to the minimum. According to convergence theorem of Robert J. Barro (1991) when the economy grows at faster rate, some states with better technology will grow faster than others but after some time when the law of diminishing marginal rate of returns sets in, the gap between poorer and richer regions narrows down due to differential marginal productivity of capital. It is precisely this framework in which the government of India adopted the New Economic Policy (NEP) in India in 1991 for bringing better economic performance of backward states at par with the developed states. India was visualized as centrally controlled economy with greater degree of state ownership prior to 1991.The Indian economy has witnessed faster economic growth during the post-economic liberalization period as India's average annual growth rate has been at 6.19 percent between 1990-91 and 2019-20 which is much better if compared to pre-economic liberalization when it was close to 4.5 percent between 1950-51 and 1989-90. This calculation of periodic average growth rates is based on author's estimates. Disaggregated data on the performance of Indian economy show that it grew at 5.77 percent, 7.21 percent and 6.58 percent, respectively, during 1990-91 – 1999-2000, 2000-01 – 2009-10 and 2010-11 – 2019-20. With the rising Gross Domestic Product (GDP)

growth rate of Indian economy, we must expect the rise in the economic convergence of specifically backward states to Indian average, more so in the light of long period since the economic reforms were started. In this framework the current paper attempts to study the economic growth performance of two largest states in India which are Madhya Pradesh (MP) and Uttar Pradesh (UP). While highlighting economic performance of these two states vis-à-vis all India the current paper makes an attempt to analyse the role of agriculture sector in the economic performance of these two states. While discussing the role of agriculture the paper attempts to highlight the significance of the role of state in the agricultural performance through the provision of infrastructure and price based support for the agriculture sector.

The reasons for taking these MP and UP to compare the economic divergence between poor states with that of national average are: (a) MP and UP are economically backward states and they are synonyms of BIMARU states; (b) together they constitute 62 percent population of the BIMARU states. BIMARU, a term which was first used by demographer Dr. Ashish Bose in the early 1980s, which literally means ailing states consisting of Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh (Sharma, 2015); (c) there is no comparative analysis of these two largest states in terms of their economic performance; (d) MP has shown the remarkable performance in agriculture sector in India in last two decades as compared to many prominent states in India including UP; and (e) whether the spectacular performance of agriculture sector in MP has made any difference on the dimension of divergence trajectory as per the framework of the convergence theorem. The first, that is current section, is an introduction of the study. Second section summarises some existing related literature and the relevance of the current study. Third section briefly outlines the research methodology for the current study. Fourth section provides the economic, social and political profiles of MP and UP. Fifth section discusses the economic performance of MP and UP in terms of Gross State Domestic Product (GSDP) growth and their comparison with the all India's trend and if the performance is according to the convergence theorem. Sixth section discusses the sectoral performance of MP and UP and the role of agriculture sector in the economic performance of MP and UP. It also discusses the factors which have caused the varying agricultural performance of UP and MP. Seventh section provides the concluding remarks.

2. Review of Literature

Based on the neo-classical model, Barro and Sala-i-Martin (1992) have tried to find out the convergence in the poorer regions in terms of per-capita income or product for the United States of America (USA) over the period during high economic growth in the USA. The concept of convergence which is also known as β-convergence highlights the fact that a poor region tends to grow faster than a rich one which enables the poor region to catch up with the rich one (Barro and Sala-i-Martin 1992). According to them poorer regions have higher marginal productivity of capital hence they tend to experience faster growth as compared to the developed regions where the marginal productivity of capital is lower due to diminishing marginal productivity law. However, such model of convergence assumes same preference and technology in rich and poor regions. Solow (1956) also provides the basic framework for explaining this negative correlation between initial levels of income and subsequent growth rates. The main assumption behind such a convergence result in the Solow model was the standard neoclassical production function with diminishing returns to physical capital, i.e. the poorer economy has lower levels of physical capital and hence higher marginal productivity of capital. Thus, for any given rate of investment, it will achieve a higher rate of growth in transition to the steady-state. While studying the β-convergence for the Indian states, Rao, Shand and Kalirajan (1999) took fourteen states for the period since 1964-65 till 1994-95 and found that per capita SDP in the states have diverged rather than converged and the divergence has accentuated during the initial years of economic liberalization. These findings about Indian states are contrary to predictions of neo-classical growth models and what empirical findings have been shown in the case of the USA by Barro and Sala-i-Martin (1992). According to Rao, Shand and Kalirajan (1999) growth of the per-capita SDP in states in India is positively related to their initial income level, which means a state having higher per-capita income initially tend to grow faster than the states which had lower per-capita income initially. While discussing the reasons for such performance of Indian states the authors argue that infrastructure through public investment has promoted the private investment and led to the divergence observed across Indian states over the period from 1965 to 1994. Another study by Ramaswamy (2007) on the regional dimension of growth and employment highlights that there has been rising inter-state disparities in the first quinquennium of the 21st century, a continuation of the trend of the 1990s. In his estimates, Ramaswamy

(2007) shows that top five ranking states (Gujarat, Tamil Nadu, Haryana, Maharashtra and Punjab) have grown faster than bottom four states (Bihar, Odisha, Uttar Pradesh and Rajasthan).

Most of the above mentioned studies have not taken into consideration the role of agriculture directly in explaining the variation of inter-state disparity across states over the period of time. Whether agriculture has important role in the determination of economic growth of a country or not, there are varying opinions. The agriculture can work as constraint on the rest of the economy through manufacturing sector on account of three main reasons (Raj 1976, Vaidyanathan 1977). Firstly, agriculture sector having the largest share of population dependent upon it carries significant demand implications for the rest of the sectors in the economy. Secondly, many industries use the agricultural inputs and therefore slowdown in agriculture production has implications for the rise in input costs which may not get reflected in the rise of prices of industrial products based on agricultural inputs and that may cause squeeze in the profits and may limit the expansion of non-agricultural sector. Thirdly, rise in prices of food grains due to slow growth of food grain sector may cause higher proportion of consumers' spending on food products leaving lower share for spending on non-agricultural items and causing slow growth of non-agriculture sectors. Chandrasekhar (2007) argues that after the 1980s there is significant increase in disproportionality between agricultural growth and non-agricultural growth in India. It is evident that during the period of 1999-2000 to 2004-05, the agriculture sector grew at 1.7 percent per annum while non-agriculture sector grew at more than 7 percent per annum. Therefore the agricultural growth is no more constraint on the growth of non-agriculture sector. Such disconnect between agricultural growth rate and non-agricultural growth rate are also on account of the fact that service sector has witnessed major increase in its dominancy in India's GDP and service sector is less dependent upon the agriculture for its inputs. The disappearance of the agricultural constraint on the performance of non-agricultural sector during the post-liberalization period has also been highlighted by Jha (2010). A study by Kannan (2011) has also shown that Kerala, in spite of having stagnation in agriculture sector, has shown dynamic performance by growing above 9 percent in non-agriculture sector (secondary and tertiary) during the period between 1997-98 and 2007-08. However, a study on economic growth in West Bengal by Guruswamy, Sharma and Mohanty (2005), highlights that even

during the liberalization period the state has performed much better than many states in spite of the market dominancy and absence of any special assistance by central government. The authors provide agriculture as the single most important factor responsible for such remarkable performance of the West Bengal economy. In this context the current study tries to understand the divergence of MP and UP from all India average and further tries to assess the role of agriculture in divergence of MP and UP from the national average as well as divergence between MP and UP themselves as no study exists on dimension.

3. Research Methodology and Tools

The current paper is broadly analytical and descriptive in studying the issues raised. The current paper compiles the data from the government sources and analyses them using basic statistical measures with the help of tables, graphs and some statistical tools. The economic performance of MP, UP and all India have been measured in terms of the GSDP and GDP at 2011-12 constant price. The data compiled for this study are annual data for 27 years starting from 1993-94 to 2019-20. It is a case of time series data where 27 years is fairly long period. Annual growth rates of sub-periods have been calculated with CAGR method. A basic statistical model, showing the relationship between agricultural growth rate and economic growth rate, has been tested with least square equation regression method. To rule out the problems of stationarity in the time series data of economic performance the author has used the annual growth rates of agricultural output, GSDP and GDP. The reason for using regression analysis is that the data is secondary and time series data and it attempts to find out the explanatory power of agriculture sector's output on state-wise GSDP and national level GDP. The details of the model have been specified in the relevant section. The data has been collected from the RBI's publication - Handbook of Statistics of Indian States as well as Handbook of Statistics on Indian Economy. The study has used many diagrams and tables to make the study more meaningful in highlighting the main objective of the paper.

