ARTHA VIJÑĀNA

Articles

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Artha Vijnana was started in March 1959. It is a quarterly journal of the Gokhale Institute of Politics and Economics and is a peer reviewed journal. It has been publishing papers on economics, demography and subjects allied to economics.

From September 2022, the Journal announced an expansion in its focus. The journal would hence forth have a broader and an inter-disciplinary approach. Articles in the areas of economic sociology, political economy are also welcome. *Artha Vijnana* is committed to publishing high quality research, aimed at the broad audience of academicians, practitioners and policy makers, across South Asia and beyond.

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Leibenstein, H. and S. Maital (1992), Empirical Estimation and Partitioning of X-efficiency: Data Envelopment Approach, *American Economic Review*, 82 (2), pp. 428-433.

Artha Vijñāna

Education : An Ennobling Influence

Gopal Krishna Gokhale

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CONTENTS

Articles

Political Economy of Maharashtra and Globalisation

R.S. Deshpande and Khalil Shaha

Tracking the analytical political economy of Maharashtra presents a challenge as it is a progressive and historically active state. The state emerged as an amalgamation of different regions with distinct production relations and economic foundations. It was formed 13 years after independence and soon earned a position as the country's t industrially advanced state. Over the last six decades, the state has had 24 Chief Ministers, with an average tenure of approximately 2.6 years. As a result, it is muddled with various issues and disturbing the path of development. Here, we aim to address issues related to the impact of globalisation in the context of the changing political economy of the state. We noted that the performance of the agricultural sector is of great concern, with a trend towards the intense commercialisation of crops. The area under cultivation is shrinking, with slow growth in irrigation and continued neglect of vast, rain-fed, drought-prone areas. Suicides by farmers have not been controlled effectively. The area under food grains is shrinking, and per capita food grain availability is worrisome. The polity and the state are more concerned with inconsequential issues and their political squabbles. A long-term development strategy is needed, especially for the agricultural sector.

Introduction

Maharashtra has carved out its image as an industrially well-developed state in India, contributing significantly to the nation's GDP and total taxes collected (GoI, January 2023). It is also known as one of the most progressive states, with a strong culture of progressive and radical movements. The state also has the distinction of having many expert committees report on the problems encountered across rarely addressed sectors (Adhav, *et. al.* 2022). The state has also made its mark as one of the most highly literate states in the country (Census of India, 2011), with many educational institutions. At the same time, Maharashtra has the dubious distinction of being a perpetually drought-prone state, with its agricultural sector consistently under severe stress, as are the state's farmers. The state also holds the dishonourable distinction of being among the states with the highest density of farmer suicides (Deshpande and Arora 2010). Out of the 5570 farmer suicides in India in 2020, Maharashtra stands at the top of the list with 2567 suicides (GoI, 2023). Maharashtra also has the distinction of investing the most significant sum

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on major irrigation in the country, having the maximum number of impounded structures (small and big dams), and still having one of the lowest proportions of net irrigated area under crops, most of which is disproportionately shared by a few crops (largely sugarcane) (Deshpande and Narayanamurthy 1998). At the macro level, the state is an agrarian economy. Although agriculture and the allied sector contribute approximately 13 per cent to the GSDP at constant prices, this sector provides food and raw materials to the broader economy. It supports more than 60 per cent of the workforce. Although Maharashtra has had the fortune of having 20 Chief Ministers and almost all the Agricultural Ministers from farmer households, the agricultural sector still hankers for attention. Most sector analysts have examined the performance of agriculture in Maharashtra (Dev Mahendra and Mungekar 1996) and conducted a comprehensive review. However, rarely is an attempt made to examine the political and economic aspects of the situation. The attempt is to address three important questions. First, has globalisation impacted the state's economic policy and political economy? Second, suppose there are visible changes in the phase of globalisation. What are the key takeaways and ways to interpret the changes emerging in the state's socio-economic landscape? Third, what are the perceptible impacts and the likely future changes in the state economy and politics? We are initially focusing on correcting the analysts' misconstrued concept of political economy, then setting the historical base for the political-economic structure. An examination of the process of globalisation follows this. This is followed by an empirically supported analytical view of Maharashtra's political and economic structure. We conclude with the issues exposed due to globalisation and the simmering discontent.

Proper Use of the Concept of Political Economy

John Stuart Mill, in Principles of Political Economy (1848), addressed descriptive and normative questions, critiquing socialism and communism. Mill's study of production focuses on labour and its connection with nature, using illustrations from our usual activities. Man's interface with nature establishes a vast economy of work. He argues that conceptual confusion exists as nature occupies an immeasurable position in any human activity. Mill's value theory implies that when required, labour and natural elements hold equal significance. He compares the perspectives of earlier French economists and Adam Smith's assertion regarding elevated land rents resulting from increased natural resources and discusses how limited resources fail to satisfy demand. Social science researchers in recent years have often misunderstood political economy, which refers to economic changes resulting from a few key events without connecting them to the state's broader context Darron, 2003). It is often associated with economic changes triggered by a few key events, rather than connecting them to broader political ideology or the state's character or governance (Sengupta 2001). In the Indian context, Pranab Bardhan is the first attempt by an Indian economist to understand "the political economy of the constraints that seem to have blocked the economy's

escape from a low-level equilibrium trap of slow growth." (Bardhan 1984). Pranab Bardhans highlights the five essential components of the state's personality: ideology, commitment, implementation, and acceptance of policy leads (Bardhan 1984). Political economy is an interdisciplinary approach that combines economics, sociology, and political science to understand the dynamics of political institutions, their environment, and historically developed economic systems (Frankel 1978). All these together contribute to the path of political economy. (Darron Acemoglu 2003). *Political economy, therefore, is an interdisciplinary approach that fundamentally involves economics, sociology, and political science, but it approaches these branches of knowledge by categorising production relations*. This is referred to as the mode of production in the Marxian framework. The two expressions differ marginally, where the former involves society, and the latter emphasises the usurious nature of the relations. Engel pointed out that economists must investigate not things but people and production relations (Wang 1966, p. 3). *Thus, political economy is an interplay between three important players, namely the state, economic policies, and the people's institutions, besides the internal or external pressure lobbies* (Jeevons, Stanley 1912, Wang 1975). The term "political economy" thus refers to an approach to studying concurrent issues; the social sciences are concerned with the relationships between individuals, governments, and public policy. It critically analyzes the government policies that affect sectors, groups, or individuals. It involves the historical emergence of agrarian capitalism and the interactions between the state, economic policies, and people's institutions. Political structure and its interaction with economic institutions are integral to political-economic analysis. It must be understood as the historical emergence of agrarian capitalism and the interactions of these three constituents and their boundaries, which culminate in the formation of the political and economic structure under the prevailing mode of production (Wessman 1979). Political structure and its interaction with economic institutions remain an integral part of political-economic analysis. This study aims to analyse the political and economic changes in Maharashtra after globalisation, focusing on the historical development of the state personality over the three decades preceding India's new economic policy. The historical emergence of production relations in the state is documented to set the background for the analysis.

The Historical Emergence of Political Economy

The State of Maharashtra was reorganised on May 1, 1960, under the Bombay Reorganisation Act of I960. Three significant milestones occurred during this time: The Samyukt Maharashtra Agitation, during which many Satyagrahis were arrested, and the Nagpur Pact (1953), which led to the separation of Gujarat State from Bombay State. Shri Y.B. Chavan was named as the first Chief Minister of Maharashtra and initially did not prefer to be on the side of Samyukta Maharashtra Agitators, but later on came along (Kamat 1980, a). Immediately after the formation of the state (Samyukta Maharashtra), he was appointed as the state's first

Chief Minister, chosen by the party's high command (Lele 1982). The newly formed state featured regions with different production relations and political economies, which were crucial in understanding the political economy of Maharashtra. However, the regions incorporated into the newly formed state had historically been characterised by different production relations and, therefore, depicted variant shades of the ground political economy (Omvedt 1981). These regional amalgamations marked the first milestone in the analytical journey of the political economy of Maharashtra. Interestingly, these regions had differential development of agrarian structures, leading to different political and economic edifices; this fact remained neglected in most Maharashtra political and economic analyses (Habib 1969, Fukazawa 1965).

Maharashtra's land revenue system was fragmented, with varying ownership rights across different regions. Vidarbha and Marathwada were assessed using documents called Patta, Qaul, or Qaulqarar and issued depending on the fixation of revenue, and an agreement of acceptance was obtained from the landowner called Qabuliat. The two stages of assessment and fixing the land revenue were called Kankut and Danabandi. The revenue was determined based on productivity and prices, which were collected according to the applicable tax regimes. The Zabti-i-Harsala was to be paid as tax every year, and Karori was appointed revenue officer in 1574–75 (Powel 1965, Habib 1969, Kuber 2021)—the state-imposed compulsion, which punished farmers for non-payment. Historian Irfan Habib noted the heavy burden of taxes on the peasantry during the Mughal regime and referred to it as an usurious system. Thus, the major parts of Maharashtra were characterised by feudal production relations, which underwent changes during the Maratha regime but remained semi-feudal, with land revenue collection in the hands of the landed gentry under state control (Guha 1985).

The Rayatwari system dominated most of the state, but settlement patterns and agrarian relations varied in the Vidarbha, Marathwada, Konkan, and Khandesh regions. Vidarbha and Marathwada regions were under Nizam rule, implementing Malgujari and Inam-based land revenue systems, creating large landowners under state protection (Fukazawa 1965, Deo 1984, Guha 1985). Nagpur was the capital of the Berar Subah, also known as the Gulshan-e-Berar under the Mughals. However, in 1724, it came under the rule of Nizam-ul-Mulk Asaf Jah and the Hyderabad State. Soon, land revenue in the form of Chauth (1/4th) was collected by the Marathas (Sarkar 2010, Kulkarni 2007). Every Malgujar was made responsible for collecting Chauth from their assigned villages, and he was recognised as the proprietor of the land. Subsequently, all the Malgujars became landlords and emerged as significant intermediaries, further donning the mantle of politicians in independent India. Marathwada had a land revenue collection system similar to Rayatwari and Jagirdari, with Inam lands distributed as gifts to army favourites or relatives. These were called Mashratul-Mash and Mashrat-ul-Khidmat, and land records were such that many times, the second and subsequent transactions of the Inam lands were not correctly recorded due to multiple claimants. The lands were also referred to as Miras Lands, Inam Lands, Watan

Lands, Upari, Thalkari, and Gatkul Jamin. Different dynasties employed these classifications alternately, as explained by Grant Duff (1826, pp. 30–36) and Altekar (1927, p. 7). The settlement in the Konkan region occurred during the Adilshahi period, prior to 1579. The Konkan region had a Khoti system, where the Khot was responsible for collecting and paying village revenue, and in return, the Khot acquired the rights to lease out land and collect revenue (Dhawale 2014, Deshpande 1998).

The Khoti system emerged in the Konkan and Ghat regions, with Khot as a significant intermediary and usurious landlord. The agrarian structure in Maharashtra was not uniform across regions and varied significantly across regions due to historical reasons. Several historical factors contributed to the current agrarian structure. In this context, Kuber (2021) writes, "Shivaji ensured that the land in every province under his control was measured and the area calculated." Revenue was fixed based on actual land measurements (Wink, Andre, 1986). The lowest assessment unit was Mauza, and groups formed Mahals for revenue purposes. Parganas were called Suba (Prant), and Shivaji's empire consisted of three Prants administered by Sar-Subhedars and other officials (Sen 1923, Altekar 1949, Fukazawa 1950, Gordon 1993). Under the Colonial regime, the British government supported wealthy peasants, granting them greater control and ownership of land and agricultural implements (Brass 1980). The state exhibited a distinctive feature characterised by various land relations, ranging from usurious capitalist exploitative landlords to peasant proprietorships. The ownership pattern of land continued to be dominated by large holders, and thus, the rural elites were usually those who held the hereditary, powerful village offices (Carter 1975).

Maharashtra's agrarian structure was influenced by the historical development of village administrative structures and the influence of the landed gentry. Maharashtra's agrarian structure was more akin to a semi-feudal mode of production. Ignatius Chithelen (1985) points out that in the early 20th century, rich peasants dominated village life in Maharashtra in a far more commanding position than ever. Charlesworth (1978) explained this with reference to some changes under British rule during the 1880s, which caused the transformation. It is known that in the hierarchical society of India, where status differentiation is traditionally accepted and deeply ingrained, the emergence of similar elements has been much easier than in any other country (Dhar 1987). Historically, Maharashtra developed five distinct types of agrarian structures: Adilshahi and Nizamshahi, which percolated from Mughal feudal organisations and created intermediaries with differential powers to support rulers and extract usurious surplus. In Khandesh, intermediaries were appointed, and under Chhatrapati Shivaji Maharaj, these intermediaries were drawn from the landed gentry and dominated the raiyats (Kulkarni 1969). The landed rich usually belonged to a dominant caste, not the type defined by M. N. Srinivas. He is mistaken in calling the numerically larger group the dominant caste; the caste and power combination cause domination in

the village. Therefore, we find that the landed gentry is spread across various castes in Maharashtra, which is also true in Karnataka.

Crawling in of Globalisation

Globalisation emerged after the shift from socialist to market-centric state policy, posing a challenge for countries like India to prepare for the change under the shadow of a liquidity threat to their foreign exchange reserves. It involves breaking down barriers between societies, economies, and political systems, and increasing cooperation in trade, finance, and ideas among diverse communities. Therefore, it posed a challenge to a country like India to position itself in preparing for the change, with a tangential departure from earlier policies, and to consider the implications. India's growth prior to 1980 was not impressive, and the agricultural sector faced significant challenges. The economic situation in the early 1980s was worrisome, leading to the adoption of an open economy model. There is a myth that globalisation, liberalisation, and privatisation began on July 23, 1990, but their roots can be traced back to the 1982–83 budget speech. The budget speech of Finance Minister Shri Pranab Mukherjee stated that *"the gross national product had declined by as much as 4.8 per cent in 1979–80, the infrastructure was in shambles, and prices had increased at an annual rate of 23.3 per cent by the end of January 1980"*, and *"industrial production, which had declined by 1.4 per cent in 1979–80, recorded an increase of 4 per cent in 1980–81*." (GoI, Budget 1982-83, Para 3 & 10). He highlighted the decline in gross national product and infrastructure and increased prices, particularly oil and oil products. Further, he stated, "*as the House is aware, there has been a substantial deterioration in our balance of payments since 1979–80, primarily because of sharp increases in import prices, particularly oil and oil products. Anticipating these developments, the government made timely arrangements to negotiate a line of credit for SDR 5 billion US$ from the International Monetary Fund under its Extended Fund Facility"* (para. 13, Budget 1982–83). Providing a way out, he refers to the liberalisation process, saying, "The balance of payments position has been under pressure recently and will continue to be so for some time to come." *However, a liberalised regime of imports has been a feature of our economic policies"* (para. 98, Budget Speech 1982–83). He accepts fully that the balance of payments (BoP) has substantially deteriorated since 1979–80 (Pt. 5, p. 13). Incentives for exporters should be provided, and the MRTP should be relaxed for capital goods, along with the procedure for industrial licensing made more streamlined. It is worth noting that forex reserves stood at US$ 7,361 million in 1979–80 and declined to US$ 3,962 million in 1981–82. The situation improved with an IMF SDR of 5 billion US dollars. Thus, the first step toward recognising economic degression was noted in the 1982–83 budget. Liberalisation and globalisation began to emerge in 1982–83 due to the mismanagement of our Balance of Payments (BoP) and a lack of prudent management of trade and reserves.

This was followed by the 1985–86 budget speech by Shri V. P. Singh. Paragraph 23 of his speech stated that *"a multipronged program of action is necessary to meet the challenges of the future. As our Prime Minister, Shri Rajiv Gandhi, observed recently in Parliament and quoted, "The challenges before our country are many. We have to modernise India. We must change the mindset of the people of India to look ahead to the future and not dwell on the past. We must make India self-reliant in every key sphere. "We must create a dynamic country equal to any other"* (Badget 1985–86, Para. 23, p. 5). Besides some steps that liberalised the industrial sector, the budget encouraged foreign investors, and the relaxation limits were raised to ₹ 100 crore. The 1985–86 budget included several important announcements: "It is proposed to notify a list of industries for delicensing so that procedural delays are minimised in areas where additional capacity is required." Relaxation for MRTP companies was fixed in 1969; this limit is being revised to ₹ 100 crore. (Budget 1985-86, para 24) Rates of duty on imports of components and raw materials were drastically reduced, and to protect end-users interests, the *import policy for computers was also liberalised. It has now been decided to extend this approach to other items of electronic manufacture. (Budget 1985-86, para 31) Certain public sector enterprises have incurred substantial cash losses, necessitating additional budgetary support. Taking into account these and other variations, including notional provisions for conversion of equity in certain public undertakings into loans, assistance towards their interest dues to the government, and additional subscriptions to the International Monetary Fund"(Budget 1985-86, para 39), and "Given these considerations, I propose to replace the tax concession under Section 80HHC of the Income-tax Act by a new provision. Under the new provision, exporters will be entitled to a deduction of an amount not exceeding 50 per cent of their export profits, carried to a reserve account for their business (Budget 1985–86, para. 102, 1985).* Thus, the economic policy change bells started ringing in 1982–83 and became clear by 1985–86, which was further taken into account. A significant document referred to by M. S. Ahluwalia (1998), known as the 'M' document, circulated in 1989. It was titled 'Restructuring India's Industrial and Trade Policies,' and VP Singh, as Prime Minister, upheld the view. The 'M' document had liberalisation as its theme, maintaining macroeconomic balances, public sector reforms, industrial licensing, the MRTP Act, reducing local protection, and increasing foreign direct investment. The industry minister, Mr Ajit Singh, pleaded for an aggressive industrial policy. In his convocation address on April 15, 1991, to the Indian Institute of Management Bangalore, Professor Manmohan Singh outlined his thinking on future economic policy in "Challenges on the Economic Front Today." He stated that *"full participation in the emerging global economy will necessitate progressive liberalisation of import and exchange controls. "A well-thought-out plan must be devised to make the rupee a convertible currency within a reasonable period, at the latest before the end of the decade"* (Singh 1991). His inclination towards making trade a growth engine was visible from his doctoral work and a paper published in 1963 (Singh, Manmohan 1963).

The above discussion makes it quite clear that the change in economic policy did not happen suddenly. However, it gradually infiltrated the economy, and at that time, the TINA argument advanced by some seemed quite convincing. Professor Manmohan Singh stated in his July 24, 1991, budget speech, "There is no time to lose." *Neither the government nor the economy can sustain itself beyond its means year after year. The room for manoeuvring—to live on borrowed money or time—no longer exists. Any further postponement of macroeconomic adjustment, long overdue, would mean that the balance of payments situation, now exceedingly difficult, would become unmanageable and inflation, already high, would exceed tolerance limits"* (Budget 1991–92). A significant change in economic policy was necessitated due to two important factors. One is that the economy was placed in quite bad shape in its macro-economic indicators, and there was no other option than pledging 20 tons of gold to Zurich Bank and 46 tons of gold to the Bank of England to get the foreign exchange of $405 million to maintain our forex needs. Second, it was strongly felt that the earlier policies of control and licenses hindered the path of growth and that the emphasis on PSUs was erroneous. It seems that these two reasons played a significant role in the 'U' turn from the earlier socialist path, and it was possibly a considered decision by the then government. However, the externalities of globalisation were not visualised like those of the "green revolution," these have to be addressed in the policy frame as and when they surface.

As a federal country with diverse development experiences across states, India presents a significant challenge to any political economy analyst (Bhardwaj and Krishna 1982, Bhalla and Singh 2001, Kurien 2000). Globalisation is likely to manoeuvre the nature of production relations and the mode of production and threaten the usual and time-tested policy interventions. Carrying with it may have far-reaching implications for sustainable growth, development and the environment. The rise of globalism and international trade means that the politics of one country can have a substantial impact on the economy of another. Understanding the political economy can help countries become more resilient to global economic changes. It is noted in the UN Human Development Report that in the recent past, developed and developing countries have actively participated aggressively in the globalisation process; as mentioned in the United Nations Human Development Report, 1996, more than 90 countries have adopted the policies and the results indicate that many of them are worse off economically than they were some years ago. The process leads to "global polarisation" between the rich and the have-nots. The HDR further indicates that the gap between the per capita incomes of industrialised nations and others has been increasing over the last thirty years (Gupta 1997). Development planning must balance across regions, taking into account the strengths and issues of the sub-regions within states, which makes a significant difference (Kurien 2000). Even under globalisation, the differential response of states is a reasonably expected outcome despite the lack of a consultation process with state governments before embarking on the New Economic Paradigm. Maharashtra is known as an industrialised state, and one can

expect a more significant impact of globalization; however, the benefits do not percolate to the agricultural sector, which is a matter of concern. Following the change in India's economic policy through the 1991 budget, Maharashtra had a majority of its Chief Ministers who were members of the Congress party, with a basic socialistic ideology. Five Chief Ministers were from Shiv Sena, and the BJP combined. All the Chief Ministers supported the liberalisation, privatisation, and globalisation policies, irrespective of their party backgrounds; at least none of them openly opposed these policies. However, one must look into the state's development experience from the beginning to trace and focus on the experience during globalisation.

Travelogue of the State: 1960–1990

Tracing the path of the state's political economy during the first three decades preceding the changes in national economic policy will set the tone for further discussion. This will lay the foundation for analysing the state's experience during the globalisation phase. Broadly, the changes in Maharashtra occurred through **three broad phases** after independence. The first phase involved the establishment of production relations within the political economy of the state, dating back to the British Colonial period. The colonial rulers had created a class of landed intermediaries with special rights named Raobahadur, Raosaheb, Rajbahadur, Khanbahadur, and Sardarbahadur. Before colonial rule, the current state of Maharashtra was spread across neighbouring provinces, with diverse production relations on the ground. Vidarbha was under the central provinces and had the *Zamindari, Khoti, Jahagirdari,* and *Mahalwari* systems of land holding, with landlords owning huge cultivable land (not necessarily fully cultivated). The relationship between the landlord and the raiyats was feudal to semi-feudal. After British officers (Sahebs) departed in 1947, a political leader from the Zilla Parishad to the Parliament is still referred to as 'Saheb', and workers touch their feet in reverence. Additionally, most of the state's political leaders are large landowners, regardless of their party affiliation. Thus, semi-feudalism continued to dominate the state's political economy (Thorner 1982). Agricultural backwardness is the hallmark of semi-feudalism and continues even after reorganisation (Srinivasan 1979).

During the second phase in the political economy of Maharashtra, the political upheaval in the state came in the form of agitation for Samyukta Maharashtra, which ended up getting a combination of regions from Hyderabad State, Berar, Khandesh, and the Bombay Presidency. The uneasiness among the state's population began with the country's independence in 1960, suppressed by the central government under the party's directions, but finally culminated in the reorganisation of the state. India's economic policy of liberal socialism (the official ideology of the INC) had its historical roots in the independence movement, and the influence of Fabian Socialism on the thinking of our first Prime Minister established the milestones of economic ideology. The country's economic

policy was shaped by a mix of political and economic ideologies (Jalan 2000, Guha 2007, and Vaidyanathan 2008). On the one hand, the prevailing political ideologies were stuck between Gandhian village primacy with decentralised governance and urban-centric development guided by Western industrial development models. The Industrial Revolution in Britain and the eye-catching changes in the USSR were visible examples (Guha 2007, Bhagwati 2019). It is the Second Five-Year Plan that concretised the economic ideology of the Indian State in no uncertain terms. Maharashtra's political and economic situation was built on the same ideological platform. It was expected that, following the implementation of land reforms, the mode of production in the state would change; however, this did not occur.

Shri Y. B. Chavan was chosen as the First Chief Minister of Maharashtra by Pandit Jawaharlal Nehru. Shri Chavan was known as a follower of Shri M. N. Roy's Radical Democratic Party, also known as the Royist Party. However, he later accepted social liberalism under the leadership of Nehru. Under his administration, the Maharashtra Agricultural Lands (Ceiling on Holdings) Act, 1961, along with the Maharashtra Tenancy Act, was passed, marking the first step in the political economy of Maharashtra's shift towards liberal socialism, at least on a legal platform. Dandekar (1962) cautioned that the planned reforms would lead to the possibility of non-viable, inefficient small units lacking proper resource endowments. It seems that the possibility he then expressed has come close to reality. Despite the intense efforts on land reforms in the state, the semi-feudal character in the villages persisted, as affirmed in the state's political structure. During the second phase, the state's development thinking was also influenced by the success of Western industrial development and by many private entrepreneurs, among the first initiatives in economic policy. A decision was made to establish the Maharashtra Industrial Development Corporation on October 1, 1960. Subsequently, the Maharashtra Industrial Development Act was passed on August 1, 1962, establishing the primacy of industry in the state's economic development. Almost at the same time, keeping in view the scarcity conditions prevailing in the agricultural sector of the state, a committee was appointed under the chairmanship of Shri Pardasani, a senior administrator in the state, to survey the scarcity areas and make policy suggestions (GoM, 1960). The recommendations of the Pardasani Committee for the agricultural sector to address scarcity was not implemented until 1972–73 when a devastating drought struck the state. The First Irrigation Commission was established in 1960 under the chairmanship of S. G. Barve, who submitted its report in 1962. The recommendations of this committee also received nearly the same treatment (Deshpande and Narayanamurthy 2001). In the second phase, despite the Chief Ministers coming from agriculturist families, the sector did not receive the most needed attention; instead, the policy was tuned more in favour of capital-seeking industries and towards crops like sugarcane through the cooperative sector.

The third phase began with the shock of the devastating droughts of 1971–72 and 1972–73. All government agencies in Maharashtra became active as many lives were lost and the economy was in a state of distress. Among the hurried

changes, the archaic famine code was replaced, the typology of famine work was changed, irrigation policy underwent change, and following the theoretical traits of the green revolution, new varieties of Jowar and bajra entered the farmers' field under the Chief Ministership of Shri V P Naik, the longest-serving Chief Minister of Maharashtra (1963–1975). The availability of irrigation and sugarcane-based cropping systems facilitated capitalist penetration into agriculture, leading to increased prosperity for a section of farmers in the irrigated areas. It also paved the way for technological improvements in agriculture, which emerged later in the 1960s as the 'Green Revolution' in certain areas (Kamat 1980a). Shri V. P. Naik favoured market reforms and was more aristocratic, as reflected in his attire. Coming from a progressive farming family and a Jowar-Bajra-Cotton-producing region in Vidarbha, he introduced new seeds of Jowar, Bajra, and Cotton into the agricultural sector. His contribution was recognised, as he was called the "Knowing King of Farmers," "Green Warrior," and the father of the Green Revolution in Maharashtra. This was a departure from the earlier water-sugar cane and cooperative-focused agricultural policies. The initiative was continued under the next chief minister, Shri Shankar Rao Chavan, who was highly educated and had a scientific bent of mind. Both regions, Vidarbha and Marathwada, placed more emphasis on food crops than sugarcane. Shri S.B. Chavan, the Chief Minister, returned to the western Maharashtra leader, and Shri Vasantdada Patil took charge in May 1977. During the seventies decade, Maharashtra's agricultural sector was neglected (Adhav, *et. al.* 2022). At that time, Kamat (1980, b) wrote". In fact, except for cotton and sugarcane, the state has a much lower total output and yield per hectare rank. Thus, a general view of the Maharashtra economy reveals the following salient features: its leading position in the industry, the importance of Mumbai in this industrial growth, and the backwardness of its agriculture (P. 1669). The agricultural sector again slumped; a sugarcane-irrigation-based cropping system dominated the development of farms and cooperatives. His ministry collapsed barely a year after taking office, and from then on until June 1991, no chief minister of Maharashtra could complete a full term in office (Desarda 1994). Although seemingly tranquil on the surface, Maharashtra experienced a shimmeringly volatile political and economic situation, which was reflected in its complex policy path. Unfortunately, for Maharashtra, consistent political leadership was never available before 1990, except during V. P. Naik's period. Except during the time of Shri V.P. Naik, politics and policy largely followed the leads set by the Central Government or the Planning Commission throughout Maharashtra, with some tinkering and a few notable exceptions.

In June 1991, under the leadership of Shri P. V. Narasimha Rao and with Dr. Manmohan Singh as Finance Minister, economic reforms were implemented. As argued above, liberalisation, privatisation, and globalisation policies have stealthily infiltrated India's economic policy (Garg 2005). The background was the upheavals the Indian economy faced during the 1980s and its inability to manage these situations, as elaborated earlier. India accepted the new regime with

market centralism, and accordingly, changes were made quickly, craftily avoiding changes in the agricultural sector. Maharashtra presented a ripe case for accepting the new trends in globalisation, as commercialisation through the industrial sector (including agro-processing industries) was one of the best-suited locations (GoI, 2007). The industrial sector responded readily, with a considerable amount of private capital being invested. The trends in savings, investment, and capital formation in the state headed upward. Undoubtedly, growth occurred in the state economy after 1991, but the quality and contributors to this growth are a matter of deep concern.

