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.

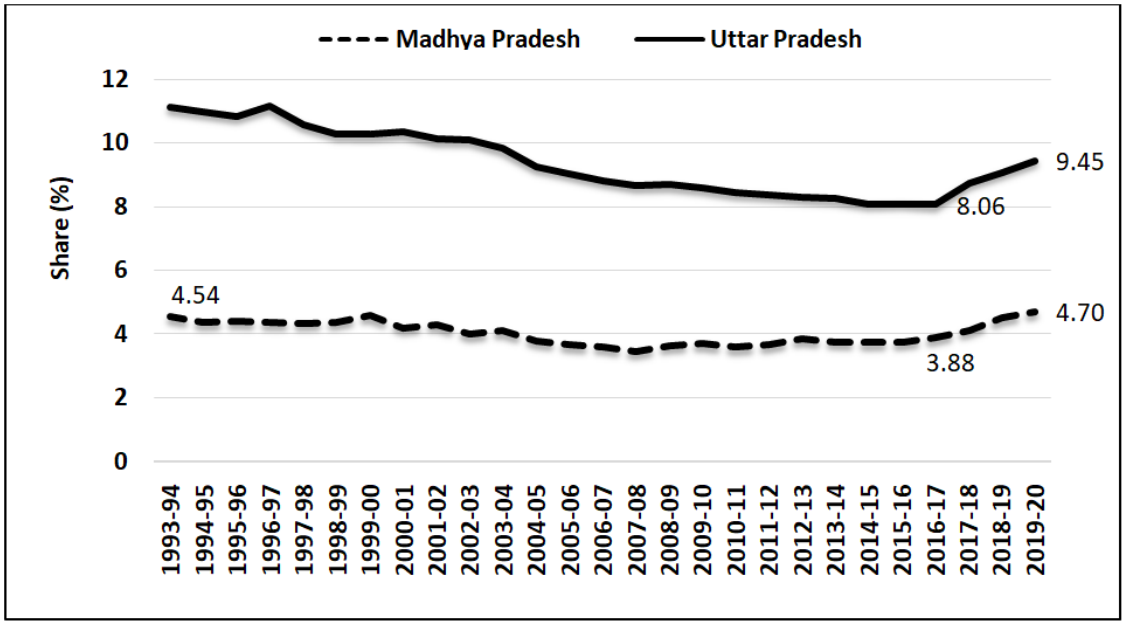
However, the sub-periods' GSDP performance reveals that MP has performed better than India, as depicted by the annual growth rate of GDP of India during the period since 2007-08 (see Table 1). Actually MP's GSDP as percentage of India's GDP was 3.45 percent in 2007-08 and after that it improved to 4.70 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%

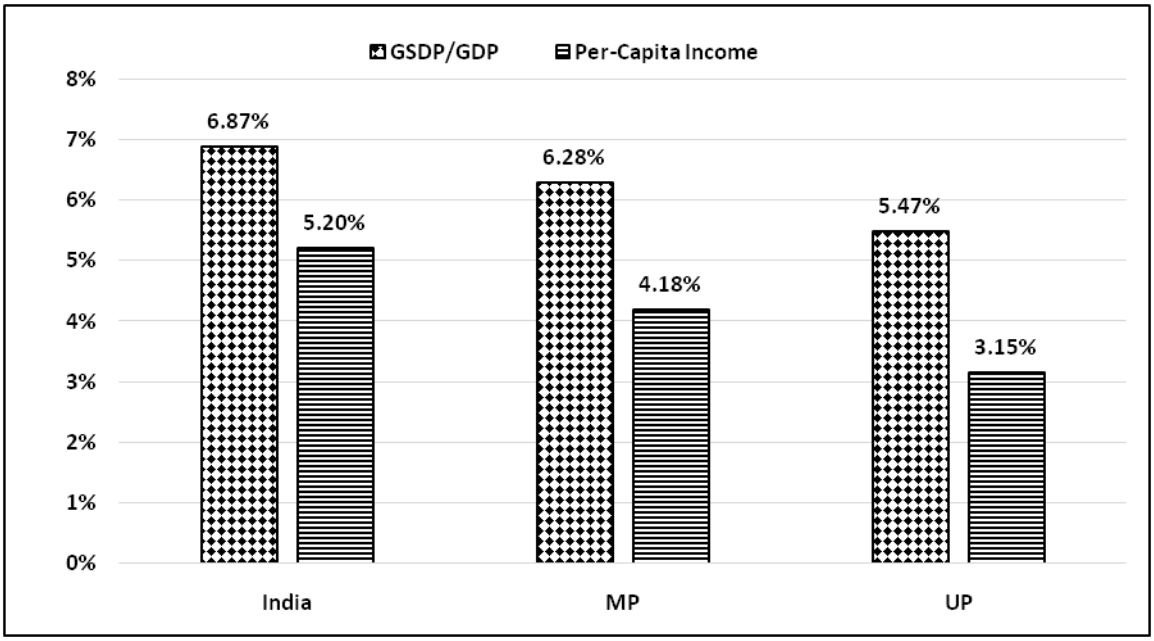
Source: Author's calculation based on data from Handbook of Statistics on Indian States, 2024, RBI.
Note: Growth rates have been calculated as CAGR. The sub-periods are of seven years except the last sub-period (2014-15 – 2019-20) which is of six years.