4. Economic, Social and Political Profiles of Madhya Pradesh and Uttar Pradesh

MP and UP are two states which form the dominant part of BIMARU states in India. These two states together constitute 22.5 percent of the population of India and about 62 percent of the population of BIMARU states. MP constitutes 6 percent of India's population, which is the fifth largest state with population share. The population share of UP is 16.50 percent which is the largest share of a state in India's population. MP's geographical area constitutes 9.37 percent of Indian territory and it is the second largest state in India in terms of geographical area. The geographical area of UP constitutes 7.03 percent of Indian territory. UP is the fourth geographically largest state in India. Literacy rate of MP is 70.6 percent while the literacy rate of UP is 69.72 percent (Govt. of India, 2016). Both states' literacy rates are below the national level literacy rate of 74 percent. Poverty ratios of MP and UP are 31.65 percent and 29.43 percent, respectively as per the 2011-12 of consumption data. Both the states are characterised by higher poverty ratio than national level poverty ratio of 21.92 percent. Based on the calculation of per-capita income at the constant price of 2011-12, MP and UP are in the bottom five states in India with per-capita income of Rs. 60,452 per annum and Rs. 43,061 per annum, respectively according to the data for 2019-20. The data on social profile of the population of MP shows that Scheduled castes and Scheduled tribes are 15.6 percent and 21.1 percent, respectively of total population of MP (Govt. of India, 2011). Together Scheduled castes and Scheduled tribes constitute 36.7 percent of total population of MP. On the other hand in UP, the share of Scheduled Castes and Scheduled Tribes are 20.69 percent and 0.6 percent of total population of UP (Govt. of India, 2011). Together Scheduled Castes and Scheduled Tribe constitute 21.29 percent of total population of UP.

The post-economic liberalization period has witnessed Bharatiya Janta Party's longest rule of MP for 21 years with smaller interval of 1 year and 97 days from 17th December 2022 to 23rdMarch, 2020, during which Indian National Congress formed the government (Website of MP Vidhan Sabha). The longest spell of BJP leadership started with forming the government in MP from 8th December, 2003 which continued till date except the interval as mentioned before. The rest of the period has been ruled by Indian National Congress forming its government in MP between 7th December, 1993 and 8th December, 2003. On the other hand, UP has witnessed mixed political leadership where the

governments were formed many a times with coalition of different political parties (Website of Govt. of Uttar Pradesh). After 1991, the BJP has formed government for the total duration of 13 years and 3 months including its coming to power since 2017. Bahujan Samaj Party (BSP) has formed the government three times with total of 7 years during which it remained in power. Samajwadi Party (SP) was in power for total of 11 years since 1991. UP has been through president rules of three years since 1991. Each party's total governance has never been in continuation except three occasions. This is where UP has experienced the political instability since the start of economic liberalization in India. Both the states have witnessed carving out of new states from their territorial past namely Chhattisgarh from MP and Uttarakhand from UP on 1st November and 9th November, respectively in year 2000. The issue of political formation in these two states has been illustrated to understand if the competitive political stability matters for better economic performance. Competitive political stability is defined as a situation where in spite of having strong opposition the ruling party is able to form the government again.

5. Economic Performance of Madhya Pradesh and Uttar Pradesh and their Divergence

5.1. Economic performance of MP

Average growth rate of MP over 1980-81 to 1989-90 was 5.18 percent, which was below all India average of 5.60 percent over the same period (Bhattacharya and Sakthivel, 2004). If we look at the per-capita income growth rate then for MP it was 2.74 percent per annum over 1980-81 to 1989-90, which was below the all India average of growth rate of 3.36 percent per annum over 1980-81 to 1989-90. This information suggests that during the 1980s, MP witnessed the rising economic disparity vis-à-vis national average. In the backdrop of such performance the analysis of Gross State Domestic Product (GSDP) of MP for the period over 1993-94 to 2019-20 and its comparison with all India performance of GDP reveals the implication of economic liberalization for the MP vis-à-vis all India. The share of MP's GSDP in India's GDP went down from 4.54 percent in 1993-94 to 3.73 percent in 2014-15 but increased to 4.70 percent in 2019-20 (see figure 1). It shows that MP lost its share during the post-economic liberalization era but with rising share to

pre-liberalization year only by 2019-20. This has been substantiated by the fact that annual growth rate of MP has been at 6.28 percent, which is slightly lower than annual growth rate of GDP of India which has been reported at 6.87 percent over the period between 1993-94 and 2019-20. The gap is 0.59 percent which is little higher than the gap which was observed during the 1980s between the annual economic growth rate of MP and all India. The per-capita income growth rate for MP during 1993-94 to 2019-20 has been at 4.18 percent per annum which is lower than all India annual growth rate of per-capita income of 5.20 percent. The gap of growth rate of per-capita income of all India and MP has been 1.02 percent which higher than what was observed during 1980s when it was 0.62 percent (See Figure 2). The rising gap of per-capita income between MP and all India is visible in Figure 3 over the period during the economic liberalization. This post-economic liberalization data shows that there has been rise in divergence of MP from all India level in terms of per-capita income. This violates the convergence hypothesis given by the Neo-classical model.

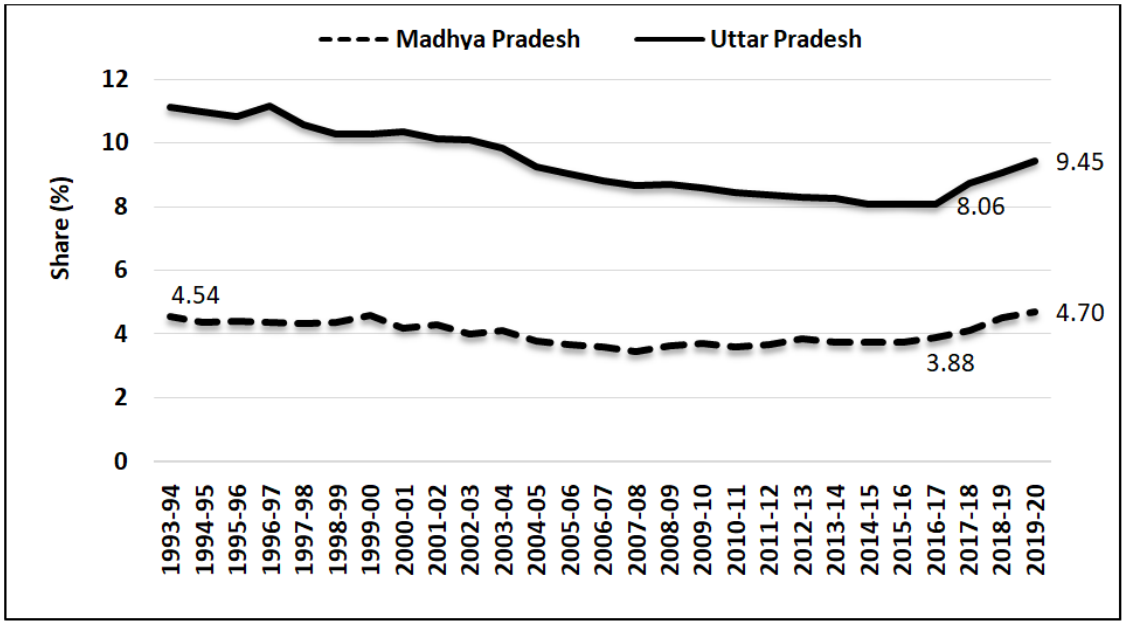
However, the sub-periods' GSDP performance reveals that MP has performed better than India, as depicted by the annual growth rate of GDP of India during the period since 2007-08 (see Table 1). Actually MP's GSDP as percentage of India's GDP was 3.45 percent in 2007-08 and after that it improved to 4.70 percent in 2019-20 (see Figure 1). What made this turnaround is the question that the current study is addressing in the sixth section. Though MP did not perform well in the period before 2007-08 as far as its share in India's GDP is concerned, this had adverse repercussion on MP's convergence to all India economic performance.