The Story of Growth: Truncating the Basics

The growth story of Maharashtra has five important pre-cursors that dictate the experience. It also raises questions about the suitability of the growth model adopted without considering the long-term consequences. First, immediately after reorganisation (even before that), the edifice of the State of Maharashtra was built on the extra importance of private industrialisation, creating capital primacy (and capitalists) in the state and also a lobby of capitalists that became an all-time active force in dictating the state's policies. Thus, liberalisation, privatisation, and globalisation policies provided fertile soil for capital-centric development in the state (Boddewar and Ghotale 2017). Second, with the advent of sugar cooperatives, even the landed gentry joined the ranks of the industrial capitalists. The existing semi-feudal capitalist policy trends intensified. A new class of strong political lobbies, supported by the sugar cooperatives and some members of the landed class, became powerful and dictated the policy and political architecture. Third, the state always had a dominant share of rainfed agriculture without proper irrigation support, and added to that, the frequent visits of droughts made these regions extremely vulnerable; therefore, agricultural labourers, as well as small and marginal farmers from these vulnerable regions, migrated to the better-off regions and also worked as sugarcane cutters in the command area of sugarcane factories. Fourth, the inequality in control of resources across groups of farmers in drought-prone areas, regional inequalities in development, and lopsided industrialisation policies created classes and regions that suffered from dependency on others. The new capital-centric, market-dependent approach exacerbated the dependency syndrome prevalent in the state through this refractory land distribution. Even with new initiatives such as radical land reforms, tenant abolition, and panchayat raj, among many other interventions, the lobby of large landowners continued to dominate. Gail Omvedt (1981) writes, "*Finally, on the political side, the new institutions of the panchayat raj, credit cooperatives and educational institutions, Mahila manuals, and similar 'village development' institutions all helped the new class maintain its hegemony in a new way over the increasingly proletarianised and restless rural majority*" (Omvedt 1981, p. A143). Last, incremental capital always found a way to develop regions and sectors that gave better returns. Naturally, services and industrial sectors were the primary

beneficiaries of investment, while agricultural sectors, particularly in underdeveloped regions and groups, were the usual non-gainers. Furthermore, the land distribution changed significantly from 1970 to 1971, with small and marginal farmers constituting approximately 80 per cent of the operational holdings.

Table 1: Sectoral Growth Rates in the Gross State Domestic Product at 2011-12 Prices

Sl. No	Period	Agriculture	Industry	Services	GSDP
1	1980-81 to 1990-91	3.67	5.45	7.07	6.02
2	1991-92 to 2022-23	3.81	5.87	8.29	6.94
3	2001-02 to 2022-23	4.03	5.94	8.19	6.98
4	2018-19 to 2024-25	4.04	9.40	3.30	5.10

Note: Compound Annual Growth Rate (CAGR). Based on the data from Indiastat.com.

- -- YoY Growth rate as given in the Economic Survey of Maharashtra 2024-25 (page 19).

Figure 1: Changes in Growth in Gross State Domestic Product (@ 2011 Prices)
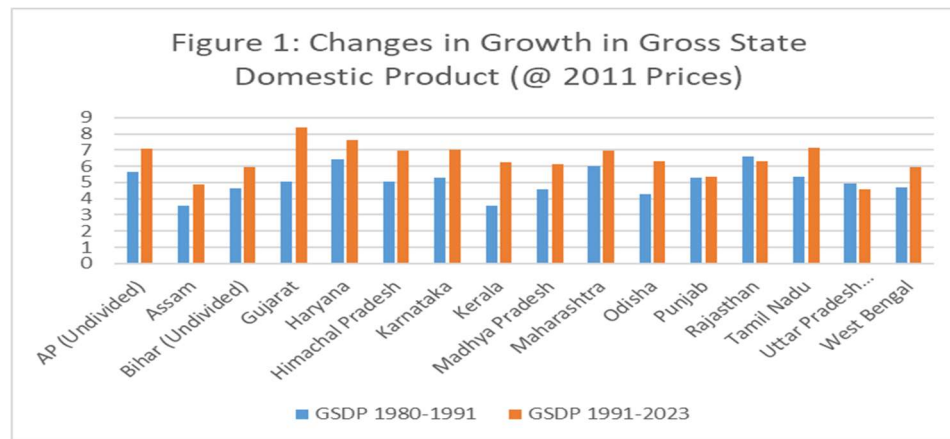
The sectoral growth rates presented in Table 1 provide the usual tools for analytical economists and are usually described as seen in the table. Two significant observations come out here. First, during the three-time spans, the agricultural sector grew at a lower rate except the last year (but that was year on year growth), and the GSDP showed consistently high growth. Second, even without any decomposition analysis, it is clear that the services sector is the major contributor to growth, like in the Indian economy. That establishes (from the Harrod-Domar framework) that capital was attracted more towards services and industries. The data on capital formation corroborate this. In an across-states comparison (Figure 1), the increment in growth rates in Maharashtra is lower than in states like Andhra Pradesh, Gujarat, Haryana, Himachal Pradesh, Odisha, and Tamil Nadu. One important difference is that the states recording better growth rate increments are those with reasonably stable political governance. On the other hand, Maharashtra was on politically shaky ground, administered by 13 Chief

Ministers from 1991 to 2023. The governance shuttled across parties and different leaders within a party, giving an average span of only about 2.5 years per Chief Minister some time that was even less than two years. Only Shri Vilasrao Deshmukh ruled for a longer span (with a four-year gap) as CM, totalling 7 years and 129 days. Among the Chief Ministers of the state, the Congress party had seven Chief Ministers serving for 18 years and 243 days total, whereas six Chief Ministers were from non-Congress parties and covered 12 years and 349 days (see annexure 1). Broadly, the ideological framework set by Shri Narasimha Rao and Dr Manmohan Singh's liberal market-centric policy continued in Maharashtra with a capital-led strategy for growth. The political ideology also swapped between the Liberal Socialism of Congress (which changed to market centralism after 1991) and that got covert natural support from the rightist ideology of the BJP and Shiv Sena combined. Remarkably, none of the Chief Ministers ever spoke on the ideological platforms of their governments; neither did the Finance Ministers make it explicit in their budget speeches, irrespective of their parties, but they mutely followed the themes dished out by the Central Government and the national party lines. Interestingly, the changes due to the Liberalization, Privatization, and Globalization and the policy directions were not discussed in the National Development Council meetings even after the policy was adopted.

Table 2: Performance of Maharashtra Economy

(In ₹ '000' Crores) at current prices

Sector & GSDP	1980-81	1990-91	2000-01	2010-11	2021-24
Agriculture & Allied Sector*	4.45	14.20	38.38	129.34	376.09
	(26.74)	(22.04)	(15.21)	(12.33)	(13.58)
Industry*	5.99	22.49	69.78	311.59	758.90
	(36.03)	(34.90)	(27.66)	(29.70)	(27.40)
Service*	6.19	27.75	144.12	608.22	1634.43
	(37.23)	(43.06)	(57.13)	(57.97)	(59.02)
State Income	16.63	64.43	252.28	1049.15	2796.43
Sector	Difference between the sectoral contributions (000 Crores) [@]				
Industry- Agriculture	1.54	8.29	31.4	182.25	382.81
Service -Agriculture	1.74	13.55	105.74	478.88	1258.34
Service-Industry	0.20	5.26	74.34	296.63	875.53
Per capita State income (in ₹*)	3,112	8,811	28,540	84,858	2,48,362

Notes: * in '000' Crores; ** in absolute rupees (GSDP basis); $ Sectoral and State Income as Gross Value-added basis; @ - These are the differences between the sectors' contributions to total GVA in ₹ 000 Crores. Figures in parentheses are the percentage of state income (Gross Value Added).

Source: Economic Survey of Maharashtra 2022-23; Government of Maharashtra

At first sight, the data in Table 2 creates a very positive impression with good growth across sectors. However, the growth of any economy must be balanced across sectors as much as possible; otherwise, the growth leads to inequality in income across sectors. Maharashtra experienced unequal growth across sectors, possibly the root of agrarian distress in Maharashtra. We may observe three important leads from Table 2. First, the share of the agricultural and allied sectors

has declined over the years, and the decline was sharper after 1990–91. At the same time, the workforce (presented in the table afterwards) has not declined at the same rate. When the agricultural sector's nominal and relative (not only share) contribution is declining and the workforce dependent on agriculture is increasing, the per capita generation of GVA from agriculture shows a declining trend. In other words, there is clear macro evidence that farm income per capita generated in the sector sharply declined after 1990–91, which led to distress. Second, when we compare the increase in sectoral income generation, it is seen that the services sector gained substantially, possibly with capital investment from the private sector. The industrial sector followed, but the agricultural sector remained at the bottom. The third observation is about the role of globalisation in this truncated growth scenario, which is evident when scrutinising this differential growth behaviour. It can be seen from the last two rows of Table 3, that the relative contribution from agriculture is shrinking. The difference between the sectoral contribution to GSDP from agriculture and allied activities and the contribution of the industrial sector increased from ₹ 8.29 thousand crores in 1990-91 to ₹ 381.81 crores. This difference between the agriculture and services sectors changed from ₹ 13.55 thousand crores in 1990-91 to ₹ 1258.34 thousand crores, which explains the forced income inequality due to sectoral growth. The growth story from 1991 to 2023 shows increased capital intensity in the services sector, followed by industries, and surprisingly scant capital flow to the agricultural sector. Even while accepting this as a natural economic process, the implications of such a gross change and neglect of the primary sector in state policy had a devastating impact on the agrarian situation, resulting in over 60 thousand suicides by farmers, where Sainath in 2020 and others have highlighted the density of suicides in Maharashtra (Sainath 2020)

Table 3: Average Sectoral Contributions to Gross State Domestic Product During Three Time-Spans

(@ 2011-12 prices in ₹ Billion)

	Agriculture & Allied	Industry	Service	Manufacturing	Construction	Trade, hotels and restaurants	Transport, Storage & Communication
1991-2002	78.9	118.4	138.4	84.50	23.90	36.1	25.9
2003-2012	300.9	548.7	891.3	398.27	91.50	220.3	147.4
2013-2023	834.8	2173.4	4042.5	1505.40	455.10	1006.9	503.8
Incremental addition to the Gross State Domestic product in ₹ billion							
1991 to 2012	221.9	430.2	752.9	313.76	67.59	184.2	121.5
2003 to 2023	534.0	1624.8	3151.2	1107.10	363.58	786.6	356.4

Source: Based on data from Indiastat.com

The growth scenario from 1991 to 2023 tells the story that during the new regime, after the change in economic policy, there was a visible change in the growth of GSDP, but that is just a superficial picture. Growth has taken place, but

if we take the quality of this growth under scrutiny, three revelations come forth. First, the GSDP has recorded growth between six and seven per annum. Here, the industry and services sectors contribute largely, and that is due to significant capital infusion in these sectors. Second, agriculture and allied activity growth stayed around four per cent, lower than the other sectors. Was it due to the relative neglect of agriculture in capital formation (public and private), or were there no efforts directed towards that? The recent report by the Government of Maharashtra on Estimates of Gross Fixed Capital Formation in Maharashtra vindicates that the sector was grossly neglected in providing growth boosters as the other two sectors attracted the majority share (*see* Figure 2). Due to the theme of market centralism followed by the state, public investment was poured into sectors other than agriculture. It is known that public sector capital formation induces the private sector to invest the needed capital, and that happens in the industry and services sectors but not in agriculture. Therefore, the agrarian distress resulted from the neglect of the agriculture sector. Third, the growth in the aggregate GSDP and the two prominent sectors, which catered mainly to the better-off sections (industry and services sector), certainly caused a void in the per capita share of the agricultural sector as against these forerunner sectors. The pace of globalisation certainly changed the trends in the consumption basket and twisted it more towards goods and services that cater to the higher income groups; consequently highlighting discontent, agriculture suffered relative neglect (Halliday 2000).

Figure 2: Gross Fixed Capital Formation (Rs in Crores)
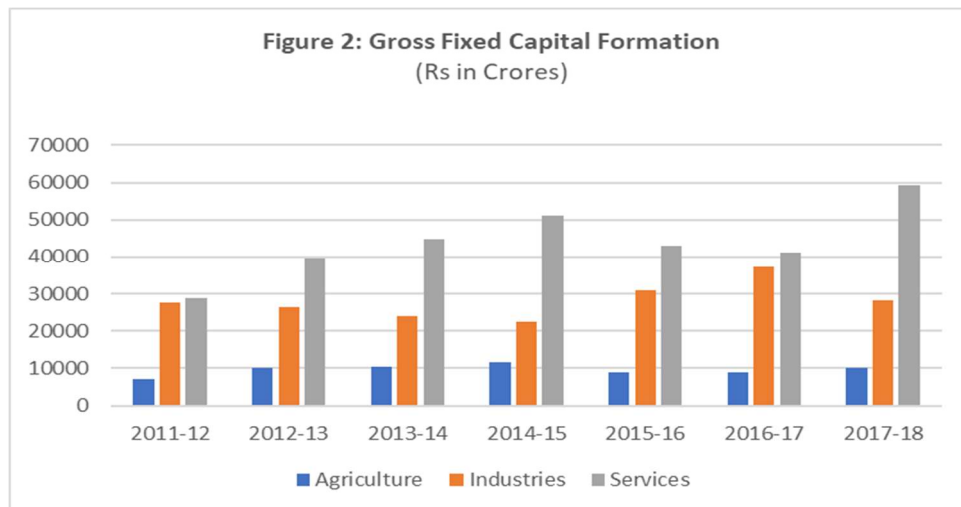
Source: Report on "Gross Fixed Capital Formation, Maharashtra (Public Sector) 2011-12-2017-18", Directorate of Economics and Statistics, Government of Maharashtra, Mumbai, 2022.

Land as the Basic Factor of Production

Significant changes in the economic policy domain will reflect on the flow of capital, production processes, production structure, labour absorption, and land

use. In the post-1991 scenario, all these have taken place, besides significant changes in the economy's structure. These were undoubtedly the externalities; some planned changes could be called unexpected or negative. In the agricultural sector, changes in land use make a significant difference. With the changes in economic policies, land use will undergo broadly three types of changes. First, the land use pattern (nine-fold or seven-fold land use classification) changes as more land goes to uses other than agriculture. Second, the crop constellation changes, and farmers prefer commercial crops that give assured cash and discourage food crops for which they do not get a respectable price. Third, the land distribution changes and the speed of marginalisation of land holdings increases due to demographic pressure and the non-viability of the marginal holder, who prefers to work in urban areas as construction labourers rather than cultivate small parcels of land for paltry returns. We look at these three changes in the past three decades. Changing land use is a regular phenomenon, and the changes occur due to climatic and economic factors. It is therefore necessary to iron out the year changes; hence, we have taken averages of three years ending in some selected years. Market-centred economic policy changes have pushed the economy towards commercial activities.

Four important distressing issues can be observed from Table 4. First, the area under forest, which stood at 52.9 lakh hectares, declined in the last two decades to nearly one lakh hectares. Second, an alarming issue is that the land 'unavailable for cultivation' has increased by 1.5 lakh hectares, either due to land going for other uses or becoming unfit for cultivation. Similarly, we note that land under non-agricultural uses increased by 3.8 lakh hectares. These two observations indicate that the land has either been used for infrastructural projects or other uses. Third, current fallows, other fallows, and cultivable wastes have increased by about two lakh hectares, possibly under the farmers' decision-making process. However, it is a matter to worry about as the landslips out of cultivation. Last, even though the gross cropped area and double-cropped area have increased by about 10 and 20 lakh hectares, respectively, the net area sown has recorded a decline of about 13.34 lakh hectares between 1992 and 2020, which is a matter of concern and indicates over-exploitation of land as a resource. With these observations, an immediate question arises. If the land is slipping out of cultivation under the pressure of commercialisation, the demand for land resources for use in non-agricultural activities with high capital intensity increases, which causes a decline in the land under cultivation, increasing the rate of exploitation of land fertility.

Table 4: Land Utilization in Maharashtra

(Area in Lakh hectares)

Details	TE 1982-83	TE 1992-93	TE 2001-02	TE 2019-20
Area under Forest	53.29	51.36	52.96	52.05
Land Not Available for Cultivation	17.37	16.16	17.05	18.55
Land under Non-Agricultural Uses	10.48	11.48	13.06	16.85
Cultivable waste	9.92	9.60	9.02	9.27
Permanent pastures and Other Grazing Land	15.64	11.48	13.11	13.21
Land under Misc Tree Crops	2.12	2.91	2.32	2.67
Current fallow	6.87	12.07	11.88	14.19
Other Fallow	12.39	10.94	11.69	12.46
Net Sown Area	179.50	181.60	176.50	168.26
Area Sown More than once	16.73	29.01	46.81	65.24
Gross Cropped Area	196.20	210.60	223.30	233.50

Note: Figures for respective period are average of Triennium Ending (TE).

Sources: Government of India 2013, accessed from http://eands.dacnet.nic.in/LUS_1999_2004.htm and Government of Maharashtra (various issues of *Season and Crop Report of Maharashtra State.*

Changing Crop Constellations: Towards Food Scarcity

Farmers' decisions to allocate areas to certain crops are guided by the climatic conditions of the region, the crop culture of the region, household needs, economic gains from the crop, and state policies. The famous Mark Nerlove's supply response model-based literature puts the entire emphasis on farmers' expected prices for the crop and risk perception. Farmers became more sensitive to prices with the new economic policy and market centrality. In the literature on crop pattern changes, these changes are named attractively as diversification in the cropping pattern. However, the changes are the final results of the farmers' decision-making calculus, which is directed by the net income generated from any crop with good market potential. We have shown in Table 5 the changing crop constellations during 1992 and 2021 to bring forth the impact of the new economic policy. The change in cropping pattern occurs undoubtedly due to the influence of the market process on the farmer's decision-making calculus. The usual analytical frame used in explaining the decision-making in area allocation is to take help from the Nerlovian Supply response framework, which considers the expected price and risk perceptions as the significant determinants of the allocation decisions. However, most of the empirical studies erroneously take the average price or risk of the last three years (Standard Deviation), representing the expected price or risk. These factors, along with market fluctuations and depressing price trends, heavily influence farmers' decisions. Table 5 presents these changes from the beginning of the LPG policy and the changes incorporated in the economy. Strangely, or by design, the new economic policy bypassed the agricultural sector, and the externalities became visible by 1999.

Table 5: Changing Crop Constellations in Maharashtra

(Figures are Percentages to GCA; GCA in 'lakh ha)

Crop	TE 1992-93	TE 2001-02	TE 2009-10	TE 2020-21
Rice	7.50	6.79	6.75	6.53
Wheat	3.48	3.85	4.96	4.30
Jowar	28.00	23.02	18.30	10.17
Bajra	9.13	7.37	4.70	2.81
Maise	0.62	3.92	3.96	4.72
Total Cereals	50.20	43.70	38.67	29.23
Gram	2.68	1.69	5.59	8.51
Green Gram	3.58	2.95	2.24	1.81
Red Gram	4.80	4.71	4.82	5.59
Black Gram	2.08	2.37	1.83	1.51
Total Pulses	15.39	15.75	15.54	18.43
Total Foodgrains	65.60	59.44	54.20	47.66
Groundnut	3.58	2.18	1.56	1.20
Soyabean	1.30	5.09	12.91	17.82
Sunflower	2.11	1.34	1.50	0.10
Total Oilseeds	12.18	11.43	17.26	19.57
Cotton	12.75	14.09	14.37	18.92
Sugarcane	2.63	2.63	3.86	4.47
Fruits	1.22	1.70	3.29	3.25
Vegetables	1.19	1.18	5.01	2.79
Gross Cropped Area (Lakh Hectares)	210.61	223.29	225.74	233.50

Note: Figures for respective periods are averages of triennium ending at the year (triennium average). Not available beyond 2021. GCA – Gross Cropped Area.

Sources: Government of Maharashtra (2022) and various issues of *Season and Crop Reports of Maharashtra State, Department of Agriculture, Pune.*

The green revolution initially, with a substantial increase in yield (only of a few crops and in some regions), raised the farmers' hopes with the promise of better yield and income with the support prices. It did not take even a decade for the farmers to realise that their net profit was being eroded due to the increased cost of cultivation under the pressure of cash requirements of the new technology. It is well known that the new technology required new seeds, water, fertilisers, pesticides, and other inputs. Further, it was clear that the growth rates in input prices (fertilisers, seeds, pesticides, machinery, and even those under state control) were higher than the farm produce. Besides, farmers never get the expected prices for their produce, and sometimes, they cannot cover the transport costs to reach the market. Therefore, the farmers' decision to allocate area was primarily driven by expected economic gains and market conditions. Table 4 presents the changes in crop constellations over the period under consideration. Two visible patterns were observed in area allocation in changes from 1992 to 2021. First, as shown in

Figure 3, the area share of rice, jowar, bajra, green gram, black gram, groundnut, and safflower consistently declined over the years. These are food crops for the Maharashtra population, which rings a caution bell for policymakers. Dangerous enough is the signal that Figure 4 *clearly and loudly gives that there is a continuous decline in the share of the area allocated to cereals and total foodgrains as crop groups.* A signal that threatens the possibility of Maharashtra struggling for foodgrain self sufficiency for its citizens

Figure 3: Crops Showing Decline in the Area Share in GCA
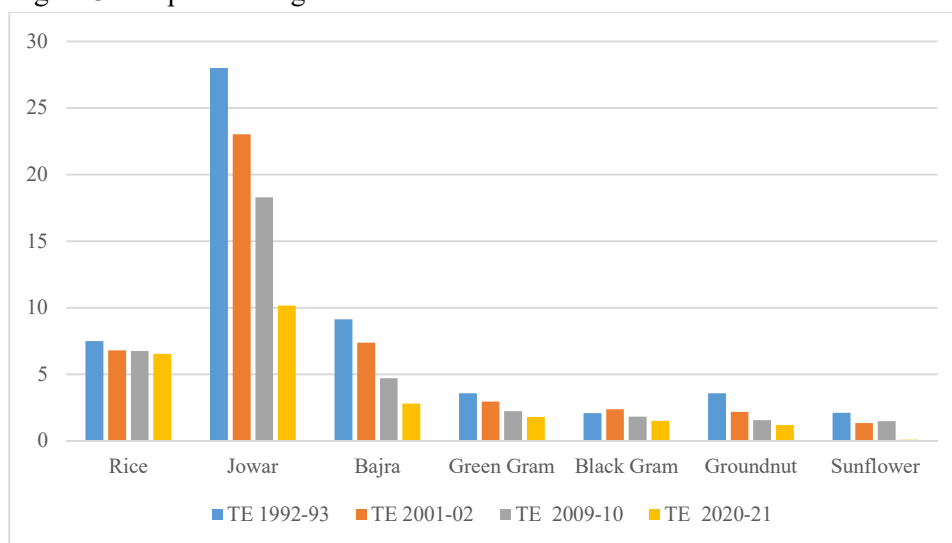
Figure 4: Declining Share of Total Cereals and Total Food grains in GCA
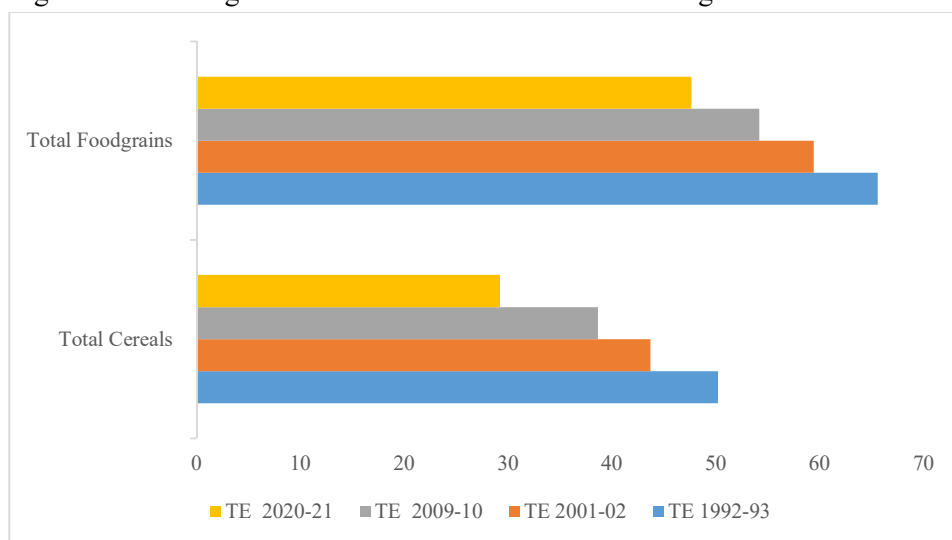
Figure 5: Crops with Increasing Area Share of GCA
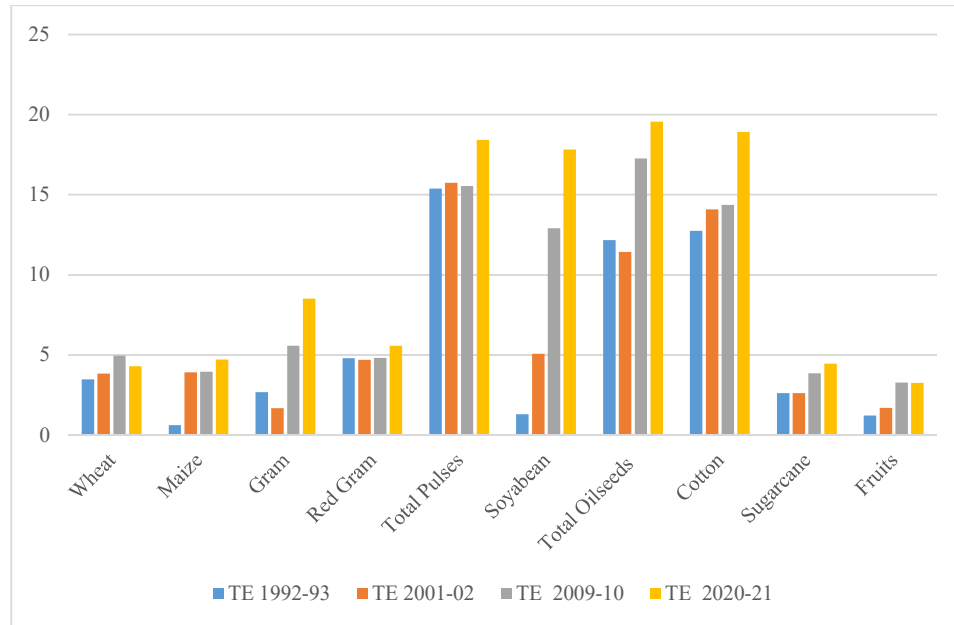
The naturally emerging question is: Why have we reached this abyss situation? Indeed, the decision to allocate an area is entirely that of the farmer, and this is done with knowledge of the situation in the household, product, and factor markets. That opens the other side of the story, which tells us what crops the farmers prefer and have increased their area share. The share of area occupied by these crops in the gross cropped area of the state is presented in Figure 5. Quite expectedly, the area shares of wheat, maize, gram, red gram, pulses, soybean, total oilseeds, sugarcane, and fruits increased sustainably between 1992 and 2021. Obviously, the market centrality of economic policy in the post-1992 period brought in strong winds for commercial crops. Capitalist farming seems to have made significant inroads into the agrarian structure of Maharashtra, which is dominated by marginal and small holdings with little capital stock of their own; the apparent fallout is the increased distress among those who cannot afford the capital investment. The main objection to this change is that it is not uniform across all classes of farmers, but the divide is quite clear. We find that the farmers growing food crops have been reducing the area under these crops, and the commercially oriented farmers, requiring more significant capital than foodgrain farming, consistently increase the area under the crops mentioned in Figure 5. This takes us to the question of the composition of the land ownership pattern and the changes that have taken place in it during 1992–2021.

Marginalised Holdings and Marginalisation of Farmers

Historically, all the regions of Maharashtra had different types of landed intermediaries like Jamindars, Jagirdars, Nawabs, Mirasdars, and traditionally designated land revenue officers like Deshmukhs, Patils, Deshpandes, and Kulkarnis. Extensive holdings were quite common, and extortionate tenancy was prevalent. The first step was taken against tenancy reforms through the Maharashtra Tenancy and Agricultural Lands Act 1948, which was modified until 2018. The act recognised tenancy, but it was necessary to be recorded. In cases of unrecorded tenancy, the tenant was given the first preference to own the land by paying the price finally decided by the tribunal in cases of disputes. The Tenancy Act also had sufficient crevices to interpret it favouring landlords. The specific debatable sections include Sections 4.9c, 15, 15c, 24, and 31, along with a few more. The sections often misused are the voluntary surrender provision and the land needed for self-cultivation, like Section 31, "Landlord will not be entitled to terminate tenancy for personal cultivation of land left with tenant"; but immediately Section 31-c states "*The tenancy of any land left with the tenant after the termination of the tenancy under Section 31 shall not at any time afterwards be liable to termination again, on the ground that the landlord Bonafide requires that land for personal cultivation*". The mechanism is simple: the tenant surrenders the land under a clause of personal cultivation by the landlord and then works on it as a full-time worker or an unrecorded tenant. Another interesting section is Section 32, which broadly states, "***On the first day of April 1957 (hereinafter referred to as "the tillers' day")*** *{mark it, actually 1st April is the day known world over with a different connotation}* ***every tenant shall, [subject to the other provisions of this section and the provisions of] the next succeeding section, be deemed to have purchased from his landlord, free of all encumbrances subsisting thereon on the said day, the land held by him as tenant***". (page 28). All these laws gave rise to hidden, unrecorded tenancy and usurious practices like reverse tenancy. It is no secret that even the small-time leaders of almost all parties' political leaders own sizeable parcels of land and get them cultivated through unrecorded tenancy in Maharashtra, and this is most prevalent. Another interesting phenomenon in the newly emerged tenancy market of Maharashtra is referred to as "reverse tenancy,", wherein the small and marginal holders, or others who cannot afford to cultivate the land, rent out their small parcels of land to the large landholder back in the village at nominal rent and at times even work as labourers on the same land (Deshpande, 1998, 2003, and 2010). Even a casual survey of construction workers in the cities of Maharashtra reveals this nasty truth: every leader of every political party in the state, with only countable exceptions, holds large parcels of land, which is visible in their election affidavits and other official documents.