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

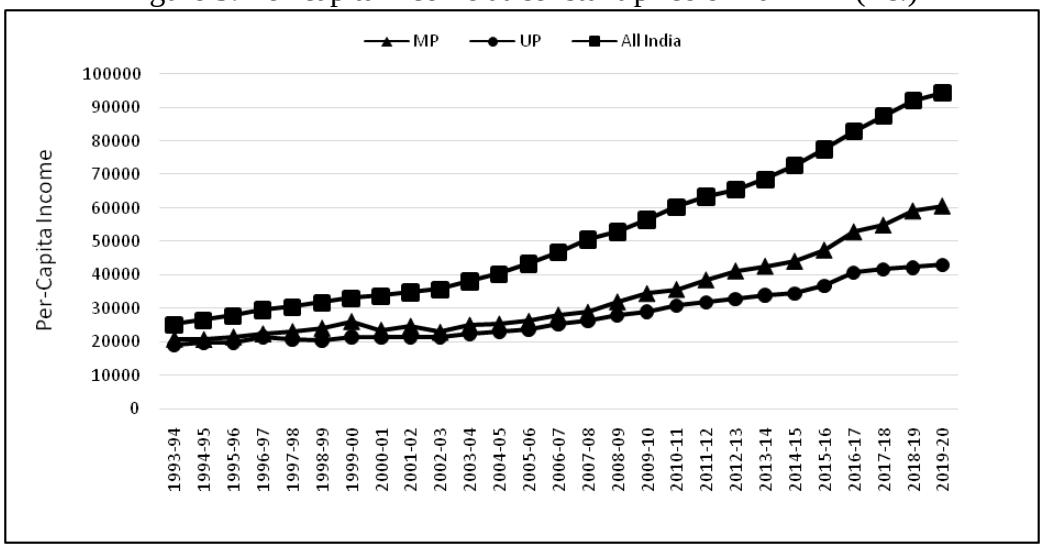
5.2. Economic performance of UP

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.