Table 1: Annual growth rate of GSDP of MP and UP and GDP of India during the sub-periods (%)

Years	Madhya Pradesh	Uttar Pradesh	All India
1993-94 - 1999-00	6.25%	4.68%	6.08%
2000-01 - 2006-07	5.26%	5.17%	7.98%
2007-08 - 2013-14	8.65%	6.25%	7.10%
2014-15 - 2019-20	8.13%	6.47%	6.97%
1993-94 - 2019-20	6.28%	5.47%	6.87%

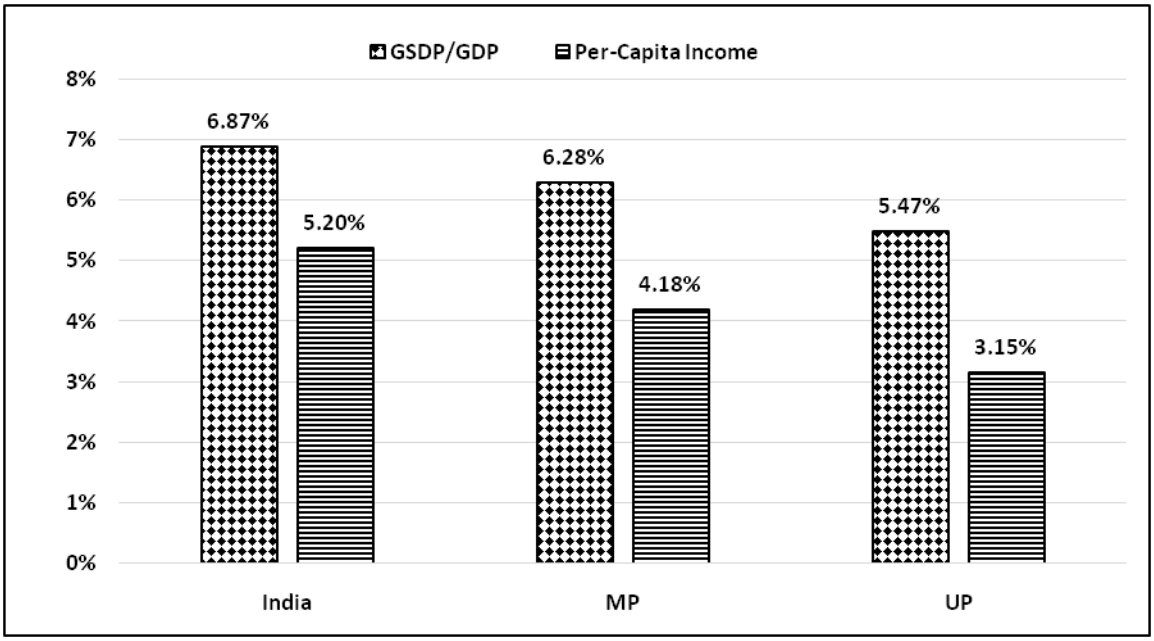
Source: Author's calculation based on data from Handbook of Statistics on Indian States, 2024, RBI.
Note: Growth rates have been calculated as CAGR. The sub-periods are of seven years except the last sub-period (2014-15 – 2019-20) which is of six years.

Figure 1: Share of MP and UP in All India GDP (percentage) over 1993-94 to 2019-20



Source: Author's calculation on the basis of data from Handbook of Statistics on Indian States, 2024, RBI

Figure 2: Comparative economic growth rate performance of MP and UP and GDP of India between 1993-94 and 2019-20



Source: Author's calculation based on data from Handbook of Statistics on Indian Economy-2024, RBI

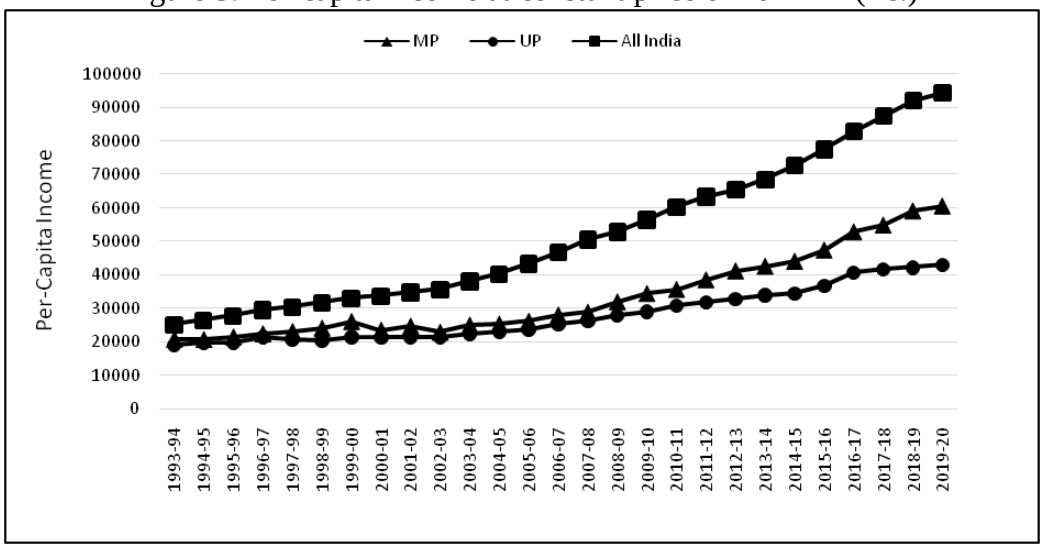
5.2. Economic performance of UP

Average growth rate of UP over 1980-81 to 1989-90 was 5.88 percent, which was above all India average of 5.60 percent over the same period (Table 1). This is where UP did better than MP during the period of 1980s. If we look at the per-capita income growth rate then it was 3.46 percent per annum over 1980-81 to 1989-90, which was well above the all India annual growth rate of 3.36 percent per annum over 1980-81 to 1989-90 (Table 1). This information suggests that during the 1980s, UP witnessed growing above the national average. In the backdrop of such performance the analysis of GSDP of UP for the period over 1993-94 to 2019-20 and its comparison with all India performance of GDP reveals the adverse implication of economic liberalization for the UP vis-à-vis all India. The share of GSDP of UP in India's GDP went down from 11.13 percent in 1993-94 to 8.06 percent in 2016-17 but with the reversal of the same went to 9.45 percent in 2019-20(see Figure 1). It shows that UP lost more in its share in the national level GDP during the post-economic liberalization era and this implies that annual growth rate of UP must be quite lower than annual growth rate of GDP of India over this long period. The annual SGDP growth rate in UP over 1993-94 to 2019-20 was 5.47 percent which is quite lower than India's annual GDP growth rate of 6.87 percent over the same period. The gap is by 1.4 percent or lower by 20.38 percent of national GDP growth rate, which indicates that performance of UP was quite opposite to what was observed during the 1980s. The economic divergence has increased quite significantly. When we compare the economic performance of UP vis-à-vis all India level in terms of per-capita income then the rising divergence is found to be quite accentuated. The per-capita income data for UP shows that it grew at 3.15 percent per annum between 1993-94 and 2019-20, which is even lower than the rate, it grew during the 1980s. If the same is compared to all India per-capita income growth rate then we find that India's per-capita income grew at 5.20 percent highlighting all India per-capita income growth rate is ahead by 2.05 percent with that of UP. So UP not only grew at lower rate than its own per-capita income growth rate of 1980s but it receded backward compared to all India level. It shows that UP lost to other states during the period of economic liberalization and it is quite along with what the critiques of economic liberalization have been saying that operation of laissez-faire increases the economic divergence between not only rich and poor families but also rich and poor regions (Sinha, Ramadas and Ramasundaram, 2023; Chancel and Piketty, 2019).

This divergence of economic performance is also negation of the economic convergence that Barro (1991) talks about the possible convergence as economy grow at faster rate.

The GSDP performance of sub-periods reveals that UP never performed better than the growth rate of GDP of India during any of the sub-periods (see Table 1). However, the sub-periods starting from 2007-08 witnessed better performance for UP as compared to previous sub-periods but this was on account of economic buoyancy of the Indian economy. But such performance of UP is nowhere close to MP's economic growth performance during the same sub-period.

Figure 3: Per-capita income at constant price of 2011-12 (Rs.)



Source: Author's calculation on the basis of data from the Handbook of Statistics on Indian Economy, RBI. Note: State-wise per-capita income is based on Net State Domestic Product and for India it is Net National Income.