The Maharashtra Agricultural Lands (Ceiling on Holdings) Act, 1961, is another case in question. This Act came into action in 1961, and the preamble states that "in pursuance of Article 31-C of the Constitution of India," "for

providing that the ownership and control of the agricultural resources of the community are so distributed as best to subserve the common good, and also that the operation of the agricultural economic system does not result in the concentration of wealth and means of agricultural production to the common detriment" (GoM, 2013), p. The law allows ceiling limits of 18 hectares of dryland (rainfed), 9.6 hectares of seasonally irrigated land, and 4.8 hectares of perennially irrigated land. If the household has more than five members, $1/5^{th}$ of the ceiling limit is extended with each additional member. However, the act became relatively ineffective due to the gaps allowing intelligent interpretations. Further, the act was amended to suit some political lobbies, but we shall not take that issue here.

The distilled observation on the two important acts is that the implementation and demographic and economic pressures resulted in the marginalisation of holdings and farmers. This happened over the years, right from the mid-sixties, but the speed of this marginalisation of holding picked up after 1990–91. The state's agricultural census data from 1970–71 onwards is given in Table 6. It is of great concern that Maharashtra has nearly 80 per cent of its operational holdings under 2 hectares, and close to 30 per cent have operational holdings less than 0.2 hectares, or nearly 1 acre. Strange that the polity and state policy recognised this fact, Govt. Maharashtra (Government of Maharashtra, Vision 2030, Date of Publication not given). Further disturbing is that 96 per cent of holdings are under 5 hectares, a threshold for generating a sizeable marketable surplus.

Table 6: Share of the Number of Operational Holdings across Size Classes (%)

Size Classes (In Hectares)	1970-71	1980-81	1990-91	2000-01	2015-16
Less than 0.5	13.80	14.45	17.61	22.63	28.60
0.5 to 1.0	11.28	13.62	16.98	21.09	22.53
1.0 to 2.0	17.74	22.45	28.80	29.71	28.39
LESS THAN 2.0	42.82	50.52	63.39	73.43	79.52
2.0 to 3.0	12.66	14.97	14.75	13.01	11.10
3.0 to 4.0	9.30	9.59	7.70	5.73	4.13
4.0 to 5.0	7.22	6.70	4.72	3.11	2.19
LESS THAN 5.0	72.00	81.78	90.56	95.28	96.94
5.0 to 10.0	17.60	13.58	7.65	4.01	2.61
10.0 to 20.0	8.44	4.11	1.62	0.64	0.38
20.0 and above	1.94	0.53	0.19	0.08	0.08

Source: Computed based on the data from Agricultural Censuses of Maharashtra for the years mentioned.

According to the ceiling on the Land Holdings Act, the ceiling limit for the drylands (without any source of irrigation) is 19 hectares, and with partial irrigation availability, it is 9.6 hectares. According to the Agricultural Census of 1970, there were 8.71 lakh holdings ranging from 5 to 10 hectares, and 5.14 lakh holdings had land in excess of 10 hectares. This was a decade after the enactment of the Land Ceilings Act. This has changed by 2015-16, with 3.98 lakh holdings

between 5 and 10 hectares and 69.7 thousand with more than 10 hectares of land. Many hold land in excess of the land ceiling limits.

Table 7: Share of the Area Across Size Classes of land Holdings (%)

	1970-71	1980-81	1990-91	2000-01	2021-22
Less than 0.5	0.77	1.23	1.97	3.65	5.79
0.5 to 1.0	1.96	3.33	5.76	9.53	14.58
1.0 to 2.0	6.06	10.92	19.04	25.50	34.12
LESS THAN 2.0	**8.79**	**15.48**	**26.77**	**38.68**	**54.49**
2.0 to 3.0	7.26	11.87	16.10	18.61	17.06
3.0 to 4.0	7.52	10.68	12.00	11.78	8.45
4.0 to 5.0	7.54	9.62	9.49	8.32	5.35
LESS THAN 5.0	**22.32**	**32.17**	**37.59**	**38.71**	**30.86**
5.0 to 10.0	28.90	29.93	23.27	15.96	8.78
10.0 to 20.0	26.58	17.42	9.44	4.96	2.84
20.0 and above	13.41	4.99	2.93	1.70	3.02
Total Area (000 Ha)	2117.90	2136.20	2092.20	2010.30	2107.90

Source: Computed based on the data from Agricultural Censuses of Maharashtra for the years mentioned

A look at Table 6 and Table 7 together brings out a clear picture that the economy of the agricultural sector in the state is experiencing an explosion of marginal and small farmers, and that has reached from 42 per cent in 1970–71 to 63 per cent in 1990–91, recording a 21 per cent -point increase. Thereafter, between 1990-91 and 2015-16, this shot up from 62 per cent to 79.5 per cent by 2015-16, an increase of 17 per cent points in just 15 years, recording a sharp increase in the process of marginalisation. At the same time, one can note a sudden increase in area share under holdings above 20 hectares after 2001; the share increased from 1.7 per cent to 3.0 per cent, undoubtedly aided by the new economic policy. The average holding size declined from 4.27 hectares in 1970–71 to 2.20 hectares in 1990–91 and went down to 1.34 hectares. The decline was noticeable after 1990–91, indicating that state agriculture was sliding down to a nonviable holding size. It is evident that agrarian distress was also at its peak at the end of the 1990s and had caused many farmers' suicides. During this period, Maharashtra had Shri Narayan Rane (259 days), Shri Vilasrao Deshmukh (7 years and 129 days), Shri Sushilkumar Shinde (1 year and 288 days), and Shri Ashok Chavan (1 year and 338 days) as the Chief Ministers. The political situation was unstable; even though one party dominated the state, the strict implementation of the land regulations was complex due to ground-level political pressures. The changes in the size of the holding are marked by increased marginalisation, and the area under the larger size of the holding heralds setting capitalistic tendencies in agriculture.

In Maharashtra, small and marginal farmers (holdings less than 2 hectares) operated together about 45 per cent of the area. Therefore, their livelihood system

was precariously tagged to the performance of the sector as well as the prices. During this phase, the prices of agricultural produce had a growth rate lower than the Consumer Price Index, edging the farmers towards impoverishment. There are interesting political and economic issues emerging from the above discussion. First, peasant farmers (with a larger share of their labour) increased substantially due to demographic pressure, policy failures, and economic nonviability due to market imperfection and depressed prices. The farm sector did not find succour even with the price policy, as there is no document like that except the illusionary and impracticable MSP (excluding a few states) (Deshpande 2004). The prices and markets were never favourable to the small and marginal peasants, and the state polity is usually a mute spectator on this issue, irrespective of the political party in power. That pulls down the economic viability of the farmers, forcing them to quit farming (NSSO, 59th round, 2003) or to migrate to urban areas with their entire family in search of manual work (Adhav, et. al. 2022). Farmers' incomes in real terms are either constant over the years or declining, pushing them to join rural work programs like MGNREGS or to migrate to cities (Deshpande and Prabhu 2005, Narayanamoorthy 2021). The present structure of land holding, the tenancy relations, and the immiseration of the peasants—complete neglect on the policy front by the representatives of farmers in the state assemblies—clearly indicate that the semi-feudal mode of production has not disappeared in the state.

Revolution that Fractionally Influenced

After suffering the prolonged phase of food insecurity and ration shortage for the first two decades after independence, seed, water, and fertiliser technology helped the country tide over food insecurity by providing a bumper harvest of wheat and rice, but confined only to a few pockets (Mitra 1968). The growth rates in Indian agriculture substantially increased, and the food insecurity issue was tackled, supported by the universal PDF providing sufficient grains through state machinery. It is well known that a few states like Punjab, Haryana, Uttar Pradesh, Tamil Nadu, and Andhra Pradesh could take considerable advantage of this change. Maharashtra was one of the states that staggered slowly into this new technology regime only in the early seventies (see Figure 6). This change happened under the Chief Ministership of Shri Vasantrao Naik, a progressive farmer and the longest-serving CM of the state. During his rule, crop productivity increased, especially for wheat, rice, jowar, sugarcane, and the three crop groups. This was a very short-lived elation, and from 1978–79, the growth slumped down. Oilseeds as a group showed promise, but food grains as a group showed a peak only in 1995–96. From 1990–91 until recently, foodgrains showed slightly better performance from 1989–90 to 1995–96 without specific efforts, and the growth started wilting down thereafter. Even though Maharashtra has the second-highest number of agricultural universities (six) and the second-highest number of agricultural scientists working compared to any other state in the country. Besides, the state has 18 chief ministers belonging to farmer families and most ministers of

agriculture. Pathetic is that the state, even today, has no agricultural policy document like that in a few other states.

Figure 6: Growth in Productivity of Major Crop Groups in Maharashtra: 1960 to 2017
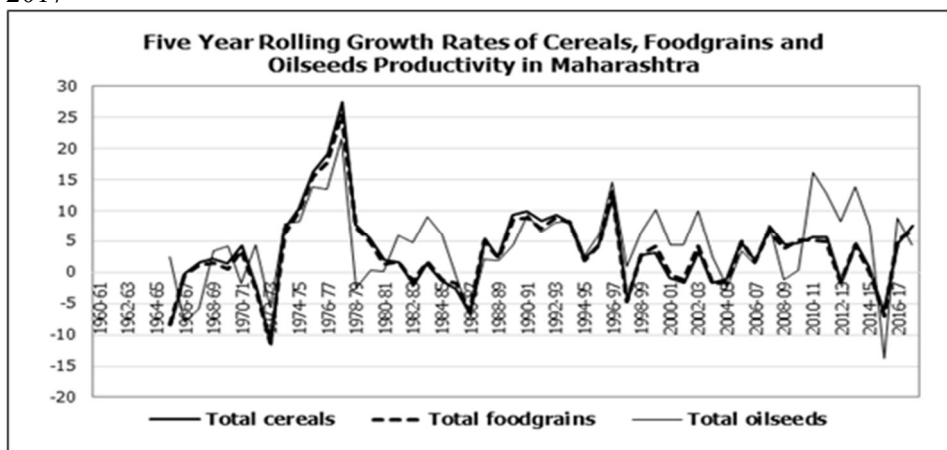
Note:1. Based on the data from Department of Agriculture, Government of Maharashtra, Pune.
2. The Five-year rolling Growth rate methodology is followed to smoothen the year-to-year fluctuations and provide a better understanding of growth behaviour (Govt of Karnataka, 2009).

Productivity growth is the essence of the impact indicator of the green revolution for the important crops and the primary crop groups, namely cereals (as the focus crops of the technological change), foodgrains (which include pulses), and oilseeds. We observe from Figure 6 that there are two peak performance phases, first beginning in 1973–74 and ending in 1979–80, that entered into a bad patch of 1979–80 to 1988–89 when political instability dominated (including President's rule for four months) the state administration even though it was the one-party rule. The internal squabbling forced a wilful neglect of agriculture, ending in the worst drought in 1987–88. During this phase of nine years, the state was ruled by seven chief ministers. The retrogression of the farm sector was quite evident, and on this background, the state stepped into the New Economic Policy. With the acceptance of the New Economic Policy in 1990–91, no significant steps were taken for the agricultural sector in the state under the new economic policy; the trends in cereals and foodgrains continued in a lower growth band. Oilseeds, however, showed better productivity. One observation is clearly visible from Figure 6: during the phase after 1991, the state's agricultural sector (cement and foodgrains) underperformed till 2015-16, except for some bright spots in oilseeds as a group.

Table 8: Ratio Yield rates of Crops in Maharashtra with that in India (In %)

Crops	TE 1990-91*	TE 2000-01*	TE 2010-11*	TE 2023-24*
Rice	84.14	67.12	72.81	81.66
Jowar	115.48	102.49	86.09	83.60
Wheat	46.16	46.42	55.89	51.10
Bajra	87.84	87.79	93.18	61.75
Total Cereals	61.40	46.91	56.54	55.08
Red Gram	62.11	97.41	130.19	107.34
Gram	74.72	69.76	90.35	97.27
Total Pulses	76.64	84.56	101.52	102.93
Total Foodgrains	61.30	46.56	56.84	54.99
Groundnut	125.22	98.06	102.89	68.02
Soyabean	93.30	134.91	85.84	112.16
Total Oilseeds	86.38	101.23	87.80	98.55
Sugarcane	132.31	120.29	123.53	114.67
Cotton	52.00	52.63	63.33	62.47

Note: 1. These are ratios in per cent of yield per hectare of the crops in Maharashtra with that in India. These are for *TE = averages of Trienniums ending at 1990-91, 2000-01, 2010-11, and 2020-21.

Source: Government of India (2012a), Government of Maharashtra (2012), Government of Maharashtra (2022), Economic Survey of Maharashtra, and the website of the Ministry of Agriculture and Farmers' Welfare, New Delhi.: https://eands.dacnet.nic.in/APY_96_To_06.htm

Typically, researchers compare the absolute productivity of crops across regions to assess the efficiency of productivity. The change in absolute productivity is an inevitable outcome; however, the relative productivity brings forth the more profound efficiency of handling the sector. It is evident from the ratios presented in Table 8 that, in most crops, the productivity of Maharashtra does not compare favorably with the country average. The ratios are declining in the cases of rice, jowar, bajra, total cereals, total food grains, groundnut, and even sugarcane. At the same time, wheat, red gram, total pulses, soybean, cotton, and total oilseeds in Maharashtra seem to be maintaining higher yield rates. One disturbing reflection comes out of these analyses about the declining importance of foodgrains in the agricultural economy of Maharashtra. Farmers seem to prefer going towards pulses and oilseeds, along with high-value agriculture, horticulture, and floriculture. Similar trends were observed earlier in the case of area allocation, indicating that commercialisation is setting its footsteps in the agricultural sector, lowering the place of food crops. This is also exacerbated by the rising prices of major food crops and the instability of income. The phase of globalisation is forcing farmers into commercialisation by allocating resources to non-food cash crops. A crucial question is looming in the foreground: Will the state survive with the possibility of a foodgrain shortage? The possibility of depending on other states for foodgrains is not ruled out.

Figure 7: Maharashtra Per capita Foodgrain Production (Kg)
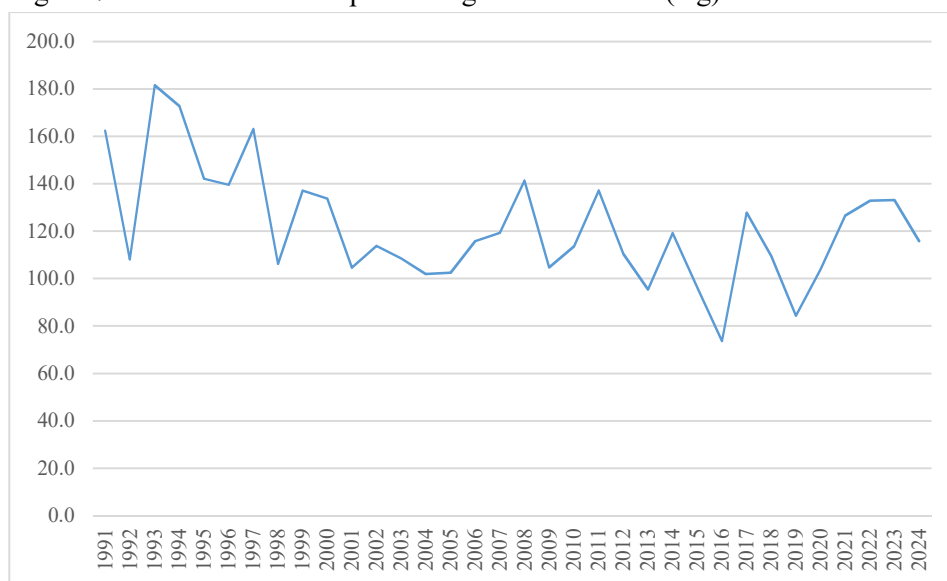
This will undoubtedly worsen in the event of a drought, which is a frequent occurrence in the state, and the income flow to households will be limited in the absence of good price support for crops such as oilseeds, soybeans, cotton, or pulses. Farmers often enter a distress situation first due to the non-availability of remunerative prices for their usual food crops, which brings down their income flow. Second, when they choose to move towards commercial crops, market imperfections and vulnerability due to price fluctuations make them helpless.

Irrigation: The Elusive Promise

Immediately after the state reorganisation, the government of Maharashtra took three important steps. First, the Maharashtra Industrial Development Corporation (MIDC) was established under the chairmanship of Shri S.G. Barve, and it continues to guide the industrial sector in its growth. The second important step was the establishment of the First Irrigation Commission, which was chaired by Shri S. G. Barve, along with members such as Prof. D.R. Gadgil, Shri Annasaheb Shinde, Shri Kadam, and others. The Commission submitted its report in 1962, which contained 30 important recommendations (GoM, 1962). The third step was the constitution of a committee to survey scarcity areas under the chairmanship of Pardasani. This committee also provided numerous important recommendations to mitigate stress in the agricultural sector caused by drought and famine. The political angle to this development is that Shri Barve was a seasoned veteran politician in the state and needed to be well-placed in good standing. Very few of these recommendations were converted into policy. Interestingly, even after this,

the state established a second irrigation commission, known as the Chitale Commission. Even after the recommendations of two excellent Irrigation Commission reports, the state did not devise a long-term irrigation policy (Narayanamurthy and Deshpande, 2002). The drought-prone areas of the state continued to suffer the frequent destruction of the household economy. Here are also a few excellent expert committee reports, like the Sukhatankar Committee for Scarcity Areas (1973), the Subramanian Committee on Drought (1975), and many other expert reports that suggest steps to be taken. But rarely are the recommendations of these experts taken into policy. To be specific, 6 out of 30 recommendations from the first irrigation commission and 22 out of 42 recommendations from the second irrigation commission were marginally considered. In Maharashtra, politics and administration have historically developed a methodology of appointing expert committees or commissions when a problem causes stress, and once the report is received (usually when the problem subsides), such reports are neatly stacked without implementing serious suggestions. Some of the suggestions come from the implementation desk, but that happened in the natural process of administration and was not straight away taken from the reports. Maharashtra has the dubious distinction of having the highest number of dams and water impounding structures, the highest quantum of water impounded, and still one of the lowest net sown areas under irrigation (Deshpande and Narayanamoorthy, 2001). Another document added to the list of documents is the Maharashtra State Water Policy-2003, prepared by the International Environmental Law Research Centre, Geneva, Switzerland. The recommendations in this document are exactly the ones reworded from the first (1962) and second (1995) irrigation commission reports of the State of Maharashtra.

The ultimate irrigation potential of Maharashtra was estimated at 12.6 million ha, comprising 8.5 million ha of surface water and 4.1 million ha of groundwater. Until 2003, the state had 53 major, 212 medium, and 2445 minor projects either completed or partially completed. Out of the ultimate irrigation potential, 43.8 lakh hectares were already tapped by 2015–16, and one of the latest references is that 70 per cent of the potential is tapped (GoM, 2021), which is contested by experts. It is well documented that everything is not well in the irrigation sector. The state of inefficiency is commented on by many in the literature, including in the second irrigation commission. One expert on irrigation in Maharashtra, while commenting on the white paper on irrigation, stated that "the overall project efficiency is hardly 20–25 per cent, as opposed to 41-48 per cent assumed in the design" (Purandare 2012). The 18th Bench Marking Report of the irrigation department includes comments on efficiency in each irrigation project, and the remarks indicate that either data is not available or efficiency is low (GoM, 2021). It will not be out of place to note that halfway through the two decades under consideration, there was political turmoil enveloping the irrigation sector of Maharashtra, sparked by a statement made in the state's Economic Survey of 2012. It was stated that the irrigation potential increased by 0.1 per cent, and expenditures totalled ₹70,000 crores. It was reported that Mr. Vijay Pandhare, Chief Engineer from the Irrigation

Department, wrote a letter to the Governor of the State, the Chief Minister, and the Principal Secretary of the Irrigation Department, complaining about rampant corruption in the department. He provided details in a 15-page letter dated May 5, 2012, alleging that no more than half of the amount spent on the irrigation projects between 1999 and 2009 had been spent for the intended purpose, and corrupt politicians and contractors had pocketed the rest. This was a highly controversial story for the media, known as the "Irrigation Scam." Under pressure from the party and colleagues, Mr Ajit Pawar had to step down as Minister for Water Resources, and Mr Sunil Tatkare was brought in. The 2014 CAG report mentions this, and a PIL was filed in the Nagpur High Court, alleging that the cost of 38 irrigation projects undertaken in Vidarbha escalated from ₹ 6,672.27 crores to ₹ 26,722.33 crores in a period of 7 months. The Government of Maharashtra countered this by issuing a "White Paper on Irrigation" in September 2019, denying any role of Mr. Ajit Pawar. The allegations subsided with the release of the white paper, which provided little evidence to prove his involvement. It stated that there had been a 28 per cent increase in irrigation potential and a 5.17 per cent increase in irrigated land in Maharashtra during those 10 years; however, the data does not support this claim. This highlights the role of irrigation, particularly canal irrigation and other initiatives in the state sector, in the political economy of agriculture in Maharashtra. The fact that the position of Minister of Irrigation is a relatively coveted and prestigious position in the cabinet, in high demand and often occupied by front-line party leaders, is notable. This is particularly true compared to the Ministry of Agriculture or Rural Development. Let us now turn to the development of irrigation in the state.

Table 9: Development of Irrigation in Maharashtra: 1990 to 2021

(In Million Hectares)

	Maharashtra				India			
	Canal and Surface	Well and Groundwater	Net Irrigated Area	Gross Irrigated Area	Canal and Surface	Well and Groundwater	Net Irrigated Area	Gross Irrigated Area
TE 1992-93	0.97	1.71	2.69	3.34	23.18	25.88	49.39	65.22
	(36.06)	(63.94)	(100)		(46.93)	(53.08)	(100)	
TE 2002-03	1.02	2.18	3.20	3.79	20.89	34.45	55.34	75.90
	(31.75)	*(68.25)*	*(100)*		*(37.74)*	*(62.26)*	*(100)*	
TE 2009-10	1.15	2.14	3.29	4.02	24.68*	38.75*	63.43*	87.76*
	(35.02)	(64.98)	(100)		(38.91)	(61.09)	(100)	
TE 2013-14	1.08	2.67	3.25	4.26	17.82	48.86	66.69	93.26
	(33.23)	(66.77)	(100)		(26.72)	(73.26)	(100)	
Year 2015-16	1.29	2.65	3.94	4.38	16.9	50.39	67.29**	96.4**

Notes: 1) SIA – surface irrigated area; WIA – well& tube well-irrigated area: 2) Figures in brackets are percentages to the net irrigated area (NIA). 3) *** - Latest data on Irrigated areas are not available beyond 2015-16 for Maharashtra.

Sources: Government of Maharashtra (2022) and https://eands.dacnet.nic.in/LUS_2000_2005.htm

The irrigation portfolio in any state cabinet is typically held by senior leaders within the party leadership. There is a pre-existing and well-known hierarchy governing the distribution of portfolios within every political party, which is well-known but rarely discussed in political-economic analyses. Irrigation is the department that provides access to agriculturists who enjoy public irrigation facilities and substantial funds for irrigation schemes. These are also the farmers that constitute the more affluent section of rural elites, hence an assured vote bank. Interestingly, most of the important publications of the government of Maharashtra, like the Maharashtra Economic Survey (2022–23, Page 141), the Statistical Abstract of Maharashtra (2018–19, Page 324), and the Reports of the Irrigation Department (Benchmarking Report 2018–19), do not give data on irrigation. Hence, some data were obtained from the Department of Agriculture and Farmers' Welfare, Government of India, Maharashtra. Government authentic publications do not give data on net irrigated area (total or by sources) from 2010 onwards, the year when the infamous irrigation scam was opened up.

The development of irrigation in Maharashtra is primarily driven by private investment rather than public sources. Between 1992 and 2016, the increase in area irrigated under canal and surface irrigation was merely 3.2 lakh hectares (approximately 21 thousand hectares per year), as opposed to 9.4 lakh hectares (approximately 62 thousand hectares per year) under groundwater, which comes from private sources. This has increased the net irrigated area by about 12.5 lakh hectares (about 8333 hectares per year) and the gross irrigated area by about 10.4 lakh hectares (about 6933 hectares per year). This leads us to two observations. First, the public investment in irrigation is far below the private investment, and in the absence of source-wise data on the area under irrigation, it is not possible to comment on the relative efficiency of the sources. Second, a clear inference leads us to believe that the increased potential is not being utilized properly. This was also commented on in the Vision 2017 document as well as in the CAG Report.

Figure 8: Annual Expenditure on Irrigation under Revenue Expenditure (₹ in Crores)
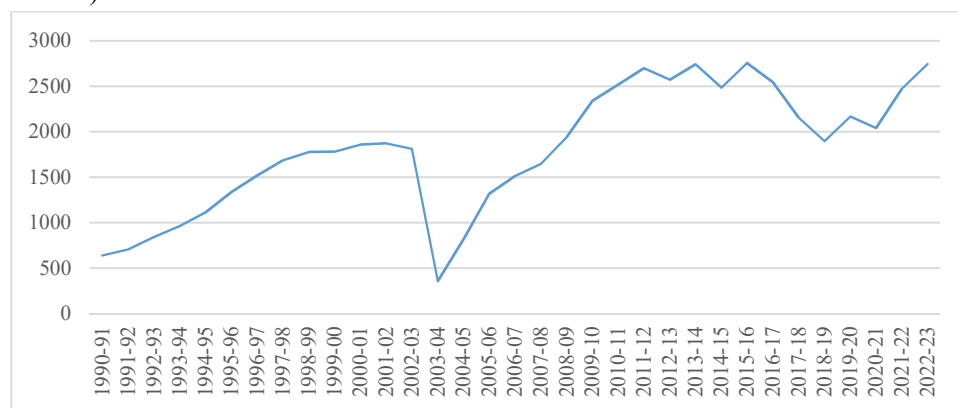
Source: Government of Maharashtra, Economic Survey of Various Years.

    As mentioned above, the entire expenditure on developing surface irrigation by state agencies has resulted in only 1.29 million hectares under assured irrigation, whereas private investment in groundwater irrigation has exceeded 2.65 million hectares. That exposes the fact that the state has failed to utilise the investment in surface irrigation prudently. During the decades that followed the implementation of the new economic policy, expenditure on the irrigation sector increased slowly, reaching ₹ 1,874 crores in 2001–02, and then dropped to ₹357 crores in 2003–04. The next peak, followed by consistently high investment, occurred from 2009–10 to 2015–16 but dropped by 2018–19 (Figure 7). An interesting reflection emerges when we examine the "year-to-year change in gross irrigated area," which tracks the path of irrigation development during these years. As shown in Figure 8, following the reorganisation of the state, irrigation development was slow and steady, with the first peak, experienced in 1973–74, continuing through the next three years. The second peak was observed in 1987–88. It becomes clear that after the shock of the 1972–73 drought and the 1987–88 drought, the irrigation administrative machinery awoke to the reality of the situation. Following the adoption of new economic policies, except for the 2011–12 period, there was little to no sustained growth. The gross irrigated area stagnated, with more observations showing negative deviations. Irrigation is certainly a fulcrum of political economy, and rural politicisation is closely associated with it. It is well known that political elites from irrigated regions influence the state's political situation, and hence, the water for irrigation provides the essential moisture for political growth in the state.

Figure 9: Year to Year Changes in Gross Irrigated Area
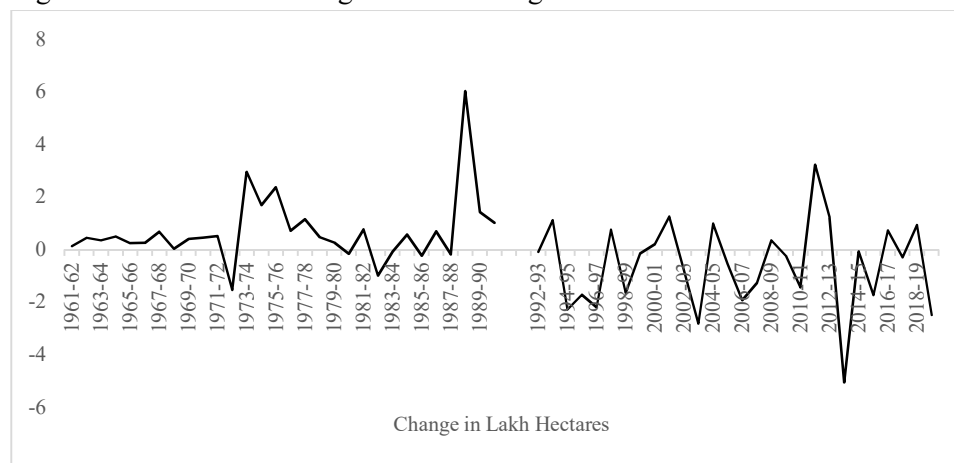
Source: Based on data from the Department of Agriculture and Farmers' Welfare, Government of India, New Delhi. https://eands.dacnet.nic.in/LUS_2000_2005.htm

    Upon its formation, the State of Maharashtra immediately confronted the issues of industrial development, drought, and water scarcity for irrigation.

However, the first few steps taken were towards the industrial development of the state. Considering the primacy of agriculture and the devastation caused by drought, the Pardasani Committee was appointed, along with the first irrigation commission, the Barve Commission. The experience of six decades suggests that significant progress was made in industrial development; however, the failure of policy and polity is quite evident in drought-proofing and expanding irrigation networks. This is becoming worse with the market centrality pushed forward in the new economic policy.