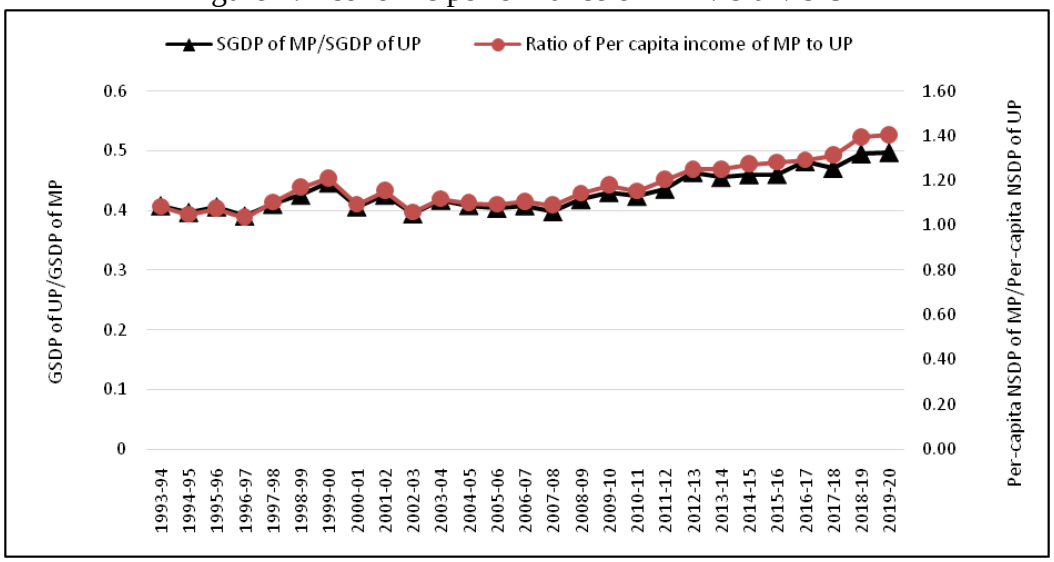
5.3. Issue of economic divergence

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



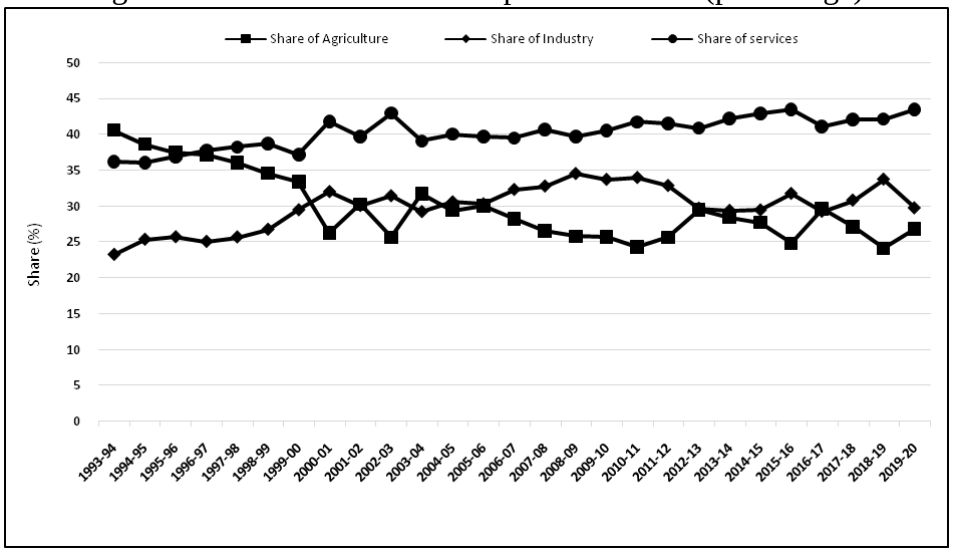
Source: Author's calculation on the basis of data from the Handbook of Statistics on Indian Economy, RBI.

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%**

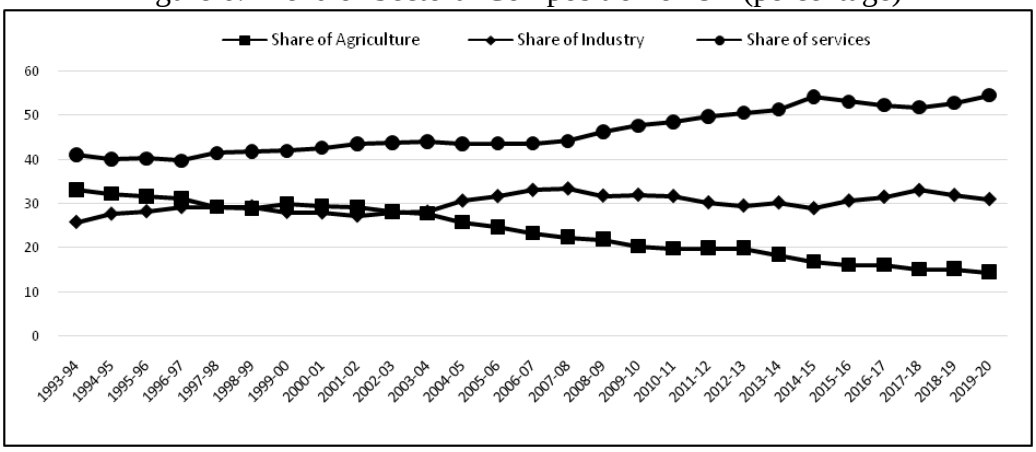
Source: Author's calculation on the basis of data from the Handbook of Statistics on Indian States (various issues). Note: Annual growth rate is based on CAGR of data at constant price of 2011-12

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%**

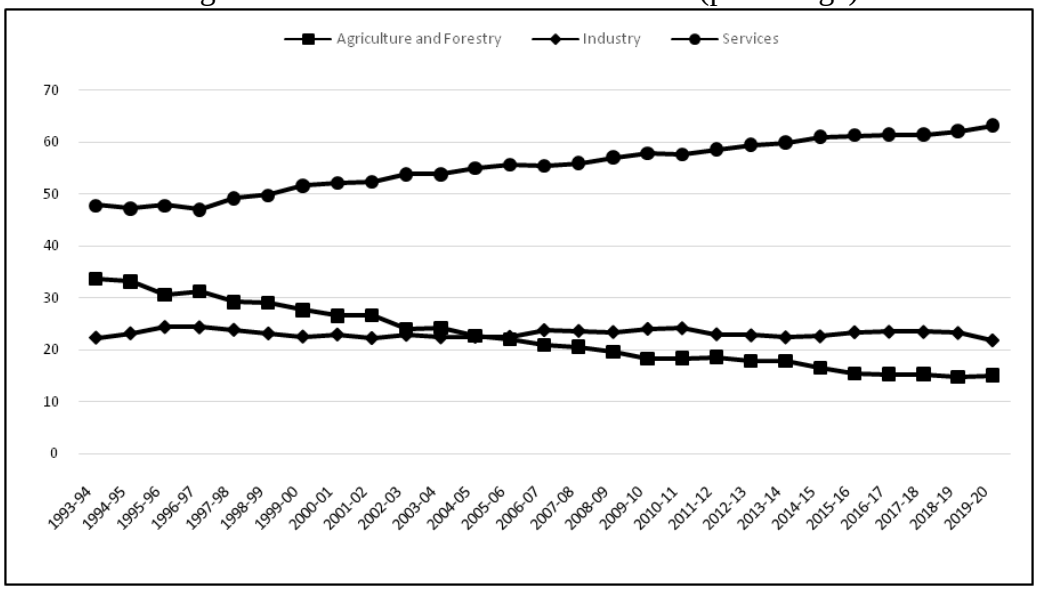
Source: Authors calculation based on the data from the RBI. Note: Annual growth rate is based on CAGR of data at constant price of 2011-12

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.

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