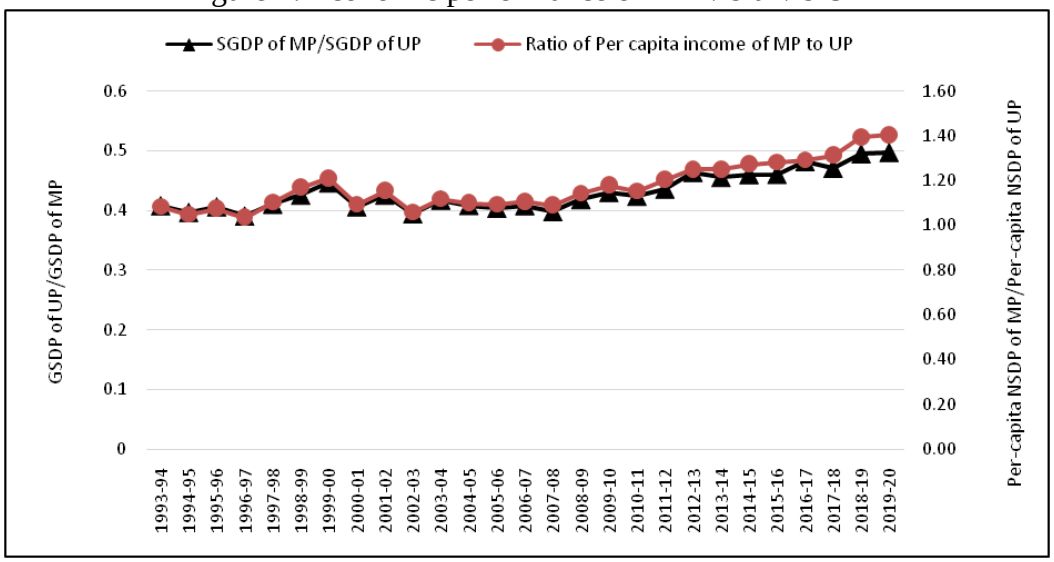
5.3. Issue of economic divergence

As we have seen in earlier studies about rising inequality across Indian states, here too we witness the rise of inequality across three political and economic entities: MP, UP and all India. However, all India is inclusive of MP and UP too. Figure 3 reveals that the per-capita income of MP, UP and all India were very close to each other in 1993-94. But 1999-2000 onwards all India per capita income increased faster than MP and UP on account of few states made economic advancement at faster pace such as Gujarat, Tamil

Nadu, Telangana etc. Such trend is as per the apprehensions made by many heterodox economists, who argue that market aggravates the economic divergence. Though 2007-08 onwards the per-capita income of MP started rising faster than the rise of per-capita income in UP.

An important concern arises about the varying performance of MP and UP, where MP is doing quite better in terms of economic growth performance as compared to UP and also that MP is doing better than India after 2007-08 and it continues till the end of the study period. In case of inter-state comparison with respect to MP and UP, arises a pertinent point about the rising inter-state divergence, which has been shown in Figure 4. It highlights the ratio of GSDP of MP to GSDP of UP as well as the ratio of per-capita NSDP of MP to per-capita NSDP of UP. The ratio of GSDP of MP to the GSDP of UP was at 0.41 in 1993-94 which increased to 0.50 in 2019-20. The similar trend has been visible even in case of the per-capita NSDP of MP vis-à-vis per-capita NSDP of UP as the ratio increased from 1.08 in 1993-94 to 1.40 in 2019-20. Such comparative economic study of MP and UP have largely been absent in the academic discourse, especially when both form a major segment of the BIMARU states in terms of population and areas. The subsequent section tries to understand such issue of divergence between MP and UP and relative convergence between MP and India based on sectoral performance with special reference to agriculture sector.

Figure 4: Economic performance of MP vis-à-vis UP



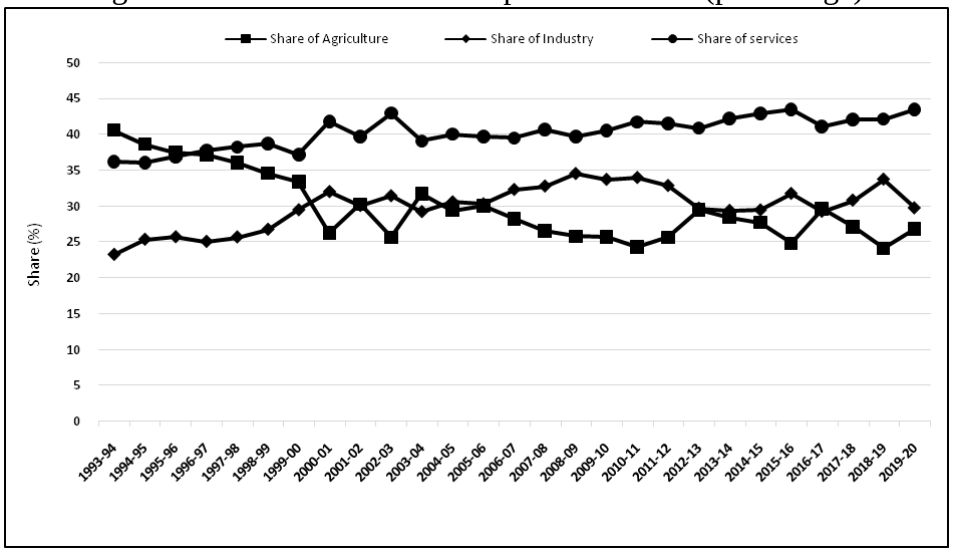
Source: Author's calculation on the basis of data from the Handbook of Statistics on Indian Economy, RBI.

6. Performance of Sectoral Composition in MP and UP and its Implication for their Economic Performance

Agriculture was the largest contributor in the GSDP of MP at the time of beginning of economic liberalization with 40.59 percent of GSDP in 1993-94 followed by service and industrial sectors with 36.18 percent and 23.24 percent, respectively (see Figure 5). After that the agriculture sector declined persistently to 25.64 percent in 2002-03 and after that it remained around that to reach at 24.33 percent in 2010-11 but after that again it increased and recorded at 26.82 percent in 2019-20. Share of industrial sector has increased from 23.24 percent in 1993-94 to 29.75 percent in 2019-20. As far as service sector is concerned it has dominated the sectoral composition of GSDP of MP over the period of study, and the trend shows that the share of service sector has increased from 36.18 percent in 1993-94 to 43.44 percent 2019-20 (see Figure 5).

On the other hand if we look at the sectoral composition of UP over the period from 1993-94 to 2019-20 then we find that the share of agriculture sector was 33.14 percent in 1993-94 and it has steadily declined to 14.44 percent in 2019-20 (see Figure 6). Share of industrial sector was 25.78 percent in 1993-94 and has increased to 30.99 percent in 2019-20. The sector which has witnessed steady increase in its share is the service sector. The share of the service sector increased from 41.08 percent to 54.57 percent in 2019-20.

Figure 5: Trend of Sectoral Composition of MP (percentage)



Source: Author's calculation on the basis of data from the Handbook of Statistics on Indian States (various issues)

Table 2: Sectoral annual growth rate of MP (in percentage)

Periods	Agriculture	Industry	Services
1993-94 - 1999-00	2.82%	10.51%	6.67%
2000-01 - 2006-07	6.75%	5.65%	4.51%
2007-08 - 2013-14	9.58%	6.39%	9.03%
2014-15 - 2019-20	6.50%	7.42%	7.51%
1993-94 - 2019-20	**4.26%**	**6.95%**	**6.68%**

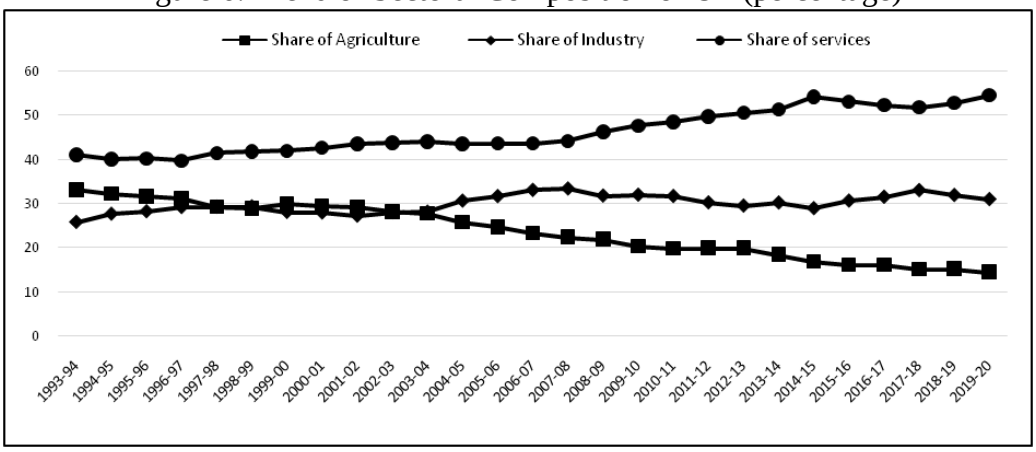
Source: Author's calculation on the basis of data from the Handbook of Statistics on Indian States (various issues). Note: Annual growth rate is based on CAGR of data at constant price of 2011-12

The comparison of sectoral composition of MP and UP with all India brings a very peculiar trend. MP's sectoral performance in comparison to that of UP and all India differs in a significant way. The share of agricultural sector in MP's GSDP does not fall to the extent as it is witnessed in UP and all India case. This implies that the segment on which majority of population is dependent upon has still maintained its share in overall economic output in MP and this could not be possible without better growth rate of agriculture sector. Better performance of agriculture sector also has better implication for the welfare of majority of population in the region. On the other hand declining share of agriculture in UP and all India has been accompanied by lower growth rate of agriculture sector, which implies slow progress of well-being of majority of population. The share of service sector in India's GDP has increased from 47.76 percent in 1993-94 to 63.19 percent in 2019-20. It is similar to UP where the share of service sector in UP's GSDP increased from 41.08 percent in 1993-94 to 54.47 percent in 2019-20. Share of industry at all India level has remained stagnant at around 22 percent over this period while in case of UP it increased from 25.78 percent in 1993-94 to 30.99 percent in 2019-20.