Policy and Polity

The Union government's initiatives broadly direct the development policy of any state in a federal context; some state-level initiatives take the forefront. However, under the Indian Constitution, agriculture is listed under the state list in the Seventh Schedule, making the policy the prerogative of the state government. On a theoretical level, there are three key drivers of any policy that shape the state's economy (Deshpande, *et. al.* 2018)—first, the ideology and promises made by the political parties in a democratic setting. Second, the issues and problems confronted are organised by their intensity, and third, the feedback of the stakeholder groups, which include the population and implementers. Among these tools of the government, apart from setting institutional norms (which include both legal and administrative ones), the allocation of resources dictates the success of these intentions. The allocation also indicates the vision of the governments in power. During every planning period, the state government presented its intentions through plan allocations, which can be taken as a proxy for its intentions and efforts in the sectoral development process. The share of the state government's allocation of plan funds to agriculture and allied sectors has been decreasing over plan periods (Table 10). The share of agriculture and allied services increased to 11.38 per cent and 11.45 per cent during the eighth and ninth plans of the state but subsequently declined to approximately seven per cent. The stories of the irrigation and flood control sectors are almost identical. However, rural development was neglected and declined continuously, reaching a decline of 5.58 per cent during the 11th plan period of the state. The total allocation, as well as the expenditure incurred in these sectors, declined from 40.11 per cent to 34.5 per cent by the end of the 11th Plan. The ineffectiveness of planning was noted by Streeton and Lipton as far back as 1968 (Streeton and Lipton 1968), but it took many years to realise this. The twelfth plan was abandoned as the incumbent government decided to disband the Planning Commission, following the recommendation of a one-person evaluation authority (headed by Dr Ajay Chibber, formerly from the IMF) appointed by the previous government. The sectoral allocation, when standardised based on the gross cropped area and gross irrigated area, reveals the dire situation created by policymakers in both the agricultural sector and the rural development sector. Irrigation and flood control also received diminishing attention in the allocation of resources at the policy level (*see* Tables 10 and 11).

Considering the plan allocations as representing the development intentions of the state polity, the allocations indicate wilful neglect of the wanting sectors by the political decision-makers in their policy. The agrarian distress and farmer suicides in Maharashtra were indeed not a random event but rather the culmination of wilful neglect of the signals of distress, not necessarily only during the nineties but from the very beginning of the reorganisation. The trend became sharper during the nineties and continued throughout the two decades. "The total number of farmer suicides in Maharashtra increased from 1,083 in 1995 to 4,147 in 2004. The increase was as high as 288 per cent among male farmer suicides from 978 to 3179" (Mishra, 2006). Data in Table 11 show a sharp decline in per-hectare allocations for agriculture after 1997 (₹ 2191 to ₹1058); it is no wonder that agrarian distress began to stalk the lives of farmers by the end of 1997, claiming many lives under the hanging threat of mere survival (Deshpande and Arora 2010, Reddy and Mishra 2010). The farmer suicides started in the state precisely around 1997 and peaked by 2005 (Talule 2020).

Table 10: Sectoral Distribution of Plan Expenditure in the FYP of Maharashtra

(₹ in   Crore)

Sr. No	Five-Year Plan Schemes	Agriculture and Allied Services	Rural Development	Irrigation and Flood Control	Total
5	7th Plan	614.39	1575.86	2239.53	4429.78
	(1985-90)	(5.56)	(14.27)	(20.28)	(40.11)
6	8th Plan	2831.93	3264.66	6370.58	12467.17
	(1992-97)	(11.38)	(13.12)	(25.60)	(50.10)
7	9th Plan	3296.59	2919.34	4694.27	10910.20
	(1997-2002)	(11.45)	(10.14)	(16.31)	(37.90)
8	10th Plan	3535.24	4300.74	12528.00	20363.98
	(2002-2007)	(7.25)	(8.81)	(25.68)	(41.74)
9	11th Plan	3947.80	3089.94	13763.60	20801.34
	(2007-12)	(7.12)	(5.58)	(24.84)	(37.54)
10	12th Plan (2012-17)	30758.00	8080.00	35299.00	74137.00
	Abandoned	(14.31)	(3.76)	(16.42)	(34.50)

Note: Figures in brackets are per cent to total Plan Exp.; Plan Exp. includes both revenue & capital.
Source: RBI (Various issues of State Finances: A Study of Budgets).

Figure 10: Expenditure on Agricultural Sector as Share of Revenue Expenditure (%)
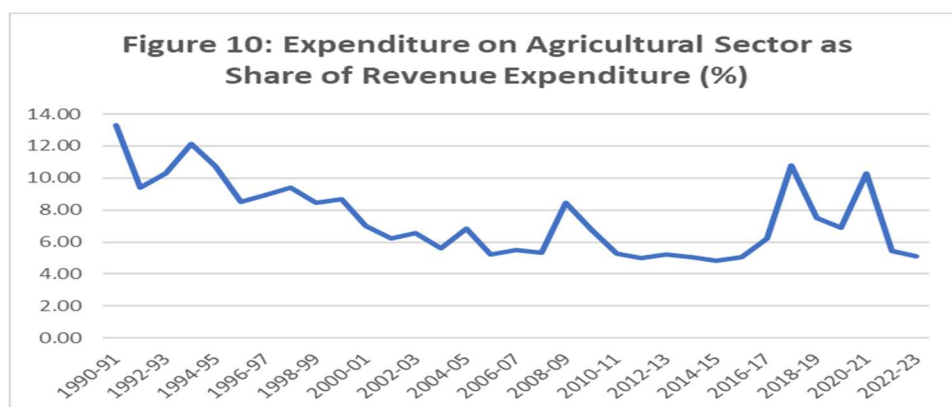
Sources: Economic Surveys of Maharashtra for various Years, from State budgets of various years, indiastat.com.

Table 11: Sectoral Plan Expenditure per Hectare in the FYP of Maharashtra

Sr. No (1)	Five-Year Plan Schemes (2)	Agriculture &Allied Services (3)		Rural Development (4)		Irrigation & Flood Control (5)		Total (6) = (3+4+5)	
		₹ Crore	₹ /ha*	₹ Crore	₹ /ha*	₹ Crore	₹ /ha**	₹ Crore	₹ /ha*
1	6th Plan (1980–85)	1,980	1,009	4,505	2,295	7,237	29,829	13,723	6,991
2	7th Plan (1985–90)	2,098	999	5,382	2,563	7,649	27,976	15,129	7,205
3	8th Plan (1992–97)	4,709	2,191	5,429	2,525	10,594	30,967	20,732	9,644
4	9th Plan (1997–2002)	3,852	1,777	3,411	1,574	5,485	14,429	12,747	5,882
5	10th Plan (2002–07)	3,437	1,534	4,181	1,866	12,180	30,202	19,799	8,834
6	11th Plan (2007–12)	2,413	1,058	1,888	828	8,411	19,376	12,712	5,575
7	12th Plan (2012–17) **Abandoned**	12,037	5,195	3,162	1,365	13,814	31,396	29,014	12,522

Source: Authors' estimates based on information provided in the GOM (various years; Economic Survey of Maharashtra) and the recent year 2019–20 (in current prices), as reported in the GOM (2020). At 2004–05 constant prices; ₹ in Crore; GCA/ha*; GIA/ha**.

The annual budgetary allocations also confirm the wilful inattention to the agricultural sector, which caused a dearth of capital in the sector. The budgetary expenditure on the agricultural sector as a share of total revenue, as indicated in the budget, declined from 13.28 per cent in 1990–91 to 4.83 per cent in 2014–15. It was only in 2008–09 that the allocation to agriculture out of budgetary resources increased to 8.46 per cent, but this share remained below 10 per cent, except in the years 2017–18 and 2020–21 (see Figure 10). The decline in budgetary allocations gives a clear indication of the neglect of capital formation in the sector. The distress in agriculture began in the early nineties and peaked in 2005–06. Researchers analysing the spate of farmer suicides attached various reasons to the phenomenon. Dandekar, after an elaborate study (Dandekar 1962), wrote, "*Background research indicated that the central question in the sector revolves around the prices farmers receive for their produce.*" Input costs are not adequately compensated through the existing price mechanism the market offers to the farmers. As a result of this mismatch, today's farmers are, to some extent, debt-ridden, and the amount of debt continues to grow in such a manner that there appears to be no easy way out of this situation (Dandekar 2016, p. 50). Similarly, investment in agriculture, both from public and private sources, is declining, which further exacerbates the situation. Another expert finds that the failure of institutions led by the state has intensified suicides; he writes, "The withdrawal of the state is evident from declining public investment in agriculture, poor government extension services, and a diminishing role of formal institutions in the rural financial market, among other factors." *The farmer now depends on the input dealer for advice, leading to supplier-induced demand and on informal sources of credit, which carry a higher interest burden* (Mishra, 2006). A significant consequence of the Green Revolution has been the increased demand for cash inputs to purchase fertilisers, seeds, and pesticides, as well as to cover the costs of electricity and water. The cash component of the cultivation cost has increased substantially, reducing the net

income flow to the farm household. The trends in absolute income have remained relatively stagnant over the years (Deshpande and Prabhu 2005, Mohanty 2009, Narayanamurthy 2021). Vasavi (2012) elaborated on the externalities inflicted by the technological change and the political economy of agrarian structure. Overall, the distress is the culmination of many events that have occurred in succession over the 1990s. These involve negligence by the state to take note of problems, increasing cost of cultivation, declining net income and debt-paying capability of the farmer, increasing debt burden, and above all, failure of institutions and the state to take note of the early signals of distress (Deshpande and Arora 2010, Reddy and Mishra 2010). In the haste to adopt new economic policies, leading to liberalisation, privatisation, and globalisation, no attention was paid to the critical agricultural sector, which was almost severely impacted, causing distress. As a result, that culminated in about a lakh suicides across states in Maharashtra and has sustained the non-enviable top rank in the interstate comparison.

Figure 11: Farmer Suicides in Maharashtra
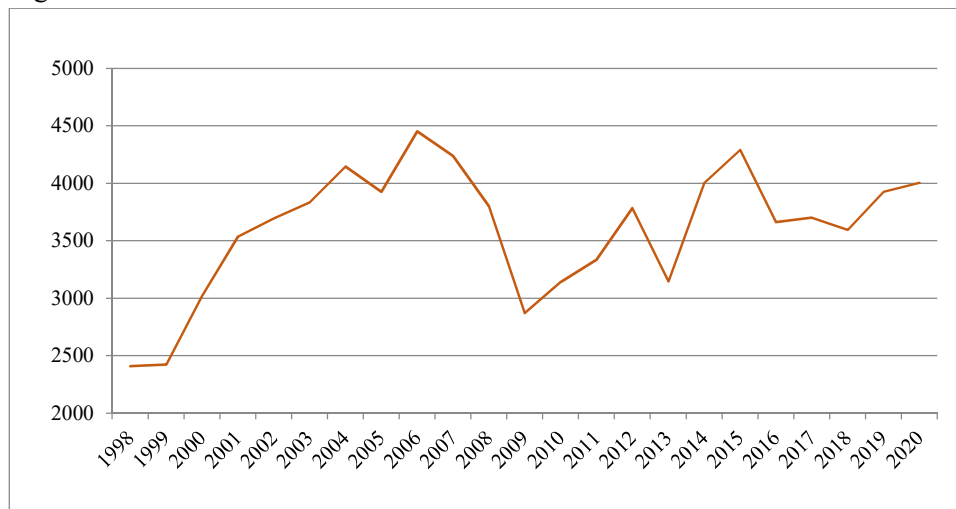
Perforated Safety Nets

Theoretically, the significant shift in the economy towards market centrality necessitates protection for those who are discriminated against in various markets. The bargaining power of the weaker elements in the presence of semi-feudal production relations requires adequate support for safety net programs that will protect those affected by market imperfections and controls by profit-maximising market functionaries. In that context, a few important things need to be brought under the scope of the safety net programs. The experience of the last two decades clearly shows that a significant number of safety net programs have been introduced; however, these programs have not been as successful as promised in

their design. The benefits of many of these programs could not reach the intended beneficiaries in the state, and this needs to be highlighted as one of the key measures in analysing the state's political economy.

Agrarian distress emerged mainly because of the shrinking income flow to farm households, which were unable to meet the requirements of expenditure on the farm and in the household, as well as pay back the debts they had incurred for cultivation purposes. The growth rates of factor prices are always higher than those of product prices. This occurs due to market failures and imperfections, as well as the non-availability of the expected price for their products. The first safety net program, which has been in operation since the mid-1960s, is the Minimum Support Price (MSP) scheme. This scheme promises to purchase all products from farmers if the prices in the Agricultural Produce Market Committee (APMC) fall below the pre-decided MSP level. This mechanism, however, failed miserably in the state of Maharashtra, as total procurement of wheat and rice in the state never exceeded 1,000 metric tons, and that of nutri-cereals (Sridhanya) procurement averaged 45,000 metric tons. Maharashtra also had an Agricultural Prices Commission that operated sporadically for some time and eventually fell into oblivion over the years. The procurement process within the APMC compound does not allow access to many genuine cultivators, and it is dominated mainly by aggregators rather than farmers alone. Procurement at MSP is forced due to the failure of APMCs to provide respectable prices for the products. Maharashtra has, for years, developed its Agricultural Produce Market Committee-regulated markets in the state; however, the density is very sparse. On average, one market serves 45 villages in the state. Across districts, this density of villages served per market varies from 24 and 25 villages in Nanded and Jalana districts, respectively, to 739, 303, and 158 villages in Sindhudurg, Ratnagiri, and Gadchiroli districts. This explains the failure of the market and price mechanisms in the state, with more considerable benefits accruing to aggregators and traders operating in the market and around the villages. Thus, prices, as well as markets, do not serve as a reliable mechanism for farmers to protect themselves against market failures. Globalisation has held out the promise of increased global trade to the agricultural sector, which has yet to materialise. Any trade that takes place from Maharashtra towards the global market is often facilitated through aggregators and wealthy traders, who sometimes act fiercely against the interests of farmers. The trade-in onions is the best example of traders working against the interests of farmers.

Maharashtra has the second-highest number of agricultural universities and research centres across the states in the country. It also has the highest number of agricultural scientists and the largest allocation of funds to agricultural research and teaching at these universities. However, the productivity rates across crops in Maharashtra are not comparable with those in neighbouring states, which are also growing the same crops, except for a few. The entire institutional setup does not work in favour of the farmer's demand for research. Research in agricultural sciences is largely supply-based and more oriented towards achieving academic excellence than farmer welfare. Similarly, institutions undertaking agricultural

extension also became defunct and disappeared due to a lack of workforce and the adoption of new technologies. Today, the extension and dissemination of agricultural knowledge have been taken over by shopkeepers, who supply raw materials to farmers (NSSO, 2003).

Being a persistently drought-prone state, Maharashtra has undertaken ambitious programs to promote watershed management. This program has absorbed huge funds from the state government over the years; however, the results do not show any significant change even in the places where large investments have been made (like Manoli World Bank-sponsored projects, COWDEP, NWDPRA (I and II), and those with NGO initiatives, etc.) (Deshpande and Narayanamurthy 1999). The Jalyukta Shivar Scheme, initiated by the Government of Maharashtra in December 2014, aimed to address water scarcity during droughts. It involved preparing a dug-out water storage structure to impound water, which will enhance the groundwater and also be used during times of scarcity. According to the initial plan, it was to cover 18,000 villages with 12 works that were previously included in watershed programs over the years. In one in-depth field evaluation study, it was noted that this scheme had implementation faults and did not benefit villages as intended (Ghotale 2020). Analysing the irrigation reforms in Maharashtra, an expert from the Maharashtra Water Resources Regulatory Authority lamented that "the present hardware-focused approach needs to be replaced by a more pragmatic, inclusive, and participatory approach. Merely making policies and introducing reforms is not enough unless these are translated into actions. Water issues are location-specific and vary from project to project and basin to basin; therefore, solutions must be site-specific (Kulkarni 2016).

The Maharashtra government accepted the Pradhan Mantri Fasal Bima Yojana with great enthusiasm and advertised it extensively. However, a recent in-depth field-based report reveals that the PMFBY implementation in Maharashtra is flawed, with farmers benefiting little from the indemnity, while insurance companies have profited significantly from the government in terms of premiums (Kulkarni and Deshmukh 2017). The Maharashtra Times, on July 28, 2022, reported a large number of fake beneficiaries and irregular practices in the PMFBY. A detailed study by Vineet Kumar for the Centre for Science and Environment found that its implementation has several shortcomings and issues that contradict the interests of farmers (Vineet Kumar 2017). The state government has accepted to implement the Shetkari Maha Samman Nidhi Yojana, providing ₹ 6,000 to every farmer in three instalments, and the Birsa Munda Krishi Kranti Yojana, under which the Scheduled Tribe farmers are provided subsidy for electricity connection, micro irrigation, pump sets, PVC/HDPE pipe, and backyard farming. Under the Pradhan Mantri Krishi Drip Irrigation Scheme or Sprinkler Irrigation Scheme, a 55 per cent subsidy is provided to small and marginal landholding farmers. However, the effectiveness of these schemes needs to be reviewed due to the political and economic structure of the villages, which are dominated by powerful lobbies. Due to the semi-feudal characteristics of the

villages, the benefits of the scheme are often passed on only to people in need through the hands of powerful political lobbies.

Maharashtra previously had a Planning Board under the Ministry of Planning to support the government in its economic development process. A similar institution exists in a few states, such as Karnataka, Kerala, and Andhra Pradesh, and these are running effectively, assisting the state governments in making critical decisions. Like the Agricultural Prices Commission, the state has taken a shortcut to throttle these valuable and practical institutions. This is reflected in the state's planning process, which involves allocations that are entirely irrational and lack a transparent developmental model. However, the state polity has an uncanny ritual of appointing expert groups every time at the drop of hat and then stack the reports without attempting to implement the crucial recommendations. This occurred in the cases of two irrigation Commission reports, the Evaluation Reports of Watershed Development Programs, the Pardasani Committee on Scarcity (1960), and the Sukhtankar and Subramanya Committees on Drought (1973). The Kelkar Committee followed the Dandekar Committee on Regional Imbalances, and the list can continue.

There is no doubt that the state implements a host of Safety Net programs, but these are implemented in the most unprofessional manner, and pilferage is intractable. Recently, The Economic Times reported (December 16, 2018), that as many as 8 lakh fake beneficiaries have been found registered across 1.09 lakh Anganwadi centres in Maharashtra. The Ministry of Agriculture has admitted that the first verification exercise of the PM Kisan Yojana, since its launch in December 2018, has shown that out of a sample of nearly 12 lakh beneficiaries, four per cent are ineligible, invalid, or simply bogus. These experiences not only take the political overtones but also erode the state's resources, bringing it very close to criticality in public debt and increasing its dependence on the union government for many programs.

Conclusions

Maharashtra is known as a progressive and forerunner state in industrial development. However, all is not well in the political economy of the state, with only three Chief Ministers serving for full terms or more than five years since reorganisation. The lingering semi-feudal character and political oligarchy exploited the agricultural sector, contributing little to its development from the state's reorganisation, except in two brief periods. Consequentially, the state has the disreputable distinction of being the most farmer-suicide-prone state. Agrarian distress began to reach its peak during the late nineties and beyond. More than 70 thousand farmers have committed suicide in this phase of liberalisation, privatisation, and globalisation. That brings up the importance of analysing the political economy of agriculture. The political-economic structure of Maharashtra emerged historically through the different production relations prevailing in the regions. Semi-feudalism, along with the landed gentry's stronghold on the state's

political structure, persisted and remained visible. The abolition of intermediaries under land reforms brought about some changes, but the mode of production persisted, with many landowners remaining extremely wealthy and affiliating with various parties. The state, with its strong favouritism towards urbanity and industry, provided fertile ground for LPG to experience high-speed proliferation and, in the process, created several externalities.

Many academics have misinterpreted the concept of political economy, often inadvertently. The discussion revealed that political economy primarily concerns the historical institutions of agrarian capitalism and the interactions between its constituents and boundaries. This culminates in the formation of the political and economic structure under the usury mode of production. The political structure and its interaction with economic institutions remain an integral part of the political-economic analysis, with an interplay among three key players: the state, economic policies, and production relations, as well as internal or external pressure lobbies. Initially, the agricultural sector of the state was at the receiving end for forty years, with a minor exception of 1974–82, when it was confronted with gross neglect at the policy level. Even though LPG was introduced into India's economic policy with the 1982 budget, it gained consolidation after the mid-1990s. Among the impacts, the agricultural sector was again at the receiving end, with commercialisation becoming a forerunner. With the introduction of the LPG policy in the early nineties, without any preparation or discussion on any platform, the government imported the perils of the LPG policy. Sadly, the NEP took no cognisance of the need for reforms in the agricultural sector, and it was left to suffer its plight. The sector remained primarily neglected until the sudden surge in farmer suicides was noted in 2002, and hastily, the Rashtriya Krishi Vikas Yojana was put together, which miserably failed in its core objective of enhancing productivity. The preparations for the envisaged market-centric approach under LPG were inadequate, and factor prices grew exponentially at a higher rate than product prices. This reduced the net income flow in peasant households, and with this, the agrarian distress in the state reached its peak, with the number of farmer suicides increasing over the years.

Land reforms helped eliminate intermediaries but were largely unsuccessful in achieving an egalitarian land distribution. It created problems such as the proliferation of uneconomic holding sizes (79 per cent of small and marginal farmers), reverse tenancy, hidden and unrecorded usurious tenancy, and land being taken out of the agricultural sector for other uses. During the two decades, the amount of land not available for cultivation increased by 1.5 lakh hectares. During these years, land under non-agricultural uses increased by 3.8 lakh hectares, and cultivable waste land increased by 2 lakh hectares. A clear trend of land slipping out of agriculture is observed. There are significant changes in cropping patterns. Land allocated to cereals and total foodgrains is declining, as are those under sugarcane and groundnut. It is not only the area share of cereals and foodgrains that is declining, but the productivity relative to the country's average has also declined from 61.3 per cent to 54.9 per cent, indicating a decline in productivity

and, consequently, a decrease in foodgrain production. A significant concern is the decline in per capita foodgrain production in Maharashtra, which has decreased from 181.6 kg/capita in 1993 to 84 kg/capita and has since slightly recovered to 134 kg/capita in 2022. This is an intense alarm sounded as an impact of commercialisation under the lure of a globalised economy. The sad saga of irrigation and technological advances in agriculture underscores the inadequate policy response of the state government. Compared to the regimes under Shri V. P. Naik or Shri Vilasrao Deshmukh, this is a gross neglect of the sector, resulting in a few farmer suicides almost every day. The safety-net schemes introduced in a rush without proper preparation were flawed, as they failed to fully deliver their intended benefits due to the politicisation of the participants and inadequacies in their implementation. Now is the time to consider deglobalisation, allowing some of the negative impacts to be mitigated.

Deglobalisation involves scaling back or reducing the speed of international cooperation and economic integration, but countries are capable of prioritising domestic economic policies over other considerations. Deglobalisation will surely bring in new challenges and opportunities for India. It will open a new horizon and a multifaceted landscape for India. Overdependence on FDI or technology generated elsewhere is likely to handicap the agricultural sector at any time. The agricultural sector requires some fundamental adjustments, including the development of a medium-term agricultural policy for Maharashtra. One must go by what the father of the nation has said about this: "*I do not want my house to be walled in on all sides and my windows to be stuffed. I want the culture of all lands to be blown about my house as freely as possible.*" *Mahatma Gandhi, Young India, June 1, 1921.*

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Annexure 1: Duration of Chief Ministers of Maharashtra: 1960 to 2023

	Name	Period of Work	Years	Days
1	Shri Y B Chavan	01-05-1960 to 20-11-1962	2	203
2	Shri M S Kannamwar	20-11-1962 to 24-11-1963	1	4
3	Shri P K Sawant	25-11-1963 to 05-12-1963	0	10
4	Shri V P Naik	05-12-1963 to 21-02-1975	11	78
5	Shri S B Chavan	21-02-1975 to 17-05-1977	2	85
6	Shri Vasantrao Patil	15-05-1977 to 18-07-1978	1	62
7	Sharad Pawar	19-07-1978 to 17-02-1980	1	214
8	President's Rule	17-02-1980 to 08-06-1980	0	112
9	Shri A R Antulay	09-06-1980 to 21-01-1982	1	226
10	Shri Babasaheb Bhosale	21-01-1982 to 02-02-1983	1	12
11	Shri Vasantrao Patil	02-02-1983 to 03-06-1985	2	121
12	Shivajirao Patil Nilangekar	03-06-1985 to 12-03-1986	0	282
13	Shri S B Chavan	12-061986 to 26-06-1988	2	106
14	Sharad Pawar	26-06-1988 to 25-06-1991	2	364
	New Economic Policy			
15	Shri Sudhakarrao Naik	25-06-1991 to 06-03-1993	1	254
16	Shri Sharad Pawar	06-03-1993 to 14-03-1995	2	8
17	Shri Manohar Joshi	14-03-1995 to 01-02-1999	3	324
18	Shri Narayan Rane	01-02-1999 to 18-10-1999	0	259
19	Shri Vilasrao Deshmukh	18-10-1999 to 18-01-2003	3	92
20	Shri Sushilkumar Shinde	18-01-2003 to 01-11-2004	1	288
21	Shri Vilasrao Deshmukh	01-11-2004 to 08-12-2008	4	37
22	Shri Ashok Chavan	08-12-2008 to 07-11-2009	1	338
	Vacant	07-11-2009 to 11-11-2010		
23	Shri Prithwiraj Chavan	11-11-2010 to 28-09-2014	3	321
	Vacant	12-11-2019 to 30-10-2014		
24	Shri Devendra Fadnavis	31-10-2014 to 12-11-2019	5	12
	Vacant	12-11-2019 to 23-11-2019		11
25	Shri Devendra Fadnavis	23-11-2019 to 28-11-2019	0	5
26	Udhav Thakre	28-11-2019 to 30-06-2022	2	214
27	Shri Eknath Shinde	30-06-2022 to 05-12-2024	2	158
28	Shri Devendra Fadnavis	05-12-2024 contd		

Quality and Performance of Health Services in District Hospitals of Haryana: An Assessment through Demand-Side Perspective

Rajesh Kumar Aggarwal and Dalbir Singh

The present study assesses the quality and performance (efficiency) of District Hospitals (DHs) from a demand-side perspective by giving patient's views. Seven factors of the out-patient construct and eight factors of the in-patient construct have been explored using Exploratory Factor Analysis. Treatment services significantly influence the patients' satisfaction at DHs (both out-patient and in-patient). The other service quality components highlighted by this survey, suggest a significant opportunity to increase the satisfaction of out-patients and in-patients at Haryana's DHs. Performance assessment of healthcare services in terms of patient satisfaction shows that 77 per cent to 88 per cent of the patients (both out-patients and in-patients) are satisfied with the healthcare services at DHs. Among other things, the study recommends enhancing the allocation of funds for healthcare services as the expansion of such services improves productivity growth, employment opportunities and standard of living and hence improves the quality of life of the people.

Keywords: Quality, Performance, Exploratory Factor Analysis, Regression Analysis, t-Test, District Hospital, Haryana.

I Introduction

Service quality components have been increasingly recognized as contributory factors toward patients' satisfaction. Scotti, Driscoll, Harmon and Behson (2007) reveal a significant relationship between patient satisfaction and perceived service quality. For the growth of the healthcare sector and better provisioning of services, it is imperative to focus on the quality and performance of healthcare services

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(Buhaug 2002). This leads to identifying the service quality components that help to measure, control, and improve patients' perceived service quality. Singh and Aggarwal (2021b) quoting Itumalla, Acharyulu and Shekhar (2014) highlighted the importance of service quality that the hospitals can play their role better if they could combine better quality with better performance.

The quality of healthcare services is designed to measure both functional and technical quality, i.e., how and what type of healthcare service is delivered to the patient. However, such types of service quality can't be sustained without proper diagnoses and procedures. The perceptions of patients availing healthcare services also play a vital role in spreading a good image of the hospital (Singh and Aggarwal 2021a). Several healthcare professional organizations, namely the National Quality Assurance Standards at the National Level, the National Accreditation Board for Hospitals and Healthcare Providers, and the Quality Council of India, have focused their research on these aspects of service quality. Nazgul (2011) has highlighted that the performance of the healthcare system directly affects people's health. Nowadays, the pressure on healthcare facilities has led policymakers to explore more efficient ways to improve performance and achieve a higher level of patient satisfaction (Singh, Singh and Singh 2017).

In this context, it becomes imperative to identify the service quality components and assess performance through patient satisfaction. Therefore, this study aims to identify the service quality components, assess the impact of service quality on the satisfaction of outpatients and inpatients, and evaluate the performance drivers in terms of satisfaction levels among outpatients and inpatients at DHs in Haryana.

II Review of Literature

Hordacre, Taylor, Pirone and Adams (2005) in their study, highlighted a high level (86 per cent) of satisfaction with healthcare services and amenities provided by healthcare institutions. The researchers' regression analysis revealed that three socio-demographic factors —education level, age, and sex —were associated with a lower level of satisfaction, whereas other factors, such as 'living with others' and 'non-emergency admission', were associated with a higher level of satisfaction. A study conducted by Yesilada and Direktor (2010) in the healthcare industry of Northern Cyprus explored three factors namely "reliability-confidence", "empathy" and "tangibles" and hence did not support the original "SERVQUAL" model of five factors. Irfan and Ijaz (2011) found in their study that patients were more satisfied with the services provided by private hospitals compared to public hospitals in Lahore. Kumaraswamy (2012) found that the highly significant factors in service quality were the 'behaviour of the physicians' and 'support staff'. Corporate health centres were found more efficient than that of non-corporate health centres on the basis of the behaviour of the physicians and support staff. Merkouris, Andreadou, Athini, Hatzimbalasi, Rovithis and Papastavrou (2013) found that patients who visited for medical treatments were more satisfied than

that with surgical treatments. However, this difference was minor. Ahmed, Assefa and Demisie (2014) measured in-patients satisfaction levels and explored associated factors related to nursing care services in public hospitals in Eastern. The results revealed that the overall satisfaction level was 53 per cent whereas 63 per cent of the patients were satisfied with 'nursing characteristics', 56 per cent were satisfied with 'caring activities', 44 per cent were satisfied with the 'information provided' and 55 per cent were satisfied with 'caring environment'. A study conducted by Bouphan, Apipalakul and Ngang (2015) in Thailand during 2011-2012 revealed that the highly influential factor affecting the performance of the hospitals were manpower, methods of treatment, and materials. Mohamed, Sami, Alotaibi, Alfarag, Almutairi and Alanzi (2015) measured patient satisfaction levels receiving healthcare services at primary health centres in Majmaah City of the Kingdom of Saudi Arabia in 2015. He found that most of the patients (82 per cent) were satisfied with the cleanliness and technical assistance received at health centres. In contrast, patients were dissatisfied with the bad condition of the buildings. The study also highlighted the association between patient satisfaction and their educational level. Hussain, Sial, Usman, Hwang, Jiang and Shafiq (2019) measured the performance of public hospitals in terms of out-patient satisfaction at tertiary hospitals in southern Punjab of Pakistan from June to July 2018. Out of identified factors, two factors namely laboratory and pharmacy services were found statistically significant factors affecting out-patient satisfaction whereas "doctor-patient communication" and "physical infrastructure" were found insignificant factors. Ismail, Gan and Ahmad (2020) also conducted a study in three public health clinics in Malaysia to explore the factors affecting the satisfaction of the patients and found that patients were highly satisfied with healthcare services. The study identified education level, age, self-perceived health status, frequency of visits, and general knowledge of pharmacists as factors significantly affecting patient satisfaction.

Thus, it emerges that the reviewed studies differ in terms of the scope, dataset, and variables used to assess service quality and performance of the health institutions. A review of the literature revealed that no study has identified the factors influencing the quality and performance of healthcare institutions at the district level in Haryana. The substance of the reviewed studies indicates that almost all of them are inconclusive in measuring both the different components of service quality and the performance of health institutions simultaneously.

The researchers in the present study followed *'SERVQUAL'* model (Parasuraman, Zeithaml, Berry, 1988) but this study did not support the original *'SERVQUAL'* model of five factors. Therefore, the model used in this study was named as *'DH-SERVQUAL'* model through which factors affecting the service quality of out-patient and in-patient departments at DHs in Haryana were identified. This study also explores the impact of identified factors of service quality on the satisfaction level of out-patients and in-patients. Further, the performance of the DHs from the demand side perspective has also been assessed in terms of patient satisfaction (both out-patients and in-patients).

Hypotheses

The hypotheses of the study are;

- H_0: Components of service quality have no significant impact on out-patient satisfaction (OPS) at district hospitals in Haryana.
- H_0: Components of service quality have no significant impact on inpatient satisfaction (IPS) at district hospitals in Haryana.
- H_0: The performance of district hospitals has no significant influence on outpatient satisfaction (OPS).
- H_0: The performance of district hospitals has no significant influence on inpatient satisfaction (IPS).

III Methods and Materials

For service quality assessment, Exploratory Factor Analysis (EFA) has been used to extract the underlying service quality components of outpatient and inpatient constructs. To check the sample adequacy, the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test were performed. The value of the KMO measure must be >0.5 for both the overall fit and for each factor as suggested by Hair, Anderson, Tatham, and Black (2008). The result of BTS test should be significant for further analysis. To decide the number of principal factors, the criterion of an Eigen Value>1 was employed and the solutions were rotated with varimax rotation.

To assess the impact of the extracted components on the satisfaction of out-patients and in-patients, regression analysis was applied. The specified models for out-patient and in-patient components are given by eqn. (1) and eqn. (2), respectively.

$$S_O = b_0 + b_1 TS_O + b_2 RS_O + b_3 LS_O + b_4 IS_O + b_5 NS_O + b_6 DS_O + b_7 MS_O + u_i \qquad ...(1)$$

Where; S_o: out-patient satisfaction score (in per cent); b_0: constant; b_1-b_7: coefficients of service quality components; TS_o: Treatment Services for out-patients; RS_o: Registration Services for out-patients; LS_o: Laboratory Services for out-patients; IS_o: Infrastructural Services for out-patients; NS_o: Nursing Services for out-patients; DS_o: Dispensary Services for out-patients; MS_o: Medicine Services for out-patients and u_i is a random variable.

$$S_I = b_o + b_1 TS_I + b_2 FS_I + b_3 LS_I + b_4 WS_I + b_5 AS_I + b_6 IS_I + b_7 MS_I + b_8 NS_I + u_i \qquad ...(2)$$

Where; S_I: in-patient satisfaction score (in per cent); b_0: constant; b_1-b_8: coefficients of service quality components; TS_I: Treatment Services for in-patients; FS_I: Food services for in-patients; LS_I: Laboratory Services for in-patients; WS_I: Wards Services for in-patients; AS_I: Admission Services for in-

patients; IS_I: Infrastructural Services for in-patients; MS_I: Medicine Services for in-patients; NS_I: Nursing Services for in-patients and 'u_i' is a random variable.

In addition to this, the performance of identified service quality components was assessed in terms of the outpatient and inpatient satisfaction levels. For this, 5-point Likert scale responses regarding satisfaction of out-patients and in-patients were transformed into two groups: 'Satisfaction (Group-1)' and 'Dissatisfaction (Group-2)'. All the scores of 'Highly Satisfied' and 'Satisfied' were merged into 'Satisfaction' whereas all the scores of Highly Dissatisfied, Dissatisfied, and 'Neutral' were merged into 'Dissatisfaction'. Since the objective in the healthcare system is to attain complete satisfaction, therefore the 'Neutral' scores were merged into the 'Dissatisfaction'. Further, satisfaction scores of all the variables of the service quality components were calculated to assess the level of satisfaction of outpatients and inpatients. To analyse the mean difference between satisfaction and dissatisfaction levels, independent samples t-test was performed.

The output table of the independent samples t-test using Statistical Package for Social Sciences provides two rows for one variable (here quality components). In the first row, 'equal variance assumed' is mentioned, whereas in the second row, 'equal variance is not assumed' is mentioned. If the calculated value of the F-statistic under Levene's test is found insignificant ($p>0.05$), then the null hypothesis of equal variance (assumption of homogenous variance) is accepted and the results of the t-test mentioned in the first row (equal variance is assumed) are relied.

If the calculated value of F-statistic under Levene's test is found significant ($p<0.05$), then the null hypothesis of equal variance (assumption of homogenous variance) is rejected and the results of the t-test mentioned in the second row (equal variance is not assumed) are relied. Thus, due to unequal variance (significant value of Levene's test), both the denominator of the t-statistic and the degrees of freedom are different than that of the equal variances form of the test statistic.

To understand the demand-side perspective, two pre-designed and pre-tested structured questionnaires were administered in the field. These include the in-patient interview questionnaire and the out-patient interview questionnaire. The questions in questionnaires were expressed using a five-point scale ranging from "highly dissatisfied" (1) to "highly satisfied" (5) as suggested by Likert, Roslow and Murphy (1934). The questionnaires were canvassed throughout the State of Haryana in all the district hospitals among both the OPD and IPD patients. A total of 330 patients (220 OPD and 110 IPD) were interviewed taking a random sample of two out-patients from five different departments of each hospital at the time of exit from the hospital, and five in-patients from five departments in each hospital.

IV Results and Discussion

Service Quality Assessment

To assess the service quality of the healthcare services, factors affecting the satisfaction of out-patients and in-patients at DHs of Haryana were identified using exploratory factor analysis (EFA). The sample size was found adequate which was confirmed with the values of the KMO measure (0.829) and the BTS ($p<0.01$) with 351 degrees of freedom for out-patient construct and the values of KMO measure (0.787) and the BTS ($p<0.01$) with 465 degrees of freedom for in-patient construct. Table 1 explains the results of the factor loading, their taxonomy and per cent of the variance of the out-patients factors.

Table 1: Factor Loadings, their Taxonomy and Per cent of Variance of Extracted Out-patient Factors

Factors		Factor Loading	Per cent of Variance
Factor 1: Treatment Services (TSs)			21.25
1.1	Received proper guidance regarding the disease	0.939	
1.2	Doctor answering the queries promptly	0.938	
1.3	Counseling by the doctors	0.927	
1.4	Approach of the doctors	0.891	
1.5	Time spent by the doctor in consultation	0.884	
1.6	Overall satisfaction from the hospital	0.622	
1.7	Out-patients readiness to revisit or recommends the district hospital services to others	0.619	
Factor 2: Registration Services (RSs)			11.93
2.1	Formalities at registration counter	0.889	
2.2	Information/ help provided by the receptionist	0.883	
2.3	Approach of the receptionist	0.735	
2.4	Waiting time in registration lines	0.731	
Factor 3: Laboratory Services (LSs)			9.51
3.1	Response of the laboratory staff	0.765	
3.2	Availability of laboratory staff	0.738	
3.3	Availability of the required laboratory test services	0.732	
3.4	Availability of latest equipment	0.711	
Factor 4: Infrastructural Services (ISs)			9.18
4.1	Drinking water facility in hospital	0.860	
4.2	Condition of the toilets/washrooms	0.819	
4.3	Hygienic condition of the waiting area	0.610	
4.4	Availability of the chairs for sitting in the waiting area	0.594	
Factor 5: Nursing Services (NSs)			8.67
5.1	Assistance given by nurses/attendants	0.884	
5.2	Behavior of the nurses/attendants	0.871	
5.3	Availability of the nurses/attendants	0.485	

Factors		Factor Loading	Per cent of Variance
Factor 6: Dispensary Services (DSs)			8.33
6.1	Behaviour of the staff at dispensary	0.850	
6.2	Availability of staff for dispensing of medicines	0.800	
6.3	Waiting time in queue for medicines	0.724	
Factor 7: Medicine Services (MSs)			7.20
7.1	Availability of medicines in hospital dispensary	0.915	
7.2	Prescription of inside medicines by the doctor	0.913	

Source: Own calculations based on field survey 2019-20.

Table 1 shows that all the 27 variables have been categorised into seven factors which are labelled as Treatment Services, Registration Services, Laboratory Services, Infrastructural Services, Nursing Services, Dispensary Services and Medicine Services. All these factors have high factor loading and explain variance ranges from 7.20 per cent to 21.25 per cent of the total variance.

Similarly, eight factors were extracted for the in-patient construct. Table 2 demonstrates the factor loading, their taxonomy and per cent of variance of in-patient factors.

Table 2: Factor Loadings, their Taxonomy and Per cent of Variance of Extracted In-patient Factors

Factors		Factor Loading	Per cent of Variance
Factor 1: Treatment Services (TSs)			21.75
1.1	Counseling by the doctors	0.961	
1.2	Doctor answering the Queries promptly	0.960	
1.3	Received proper guidance regarding the disease	0.950	
1.4	Behaviour of the doctors	0.941	
1.5	Time given by the doctor in treatment/consultation during ward visits	0.882	
1.6	Patients' willingness to revisit/recommend hospital services	0.761	
1.7	Overall satisfaction from the hospital	0.741	
1.8	Availability of the doctors in the hospital	0.712	
Factor 2: Food Services (FSs)			13.12
2.1	Quality of the food items available in the canteen	0.932	
2.2	Quantity of the food items	0.923	
2.3	Cost of the food items	0.901	
2.4	Availability of the canteen in the hospital	0.873	
2.5	Behaviour of the canteen staff	0.632	
Factor 3: Laboratory Services(LSs)			10.85
3.1	Behaviour of the laboratory staff	0.872	
3.2	Availability of the laboratory staff	0.792	
3.3	Availability of the required laboratory test services	0.771	
3.4	Availability of latest equipment	0.713	
3.5	Waiting time for sample	0.554	

Factors		Factor Loading	Per cent of Variance
Factor 4: Wards Services (WSs)			7.82
4.1	Hygienic condition of the rooms/ward	0.875	
4.2	Ventilation of the rooms/wards	0.866	
4.3	Cleanliness of bed sheets	0.738	
Factor 5: Admission Services (ASs)			6.80
5.1	Behaviour of the receptionist	0.875	
5.2	Information/ help provided by the receptionist	0.832	
5.3	Time Taken in admission process	0.701	
Factor 6: Infrastructural Services (ISs)			6.80
6.1	Provisions for security in the hospital/wards	0.804	
6.2	Condition of toilets/washrooms	0.787	
6.3	Availability of drinking water facility	0.728	
Factor 7: Medicine Services (MSs)			6.25
7.1	Prescription of medicines by the doctor	0.905	
7.2	Availability of medicines	0.885	
Factor 8: Nursing Services (NSs)			6.22
8.1	Assistance given by nurses	0.895	
8.2	Behaviour of the nurses	0.894	

Source: Own compilation based on field survey 2019-20.

Table 2 demonstrates that all 31 variables have been categorised into eight factors. All these factors have high factor loading and explain variance ranges from 6.22 per cent to 21.75 per cent of the total variance.

Reliability of the Constructs: The construct is considered reliable with a lower limit of Cronbach's alpha equal to 0.7 (Cronbach, 1951). The results of the reliability test for OPD and IPD constructs shown in Table 3 describe that all seven factors of out-patient construct and eight factors of in-patient construct have high Cronbach's alpha values ranging from 0.76 to 0.96 and 0.75 to 0.99 respectively, which indicates that all of these factors are reliable and contribute the largest part of the variance of the service quality model for out-patients and in-patients.

Table 3: Reliability of Out-patient and In-patient Constructs

Out-patient Components			In-patient Components		
S. No.	Service Quality Components	Coefficient of Cronbach's Alpha	S. No.	Service Quality Components	Coefficient of Cronbach's Alpha
1	Treatment Services	0.96	1	Treatment Services	0.96
2	Registration Services	0.85	2	Food services	0.93
3	Laboratory Services	0.78	3	Laboratory Services	0.84
4	Infrastructural Services	0.79	4	Wards Services	0.84
5	Nursing Services	0.83	5	Admission Services	0.75
6	Dispensary Services	0.76	6	Infrastructural Services	0.78
7	Medicine Services	0.92	7	Medicine Services	0.94
			8	Nursing Services	0.99

Source: Own compilation based on field survey 2019-20.

Regression Analysis

This analysis was conducted to determine the combined and individual impact of the extracted factors on patients (both outpatients and inpatients). For out-patient analysis, seven extracted factors were regressed on the out-patient satisfaction score. The results of the Multiple Regression Model for out-patients are shown through eqn. 3.

$$S_o = 71.7 + 6.2TSs + 2.9RSs + 2.7LSs + 3.4ISs + 2.9NSs + 2.5DSs + 2.1MSs \dots (3)$$
$$t = \quad (1873.3) \ (162.3) \ (75.9) \ (71.2) \ (89.9) \ (75.2) \ (65.2) \ (55.2)$$
$$R^2 = .89$$
$$Adj R^2 = .89$$
$$F = 8320$$
$$VIF = 1.0, \ Tolerance = 1.0$$

The coefficients of the seven identified factors for out-patients are found highly significant with high values of t-statistic as shown in the equation. (3). Further, high values of the coefficient of determination ($R^2 = 0.89$) and adjusted R^2 of 0.89 imply that these factors contribute significantly to explaining the variance in satisfaction scores of out-patients at district hospitals in Haryana. The F-statistic (8320) is also highly significant, suggesting that all factors jointly affect outpatient satisfaction significantly. It is evident from eqn. (3) that the first component 'Treatment Services' is found highly significant, followed by other components, namely registration services, laboratory services, infrastructural services, nursing services, dispensary services, and medicine services. *Variance inflation factors (VIF) >4 or Tolerance <0.2 indicates the problem of multicollinearity in multiple regression analysis* (Hair, Black, Babin, Anderson, 2010). The values of *VIF and Tolerance*, shown in eqn. (3), are equal to one for all the factors showing the absence of multicollinearity in the model.

Thus, the results indicate that all the factors have a significant positive impact on out-patients' satisfaction at district hospitals in Haryana. Hence, H_0 (*Components of service quality have no considerable impact on out-patient satisfaction at district hospitals in Haryana*) is rejected and it is concluded that the components of service quality identified in the present study significantly affect out-patients' satisfaction level.

Likewise, the impact of in-patients components has been assessed through Multiple Regression, the results of which are shown through eqn. (4).

$$S_I = 70.3 + 5.0TS_I + 3.7FS_I + 2.8LS_I + 2.5WS_I + 2.2AS_I + 2.6IS_I + 2.0MS_I + 2.2NS_I \dots (4)$$
$$t = \quad (2006.5) \ (143.1) \ (105.0) \ (80.9) \ (71.8) \ (63.1) \ (73.8) \ (58.1) \ (63.8)$$
$$R^2 = .80$$
$$Adj R^2 = .80$$
$$F = 7509$$
$$VIF = 1.0, \ Tolerance = 1.0$$

Eqn. (4) demonstrates that the coefficients of the identified factors are highly significant (p <0.01). The coefficient of determination (R^2 =0.80) and the adjusted R^2 is 0.80 (p< 0.01) are significant. Further, the value of the F statistic (7509) is also significant which supports the fact that all the factors jointly affect the satisfaction level of in-patients, significantly. There is no problem of multicollinearity as the values of *variance inflation factors (VIF)* and *Tolerance* are equal to unity for all the factors.

Thus, these results indicate that all the factors have positive sign and significantly affect the satisfaction level of in-patients. Hence, H_0 (*Components of service quality have no significant impact on in-patient satisfaction at district hospitals in Haryana*) is rejected.

Performance Assessment

The performance of DHs was assessed in terms of outpatients' satisfaction levels from different quality components of OPD services. Table 4 provides the mean, standard deviation, and standard error of the seven extracted quality components. It is evident from Table 4 that a majority of the out-patients availing health facilities at DHs were satisfied with all the quality components of healthcare services, with high satisfaction scores.

Table 4: Descriptive Statistics of Quality Component-wise Responses of Out-patients at DHs

Quality Components	Performance Components	N	Mean	SD	Std. Error Mean
Treatment Services	Satisfaction	158	3.98	0.24	0.02
	Dissatisfaction	62	2.18	0.50	0.06
Registration Services	Satisfaction	209	3.99	0.27	0.02
	Dissatisfaction	11	2.21	0.67	0.20
Laboratory Services	Satisfaction	167	3.86	0.24	0.02
	Dissatisfaction	53	2.77	0.46	0.06
Infrastructural Services	Satisfaction	136	3.92	0.28	0.02
	Dissatisfaction	84	2.66	0.42	0.05
Nursing Services	Satisfaction	169	4.13	0.29	0.02
	Dissatisfaction	51	2.61	0.55	0.08
Dispensary Services	Satisfaction	172	4.04	0.19	0.01
	Dissatisfaction	48	2.87	0.63	0.09
Medicine Services	Satisfaction	99	4.01	0.20	0.02
	Dissatisfaction	121	2.18	0.46	0.04

Source: Own compilation based on field survey 2019-20.

Further, Independent-Samples t-test was applied to assess the performance of DHs in terms of out-patients' satisfaction from different components of service quality.

Table 5: Service Quality Components for Out-patients: Results of Independent Samples t-Test

Quality Components	Assumption of Variance Equality	Levene's Test		t-Test			
		F	Sig.	t-values	Degrees of Freedom (df)	Sig. (2-tailed)	Mean Difference
Treatment Services	Equal variances assumed	64.760	0.000	-36.226	218.000	0.000	-1.799
	Equal variances not assumed			-27.260	72.092	0.000	-1.799
Registration Services	Equal variances assumed	29.211	0.000	-19.040	218.000	0.000	-1.781
	Equal variances not assumed			-8.790	10.175	0.000	-1.781
Laboratory Services	Equal variances assumed	54.940	0.000	-22.293	218.000	0.000	-1.087
	Equal variances not assumed			-16.469	61.464	0.000	-1.087
Infrastructural Services	Equal variances assumed	30.545	0.000	-26.755	218.000	0.000	-1.268
	Equal variances not assumed			-24.421	128.999	0.000	-1.268
Nursing Services	Equal variances assumed	18.388	0.000	-25.817	218.000	0.000	-1.516
	Equal variances not assumed			-18.976	58.925	0.000	-1.516
Dispensary Services	Equal variances assumed	132.967	0.000	-21.267	218.000	0.000	-1.169
	Equal variances not assumed			-12.710	49.385	0.000	-1.169
Medicine Services	Equal variances assumed	78.516	0.000	-36.680	218.000	0.000	-1.828
	Equal variances not assumed			-39.271	171.280	0.000	-1.828

Source: Own compilation based on field survey 2019-20.

Table 5 shows that all the values of the F-statistic for all the components are significant showing the variances of both of the groups are not the same. Thus, the results of the 'Equal variances not assumed' row are considered for further interpretation. Further, all the values of the t-statistic for all the components are significant ($p<0.05$). Thus, all the seven components discussed above are found significant which implies that the out-patients are satisfied with the performance of DHs in terms of service quality components.

It is evident from Table 5 that all the values of the t-statistic are highly significant ($p<0.01$). Hence, the null hypothesis (H_0: *The performance of district hospitals has no significant influence on out-patient satisfaction*) is rejected and it is concluded that out-patients are significantly satisfied with the performance of DHs in Haryana. In other words, the performance of DHs in terms of service quality components has a significant influence on out-patient satisfaction.

Likewise, the performance of DHs was assessed in terms of in-patients' satisfaction with service quality components of IPD services. Table 6 shows the number of patients, mean, standard deviation, and standard error of the in-patient's quality components.

Table 6: Descriptive Statistics of Quality Component-wise Responses of In-patients at DHs

Quality Components	Performance Components	N	Mean	SD	Std. Error Mean
Treatment Services	Satisfaction	87	3.98	0.20	0.02
	Dissatisfaction	23	2.44	0.67	0.14
Food Services	Satisfaction	54	3.95	0.14	0.02
	Dissatisfaction	56	2.51	0.50	0.07
Laboratory Services	Satisfaction	99	3.95	0.20	0.02
	Dissatisfaction	11	2.60	0.59	0.18
Wards Services	Satisfaction	78	4.08	0.28	0.03
	Dissatisfaction	32	2.68	0.51	0.09
Admission Services	Satisfaction	60	4.30	0.42	0.05
	Dissatisfaction	50	2.93	0.46	0.07
Infrastructural Services	Satisfaction	19	3.90	0.19	0.05
	Dissatisfaction	91	2.45	0.56	0.06
Medicine Services	Satisfaction	65	4.01	0.17	0.02
	Dissatisfaction	45	2.29	0.60	0.09
Nursing Services	Satisfaction	89	4.29	0.44	0.05
	Dissatisfaction	21	2.24	0.44	0.10

Source: Own compilation based on field survey 2019-20.

Table 6 shows that a majority of the in-patients availing health facilities at DHs were satisfied from all the quality components of healthcare services with high satisfaction scores (3.89 to 4.30).

Further, an Independent-Samples t-test was applied to assess the performance of district hospitals in terms of inpatients' satisfaction from different components of service quality, the results of which are shown in Table 7.

Table 7: Service Quality Components for In-patients: Results of Independent Samples t-Test

Quality Components	Assumption of Variance Equality	Levene's Test		t-Test			
		F	Sig.	T	Degrees of Freedom (df)	Sig. (2-tailed)	Mean Difference
Treatment Services	Equal variances assumed	76.374	0.000	-18.821	108.000	0.000	-1.540
	Equal variances not assumed			-10.902	22.996	0.000	-1.540
Food Services	Equal variances assumed	81.178	0.000	-20.626	108.000	0.000	-1.441
	Equal variances not assumed			-20.954	63.472	0.000	-1.441
Laboratory Services	Equal variances assumed	37.793	0.000	-16.148	108.000	0.000	-1.349
	Equal variances not assumed			-7.581	10.267	0.000	-1.349
Wards Services	Equal variances assumed	15.108	0.000	-18.479	108.000	0.000	-1.404
	Equal variances not assumed			-14.656	38.863	0.000	-1.404

Quality Components	Assumption of Variance Equality	Levene's Test		t-Test			
		F	Sig.	T	Degrees of Freedom (df)	Sig. (2-tailed)	Mean Difference
Admission Services	Equal variances assumed	0.045	0.833	-16.396	108.000	0.000	-1.373
	Equal variances not assumed			-16.264	100.588	0.000	-1.373
Infrastructural Services	Equal variances assumed	25.778	0.000	-11.010	108.000	0.000	-1.444
	Equal variances not assumed			-19.533	84.569	0.000	-1.444
Medicine Services	Equal variances assumed	116.802	0.000	-22.024	108.000	0.000	-1.719
	Equal variances not assumed			-18.786	48.675	0.000	-1.719
Nursing Services	Equal variances assumed	0.386	0.536	-19.262	108.000	0.000	-2.048
	Equal variances not assumed			-19.327	30.287	0.000	-2.048

Source: Own compilation based on field survey 2019-20.

Table 7 shows that all the values of the F-statistic for all the components (except Admission Services and Nursing Services) are significant, showing the variances of both groups are not the same. Thus, the results of the 'Equal variances not assumed' row are considered for further interpretation. However, the values of the F-statistic for the Admission Services and Nursing Services are insignificant, showing that the variances of both groups are the same. Thus, the results of the 'Equal variances assumed' row are considered for further interpretation. Further, all the values of the t-statistic for all the components are significant ($p<0.05$). Thus, all eight components discussed above are found significant, which implies that the in-patients are satisfied with the performance of DHs in terms of service quality components identified in this chapter.

It is evident from Table 7 that all the values of the t-statistic are highly significant ($p<0.01$). Hence, the null hypothesis (***H₀:*** *The performance of district hospitals has no significant influence on in-patient satisfaction)* is rejected and it is concluded that in-patients were significantly satisfied with the performance of DHs in Haryana. In other words, the performance of DHs has a significant influence on in-patient satisfaction.

V Conclusions and Policy Recommendations

The results of the study showed that seven factors of out-patient construct and eight factors of in-patient construct have been explored using Exploratory Factor Analysis and hence differs from the previous studies.

- Treatment services significantly influence the patients' (both out-patient and in-patient) satisfaction at DHs. The quality of treatment services attracts more patients to DHs and increases patients' trustworthiness towards these hospitals. There is a need for the accessibility of qualified and devoted doctors to listen to patients' grievances. The other services components have also much potential to improve the satisfaction of patients at DHs in Haryana.

- Performance assessment of healthcare services in terms of patient satisfaction shows that 77 per cent to 88 per cent of the patients (both out-patients and in-patients) are satisfied with the healthcare services at DHs.

- The study recommends increasing budgetary allocation for healthcare services as these services improve productivity growth, employment opportunities, and income level, which would help to improve the quality of life of the people.

- The Quality Assurance Cell, functioning in every DH, monitors and ensures the quality of services in various departments of the hospitals. But, it is observed that they have limited functional autonomy to bring about systematic improvements and efficiency in the system. It is expected that in future, this cell gets functional independence which will lead to improvement on all fronts.

- Last, but not least, there is a need to carry out rigorous planning and assessment exercises throughout the year through in-house patient satisfaction surveys, monitoring, and periodical review before the next budgetary allocations are sanctioned and implemented in the State. This will surely result in a much more efficient use of scarce resources.

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Institutional Agricultural Credit Repayment Performance of the Farmers: A Study in North Twenty-Four Parganas District of West Bengal

Golam Ahsan Waresh and Melisha Khatun

Indebtedness is one of the serious problems of farmer distress. The research aims to identify the factors influencing farmers' institutional repayment performance. The multinomial logistic regression method is utilised to determine the factors influencing the repayment potential of 280 borrower farmers in the North 24 Parganas district of West Bengal. The multistage sampling technique has been employed to select samples of borrower farmers. Demographic and labour participation attributes, human capital, agricultural parameters, financial status, lending parameters, etc., have a significant impact on the repayment performance of borrowing farmers. A proper assessment of the creditworthiness of the farmers should be considered at the time of sanctioning the credit to reduce the risk of default. The research identifies a moral hazard issue in agricultural credit and recommends strict monitoring of credit utilisation to mitigate the problem.