The earlier discussed economic performance of MP and UP vis-à-vis India and economic performance of MP vis-à-vis UP is being explained based on the sectoral performance and related economic policies especially with respect to the agriculture sector as this paper attempts to highlight the role of agriculture sector in determining the economic convergence. It is clearly visible that agriculture sector in MP has shown an outstanding performance if compared to UP as well as all India. The sharp decline in the share of agriculture sector that has been witnessed in case of UP and at all India level has not been observed in case of MP. Such performance of agriculture may have explanation of divergence between UP and MP in terms of GSDP. The performance of agriculture sector

in MP can also be used to explain the divergence of MP from all India till the mid-2010s and convergence afterwards.

Figure 6: Trend of Sectoral Composition of UP (percentage)



Source: Authors calculation based on the data from the RBI

Table 3: Sectoral annual growth rate of UP (in percentage)

Periods	Agriculture	Industry	Services
1993-94 - 1999-00	2.92%	6.18%	5.07%
2000-01 - 2006-07	1.44%	8.52%	5.91%
2007-08 - 2013-14	2.75%	4.38%	8.83%
2014-15 - 2019-20	3.60%	8.37%	7.02%
1993-94 - 2019-20	**2.30%**	**6.48%**	**6.67%**

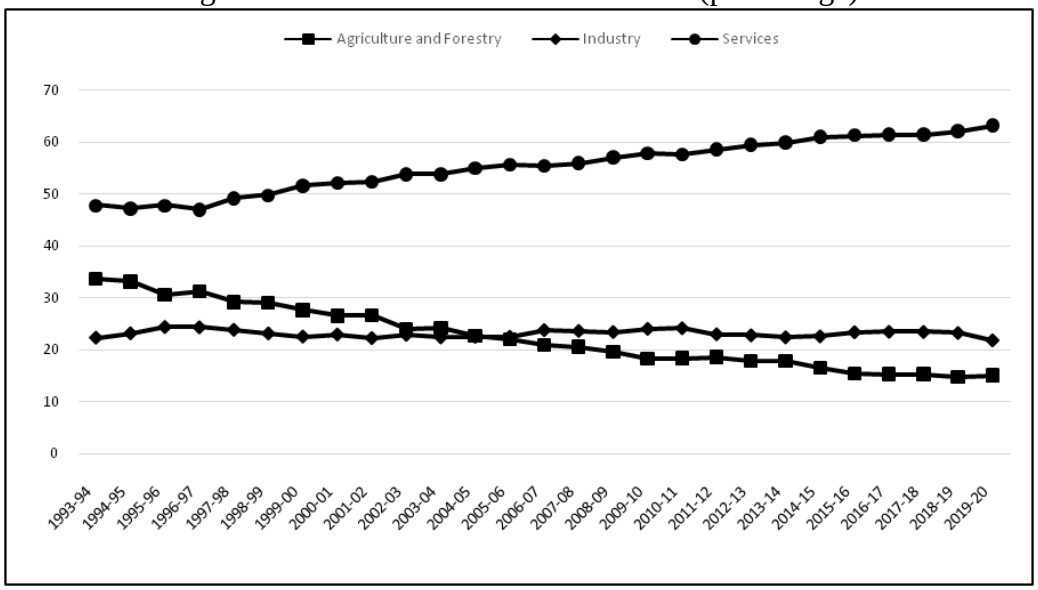
Source: Authors calculation based on the data from the RBI. Note: Annual growth rate is based on CAGR of data at constant price of 2011-12

Table 4: Sectoral annual growth rate of India (in percentage)

Periods	Agriculture	Industry	Services
1993-94 - 1999-00	3.31%	6.94%	8.13%
2000-01 - 2006-07	2.61%	7.40%	7.86%
2007-08 - 2013-14	3.46%	5.03%	7.20%
2014-15 - 2019-20	4.43%	5.65%	7.16%
1993-94 – 2019-20	**3.21%**	**6.35%**	**7.60%**

Source: Authors calculation based on the data from the Handbook of Statistics on Indian Economy (Real Time), RBI

Figure 7: Sectoral share in GDP of India (percentage)



Source: Authors calculation based on the data from the Handbook of Statistics on Indian Economy (Real Time), RBI.

The annual growth rate of agricultural output in MP was 4.26 percent between the years 1993-94 and 2019-20, which is higher than 2.30 percent of UP for the same period and also 3.21 percent of all India (see Tables 2, 3 and 4). Remarkably the agriculture sector performance in MP has been very high at 9.58 percent for the period from 2007-08 to 2013-14, rather it has been the highest in India. If we look at the sub-period figures we find that for the sub-periods: 2000-01 – 2006-07, 2007-08 – 2013-14 and 2014-15 – 2019-20, annual growth rates of agriculture in MP were 6.75 percent, 9.58 percent and 6.50 percent, respectively; while during the same sub-periods UP recorded annual growth rates of agriculture at 1.44 percent, 2.75 percent and 3.60 percent, respectively. If we compare the MP's agricultural performance with that of all India then we find that during the same sub-periods India's agriculture sector grew at an annual rate of 2.61 percent, 3.46 percent and 4.43 percent, respectively. This impressive performance of MP in agriculture sector can be used to explain distinguishing economic performance of MP vis-à-vis UP. It is also necessary to explain that what made MP so special in terms of agricultural performance so that other similar states can adopt such policies to strengthen their agricultural base. Such issues have been discussed in the following sub-sections:

6.1. Role of agriculture in economic growth of MP and UP

There may be variations in opinion about the role of agriculture in the economic performance of any region. But given the dominancy of major share of population in India and also MP and UP, the role of agriculture cannot be ruled out in having influence of the economic performance of these geographies specially in UP and MP. Such explanations may be derived based on the logic of the existing works which have argued the role of agriculture in an economy through forward and backward linkages (Jha, 2010). To understand the role of agriculture in the economic performance, an ordinary least square regression test was conducted for MP, UP and India based on the model which considers economic growth rate as measure of economic performance and being considered as dependent variable and agriculture sector growth rate as independent variable. The model is specified as follows:

$$Y_{gt} = \beta_0 + \beta_1 A_{gt} + \varepsilon_t \qquad (1)$$

Where Y_{gt} is annual GSDP growth rate for states – UP and MP and annual GDP growth rate of all India, β_0 is intercept and β_1 is co-efficient to explain the change in Y_{gt} due to change in A_{gt}. Here A_{gt} is annual growth rate of agriculture in respective state and all India. ε_t is the error term. The general estimation of this model for the different time periods provides the results which are presented in Table 5 and Table 6.[2,3]

[2] Regarding anonymous reviewer's concern about the limitation of small sample size of the data for regression analysis in this paper, the author while agreeing with it believes that the data in the study does not consist of primary observations and it is 26 years' time-series data and not merely 26 samples. Therefore, using regression for data spanning 26 years or 13 years does not undermine the results of the regression analysis used in the study. The applicability of regression analysis isn't strictly limited by the number of data points or the time frame they cover. However, there are important considerations to keep in mind when working with such long-term data which author considered at the time of analysis. The regression test has been run independently for each state hence it is not a panel and cross-sectional data. Author also wants to point out that in OLS Regression Findings, the availability of Multiple R itself is a correlation coefficient hence it serves the suggestion made by the reviewer to use the correlation analysis instead of regression analysis. Keeping regression analysis helps to provide the coefficient of determination that measures the proportion of variance in the dependent variable (GDP/GSDP growth) that is predictable from the independent variable (agricultural growth).