Keywords: Indebtedness, Farmer distress, Creditworthiness, Risk, Defaulting, Moral hazard

I Introduction

The agricultural sector holds a prominent position in the economy of West Bengal. During the period of globalisation and economic liberalisation, farmers transitioned their attention from subsistence farming to market-oriented agriculture. This necessitates a complete reconstruction of the agricultural production sector, with a specific emphasis on enhancing farm infrastructure, optimising mechanisation, and promoting the cultivation of cash crops. The modernisation of agribusiness has substantially augmented the financial needs of farmers. The economic importance of the agricultural credit system is appreciable, as the majority of the farmers own marginal and small land holdings with limited savings in West Bengal. The flow of agricultural credit has incredible

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Institutional Agricultural Credit Repayment Performance of the Farmers: A Study in North Twenty-Four Parganas District of West Bengal.

consequences for the economic growth of West Bengal. Despite significant improvements in agricultural output and credit distribution through institutional sources and new technology, rural farmers continue to face widespread indebtedness in the country. Farmers in West Bengal are experiencing economic hardship, resulting in restricted access to loans for productive activities. Farmers in West Bengal face a pressing issue of indebtedness, which is a significant cause of distress and even suicide (Report of the Agro-economic Research Centre 2017). Poor qualities of lending, inappropriate monitoring and supervision, and, to some extent, inappropriate identification of the creditors by the lender have contributed to the adverse credit discipline among the borrowers. The institutional and non-institutional credit markets operated simultaneously in rural areas in West Bengal. The majority of farmers, especially marginal and small-scale farmers, still rely on the non-institutional credit market due to limited accessibility and the inadequacy of institutional credit. The exorbitant interest rate of the non-institutional credit market increases the burden on farmers. The agricultural production system is characterized by seasonal cycles. The features of diversification of credit in unproductive activities persist among the farmers during the adverse economic situation and subsequently increase the debt burden, ultimately entrapping them in a debt trap. The absence of marketing facilities involves numerous market middlemen in the transacting of agricultural products. It prevents the farmers from getting remunerative prices for their products. Borrowing and indebtedness are the two sides of the same coin, where borrowing is the cause and indebtedness is the result. Increasing borrowing does not necessarily increase indebtedness among farmers unless persistent issues impact agricultural prospects. In West Bengal, such persistent problems are widely spreading. The incidence of indebtedness among farmers poses a serious concern not only to the farmers but also to policy administrators. The present study aims to identify and highlight the determinants of indebtedness among farmers in selected areas of the North 24 Parganas district, West Bengal.

The agricultural sector plays a crucial role in West Bengal's economy (Ghosh and Bagchi 2016). Credit is one of the most essential inputs for the expansion of the agricultural sector (Kumar, Surjit, Bantilan, Lagesh, Yadav 2015). Short-term credit provides better working capital for increasing the productivity of the utilisation of agricultural inputs, while medium- and long-term credit produces fixed capital formation in agriculture (Samal 2002). This entails the timely accessibility of agricultural credits at a reasonable rate, which is an indispensable requirement for improving agricultural activities and expanding the sector (Kumar, Surjit, Bantilan, Lagesh, Yadav 2015). The economic importance of the agricultural credit system is significant, as the majority of farmers in West Bengal own marginal and small landholdings with limited savings (Samal 2002). The issue of indebtedness among farmers is an age-old problem. The disappointing aspect is that it has been exacerbated further in recent years (Sandhya and Kumar 2013). Almost half of the farmers in West Bengal are heavily indebted (NSSO 2013). Adequate agricultural advances and productive utilization are prerequisites

for the expansion of this sector (Lokesha and Hawaldar 2019). Many farmers in rural areas rely on informal credit markets despite high interest rates due to the inaccessibility and inadequacy of the formal credit market (Chakraborty and Gupa 2017a). The effectiveness of the agricultural credit system depends on the efficient use of credit funds by borrower farmers (Lokesha and Hawaldar 2019). Poor lending quality can increase pressure on the non-performing assets of financial institutions. It causes serious problems in the allocation of credit. If this instance continues, the potential of the financial institutions to recycle their funds would be highly restricted. This could be the reason behind the failure of the entire agricultural credit system (Hawaldar, Spulbar, Lokesha, Birau, Rebegea 2020). Patil (1967) has pointed out that the majority of defaulters were from smallholdings, while smaller proportions were from large holding groups in the Kulaba district of Maharashtra. It was also found that the total annual income earned per household in the defaulter group was lower in both small and large holding groups, and higher in medium-sized groups. The primary reasons for loan defaults include adverse crop seasons, higher domestic expenditure, and maintaining a large family size. Tiwari (1969) found a positive association between the size of the holdings and the amount of credit taken for productive purposes. A critical assessment of the Radhakrishan Committee (2007) revealed that half of the farmers' households were in debt, with three-fifths of their debt owed to institutional sources. It was interesting that the incidence of indebtedness among farmers was a strikingly regional phenomenon. It was low in less developed states, particularly hill states, and generally high in agriculturally developed states. The committee has pointed out that the incidence, as well as the debt per farmer's household, was high in all the states that reported suicide among farmers. Kalyankar (1983) has investigated the problem of wilful defaulting among the farmers. Samal (2002) revealed that a very high default rate is one of the most important factors that prevent the flow of agricultural credit in West Bengal. This has spoiled the recovery climate in rural areas. The implementation of the rural debt waiver scheme in 1989 has destroyed credit discipline among farmers. Chakraborty and Gupta (2017b) have highlighted the existence of a moral hazard problem in the rural credit market by examining the sources and patterns of borrowing, consumption, and production among households. Households borrowing from formal sources tend to have higher consumption expenditures, social spending, and lower investment, compared to households borrowing from informal sources. Higher spending reduced the investment and, in turn, adversely affected the loan repayment performance. Borrowers tend to default more on loans that are taken from sources that impose lesser penalties in the future. Ray and Kumar (2019) found that the responsible factors influencing the indebtedness among the farmers were the interest rate, diversification of farm credit towards non-productive activities, and high consumption expenditure in the Nadia district of West Bengal. It recommended the enhancement of financial inclusion for marginal and sub-marginal farmers to prevent them from resorting to non-financial

credit for consumption needs, and financial institutions should take the initiative to provide consumption credit to the farmers.

II Methodology

The research is completely based on primary household data. It includes a questionnaire survey of borrower farmers from the selected areas of North 24 Parganas district, West Bengal. We executed a multi-stage sampling technique to collect the samples of borrower farmers. Here, the district is considered the first-stage unit, the subdivision is the second-stage unit, the block is the third-stage unit, and the village is the fourth-stage unit. Finally, the borrower farmers are the ultimate unit of the research work.

North 24 Pgs district, despite its agricultural dominance, has a low composite financial inclusion index (Rank 17) and a poor credit-deposit ratio of Regional Rural Banks (NABARD: Financial Inclusion Report 2023). The district comprises five subdivisions: Basirhat, Bongaon, Barrackpur, Barasat, and Bidhannagar, out of which Basirhat subdivision is predominantly rural. There are ten community blocks in the district.

The Basirhat-I and Hingalganj community blocks in Basirhat subdivision have the highest and second-highest degree of transformation in urban-rural population ratio (Census Report 2001 and 2011). It indicates a high degree of rural-urban demographic linkage and urbanization (Bhagat 2018). The higher degree of rural-urban demographic linkage and urbanization plays an important role in giving farmers' greater access to borrowing opportunities, which in turn can be used to improve human capital accumulation, socioeconomic status, and long-term economic development. It also enhances farmers' access to and usage of the financial system. Thus, Basirhat-I and Hingalganj community blocks are being selected for the purpose of the research. Four villages are selected from each of the blocks. Finally, we select thirty-five farmers from each of the villages, choosing a total of 280 borrower farmers for the study between February 2023 and May 2023. Table 1 shows the category-wise distribution of sample farmers, while Figure 1 shows the distribution of sample farmers according to the size of land they operate.

Figure 1: Distribution of Sample Farmers According to Land Size
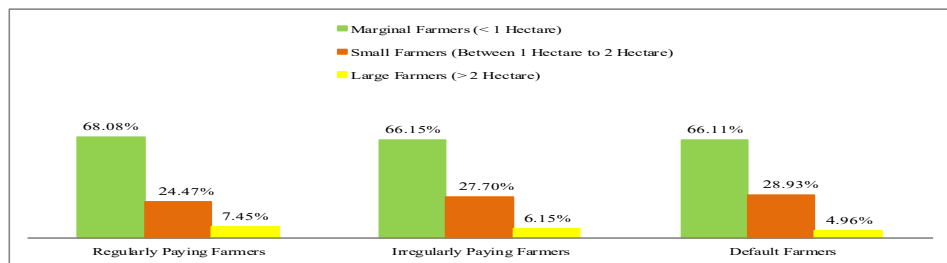
Source: Author's Calculation Based on Primary Survey.

Table 1: Category Wise Distribution of Sample Farmers

Regularly Paying Farmers	Irregularly Paying Farmers	Default Farmers
94 (33.57%)	65 (23.21%)	121 (43.21%)

In our research work, we have collected three categorical outcome variables (Y) from the North Twenty-Four Parganas district in West Bengal. Firstly, we classified the farmers who are paying on time as regular-paying farmers. Secondly, we classified the farmers who failed to pay on time as irregular-paying farmers. Lastly, we categorize the farmers who have not repaid the loan as defaulters. The explanatory variables (X) are both continuous and categorical. We have executed multinomial logistic regression to predict the likelihood of a farmer belonging to two categories compared to the referent category, given certain other information. Table 2 contains all the explanatory variables in the model.

Table 2: Explanatory Variables of Multinomial Logistic Regression Model

Indicators	Variable	How the variable is measured
Socio-economic Attribute	Family Size	Number of Household Members in the Family
	Working Participation Rate	Ratio of Employed Persons in the Family to Total Members in the Family
Human Capital Attributes	Farming Experience without Formal Credit	Years of Farming Experience in the Absence of Formal Credit
	Farming Experience with Formal Credit	Years of Farming Experience in the Presence of Formal Credit
	Education	0 – Illiterate 1 – School Education (Up to Higher Secondary) 2 – Above School Education
Agricultural Attributes	Land Holdings	Net Cultivated area in Hectare
	Farming Expenditure Per Hectare	Annual Farming Expenditure in Rupees Per Hectare
	Cropping Intensity	0 - Low (Average Cropping Intensity of Land <125) 1 – Moderate (Average Cropping Intensity of Land <150) 2 – High (Average Cropping Intensity of Land >150)
Financial Attributes	Off-farm Income	Monthly Income Sourcing from Other than Farming (Rupees)
	Farming Income Per Hectare	Net Annual Farming Income Per Hectare (Rupees)
	Savings	Total Savings (Rupees)
Lending Attributes	Loan Amount from Financial Institution	Amount of Loan getting from Financial Institution (Rupees)
	Loan Amount from Non-Financial Institution	Amount of Loan getting from Non-Financial Institution (Rupees)
	Interest Rate of Financial Institution	Annual Cost of Borrowing from Financial Institutions (Rupees)
	Interest Rate of Non-financial Institution	Annual Cost of Borrowing from Non-Financial Institutions (Rupees)
	Difficulties in Mode of Payment	1 - Facing Difficulties in Mode of Payment by the Farmers 0 – Otherwise
Accessibility of Market	Distance	Distance between Market Place and Farming Place (K.M.)

Indicators	Variable	How the variable is measured
Borrowing History	Instalment Failed to Repay in Last Availed Agricultural Loan	Number of Instalment Failed to Repay in Last Availed Agricultural Credit (Financial Institution)
Assurance and Monitoring	Assurance of Next Loan	1 –If the Lender Assure Future Credit 0 – Otherwise
Attitude of Lender (Financial Institute)	Supervision	1 – Properly Supervised by the Lending Institution 0 – Otherwise
Utilization and Anticipation Attitude	Repaying Old Debt	1 – If the Borrower Repaying the Old Debt (Financial Institution/ Non-financial Institution) 0 – Otherwise
	Expectation about Loan Waiver Scheme	1 – The Borrower Expected Loan Waiver Scheme 0 – Otherwise
	Diversification	1 – If the Borrower Diversify the Financial Institutional Credit (Exclude Repaying Back Dated Debt) 0 – Otherwise
	Constant of the Regression Model	

The relative risk ratio (RRR) of a coefficient reflects how the risk of the outcome falling in the comparison group changes relative to the risk of the outcome falling in the referent group (the regular-paying farmer group) as the variable in the question changes. If RRR > 1, it indicates that the risk of the outcome falling in the comparison group compared to the risk of the outcome falling in the referent group increases as the variable increases. If RRR < 1, it indicates that the risk of the outcome occurring in the comparison group is lower than in the referent group as the variable increases.

We scrutinized both the continuous and categorical predictor variables for the presence of multicollinearity and the degree of association using the variance inflation factor (VIF) and contingency coefficients, respectively, before estimating the multinomial logistic regression model. The VIF values of the continuous explanatory variables show no serious problem of multicollinearity (Table 6). We did not find any strong associations among the categorical independent variables (Table 7). The computed tables are given in Appendix I. The one-way ANOVA analysis (continuous variables) is utilised to determine the statistical significance of the difference among the three groups (Table 4). The χ^2-test analysis is used to identify significant differences in the distribution of borrower farmers on categorical variables among the three groups (Table 3).

III Result and Discussion

Descriptive Analysis

Table 3: Descriptive Summary of Categorical Explanatory Variables of the Borrower Farmers

Indicators	Regularly Paying Farmers	Irregularly Paying Farmers	Default Farmers	χ^2 - Statistics
Education				
Illiterate	19 (20.21%)	16 (24.62%)	32 (26.45%)	
School Education (Up to HS)	49 (52.13%)	45 (69.23%)	77 (63.64%)	18.46 ***
Above School Education	26 (27.66%)	4 (6.15%)	12 (9.92%)	
Cropping Intensity				
Low	16 (17.02%)	22 (33.85%)	22 (18.18%)	
Moderate	44 (46.81%)	20 (30.77%)	38 (31.40%)	13.78 ***
High	34 (36.17%)	23 (35.38%)	61 (50.41%)	
Difficulties in Mode of Payment				
Farmers Facing Difficulties	36 (38.30%)	32 (49.23%)	58 (47.93%)	2.60
Otherwise	58 (68.70%)	33 (50.77%)	63 (52.07%)	
Assurance of Future Credit				
Lender Assure Next Credit	57 (60.64%)	24 (36.92%)	36 (29.75%)	21.57 ***
Otherwise	37 (39.36%)	41 (63.08%)	85 (70.25%)	
Supervision				
Supervised by the Lender (Financial Institution)	50 (53.19%)	21 (32.31%)	30 (24.79%)	19.02 ***
Otherwise	44 (46.81%)	44 (67.69%)	91 (75.21%)	
Repaying Old Debt				
Repaying Back Dated Debt (Financial Institution/ Non-financial Institution)	51 (54.26%)	45 (69.23%)	85 (70.25%)	6.70 **
Otherwise	43 (45.74%)	20 (30.77%)	36 (29.75%)	
Expectation on Loan Waiver Scheme				
Expecting Loan Waiving	59 (62.77%)	49 (75.38%)	94 (77.69%)	6.30 **
Otherwise	35 (37.23%)	16 (24.62%)	27 (22.31%)	
Diversification of Credit				
Diversify the Credit in Unproductive Activities	26 (27.66%)	22 (33.85%)	64 (52.89%)	15.37 ***
Otherwise	68 (72.34%)	43 (66.15%)	57 (47.11%)	

Notes: *** Significant level at one per cent, ** Significant level at five per cent.

Source: Author's Calculation Based on Primary Survey.

Family size and the working participation rate determine the socio-economic indicators of farmers. The average family size of default category farmers was 5.03, which was higher than that of regularly paying and irregularly paying farmers (Table 4). The study found that the economic participation of women (spouses of farmers) in default category farmer families (Figure 2) was notably lower (37.19 per cent), with the highest percentage of illiteracy (26.45 per cent) among these farmers (Table 3) in the study area. The joint family system (47.93 per cent) is the predominant structure in default category farmers (Figure 3).

Figure 2: Women (Spouse of the Sample Farmers) Economic Participation
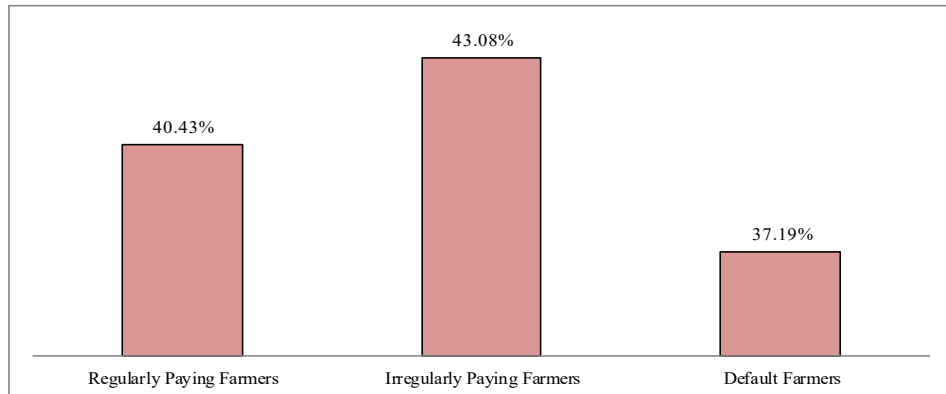
Source: Author's Calculation Based on Primary Survey.

Figure 3: Family Structure of Sample Farmers
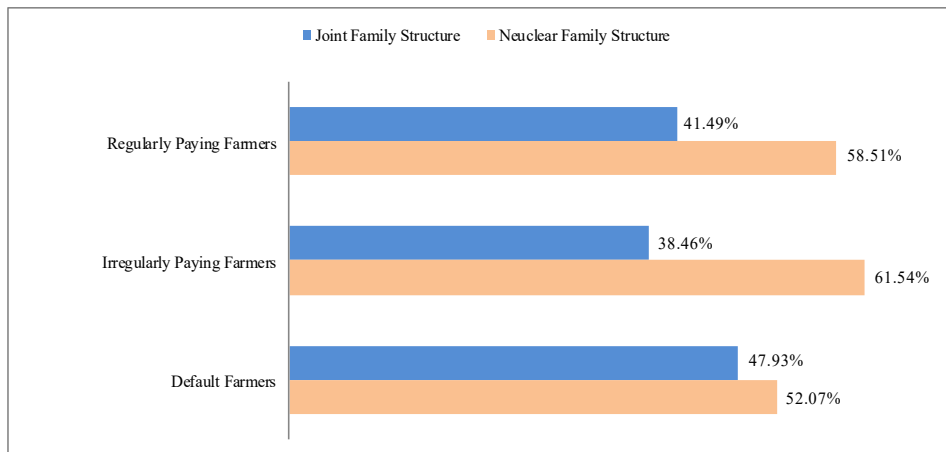
Source: Author's Calculation Based on Primary Survey.

Regularly paying farmers had a higher working participation rate (Table 4) of 0.45 compared to other farmer categories, due to a higher literacy rate of 79.79% (Table 3). The economic value of farmers' experiences, skills, and knowledge is called human capital. The research focuses on examining the human capital indicators of farmers, specifically their experience (with credit and without credit) and educational attainment. Irregularly paying farmers have a higher average farming experience of 22.80 years (Table 4) due to their higher average age (47.84) compared to regular and default farmers (Figure 4).

Figure 4: Repayment Category-wise Average Age of Sample Farmers
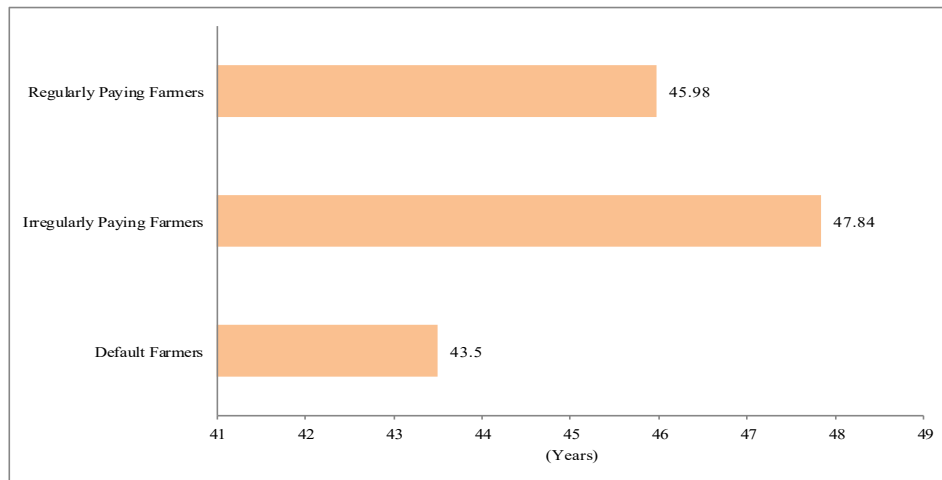
Source: Author's Calculation Based on Primary Survey.

Regularly paying farmers typically have an average operating land holding of 0.94 hectares, while irregularly paying farmers have a slightly smaller average holding of 0.91 hectares (Table 4). Farmers in the default category have the smallest average holdings (0.84 hectares). Default farmers experienced higher average annual agricultural expenses per hectare of ₹76,856 compared to regular and irregularly paid farmers (Table 4), because 50.41 percent of default farmers in Table 3 have higher cropping intensity land. Regular-paying farmers earned an average monthly off-farm income of ₹24,500/-, higher than other categories of farmers due to their higher overall literacy rate (Table 3) and working participation rates (Table 4). Regularly paying farmers earned significantly higher average annual farming income per hectare, amounting to ₹84,417.02/-, in comparison to other categories of farmers (Table 4). The explanation for this was that regularly paying farmers hold the highest average land size (Table 4), while 82.98 per cent of them hold moderate and high cropping intensity land (Table 3). Furthermore, the default farmers have a marginally higher average annual farming income than the irregularly paying farmers, despite holding a smaller average land size (Table 4), because 81.81 percent of them have moderate to high fertility land (Table 3). Regular-paying farmers have a higher average total savings of ₹42,585.11/- compared to irregularly paying farmers and default farmers (Table 4). Most interestingly, irregular-paying farmers have lower average total savings than default category farmers in Table 4. The socio-economic indicators of irregularly paid farmers did not justify the reasons for the low average savings. The survey revealed that 73.87 per cent of irregular-paying farmers experienced debt distress and income shock in the previous crop season (Figure 5) due to inadequate institutional credit, high cultivation costs due to the shift in the cropping pattern from traditional to commercial crop, crop failure, fluctuating market prices, and

uneconomical expenses. It was reflected in the average number of installment failures in the previous crop cycle, which was found to be 2.55 (Table 4), surpassing both regularly paying and defaulting farmers. The research also found that 44.62 per cent of irregular-paying farmers have consumption credit (Figure 6). The reasons mentioned above can justify the limited savings of irregularly paying farmers. Further, despite the higher average annual farming income per hectare and total savings of default category farmers compared to irregularly paying farmers (Table 4), they were not capable of repaying the installment amount of current institutional credit. This indicated the presence of wilful defaulters in the agricultural credit market.

Figure 5: Distribution of Farmers Suffered from Debt Distress in Previous Crop Season
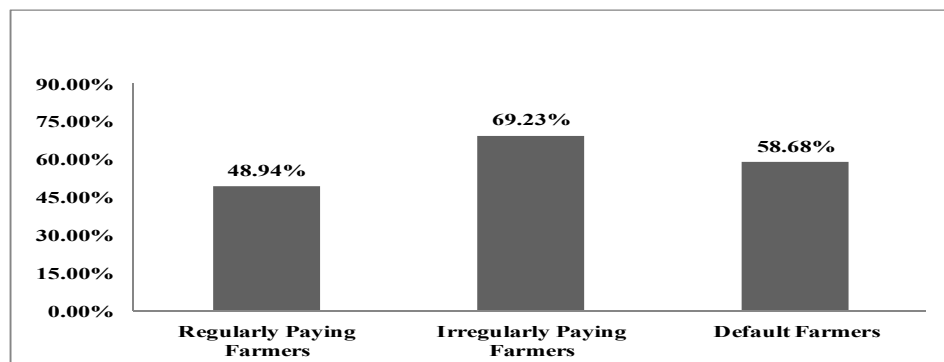
Source: Author's Calculation Based on Primary Survey.

Figure 6: Distribution of Farmers Having Consumption Credit

Source: Author's Calculation Based on Primary Survey.

Table 4: Descriptive Summary of Continuous Explanatory Variables of the Borrower Farmers

Indicators	Regularly Paying Farmers Mean (S.D)	Irregularly Paying Farmers Mean (S.D)	Default Farmers Mean (S.D)	F- Statistics
Family Size	4.47 (1.18)	4.31 (1.04)	5.03 (1.26)	10.02 ***
Work Participation Rate	0.45 (0.133)	0.36 (0.131)	0.34 (0.138)	19.24 ***
Farming Experience without Formal Credit	12.47 (8.23)	14.55 (7.93)	9.56 (6.85)	9.87 ***
Farming Experience with Formal Credit	7.98 (3.21)	8.25 (3.20)	9.35 (4.79)	3.54 **
Land Holdings	0.94 (0.84)	0.91 (0.90)	0.84 (0.63)	0.49
Farming Expenditure Per Hectare (Annual)	₹ 76412.76 (8837.74)	₹ 75870.77 (7776.92)	₹ 76856.20 (8706.98)	0.29
Off-farm Income (Monthly)	₹ 24500 (18670.17)	₹ 22461.54 (16629.30)	₹ 18628.10 (15592.80)	3.33 **
Farming Income Per Hectare (Annual)	₹ 84417.02 (11406.83)	₹ 80166.15 (9849.08)	₹ 81520.66 (9509.94)	3.74 **
Total Savings	₹ 42585.11 (27297.02)	₹ 31353.85 (15266.83)	₹ 40033.06 (25103.10)	4.48 **
Loan Amount from Financial Institution	₹ 61436.17 (47683.22)	₹ 60569.23 (51308.19)	₹ 62603.31 (46599.26)	0.04
Loan Amount from Non-Financial Institution	₹ 168414.89 (69206.32)	₹ 144292.31 (93788.61)	₹ 140454.55 (86506.26)	3.26 **
Interest Rate of Financial Institution (Annual)	5.95 (2.04)	5.74 (1.93)	6.64 (1.67)	6.26 ***
Interest Rate of non-financial Institution (Annual)	23.64 (7.85)	18.68 (11.50)	19.23 (10.64)	6.65 ***
Distance (K.M)	2.82 (2.13)	3.83 (2.12)	3.71 (2.24)	5.85 ***
Instalment Failed to Repay in Last Availed Agricultural Loan	0.82 (0.96)	2.55 (1.39)	1.88 (1.38)	38.91 ***

Notes: *** Significant level at one per cent, ** Significant level at five per cent.

Source: Author's Calculation Based on Primary Survey.

The average amount and annual interest rate of institutional credit for default category farmers were ₹62,603.31/- and 6.64 per cent, respectively, marginally exceeding those of regular-paying and irregular-paying farmers (Table 4). The survey revealed that 19.83 percent of defaulting farmers obtained medium- and long-term institutional credit (Figure 7), which marginally exceeded that of other groups of farmers. The amount and annual interest rate of such credit were higher than those of short-term credit and the Kissan Credit Card (KCC) scheme. Thus, the average amount of institutional credit and annual interest rate exceeded those of other groups of farmers.

Figure 7: Repayment Category-wise Distribution of Types of Credit
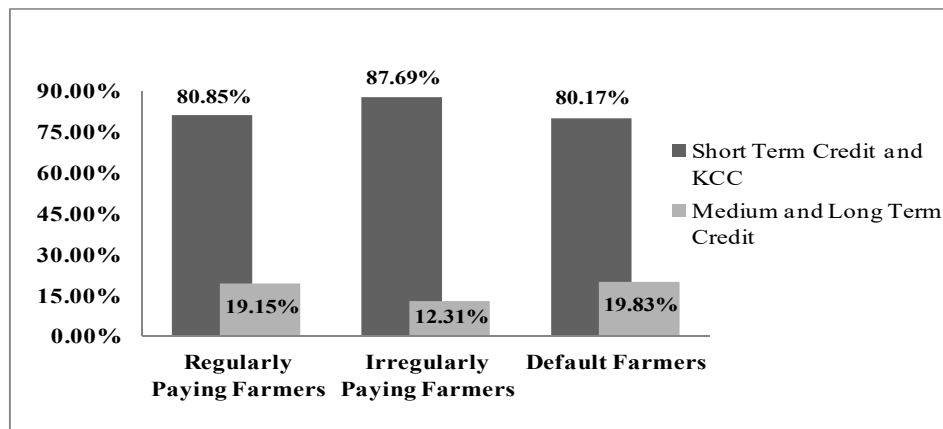
Source: Author's Calculation Based on Primary Survey.

Regularly paying farmers have a higher proportion of large farmers (Figure 1) and hold a larger average amount of cultivated land (Table 4); as a result, they obtain a higher average amount of informal credit. Despite the rapid expansion of rural institutional credit, moneylenders still dominate the rural agricultural credit market, with 91.49 per cent of regular-paying farmers obtaining informal credit (Figure 8), along with a higher average dependency (proportion of informal credit to total credit) on non-institutional credit in the research area (Figure 9). Therefore, they have a higher average informal interest rate (Table 4). Furthermore, irregularly paying farmers have a higher proportion of large farmers than those in the default category (Figure 1). They hold a comparatively larger average amount of farming land (Table 4), and as a result, they obtain a higher average amount of informal credit than the default category farmers (Table 4). The average informal interest rate of default category farmers is higher than that of irregularly paying farmers due to a higher proportion of default farmers obtaining informal credit (Figure 8). The average dependency of default category farmers is also higher than that of irregularly paying farmers (Figure 9).

Figure 8: Proportion of Sample Farmers Obtained Credit from Informal Sources
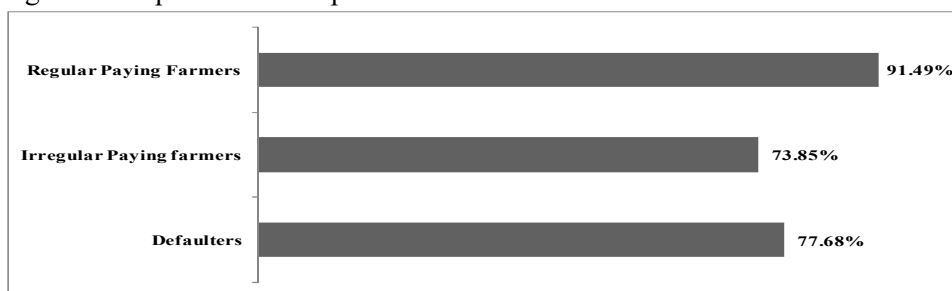
Source: Author's Calculation Based on Primary Survey.