[3] With respect to another observation by the anonymous reviewer about the starting year of data for the study, the concern was about 1993-94 as starting period of the study while in regression analysis it is mentioned the period since 1994-95. The author states that the data on sectoral composition is available only since 1993-94 in the source on most of counts which have been used for the analysis in this study. When the CAGR is being calculated for the period from 1993-94 to 2019-20 then the average growth rate that author gets for this period will be for the whole of 1993-94 to 2019-20 and not the 1994-95 to 2019-20. But when author calculates the annual growth rate for each year for the regression analysis purpose then there is limitation to have annual growth rate for 1993-94 as data for 1992-93 is not available in the source

Table 5: Results of Ordinary Least Square Regression of economic growth rate on agricultural growth rate (1994-95 – 2019-20) as per Equation 1

Statistical Measures	MP	UP	India
Intercept	5.14 (0.000%)	4.62 (0.000%)	5.94 (0.000%)
Co-efficient	0.24 (0.000%)	0.38 (0.133%)	0.16 (2.895%)
Multiple R	0.77	0.6	0.43
R Square	0.6	0.35	0.18
Adjusted R Square	0.58	0.33	0.15
Standard Error	2.91	1.98	1.36
Significance F	0.00%	0.13%	2.90%
No. of observations	26	26	26

Source: Author's calculation. Note: Figures in parenthesis are p-values.

Table 6: Results of Ordinary Least Square Regression Results of economic growth rate on agricultural growth rate for sub-periods (1994-95 – 2006-07 and 2007-08 – 2019-20) as per Equation 1

Sub-periods	Statistical Measures	MP	UP	India
1994-95 – 2006-07	Intercept	4.04(0.041 %)	3.63 (0.013%)	5.94 (0.000%)
	Co-efficient	0.26 (0.022 %)	0.53 (0.411%)	0.22 (1.719%)
	Multiple R	0.85	0.74	0.65
	R Square	0.73	0.54	0.47
	Adjusted R Square	0.71	0.5	0.36
	Standard Error	2.87	1.99	1.29
	Significance F	0.02%	0.41%	1.72%
	No. of observations	13	13	13
2007-08 – 2019-20	Intercept	7.02 (0.001 %)	5.69 (0.000%)	6.14 (0.000%)
	Co-efficient	0.14 (4.574 %)	0.20 (16.078%)	0.03(81.618%)
	Multiple R	0.59	0.43	0.08
	R Square	0.34	0.19	0.01
	Adjusted R Square	0.28	0.11	-0.09
	Standard Error	2.57	1.66	1.46
	Significance F	4.57%	16.08%	81.62%
	No. of observations	13	13	13

Source: Author's calculation. Note: Figures in parenthesis are p-values.

The significant role of agriculture sector in explanation of economic performance of Madhya Pradesh is clearly visible as compared to UP and all India for the entire period from 1994-95 to 2019-20 (see Table 5). The intercept values indicate the expected economic growth rate when the agricultural growth rate is zero. The P-values suggest that the intercept for MP is highly significant, while for UP and all India, it is less significant.

as desired by the author. Hence annual growth rate has been calculated starting from 1994-95 till 2019-20 with 26 observations and hence in the regression analysis it is using 1994-95 as the starting period. Such a long-run analysis-based trend is not influenced by just one year growth rate if it is missing due to structural issues on the availability of data.

The coefficients represent the change in economic growth rate for a one-unit change in agricultural growth rate. For MP, the positive coefficient with a highly significant P-value indicates a strong positive relationship between agricultural growth rate and economic growth rate. However, for UP and all India, the relationship is also positive but less significant. The strong correlation between GSDP growth rate and agricultural growth rate of MP is also shown by the Multiple-R with a value of 0.77 but the values of Multiple-R are lower in case of UP and all India. The analysis of the Table 5 shows that agricultural growth has a significant impact on the economic growth of MP compared to UP and all India. This suggests that policies aimed at boosting agricultural growth in MP could have a substantial effect on its overall economic growth compared to the other regions. The further analysis of relationship between agriculture and economic growth across MP, UP and all India for sub-periods reflects the same characteristics as we have observed in case of the overall period. It is visible that agriculture has been more effective in determining the economic growth in MP as compared to UP and all India during both the sub-periods (see Table 6). This is also substantiated by the values of Multiple-R showing correlation between agricultural growth rates and GSDP growth rate of MP and UP and all India's GDP growth rate. However, it appears that the significance of agriculture sector's growth in determining the economic growth has declined during 2007-08 – 2019-20 as compared to 1994-95-2006-07. And this could be on account of the service sector turning a dominant sector in MP, UP and all India level. Even in the later period (during 2007-08 – 2019-20) the significance of agriculture in MP on its impact on economic growth is better as compared to UP and all India level. This suggests that while agricultural growth remains important in MP but its influence on economic growth has diminished over time but not as much as in UP and at all India level.

6.2. Agricultural policies in MP

We have observed in the above section that agriculture appears an important factor in explaining the better economic performance of MP during the last two decades. We need to discuss the implementation of agricultural policies in MP which can be a role model for those states who are economically backward and have major population dependent upon the agricultural and rural economies. Gulati, Rajkhowa and Sharma (2017), while

highlighting the extraordinary performance of agriculture sector in MP, argue that such a spectacular growth of agriculture is attributable to expanded irrigation facilities, strong procurement system accompanied by bonus over the Minimum Support Price (MSP) for wheat and all weather roads to connect farmers with the markets. Many authors have attributed the spectacular performance of agriculture in MP to former Chief Minister Mr. Shivraj Singh Chauhan, who has implemented effective agricultural policies that brought popularity to Mr. Chauhan in the politics of MP. So much so that he is being considered parallel to Pratap Singh Kairon, who was an iconic Chief Minister of Punjab and during Kairon's regime Punjab turned out to be the food bowl of India (Mishra, 2024). The period during which MP witnessed spectacular agricultural performance that arrested the slide in the share of MP in all India GDP after mid-2000s has been characterised by few agricultural trends which are mentioned below:

6.2.1. Increase in sown area

Increase in agricultural production is reflected by Gross and Net Sown Areas. The Gross Sown Area represents the total area sown once and/or more than once in a particular year, i.e. the area is counted as many times as there are sowings in a year. The data on Gross Sown Area for MP as share of all India shows that it increased from 10.57 percent in 2004-05 to 13.38 percent in 2019-20 (see Table 7). On the other hand in case of UP it has declined from 13.36 percent in 2004-05 to 12.83 percent in 2019-20. The Net Sown Area represents the total area sown with crops. In case of Net Sown Area, the area sowed more than once in the same year is counted only once. The data on Net Sown Area shows that for MP it has increased from 10.65 percent of all India Net Sown Area in 2004-05 to 11.09 percent in 2019-20. But in case of UP it has remained stagnant as it was 11.86 percent of all India Net Sown Area in 2004-05 and remained at 11.70 percent in 2019-20.

6.2.2. Increase in irrigated area

Irrigation is very important input in agriculture. Major agricultural growth between the years 1970 to 2000 in India has been attributed to irrigation induced productivity (Shah,

Mishra, Kela and Chinnasamy, 2016). Based on this approach political leadership in MP pursued agricultural growth through irrigation expansion not only as economic instrument to make MP agriculturally independent but also as a political strategy for capturing agrarian vote-banks. The increase in irrigated area is measured with two variables: Gross Irrigated Area and Net Irrigated Area. Gross Irrigated Area is defined as total area under crops irrigated once or more than once in a year. If a cropped area is irrigated twice in a year then gross irrigated area is twice of the area of crops.The Gross Irrigated Area in MP increased from 7.64 percent of all India Gross Irrigated Area in 2004-05 to 13.08 percent in 2019-20 (see Table 7). On the other hand in UP the Gross Irrigated Area declined from 23.36 percent in 2004-05 to 20.45 percent in 2019-20. The Net Irrigated Area, which is defined as area irrigated once in a year for any crop, increased in MP from 10.20 percent of all India Net Irrigated Area in 2004-05 to 16.59 percent in 2019-20. While in case of UP it declined from 22.15 percent in 2004-05 to 18.99 in 2019-20 (see Table 7). Considering the role of irrigation in inducing productivity of the land, such progress of MP on the front of irrigation may have been an important factor in determining its spectacular agricultural performance.

6.2.3. Increase in cropping intensity:

Cropping intensity essentially determines the nature of crop production and the cropping pattern, the scope for crop diversity and crop rotation, opportunities with regard to farming incomes, and rural employment (Mondal and Sarkar, 2021). Increase in cropping intensity can be considered as an important factor for better performance of agriculture for any state or a country. The Cropping Intensity Index of MP increased from 134.9 in 2004-05 to 182.3 in 2019-20 (see Table 7). The improvement in cropping intensity of MP has been so much that it was at 15th position amongst all Indian states and UTs in 2004-05 but by 2019-20 it climbed to 7th position at all India level. The state-wise position of cropping intensity has been calculated by the author based on data from the RBI. However, UP has been nearly stagnant in Cropping Intensity Index between 2004-05 and 2019-20 as it increased from 153.0 to 165.6. Such variation in performance must have implication for the agricultural performance of MP far better than UP.

Table 7: Important agricultural indicators in MP and UP as share of all India

	Gross Sown Area* (%)		Net Sown Area* (%)		Gross Irrigated Area* (%)		Net Irrigate Area* (%)		Cropping Intensity Index	
Year	MP	UP	MP	UP	MP	UP	MP	UP	MP	UP
2004-05	10.57	13.36	10.65	11.86	7.64	23.36	10.2	22.15	134.9	153
2005-06	10.17	13.13	10.61	11.78	6.97	22.51	9.34	21.49	131	152.2
2006-07	10.45	13.21	10.54	11.85	7.54	22.15	10.14	21.22	136.5	153.3
2007-08	10.46	12.97	10.42	11.64	7.46	21.74	10.16	20.71	139	154.2
2008-09	10.58	13.04	10.53	11.67	7.55	22.06	10.22	21.11	138.3	153.8
2009-10	11.32	13.45	10.76	11.92	8.42	22.75	11.13	21.6	143	153.4
2010-11	11.15	12.96	10.68	11.72	8.34	22.07	11.21	21.11	145.8	154.4
2011-12	11.5	13.25	10.81	11.79	8.96	21.68	12	21.02	147.8	156
2012-13	11.89	13.28	10.99	11.85	9.66	21.76	12.84	20.92	150.7	155.9
2013-14	11.95	12.86	10.92	11.71	10.3	21.19	13.82	20.5	155.9	156.5
2014-15	12.01	13.19	11.01	11.9	10.53	21.43	13.97	20.98	155.1	157.5
2015-16	11.97	13.23	10.9	11.85	10.26	21.36	13.7	21	156.5	159.1
2016-17	12.04	13.4	10.96	11.92	10.71	21.72	14.26	20.7	159	162.7
2017-18	12.5	13.37	10.95	11.92	11.22	21.28	15.05	20.43	165.3	162.4
2018-19	12.98	13.35	10.98	11.95	12.11	20.71	15.71	19.92	171.8	162.4
2019-20	13.38	12.83	11.09	11.7	13.08	20.45	16.59	18.99	182.3	165.6

Source: Author's calculation based on data from the Handbook of Statistics on Indian States-2024, RBI.
* Figures are expressed as share in all India.

6.2.4. Effective implementation of MSP for wheat

There has been wider consensus about the positive role of Minimum Support Price (MSP) in enhancing production of crops provided the state has been sincere in implementation of procurement of crops with well-structured administrative and logistic setup in place (Singh and Bhogal, 2021; Sardana, 2024). India introduced the MSP in 1965 to achieve self-reliance in food grains. However, in recent time the MSP has been pursued sincerely and effectively in MP also especially in the case of wheat. This has led to remarkable performance of wheat in MP. UP has lagged in implementing the MSP effectively, as evident from Table 8. An innovation was done by MP in organising its procurement as a decentralised procurement system where wheat is procured by state agencies (co-operative societies) and only the surplus wheat stocks over and above the state's requirement under the targeted public distribution system/National Food Security Act and other welfare schemes have been taken over by the FCI for dispatch to other consuming regions. The MP government started "e-Uparajan" initiative to regulate the number of farmers bringing their produce by maintaining records of farmers willing to sell at the MSP and allocating a date to each farmer through SMS. Primary objective of this programme was to enable a smooth, regulated and efficient procurement process. The Madhya Pradesh State Civil Supplies Corporation Ltd (MPSCSC) and MP State Co-operative and Marketing Federation made necessary procurement arrangements in the allotted procurement areas. Each district collector approved number of societies to open

their centres for procurement operations. The numbers of centres and their locations are decided by the district collector. Often the number of procurement centres for wheat has been almost 4 times higher than rice procurement centres. There was also increase in storage capacity and to promote effective augmentation of storage capacity, there was introduction of the Warehousing and Logistics Policy in 2012. This led to rise in the storage capacity of MP for food grains from 8.03 percent of national storage capacity in 2013 to 20.52 percent in 2018. Effective implementation of MSP programs is reflected by the fact that wheat procurement in MP increased from 2.12 percent of all India level procured wheat in 2004-05 to 19.70 percent in 2019-20. In case of the rice the share of MP increased from 0.17 percent in 2004-05 to 3.36 percent in 2019-20. As far as UP is concerned, its shares in all India level procured wheat were reported at 10.60 percent in 2004-05 and 10.84 percent in 2019-20. In case of the rice, UP's share declined from 12.04 percent in 2004-05 to 7.31 percent in 2019-20. Table 8 reflects the sincere efforts of MP government in promoting the procurement of wheat and rice. This has led to the extent that in 2020-21, MP was the largest contributor in all India level wheat procurement under MSP program by contributing 12,816 thousand tons followed by Punjab and Haryana with contributions of 12,714 thousand tons and 7,400 thousand tons (Govt. of India, 2021).

Better performance of economic growth of MP as compared to performance of economic growth of UP during the post-economic liberalization can be explained only if we take agriculture sector performance into account. The higher growth rate of income of population dependent on agriculture has greater degree of demand implication in the state as the marginal propensity to consume is higher in the economically poor class (Murugasu, Wei and Hwa, 2013). The role of agriculture in deciding the pattern of industry and services are through backward and forward linkages which exists between agriculture and rest of the two sectors. The poor performance of UP in the agricultural production is on account negligence by the state government toward agriculture over a substantial period of time during the economic liberalization period. It did not have any remarkable schemes as we have seen in the context of MP. The benefits of MSP have not been extended adequately to the farmers due to poor functioning of procurement stations such as *mandis* as well as delay and unnecessary harassments of farmers. The data on procurement of wheat of UP as percentage of all India level suggest that wheat

procurement has been at 2.72 percent in 2013-14 which is lower than what was the procurement share of 10.60 % in 2004-05 even though the MSP for wheat has increased (see Table 8).

Table 8: Share on MP and UP in wheat and rice procurement at all India level (%)

	Share in Wheat		Share in Rice	
Year	**MP**	**UP**	**MP**	**UP**
2004-05	2.12	10.6	0.17	12.04
2005-06	3.38	3.92	0.49	11.39
2006-07	0	0.53	0.29	10.19
2007-08	0.52	4.94	0.24	10.06
2008-09	12.46	16.22	0.72	11.75
2009-10	8.62	17.01	0.8	9.06
2010-11	18.86	8.77	1.51	7.47
2011-12	21.88	15.25	1.81	9.58
2012-13	22.26	13.25	2.64	6.72
2013-14	25.35	2.72	3.28	3.54
2014-15	25.56	2.23	2.52	5.3
2015-16	26.02	8.07	2.48	8.5
2016-17	17.39	3.47	3.45	6.18
2017-18	21.82	12	2.87	7.53
2018-19	20.43	14.79	3.14	7.28
2019-20	19.7	10.84	3.36	7.31

Source: Author's calculation based on data from Agricultural Statistics at a Glance (various issues)

The MSP of wheat and rice increased from Rs. 640 per quintal and Rs. 560 per quintal, respectively in 2004-05 to Rs. 1925 per quintal and Rs. 1815 per quintal in 2019-20 (Agricultural Statistics at Glance, GOI, 2011 and 2022). The MP government had extended some bonus price over and above the MSP to benefit the farmers also ranging from Rs. 100 per quintal to Rs. 150 per quintal (Gulati, Rajkhowa, Roy and Sharma, 2021). Due to non-functioning of UP's procurement system, the farmers end up selling to private players, which was 15 to 25 percent less remunerative for farmers. There has been also an obstacle in procurement of sugarcanes from the farmers due to unnecessary delay in the payment to farmers. The lower performance of agriculture in UP do have implication in determining its economic growth rate as 59 percent of workforce of UP is engaged in agriculture sector. The depressed demand of this large number of population

of UP due to very low growth rate of agriculture worked as impediment in the progress of rest of the sectors and therefore economic growth. To substantiate this argument one can refer to an existing study by Tirpathi (2016) that examines the lead role of agriculture in UP in determining its economic growth and he has also shown econometrically that agriculture has been an engine of economic growth of UP and therefore the stagnation of agriculture in UP may explain the stagnation of UP's economic growth and therefore its divergence from MP as well as all India.