Figure 9: Category-wise Dependency on Informal Source of Credit of Sample Farmers
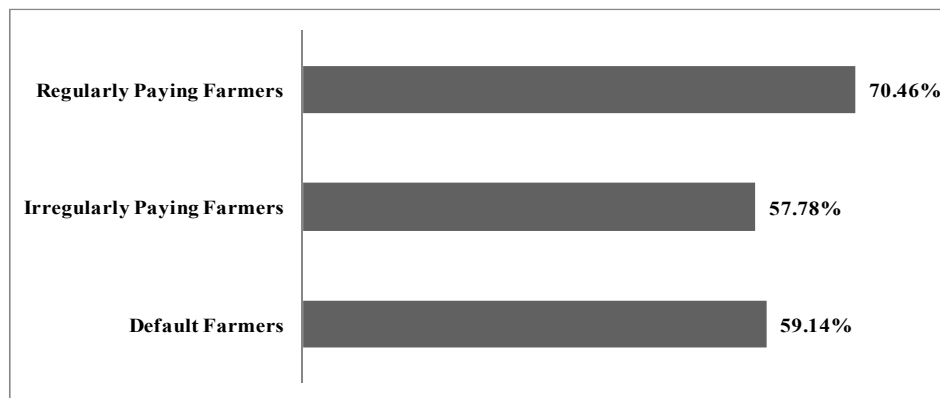
Source: Author's Calculation Based on Primary Survey.

The distance between the marketplace and the farmer's farm serves as a proxy for market accessibility. Regularly paying farmers are able to access the market more efficiently and effectively due to the shorter distance between the market and their farming location compared to other groups of farmers (Table 4). Payment issues are more prevalent among irregularly paying and defaulting farmers (Table 3).

Regularly paying farmers are more aware of the modern banking system compared to irregularly paying and defaulting farmers. The modern banking system can facilitate repayment without much risk and in a shorter time. The research shows that most regular-paying farmers receive future credit assurance (Table 3) from lenders, which increases their confidence and reliance on lenders. This can potentially improve repayment performance. Most of the regular-paying farmers (53.19 per cent) in Table 3 are under the supervision of the officials of the lending institutions, which can help prevent them from diversifying credit into unproductive activities. The research revealed that a significant portion of default category farmers (52.89 per cent) in Table 3 were diversifying their institutional credit due to inadequate supervision. On the other hand, a lower proportion of regularly-paying farmers (27.66 per cent) in Table 3 are unable to diversify their institutional credit due to proper monitoring. Table 3 shows that the majority of default farmers (70.25 percent) repaid their backdated debt, followed by irregularly paying farmers (69.23 per cent), indicating an ineffective use of current credit and potentially reducing their repayment performance. Anticipating the loan waiver scheme could have an adverse impact on loan repayment performance. It reduced the credit discipline of the borrower farmers and caused wilful defaulting. The research found that 71.69 per cent of default farmers (Table 3) and 75.38 per cent of irregularly-paying farmers (Table 3) expected loan waiver schemes, which adversely impacted their repayment performance.

Empirical Result Analysis

The research involved 280 institutionally borrowed farmers. The log likelihood statistic of the fitted model is -148.73. The likelihood ratio Chi-Square test uses it to verify if the coefficients of all explanatory variables in the model are simultaneously zero. The value of the Likelihood Ratio (LR) chi-square test is 300.63. It is indicated that at least one of the predictors' coefficients is not equal to zero for both equations (irregular paying farmers relative to regular paying farmers and default farmers relative to regular paying farmers). The small p-value of the LR test (< 0.0000) would suggest that at least one of the regression coefficients in the model is not zero. In other words, the likelihood ratio chi-square of 300.63 with a p-value less than 0.0000 indicates that our model significantly better fits than an empty model (i.e., a model with no predictors). The McFadden's pseudo-R-squared of the multinomial logistic regression model was 0.5027.

Interpretation of Relative Risk Ratio

The relative risk ratio of the working participation rate of irregular-paying farmers and default farmers is 0.002 and 0.004, respectively (Table 5a). It is also statistically significant at the one per cent level. An increase in the working participation rate within the family can provide an employment opportunity to source income. It reduces the dependency ratio within the family and increases the income level. Increasing income levels can reduce credit risk and enhance repayment capacity (Sarap 1987, Meta 2006). The model indicates that with a one-year increase in experience without credit among default farmers, the relative risk ratio of being in the default group is 0.853 times more likely than the referent group, and this difference is statistically significant at the 1% level (Table 5a). Farmers with more experience tend to demonstrate better business management skills, resulting in increased efficiency and a positive impact on loan repayment performance. The relative risk ratio of experience with credit among irregular-paying farmers is 0.829 (Table 5a). The probability of being a regular-paying group of irregular-paying farmers would increase with an increase in credit experience by one year. Farmers with more credit experience build a strong reputation and creditworthiness and become reliable lenders, resulting in timely loan repayments (Lakra, Kushwaha, Singh 2015, Singh 2015). The relative risk ratios of higher-educated farmers among irregular-paying farmers and default farmers are 0.160 and 0.208, respectively, and statistically significant (Table 5a). Higher level education can create employment opportunities. Higher education enhances managerial skills and knowledge about the effective utilization of agricultural inputs. Higher education levels enhance borrowing performance and reduce default probability in farmers as they develop entrepreneurial skills and engage in off-farm activities (Patel, Pande, Nahatker 1993, Meta 2006, Singh 2017). The model indicates that increasing the land holdings of default farmers by one unit significantly reduces their risk of being a default group to a regular-paying

group by 0.341, assuming other variables remain constant (Table 5a). This enhances income generation for farmers with extensive land holdings and facilitates timely credit repayment for them (Singh, Bhogal, Singh 2014, Lakra, Kushwaha, Singh 2015, Singh 2015). The relative risk ratio of annual farming expenditure per hectare in Table 5a indicates that increasing expenses on farming activities have a significant impact on the repayment performance of default farmers. The formal production credit that the small and marginal farmers received was insufficient to cover the required working capital per hectare for input and operational costs. It indicates that small and marginal farmers have to rely on informal sources for their working capital needs at an exploitative interest rate. Rising operating expenses, fluctuating crop prices, and market exploitation by intermediaries negatively impact farmers' financial stability. Thus, it has a negative impact on the repayment capability of the farmers (Samal 2002, Agricultural Situation in India 2015, Rathore, Mishra, Kumar 2017).

Table 5a: Relative Risk Ratio of Explanatory Variables of the Multinomial Logistic Regression Model

Explanatory Variables	Irregularly Paying Farmers			Default Farmers		
	RRR	Std. Error	P> |Z|	RRR	Std. Error	P> |Z|
Regularly Paying Farmers (Base Outcome)						
Family Size	0.83749	0.19969	0.457	1.29694	0.28520	0.237
Work Participation Rate	0.00172	0.00346	0.002***	0.00354	0.00666	0.003***
Experience (Without Credit)	1.04306	0.04482	0.327	0.85266	0.03546	0.000***
Experience (With Credit)	0.82926	0.07612	0.041**	1.11279	0.08366	0.155
Education (Reference: Illiterate)						
Schooling (Up to HS)	0.97183	0.65647	0.966	0.90412	0.55350	0.869
Above Schooling	0.15969	0.17672	0.097*	0.20808	0.19181	0.089*
Land Holdings	0.69200	0.29709	0.391	0.34139	0.14443	0.011**
Farming Expenditure Per Hectare (Annual)	1.00008	0.00004	0.040**	1.00004	0.00003	0.221
Cropping Intensity (Reference: Low Intensity)						
Moderate Intensity	0.08985	0.08815	0.014**	0.88065	0.80766	0.890
High Intensity	0.18776	0.15631	0.045**	2.30397	1.79563	0.284
Off-firm Income (Monthly)	0.99999	0.00001	0.684	0.99997	0.00001	0.087*
Farming Income Per Hectare (Annual)	0.99995	0.00002	0.089*	0.99992	0.00002	0.009***
Savings	0.99996	0.00001	0.015**	1	0.00001	0.998
Loan Amount from Financial Institution	1.00002	0.000008	0.053*	1.00005	0.00007	0.552
Loan Amount from Non-Financial Institution	1.00001	0.00001	0.035**	1.00001	0.00004	0.742
Interest Rate of Financial Institution (Annual)	0.87836	0.16244	0.483	1.46631	0.24486	0.022**
Interest Rate of non-financial Institution (Annual)	0.90647	0.03652	0.015**	0.94353	0.03284	0.095**
Distance	1.39029	0.18045	0.011**	1.26808	0.15014	0.045**
Difficulties in Mode of Payment (Reference: Not Facing Difficulties in Mode of Payment)	2.53562	1.33180	0.076*	2.24970	1.05443	0.084*

Note: *** Significant level at one per cent, ** Significant level at five per cent, *Significant level at ten per cent.

Table 5b: Relative Risk Ratio of Explanatory Variables of the Multinomial Logistic Regression Model

Explanatory Variables	Irregularly Paying Farmers			Default Farmers		
	RRR	Std. Error	P> |Z|	RRR	Std. Error	P> |Z|
Regularly Paying Farmers (Base Outcome)						
Instalment Failed to Repay in Last Availed Agricultural Loan	3.82339	0.95138	0.000***	2.62726	0.57983	0.000***
Assurance of Next Loan (Reference: Lender Not Assure Future Credit)	0.15335	0.08622	0.001***	0.12159	0.06272	0.000***
Supervision (Reference: Not Properly Supervised by the Lending Institution)	0.26434	0.16187	0.030**	0.11984	0.06801	0.000***
Repaying Old Debt (Reference: Not Repaying Back Dated Debt)	2.68697	1.51130	0.079*	3.18921	1.58404	0.020**
Expectation Loan Waiver Scheme (Reference: Not Expecting Loan Waiver Scheme)	7.87972	5.09629	0.001***	5.7594	3.10063	0.001***
Diversification (Reference: Not Diversify the Credit Getting from Financial Institution)	1.26420	0.696493	0.670	2.19728	1.04244	0.097*
Constant	3.62947	15.4121	0.761	4.38958	17.37524	0.709

Note: *** Significant level at one per cent, ** Significant level at five per cent, *Significant level at 10 per cent.

Log likelihood = -148.72856

Number of Observation = 280

LR Chi2 (50) = 300.63

Prob > Chi Square = 0.0000

Pseudo R Square or McFadden's R Square = 0.5027

Source: Author's Calculation Based on Primary Survey

The relative probability of moderate cropping intensity farmers among irregular-paying farmers is 0.090, and the relative likelihood of higher cropping intensity farmers among irregular-paying farmers is 0.188, with statistical significance at the five per cent level (Table 5a). High-cropping-intensity land provides a higher level of output and generates more income. Higher-intensity land has a positive impact on the repayment performance of the farmers (Singh 2017). Farmers' off-farm activities offer an additional income source, enhancing repayment performance and potentially reducing credit risk (Singh, Bhogal, Singh 2014, Ray and Kumar 2019). The study indicates that an increase in off-farm income leads to a decrease in the relative risk ratio of defaulters to regularly paying farmers by 0.999 at a 10 per cent significance level (Table 5a). The relative risk ratio of annual farming income per hectare is less than one and statistically significant for both irregularly paying and defaulting farmers (Table 5a). Higher income from agricultural activities has a positive impact on farmers' creditworthiness and repayment performance. A higher level of income provides financial stability to farmers (Ray and Kumar 2019). The study indicates that increasing farmers' savings by one unit could decrease the relative risk of irregular-paying categories to regular-paying categories by a factor of 0.999, assuming other

variables remain constant (Table 5a). In other words, increasing the savings of the farmers has significantly reduced the default risk. Farmers typically save money for future consumption smoothing, wealth accumulation, and contingency purposes during periods of poor harvests, accidents, and low agricultural product prices. It indicates that the greater the amount of savings, the greater the capacity to repay debts (Singh and Gupta 2021). An irregular-paying farmer's loan amount to both financial institutions and non-financial institutions has a higher relative risk ratio, indicating a higher likelihood of default (Table 5a). Farmers often resort to informal lending sources to supplement institutional funds. Informal market sources typically charge a higher interest rate than formal market sources. Farmers prioritise repaying informal credit first to avoid higher interest charges and ensure the future availability of funds from traditional lenders (Figure 10). Financial institutions impose lower penalties than non-financial institutions, encouraging farmers to diversify their use of institutional credit for productive purposes or repay non-institutional credit. This activity of the farmers increases the interest burden and dampens the lending activities of financial institutions (Meier 1986, Chakraborty and Gupta 2017a). Additional credit provides additional liquidity to the farmers. Farmers often prefer additional liquidity from the informal credit market due to institutional credit rationing. The farmers often utilise the additional liquidity for consumption purposes, which increases the utility for a very short period of time. The farmers always prioritise repaying informal credit to avoid higher interest charges and ensure the future availability of funds from traditional lenders. Farmers utilise formal credit at the time of repayment of informal credit. This leads to the unproductive utilisation of formal credit and the decline of institutional credit repayment. (Meier 1986, Bhattacharjee 2004, Chakraborty and Gupta 2017a).

Figure 10: Repayment Category-wise Distribution of Prioritise Repaying Informal Credit
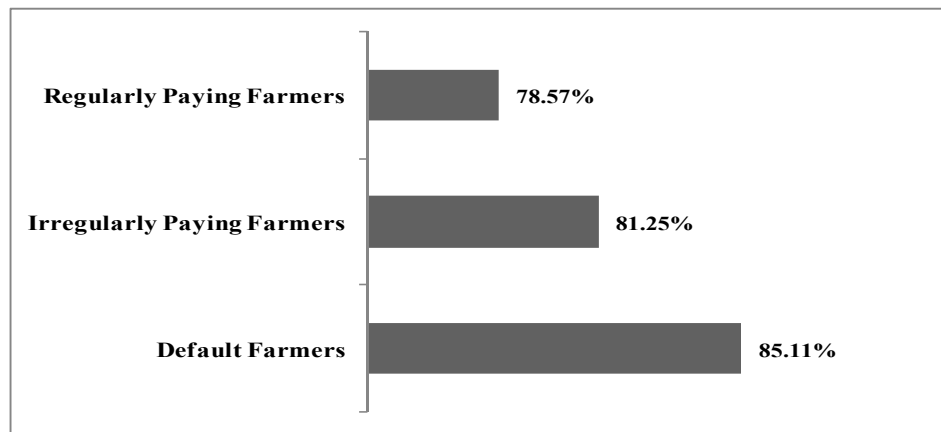
Source: Author's Calculation Based on Primary Survey.

The relative risk ratio of the institutional interest rate is 1.466, indicating that default-category farmers are more likely to face difficulties in repaying credit as institutional interest rates increase (Table 5a). Exorbitant interest rates are causing farmers to fall into a debt trap, thereby reducing their repayment performance (Meier 1986, Chakraborty and Gupta 2017a, Reddy, Reddy, Raju, Bose 2020).

The relative risk ratio of the informal interest rate of irregular-paying farmers is 0.906, while that of default-category farmers is 0.943; both are statistically significant (Table 5a). Research suggests that a rise in informal interest rates can have a positive impact on the repayment of institutional credit. Farmers are switching from informal to formal credit. It enhances their creditworthiness and repayment capability, enabling them to obtain adequate formal credit at a cheaper rate from financial institutions (Bhattacharjee 2004, Chakraborty and Gupta 2017a). The research revealed a decline in institutional credit repayment performance, while the size of informal credit loans increased and interest rates remained constant. On the other hand, the study found an increase in institutional credit repayment performance, while the interest rate of informal credit increased and the loan size of informal credit remained constant. This behaviour of the farmers indicates the presence of wilful defaulters and identifies the moral hazard problem in the agricultural credit market (Bhattacharjee 2004, Chakraborty and Gupta 2017a). Market accessibility is a significant factor in determining the repayment performance of farmers. The relative risk ratio for irregular-paying and default farmer is 1.390 and 1.269, respectively, based on the distance between the marketplace and their residence (Table 5a). The distance between the market and the residence has a negative and significant impact on the repayment performance of farmers. Farmers near marketplaces have a locational advantage due to market accessibility. Access to markets is crucial for farmers to achieve profitability and productivity (Report of the Committee on Doubling Farmers' Income, 2018). The relative risk ratio for difficulties in payment mode is 2.535 for irregular-paying farmers and 2.250 for default farmers (Table 5a). Smooth transaction facilities positively impact farmers' repayment performance. Agricultural value chains involve numerous cash transactions between various stakeholders. Most of the farmers are unaware of modern online banking systems or digital payments like NEFT, RTGs, UPI, etc. Cash transactions involve transportation costs, transaction costs, time, and risk. The modern banking system, or digital payment, is reducing transaction costs, offering flexibility, and enhancing the customer experience in repayment (Singh, Bhogal, Singh, 2014; The Role of Digital Payments in Sustainable Agriculture and Food Security, 2017).

A poor borrowing history negatively impacts farmers' repayment performance, as the relative risk ratio is greater than one (Table 5b). A good borrowing history reflects the farmers' reputation and creditworthiness. Farmers with a good past borrowing history can receive interest subsidies from the financial institution (RBI 2022). The low interest rate of financial institutions has a positive impact on the repayment performance of farmers (Rathore, Mishra, Kumar 2014, Reddy, Raju, Bose 2020). The value of the relative risk ratio of assurance of future

credit in Table 5 indicates that providing future loan assurance boosts borrowers' confidence, allowing them to rely on lenders, thereby enhancing their repayment performance (Meier 1986, Patel, Pande, Nahatker 1993, Chakraborty and Gupta 2017b). The financial institution issues the Kisan Credit Card (KCC), a revolving credit that allows users to use, repay, and reuse the credit limit. This scheme has provided timely and adequate credit to farmers, enabling them to purchase quality inputs and adopt modern agricultural practices.

The estimated model suggests that effective institutional supervision and monitoring significantly enhance the repayment performance of farmers, as evidenced by a relative risk ratio of less than one (Table 5b). Regular supervision by lending institutions ensures that loans are used accurately for their intended purpose and leads to improved repayment performance. It also provides assistance to settle farmers' debt obligations on time (Meier 1986, Rathore, Mishra, Kumar 2014, Chakraborty and Gupta 2017b). The estimated relative risk ratio indicates that repaying old debt has an adverse effect on the repayment performance of farmers (Table 5b). Repaying old debt with current institutional credit temporarily reduces the debt burden but negatively impacts institutional credit repayment performance in the long run (Lakkannavar 2017). The expectation of a loan waiver scheme may create a moral hazard problem for potential eligible farmers. It could significantly influence farmers' consumption and investment decisions. Farmers may consume more, invest less, and not utilise their loans productively, expecting government bailouts to help them. Repeated waivers can alter farmers' expectations regarding loan contract enforcement. It affects the productive utilisation pattern of institutional credit. The expectation of loan waivers for farmers makes for unproductive expenditures. The relative risk ratio of the model in Table 5 indicates that the expectation of a loan waiver scheme has a negative impact on the repayment performance of farmers (Sandhya and Kumar 2013, Chakraborty and Gupta 2017b, Narayanan and Mehrotra 2019). The relative risk ratio of diversification of credit in unproductive activities is greater than one for default category farmers, indicating that it has a negative impact on the repayment performance of farmers (Table 5b). Farmers often diversify their credit for unproductive activities or consumption purposes like unanticipated expenses, medical facilities, social obligations, religious rituals, the construction of buildings, etc. Such activities significantly limit income generation, impacting repayment performance (Chakraborty and Gupta 2017b, Ray and Kumar 2019).

IV Conclusion

Agricultural crises prevail in the form of indebtedness among the farmers in West Bengal. Farmers' debt distress is a serious concern in the modern agricultural sector, and it is reflected in their repayment performance The study aimed to identify the factors influencing farmer repayment performance in the North 24 Parganas district of West Bengal. The study reveals various factors that significantly affect farmers' repayment performance, including experience,

dependency, working participation, land holdings, income, loan amount, interest rate, borrowing history, savings, distance, education, cropping intensity, supervision, mode of payment, and expectations regarding loan waiver schemes. Informal credit continues to dominate in the rural credit market. Small and marginal farmers continue to rely on informal credit sources due to the inadequacy of formal credit. The research has identified a moral hazard problem among irregular-paying farmers and defaulting farmers in the study area. The diversification of credit for consumption and non-productive purposes has led to increased distress among farmers. Risk factors such as natural calamities, pest and disease infestations, spurious seeds of the crop, mounting costs of cultivation, and fluctuations in prices of produce play major havoc with the farmers in the study area. The government should emphasise agricultural risk management measures through crop insurance, rainfall insurance, farm income insurance, and a calamity relief fund to safeguard farmers. The expectation about the loan waiver scheme could be a cause of wilful defaulting, and government intervention and the announcement of such a scheme might create a moral hazard problem. Strict monitoring and proper supervision by financial institution officials can reduce the chances of credit diversification and wilful default. Strict credit utilisation monitoring can be achieved through regular visits to the borrower's house, ongoing contact, close monitoring of days past due, and continuous evaluation of the borrower's creditworthiness. The government should provide an adequate amount of formal credit straightforwardly. Financial institutions should regularly conduct awareness camps for farmers to promote commercial farming and encourage the adoption of new production techniques. The financial institution should also establish a robust communication system that regularly provides voice- or SMS-based information on inputs, markets, and weather forecasting to borrower farmers. Banks should allow private lenders to act as agents for granting and recovering loans on behalf of institutions, similar to savings-mobilisation agents appointed by banks. The government should emphasise a farm income enhancement policy in terms of adequate remuneration for farmers' outputs, subsidising key inputs, and providing storage facilities that can help them speculate on the market situation and avoid selling at a low price during adverse situations. Lending credit in agriculture involves some degree of risk. The lending institution should assess the creditworthiness of the farmers at the time of sanctioning credit to reduce the risk of default. The government should introduce more rural livelihood programmes to ensure food security and employment for farmer households, thereby contributing to socio-economic development.

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Appendix-I

Table 6: Variance Inflation Factor of Continuous Explanatory Variables of the Multinomial Logistic Regression Model

Variables	VIF	$(\frac{1}{VIF})$
Loan Amount from Financial Institution	2.52	0.396934
Interest Rate of non-financial Institution	2.49	0.400933
Loan Amount from Non-Financial Institution	2.49	0.401208
Land Holdings	1.87	0.533992
Interest Rate of Financial Institution	1.74	0.573639
Farming Experience with Credit	1.44	0.694260
Farming Experience without Credit	1.34	0.748125
Dependency	1.25	0.801784
Farming Income Per Hectare	1.21	0.827898
Working Participation Rate	1.18	0.847106
Savings	1.17	0.856003
Farming Expenditure Per Hectare	1.13	0.888194
Instalment Failed to Repay in Last Availed Agricultural Loan	1.11	0.896908
Distance	1.09	0.914676
Off-farm Income	1.03	0.967397
Mean VIF	1.54	

Source: Author's Calculation Based on Primary Survey.

Table 7: Contingency Coefficient Table of Categorical Explanatory Variables of the Multinomial Logistic Regression Model

	Education	Crop Intensity	Assurance of Future Credit	Supervision	Difficulties in Mode of Payment	Repaying Back Dated Debt	Expecting Loan Waiver Scheme
Crop Intensity	0.0764						
Assurance of Future Credit	0.0392	0.1422					
Supervision	0.0554	0.0864	0.0271				
Difficulties in Mode of Payment	0.0583	0.0016	0.0488	-0.0516			
Repaying Back Dated Debt	0.0425	0.0767	-0.0853	0.0111	-0.0818		
Expecting Loan Waiver Scheme	0.0440	0.0614	0.1065	0.0354	0.0336	0.0570	
Diversification of Credit	0.0137	0.0534	-0.1301	-0.1275	-0.0059	-0.0366	0.0358

Source: Author's Calculation Based on Primary Survey.

Rural Households Severely Drained by Usurious Moneylenders!

S. Santhosh Kumar

This study paves the way for the identification of the antecedent factors leading to the dependence of rural households on usurious moneylenders and whether this dependence is economically beneficial or draining the households availing credit. We identified five factors such as cumbersome initial procedures for formal credit, quick access to informal credit, flexible terms and conditions for informal credit, consumerism, alcoholism and contingencies, and poor money management as the antecedents that strongly compel the rural households to seek finance from moneylenders. It is confirmed that though these credits are meeting their immediate financial needs it is distressing their economic existence in the long run.

Keywords: Rural credit, Informal credit, Usurious moneylenders, Antecedents of credit

I Introduction

The rural India is characterized by lower per capita income, lower banking penetration, lower insurance penetration, lower literacy and lower opportunities for economic activities (GoI 2007, RBI 2008b, Sriram and Parhi 2006, RBI 2019, APRACA 2015, GoI 2018). The alarming uncertainty in the agricultural scenario due to unpredictable weather and the exploitation by middlemen in the marketing of the produce always keep the rural households as a vulnerable group. This vulnerability along with their social and cultural backwardness provides opportunities for others to take undue advantage on them. The major exploitation is from informal moneylenders whose target is always these vulnerable communities. They approach them with attractive terms and meet their financial needs at higher interest rates (Gupta and Chaudhuri 1997, Ayyagari, Kunt, and Maksimovic 2010, Deshpande and Prabhu 2005, Reddy 2006). The influence of moneylenders in different forms in India could be traced since the British colonial period (1857 to 1947) (Balachandran and Dhal 2018,

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Kurup 1976, RBI 2008a, Reddy 2006, Shah, *et. al.* 2007, Sharma and Chamala 2003).

A decline in usurious money lending activities in the post independent India began with the nationalization of banks in 1969 (Basu 2005, Chavan 2005, Reddy 2006, RBI 2008a). The gradual decline in the average share of exploitative sources of lending from 75 per cent in 1951-1961 to less than 25 per cent in 1991 is evidencing a considerable decline in informal money lending activities in the country (Ray 2019, Pradhan 2013b, NAFIS 2017, RBI 2019, NSSO 2014). This was made possible by the opening up of rural bank branches in unbanked areas, accelerated priority sector lending and interest rate subvention on loans(Chavan 2005, Basu 2005, Pradhan 2013a). Meanwhile, Government of India came up with the flagship initiative called Integrated Rural Development Programme (IRDP) in 1980 with the aim of providing income generating assets to the rural poor through the provision of cheap bank credit (Taylor 2017, Shah, Rao, and Shankar 2007, RBI 2008b, APRACA 2015). The inception of National Bank Agriculture and Rural Development (NABARD) in 1982 was another move in the same direction for provisioning rural lending by refinancing banks, credit societies and other financial institutions that are engaged in lending to agriculture and rural industries (Chavan 2005, Ray 2019, Reddy 2006, GoI 2007, APRACA 2015). However, the IRDP initiative was a failure in all sense ultimately leaving the rural poor beneficiaries as bank defaulters (Ray 2019, Taylor 2017, Shah, Rao, and Shankar 2007). This resulted in lack of focus of the formal credit institutions on the rural people and further paved the way for local moneylenders to strengthen their operations without limits (Taylor 2017, Shah, Rao, and Shankar 2007).

Later, since early 1990s, the country witnessed the spread of Self-Help Groups (SHGs), primarily women groups, in a larger magnitude in different states (NABARD 2020, Taylor 2017, APRACA 2015, APMAS 2017). The Governmet of India introduced the SHG-Bank linkage Programme (SHG-BLP) through NABARD in 1992 with the involvement of state governments to give credit linkage to SHGs through banks for distribution of microcredit to the members of SHGs. The spread of the microfinance initiatives especially through the SHG-BLP could make significant reduction in the dependence of households on local moneylenders for their financial needs (APMAS 2017, APRACA 2015). However, to tackle the situation, the moneylenders started reducing their interest rate, relaxed the security norms and brought more transparency in dealings to coexist in the changed context (Ayyagari, *et. al.* 2010, Chavan 2005, Madestam 2014, Sriram and Parhi 2006). Meanwhile, as part of widening the outreach of formal microfinance in the country, some specialized NGOs were licensed as micro finance institutions (MFIs) to provide microcredit by establishing linkage to formal financial institutions. Later, these MFIs were transformed as Non-banking Finance Companies (NBFCs) with more regulation (Pandey, Bandyopadhyay and Guiette 2019, Taylor 2017, APRACA 2015). In a while, the MFI-NBFCs operations received severe criticism for their higher interest rates

for micro loan, rigid repayment schedules and barbarian collection mechanism , Mitra and Shroff 2007, Government of Kerala 2014). They were effectively charging the poor at higher rates between 24-30 per cent per annum when the committed rate of interest was 10 per cent on flat basis. The Indian microfinance sector, though it witnessed tremendous growth during the MFI-NBFCs in the initial years of their operation, their lending practices, pricing, operations, and particularly the collection mechanisms were subject to severe criticism. The aggressive collection measures of the MFI-NBFCs along with adversities like crop failures and unexpected economic contingencies forced many loanees to commit suicide (Aiyar 2010, Balachandran and Dhal 2018, Basu 2005, Chavan 2005, Pandey, *et. al.* 2019, Ray 2019, Sriram and Parhi 2006). The minimal regulation of MFI-NBFCs and the rapid growth of the sector by exploiting the poor created an environment where the customers are increasingly dissatisfied with microfinance services. The state of Andhra Pradesh was the severely affected state in the country that time (2010) (APMAS 2017, Chakraborty and Sokhi 2012, GoI 2007, Aiyar 2010). The irresponsible and exploitative functioning of the MFI-NBFCs during 2000 to 2010 gave further scope for the moneylenders to flourish (Chakraborty and Sokhi 2012).