7. Conclusion

Current study reveals that there has been rise in the divergence of economic performance of MP and UP, representing backward states, from all India average during the period of economic liberalization. This has been reflected also by divergence between the per-capita income of MP and UP and all India level per-capita income. The per-capita income of MP as percentage of all India per-capita income has decreased from 82.46 percent in 1993-94 to 64.03 percent in 2019-20. Similarly the per-capita income of UP as percentage of all India per-capita income has declined from 76.19 percent in 1993-94 to 45.60 percent in 2019-20. Even though Indian economy has been characterized by rising dominance of market forces during the economic liberalization period and Indian economy has grown at faster pace but the income gap between the backward states and the all India average has gone up.

However, the performance of MP has been better than UP in terms of annual economic growth rate as well as per-capita income. The performance of MP as compared to UP has been better as the per-capita income of UP as percentage of per-capita income and MP has declined from 92.41 percent in 1993-94 to 71.23 percent in 2019-20. This gap has increased particularly after the mid-2000s since when the agricultural performance of MP has been the best among all Indian states. The better performance of MP as compared to UP can be attributed to varying performance of agriculture sector. The statistical analysis shows that during 1994-95 – 2006-07 the economic growth of MP, UP and all India had strong relationship with agricultural performance. However, the significance of agriculture in explanation of economic growth performance of MP, UP and all India has

gone down during 2007-08 – 2019-20 on account of service sector emerging as lead sector in the contribution to GSDP in states and GDP at all India. Although in 1994-95 – 2006-07 as well as 2007-08 – 2019-20 the agriculture sector has remained an important independent variable in explanation of GSDP growth rate in MP as compared to UP and all India. The role of agriculture sector in better economic performance of MP has been significant because the share of agriculture sector in MP's GSDP is still very high as compared to all India trend even during 2019-20. MP government has played significant role in pursuing agriculture-centric economic policies emphasising the role of irrigation, road transports and MSP to promote agriculture sector in the state. It implies that to make the economy grow at faster pace the agriculture sector must be given higher priority in the developmental plan of the government and it needs to be supported with substantial scale of infrastructure growth along with the price based incentives to farmers. Agriculture driven economic growth rate is also important as even now the largest share of workforce in India is engaged in agriculture sector and such work force has greater role in generation of demand in the economy which will catalyse the economic growth in other sectors in sustainable manner. Such efforts will also play role in reduction of regional disparity and help in promotion of balanced regional growth.

References

- Barro, R. J. (1991), "Economic Growth in a Cross Section of Countries", *The Quarterly Journal of Economics*, Vol. 106, No. 2.
- Barro, R.J. and Xavier Sala-i-Martin (1992), "Convergence", *Journal of Political Economy*, Vol. 100, No. 2, April.
- Bhattacharya, B.B. and S. Sakthivel. (2004), "Regional Growth and Disparity in India: Comparison of Pre- and Post-Reform Decades", *Economic and Political Weekly*, Vol. 39, Issue No. 10, March 6.
- Chandrasekhar, CP (2007), "The Process of Reforms and Retrogression of Agriculture in India Independent", *Social Scientist/Sahmat*, 22-24 February.
- Chancel, Lucas and Thomas Piketty (2019), "Indian Income Inequality, 1922-2015: From British Raj to Billionaire Raj?", *The Review of Income and Wealth*, Volume-65, Issue-S1, November.
- Govt. of India (2011, 2022), *Agricultural Statistics at Glance*, Ministry of Agriculture and Farmer Welfare, Delhi.
- Govt. of India (2011), Census Table-2011, Ministry of Home Affairs, available at https://censusindia.gov.in/census.website/data/census-tables
- Govt. of India (2016), *Men and Women in India – 2016*, Ministry of Statistics and Program Implementation, Delhi, available at

https://mospi.gov.in/publication/women-and-men-india-2016

- Govt. of Madhya Pradesh (undated), List of Honourable Chief Ministers of Madhya Pradesh, available at: https://mpvidhansabha.nic.in/loh_.htm
- Govt. of Uttar Pradesh (undated), List of Chief Ministers of Uttar Pradesh and their Period, available at http://upvidhanparishad.nic.in/Mukhyamantri.htm
- Gulati, Ashok, Pallavi Rajkhowa and Pravesh Sharma (2017), *Making Rapid Strides- Agriculture in Madhya Pradesh: Sources, Drivers, and Policy.* Delhi: Indian Council for Research on International Economic Relations.
- Guruswamy, Mohan, Kamal Sharma and Jeevan Prakash Mohanty (2005), "Economic Growth and Development in West Bengal: Reality versus Perception", *Economic and Political Weekly,* Vol. 40, Issue No. 21, May 21.
- Jha, Rajiv (2010), "Analytics of the Agriculture-Industry Relationship in a Closed Economy: A Case Study of India", *Economic and Political Weekly,* Vol. 45, IssueNo. 17, April 24-30.
- Kannan, K.P. (2011), "Agricultural Development in an Immersing Non-agrarian Regional Economy: Kerala's Challenges" *Economic and Political Weekly, Vol. XLVI No.* 9, February 26.
- Khan, Waseem and W. K.Ansari (2018), "Does Agriculture Matter for Economic Growth of Uttar Pradesh (India)", *Ekonomika Regiona,* Vol. 14 Issue 3.
- Mishra, Prabhudatta (2024), "Agri Ministry gets Minister it Deserves in Shivraj Singh Chauhan", Business Line", 11th June, https://www.thehindubusinessline.com/news/agri-ministry-gets-the-minister-it-deserves-in-shivraj-singh-chouhan/article68276641.ece
- Mondal, Tarun Kumar and Santana Sarkar (2021), "Analysing Cropping Intensity in North Twenty FourParaganas District, West Bengal, India", Miscellanea Geographica – Regional Studies on Development, Vol. 25, No. 4.
- Murugasu, Dhruva, A. J. Wei and T. B. Hwa J. (2013). *The Marginal Propensity to Consume across Household Income Groups.* Malaysia: Central Bank of Malaysia.
- Raj, K.N. (1976), "Growth and stagnation in Indian industrial development", *Economic & Political Weekly,* Annual Number, February.
- Ramaswamy, K.V. (2007), "Regional Dimension of Growth and Employment", *Economic & Political Weekly*, Vol. 42, Issue No. 49, December 8.
- Rao, M. Govinda, R.T. Shand and K.P. Kalirajan (1999), "Convergence of Incomes across Indian States: A Divergent View", *Economic and Political Weekly,* Vol. 34, No. 13, April 2.
- Reserve Bank of India (2024), *Handbook of Statistics of Indian States,* RBI, Mumbai accessed online.
- Reserve Bank of India (various issues), *Handbook of Statistics of Indian Economy,* RBI, Mumbai, accessed online.
- Sardana, Arvind (2024), "Minimum Support Price: Lessons from the Malwa Experience in Madhya Pradesh", *Economic and Political Weekly (Engage),* Vol. 59, Issue No. 15, April 13.
- Shah, Tushar, Gaurav Mishra, Pankaj Kela and Pennan Chinnasamy (2016), "Har Khet Ko Pani? Madhya Pradesh's Irrigation Reform as a Model", *Economic and Political Weekly,* Vol. LI, No. 6, February 6.
- Sharma, Vinita (2015), "Are BIMARU States Still Bimaru", *Economic and Political Weekly,* May 2, 2015, Vol. 50, No. 18.

- Singh, Sukhpal and Shruti Bhogal (2021), "MSP in a Changing Agricultural Policy Environment", *Economic and Political Weekly*, Vol. LVI, No. 3, January 16.
- Sinha, Manjisha, Sendhil Ramadas and P. Ramasundaram (2023), "Are Spectacular Growth and High Inequality Two Sides of the Same Coin?", *Economic and Political Weekly*, Vol-LVIII No. 19, May 13.
- Solow, Robert (1956). "A Contribution to the Theory of Economic Growth," *The Quarterly Journal of Economics*, Vol. 70, No.1.
- Tripathi, A. (2016). "Agriculture is Still the Engine of Economic Growth: Empirical Evidence from Uttar Pradesh, India." *Asian Journal of Agriculture and Development*, 13(1).
- Vaidyanathan, A. (1977), "Constraints on growth and policy options", *Economic & Political Weekly*, September 17 and December 17.
- Verick, R. P. (2017). *The State of Employment in Uttar Pradesh: Unleashing the Potential for Inclusive Growth.* Geneva, Switzerland: International Labour Organization.
- Verma, Smriti A. G. (2017, March). *Doubling Agricultural Growth in Uttar Pradesh: Sources and Drivers for Agricultural Growth and Policy Lessons.* New Delhi: Indian Council for Research on International Economic Relations.

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