II The Background for the Study

Though Kerala has its government sponsored micro lending programme (Kudumbashree) and a wide network of formal financial institutions, several people line up for credit and for depositing money with moneylenders (Government of Kerala 2014, Jeromi 2008, Mohanakumar and Sharma 2006, RBI 2007). But, easy availability of loans from the usurious moneylenders often persuade people to borrow even for lavish spends (Jeromi 2008, Ray 2019, Mohieldin and Pradhan 2013b, RBI 2019). Large number of these borrowers have no regular income to service their loans. The interest and principal refund obligations of these loans often multiply beyond their financial capacity. When the overdue from loanees cumulate, the moneylenders resort to stringent collection measures resulting even in clashes and man handling. In some cases, they are forced to commit suicide or flee from their homes. The alarming number of suicides among households and mounting cases of harassment against loanees and their relatives forced the Govt. of Kerala to launch a special drive called *'Operation Kubera'* in the year 2014 against usurious practices in the state by the private moneylenders (BusinessLine 2014a, 2014b, 2014c, EconomicReview 2015, Government of Kerala 2014, TOI 2014). Despite all the regulations and measures, it has been deep rooted in the economy leaving no hard-core initiatives to solve the issue. It is in this context, this study aims to identify the antecedent factors leading to dependency on moneylenders for credit and the impact of such credit on the financials of the rural households in Kerala.

III Literature Support for the Initial Hypothesis and the Measures Adopted in the Study

Since the Vedic period (i.e., 1500-500 BC), evidences of money lending activities could be traced in India. But professional banking began in the country only from 500 BC (RBI 2008a, Balachandran and Dhal 2018, APRACA 2015). A moneylender being a local person - individual or group of individuals, lend their surplus funds to anyone who agrees to repay with interest (The Kerala Money Lenders Act 1958). They use extensive information advantage and lend money to the needy without any delay. This information advantage enables the moneylenders to lend money without any questioning, collateral or guarantor (APRACA 2015, Balachandran and Dhal 2018, Degryse, *et. al.* 2016, Pandey, *et. al.* 2019, Ray 2019, Ayyagari, *et. al.* 2010, Timberg and Aiyar 1984, Sharma and Chamala 2003, Bolnick 1992, Mohieldin and Wright 2000, Pham and Lensink 2007, Barslund and Tarp 2008).

Table 1: Literature Support for Constructs and the Measures

Primary constructs	Literature support
Antecedents of dependence on moneylenders	
The leads about the factors forcing rural households to depend on usurious moneylenders are identified from the related literatures for inclusion in the interview schedule.	(APRACA 2015, Barslund and Tarp 2008, Gupta and Chaudhuri 1997, NAFIS 2017, Ray 2019, RBI 2007, 2019, Degryse, *et. al.* 2016, Indian Express 2018, Mitra and Shroff 2007, Aruja and Kumar 2020, Sriram and Parhi 2006, Mallick 2012, Shah, *et. al.* 2007)
Dependence on moneylenders	
When the poor households are in need of money, rationality in making a choice of credit sources is impractical. They depend on flexi sources such as local moneylenders disregarding the inherent exploitation associated with informal credit. This is the designated dependence in the study.	(Ayyagari, *et. al.* 2010, Pandey, *et. al.* 2019, RBI 2019, Sinha 1976, TOI 2016)
Economic erosion	
Higher interest rates akin to the informal credit are burdening the households with unending higher financial obligations. This is entailing the borrowers in debt traps.	(Ray 2019, Shah, *et. al.* 2007, Allen, *et. al.* 2018, RBI 2007, Ratnam and Sathyanathan 1935)

The above three sets of constructs (Table 1) are remaining independent by themselves in the literature. A statistical model linking the above three sets of constructs is hardly found. This study is an attempt to establish the causality among the three through a Structural Equation Model. The simple model in this respect can be shown as below (Figure 1).

Figure 1: Conceptual Model of the Study
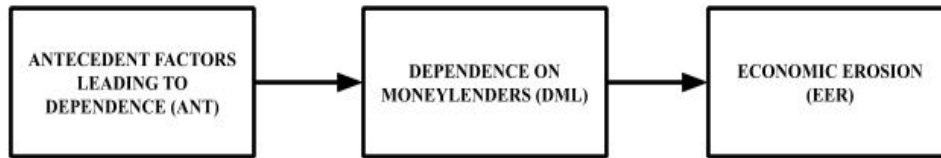
Initial Hypothesis

The following initial hypothesis is formulated from the above literature, which is further decomposed into detailed testable hypotheses after factor identification through an EFA.
"Some antecedent factors force rural households to depend on usurious moneylenders, and that dependence cause significant economic erosion among them".

IV Methodology

Overview

In total, 960 rural households availing informal credits from moneylenders are interviewed to collect the data. A multi-stage sampling procedure is followed for choosing the sample respondents. Since a formal list of population was impractical for each of the selected locations, the sample respondents were chosen at random from the locally made lists of population with the help of local authorities, and political and communal leaders. An interview schedule loaded with twenty-one statements to identify the antecedents, two statements to capture the dependence of households on moneylenders and four statements to measure the economic erosion resulted from the dependence on moneylenders was used to collect data. The twenty-one antecedent measures are subjected to a dimension reduction through an Exploratory Factor Analysis (EFA) for identifying the factor structures. Then, as part of confirming the factor structures, the explored antecedent factors, the items capturing dependence and economic erosion are confirmed through a Confirmatory Factor Analysis (CFA). Then, a Structural Equation Model (SEM) is run to find the interrelationship among the different constructs in the conceptual model. Data are analyzed SPSS 23 and AMOS 24.

Interview Schedule Design

Twenty-one measures were included in the interview schedule to identify the influencing factors that force households to depend on moneylenders for credit. Similarly, two measures were included for assessing the "magnitude of dependence" and four measures for evaluating the "magnitude of economic

drain" among households due to their reliance on moneylenders for credit. The responses to all these measures are collected on a five-point Likert-type scale that ranges from 'strongly agree' to 'strongly disagree'.

Exploratory Factor Analysis (EFA)

We used Exploratory Factor Analysis (EFA) to identify the antecedent factors that force the households to depend on moneylenders for their credit needs. The EFA, in general, helps to identify the underlying factor structure from a larger set of variables or measures. This technique explores the measures/variables in the interview schedule so as to reduce them into smaller number of factors.

Kaiser–Meyer–Olkin Test and Bartlett Test

Before doing EFA, the Kaiser–Meyer–Olkin (KMO) test for sampling adequacy and the Bartlett test for sphericity are performed. For ensuring sampling adequacy, a KMO coefficient of >0.6 is required as it confirms the strength of partial correlation among each factor explored (Kaiser 1974). The correlation matrix of the variables must not be an identity matrix to proceed with EFA. The Bartlett test can confirm whether the correlation matrix is an identity matrix or not. The computed KMO coefficient of 0.751 of the twenty-one measures in the study confirmed that the data were suitable for factor analysis. Similarly, the significance level of Bartlett's test was 0.000, indicating that the data were acceptable for EFA.

Exploratory Factor Extraction

After the principal component factor analysis, six common antecedent factors accounting for 73.183 per cent of the total variance in the twenty-one measures of dependence of households on moneylenders were identified (Table 2). Measures with a factor load of more than 0.50 were considered to form the common antecedent factors. The six common factors extracted after the orthogonal rotation and the respective factor loadings are shown in Table 3. Labels are assigned for each common factor to reflect the standard and potential attributes of each factor.

Table 2: Total Variance in Exploratory Factor Analysis

Factor	Initial Eigenvalues			After Extraction			After Rotation		
	Total	Variance (%)	Accumulation (%)	Total	Variance (%)	Accumulation (%)	Total	Variance (%)	Accumulation (%)
1	4.368	22.990	22.990	4.368	22.990	22.990	3.105	16.343	16.343
2	2.809	14.787	37.776	2.809	14.787	37.776	2.496	13.138	29.480
3	2.176	11.454	49.230	2.176	11.454	49.230	2.402	12.640	42.121
4	1.961	10.321	59.551	1.961	10.321	59.551	2.304	12.127	54.248
5	1.343	7.070	66.620	1.343	7.070	66.620	1.914	10.072	64.320
6	1.247	6.563	73.183	1.247	6.563	73.183	1.684	8.863	73.183
…	…	…	…						
19	0.061	0.320	100.000						

Source: Extraction Method: Principal Component Analysis.

Table 3: Factor Loadings after Rotation and the Extraction of Six Common Factors

| Variables		Factor load matrix						Extracted common factors
No.	Antecedent Measures	1	2	3	4	5	6	
7	Unavailability of collateral	**.696**	.302	.096	.061	-.039	-.010	Cumbersome initial procedures for formal credit (P)
8	Failure to prove credit worthiness	**.747**	.072	.126	-.017	-.079	.081	
9	Burden of paperwork	**.833**	.136	.148	.053	-.050	.012	
10	Lengthy sanctioning time	**.821**	-.042	.088	.043	-.030	.081	
12	Insufficient sanctions	**.719**	-.027	.161	.053	.012	-.045	
1	Proximity to informal moneylenders for credit	.110	**.748**	.070	.080	.025	-.036	Quick access to informal credit (Q)
3	Less cumbersome initial formalities	.089	**.941**	.055	-.011	-.060	.034	
5	Little or no collateral requirements	.078	**.931**	.049	-.031	-.064	.027	
6	Alcoholism and other addictions of family members	.223	.211	**.774**	-.005	-.183	-.042	Consumerism, alcoholism and contingencies (C)
18	Tendency to imitate others and consume more	.190	.012	**.919**	-.024	-.082	-.082	
19	Contingencies/Emergencies	.188	.008	**.905**	-.020	-.023	-.027	
2	Speedy disbursement of informal credit from moneylenders	.070	-.052	-.058	**.853**	-.152	.122	Flexible terms and conditions for informal credit (M)
4	Purpose unquestioned	.008	-.016	-.057	**.866**	-.070	.249	
6	Flexibility in repayment of informal credit obligations	.074	.119	.061	**.823**	-.137	-.077	
11	High processing fees charged by formal lenders	.011	-.038	-.161	.008	**.681**	.045	Rigid terms and conditions for formal credit (F)
13	Inflexibility in repayment of formal credit obligations	-.101	.017	-.053	-.302	**.811**	.006	
14	Lack of influence with formal sector officials	-.067	-.055	-.007	-.115	**.828**	-.069	
15	Poor money management	.044	-.004	-.082	.133	-.017	**.883**	Excessive attractions and poor money management (I)
17	Excessive attraction to some products	.050	.020	-.039	.091	.008	**.887**	

Note: *Bold values indicate factor load greater than .050.

After exploring the six factors, a Confirmatory Factor Analysis (CFA) is done to estimate the factor loadings of the six antecedent factors identified in

EFA to the second order construct 'ANT'. The second order factor loadings of the five factors show a positive relationship towards ANT except the factor F (Figure 2). Hence, for further analysis factor F is excluded (Factor loading of - .31).

Figure 2: Second order construct 'ANT'- Confirmatory model
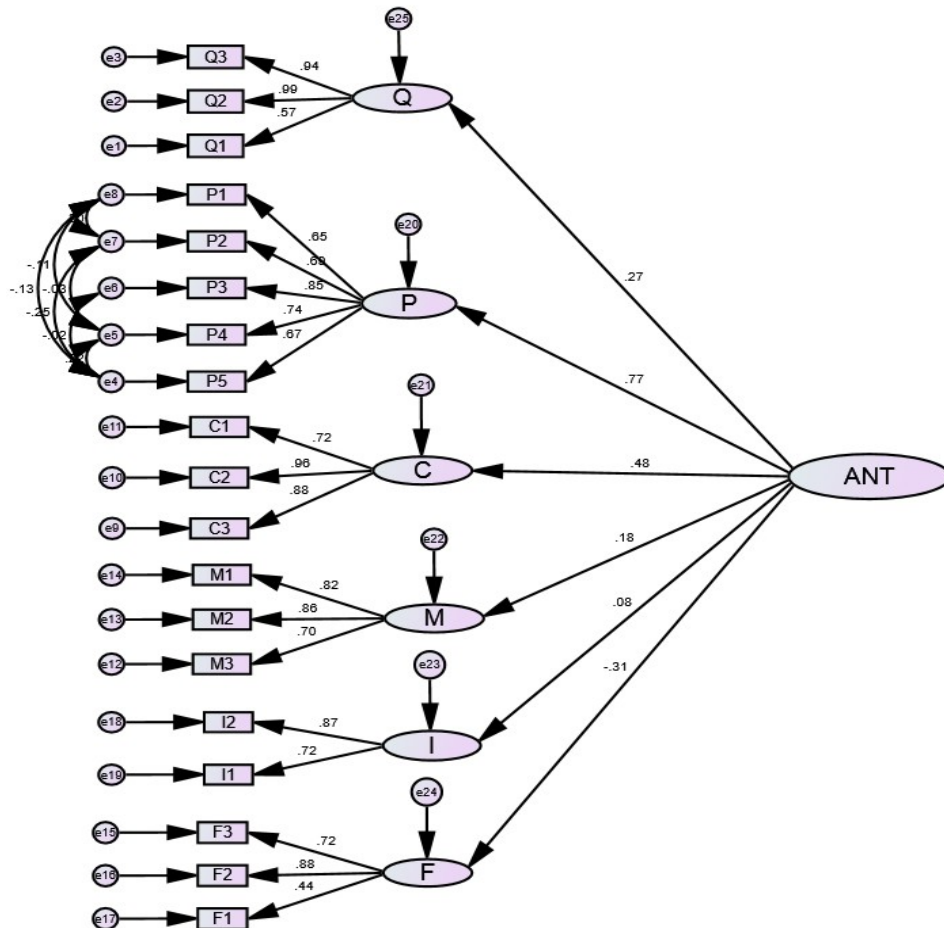
To assess the internal consistency of the six factors, we conducted a Cronbach's ∝ α reliability test (Table 4) to determine whether the measures were appropriately grouped. The Cronbach's ∝ values of all the confirmed factors were in the range of 0.766 to 0.957 and thus satisfied the required minimum of 0.70 for consistency (Hair, *et. al.* 2006). In short, the internal consistency of each factor was ensured before going for SEM analysis.

Decomposition of Initial Hypothesis and Empirical Model for Confirmation and SEM

We developed the following model (Figure 3) with the support of the available literature and the EFA to test it empirically and to establish the following two decomposed hypotheses (H_1 and H_2) from the general hypothesis set in advance. The antecedent factorssuch as cumbersome initial procedures for formal credit (P), excessive attractions and poor money management (I), quick access to informal credit (Q), flexible terms and conditions for informal credit (M) and consumerism, alcoholism and contingencies (C) are the antecedent factors (ANT) that lead to dependenceon moneylenders (DML) and finally to the economic drain in the wealth of the rural households. The construct ANT is a second-order construct capturing values from the five antecedent factors.

H_1 The antecedent factors such as cumbersome initial procedures for formal credit(P), quick access to informal credit (Q), consumerism, alcoholism and contingencies (C), flexible terms and conditions for informal credit (M) and excessive attractions and poor money management (I) are leading rural households to depend on moneylenders for their credit needs.

H_2 The continuous dependence of the rural households on moneylenders for their credit needs leads to significant economic erosion in their scanty wealth.

Figure 3: Conceptual Model of Antecedents of Dependence on Moneylenders That Leads to Economic Erosion
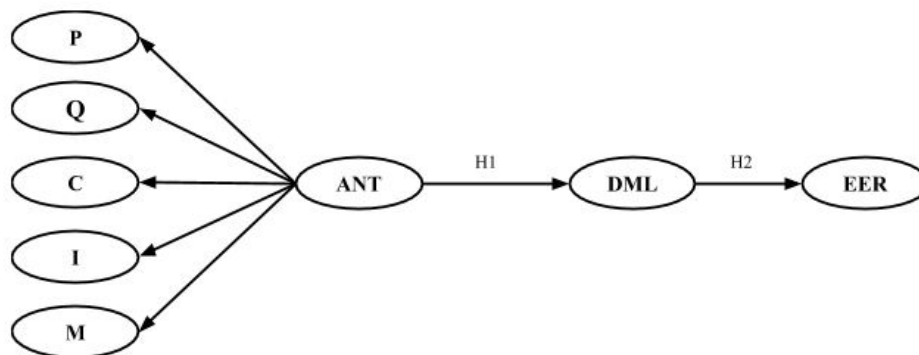
V Results and Discussion

Structural Equation Model (SEM)

After identifying the antecedent factors that force the rural households to depend on moneylenders, a Structural Equation Modeling (SEM) as specified in Figure 3 is run to establish whether the continuous dependence of rural households on

usurious moneylenders are resulting in economic erosion among them. SEM is instrumental in evaluating the relationship between latent variables in a model by running a simultaneous multiple regression analysis. SEM analysis generally includes a measurement model and a structural model (Chinda and Mohamed 2008). We used the measurement model for validity checks and SEM to identify whether the antecedent factors force the rural households to depend on usurious moneylenders for their credit needs and finally whether such dependence cause significant economic erosion to the rural households.

Measurement Model

A sound measurement model is to be confirmed before the structural model is tested. Table 4 shows the results of the Confirmatory Factor Analysis (CFA) for the measurement model of the antecedent factors, dependence and economic erosion constructs (Figure 4).

Validity Test

Construct validity that comprises of Convergent Validity (CV) and Discriminant Validity (DV) must be ensured as part of a measurement procedure (Campbell & Fiske, 1959). Convergent validity ensures whether the multiple measures or items used to capture a construct or a latent variable are related. The factor loading, Composite Reliability (CR), and Variances Extracted (AVE) are the criteria for confirming convergent validity (Hair, *et. al.* 2006). The factor loading of all the measures or items in the measurement model exceed the recommended value of 0.5 (Hair, *et. al.* 2006) (Table 4). The Composite Reliability (CR) values of all latent constructs range from 0.767 to 0.995 (Table 4) against the recommended level of 0.7 (Hair, *et. al.* 2006). The Average Variances Extracted (AVE) were in the range between 0.535 and 0.980 which is also normally acceptable (Table 4). Discriminant Validity (DV) ensures whether the constructs or the latent variable in the model are distinct. The squared correlations between constructs and variance extracted for each construct are the benchmarks for confirming DV (Hair, *et. al.* 2006)**.** As the squared correlations for each construct in the model are less than the average variance extracted (AVE) by the indicators measuring that construct ensure that the constructs and the model has adequate discriminant validity (Table 5). Thus, the measurement model confirmed adequate reliability, convergent validity, and discriminant validity.

Figure 4: Confirmatory Factor Analysis - Measurement Model
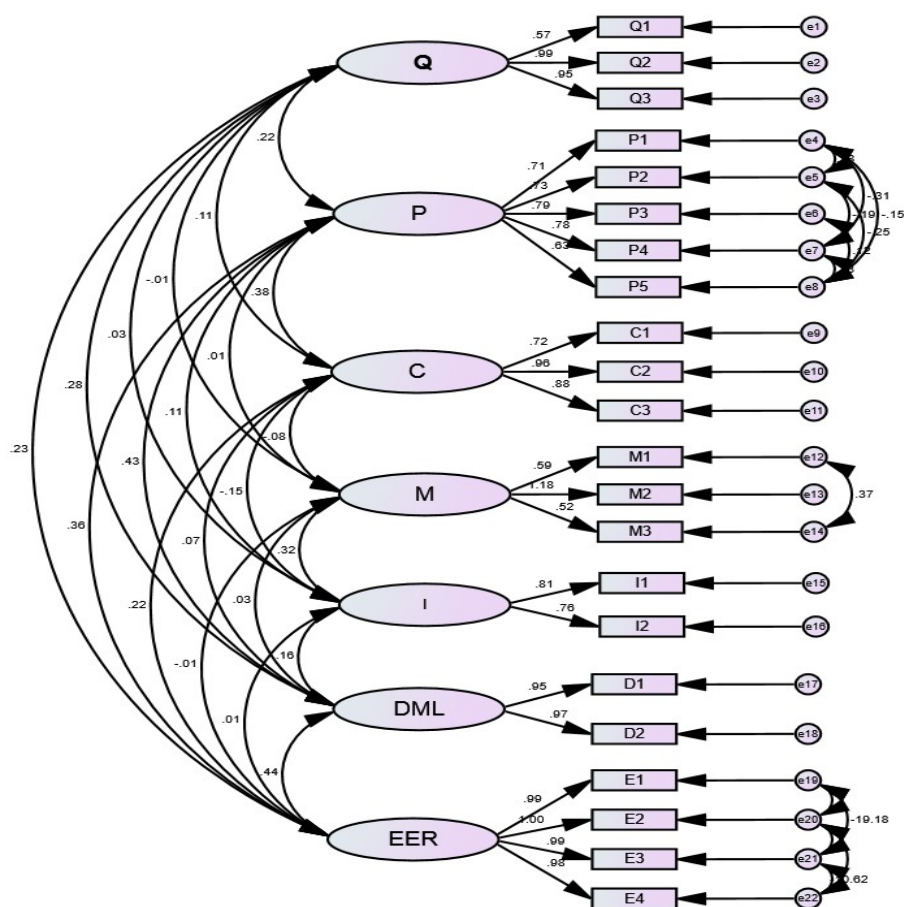
Table 4: Result of CFA for Measurement Model

Construct	Item	Cronbach's∝	Factor Loading	CR	AVE
Quick access to informal credit (Q)	Q1	0.864	.574	0.888	0.735
	Q2		.989		
	Q3		.947		
Cumbersome initial procedures for formal credit (P)	P1	0.839	.713	0.851	0.535
	P2		.732		
	P3		.793		
	P4		.782		
	P5		.626		
Consumerism, alcoholism and contingencies (C)	C1	0.883	.716	0.893	0.738
	C2		.963		
	C3		.880		

Construct	Item	Cronbach's∝	Factor Loading	CR	AVE
Flexible terms and conditions for informal credit (M)	M1	0.832	.594	0.843	0.673
	M2		1.182		
	M3		.518		
Excessive attractions and poor money management (I)	I1	0.766	.812	0.767	0.622
	I2		.765		
Dependence on moneylenders (DML)	D1	0.957	.949	0.958	0.919
	D2		.968		
Economic erosion (EER)	E1	0.899	.992	0.995	0.980
	E2		1.004		
	E3		.988		
	E4		.976		

Note: CR= Composite Reliability; AVE=Average variance extracted.

Table 5: Discriminant Validity of Constructs

	DML	P	Q	C	M	I	EER
Dependence on moneylenders (DML)	0.959						
Cumbersome initial procedures for formal credit (P)	0.283	0.857					
Quick access to informal credit (Q)	0.431	0.222	0.732				
Consumerism, alcoholism and contingencies (C)	0.070	0.114	0.375	0.859			
Flexible terms and conditions for informal credit (M)	0.028	-0.012	0.013	-0.082	0.820		
Excessive attractions and poor money management (I)	0.156	0.032	0.106	-0.154	0.319	0.789	
Economic erosion (EER)	0.438	0.234	0.363	0.222	-0.008	0.015	0.990

Note: Diagonals represent the square root of the average variance extracted while the other entries represent the squared correlations.

SEM Model and Testing of Hypotheses

The structural equation model establishes the relationships between the constructs or latent factors through simultaneous regression models (Wong and Cheung 2005). We tested a structural equation model that inspects the relationships between the five antecedent factors that influence the rural households for availing credit from moneylenders, the magnitude of their dependence on moneylenders and the economic drain in the wealth of the households on account of such dependence for credit. The integrated the measurement model and the structural model that accommodate the above explained seven constructs and its relationships are shown in Figure 5.

Figure 5: Structured Equation Model
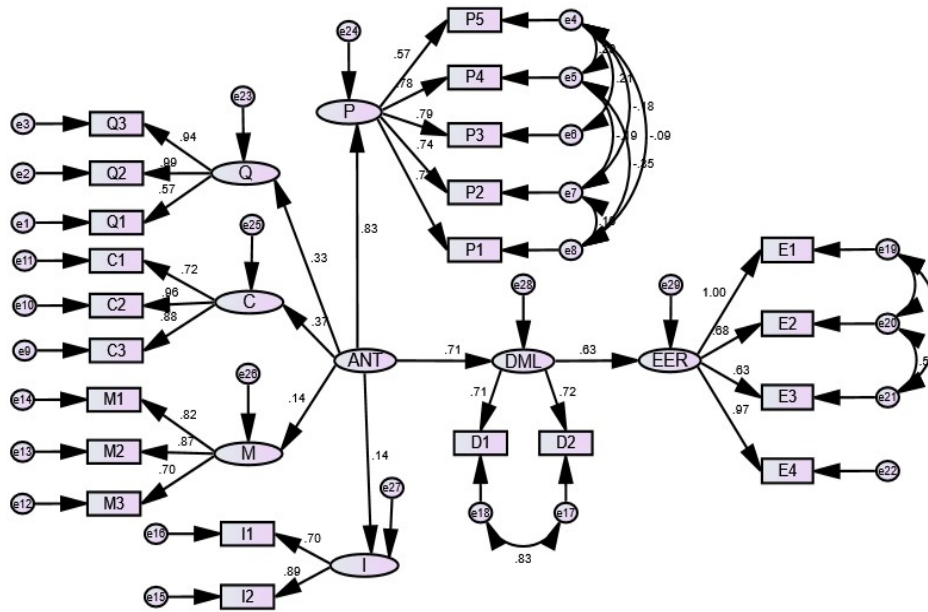
Hypotheses Test

Table 6 shows the regression weights of the structural equation model. The hypotheses can be accepted only when the significance levels are less than 0.05. The two hypotheses have very small p values (<0.01) and thus stand accepted. Thus, the antecedent factors such as (a) cumbersome initial procedures for formal credit, (b) quick access to informal credit, (c) consumerism, alcoholism and contingencies, (d) flexible terms and conditions for informal credit, and (e) excessive attractions and poor money management of the rural households force them to depend on usurious moneylenders for their credit needs and this financial dependence are bringing significant economic erosion in their lives.

Table 6: Regression Weights in the Structural Equation Model

Relationship	Regression weights				
	Estimate	Standard error	Critical error	P	Test results
Antecedents ⟶ Dependence on moneylenders (ANT to DML)	.713	.132	7.958	***	Accepted
Dependence on moneylenders ⟶ Economic erosion (DML to EER)	.631	.079	11.441	***	Accepted

Note: ***p < .001.

An integrated structural model (Figure 5) is to be evaluated by a series of statistical fit indices (Hsu, *et. al.* (2012). In specific, the model must meet the

benchmarks for absolute fit, incremental fit, and parsimonious fit. The goodness of fit between the model and the sample data is a significant indicator of the absolute fit of the model. It ensures whether the proposed model has superior fit or not. The incremental fit indices compare the model of interest with some alternative, such as the null or independence model. The parsimonious fit indices are also relative fit indices that penalize less parsimonious models so that simpler theoretical processes are favored over more complex ones.

The different fit indices of the tested model and the corresponding benchmarks are given in Table 7. Except one absolute fit index (i.e., root mean square residual (RMR=0.070) exceeded the recommended value (0.05), all other indices complied with the recommended standards. Therefore, the model can be considered as an appropriate one.

Table 7: The Goodness of Fit of the Optimized Structural Equation Model

Type	Index	Benchmark	Value	Result
Absolute fit	CMIN/DF	<5,good fit	4.844	✓
	RMR	<0.05, good fit	.070	X
	RMSEA	<0.08, not bad fit	.063	✓
	GFI	>.90, good fit	.914	✓
Incremental fit	NFI	>.90, good fit	.939	✓
	RFI	>.90, good fit	.926	✓
	IFI	>.90, good fit	.951	✓
	TLI	>.90, good fit	.941	✓
	CFI	>.90, good fit	.951	✓
Parsimonious fit	PGFI	>.50, good fit	.690	✓
	PNFI	>.50, good fit	.777	✓
	PCFI	>.50, good fit	.786	✓

Notes: χ^2 test = Chi-square; RMR= Root Mean Square Residual; GFI= Goodness of Fit Index; RMSEA= Root-Mean Square Error Approximation; NFI= Normed Fit Index; RFI= Relative Fit Index; IFI= Incremental Fit Index; TLI= Tucker-Lewis Index; CFI= Comparative Fit Index; PGFI= Parsimony Goodness-of-Fit Index; PNFI= Parsimony Normed Fit Index; PCFI= Parsimony Comparative Fit Index.

VI Conclusion

The antecedents identified in this study necessitate that rural households get finance from moneylenders. The easy access and flexible terms and conditions provided by moneylenders often compel households to seek no other source of finance. The households generally disregard the higher interest obligations of these loans. This irrational dependence on usurious moneylenders, most of the time, results in debt traps. These credits are provided without evaluating the purposes and repayment capacity of the borrower. Sourcing new credits from the same moneylenders to repay their previous debts with them is quite common among these households. This is maintaining an unbreakable chain linking the poor households and the moneylenders.

A pertinent question that gets focused here is, who benefits from this deal? As long as financial needs are unlimited and the formal sector focuses more on prime lending, usurious moneylenders will remain the last resort for rural households, despite being unaffordable. The penalty for default, rigid collection policies, and the consequent mental agony associated with informal credit are regular debates in the common parlance. Still, the rural households depend on them irrespective of all the demerits related to that source of financing. When consumerism, alcoholism, and contingencies become the antecedents and priorities for sourcing informal credits, the risk of default accretes, and the chance of being in a permanent debt trap increases. The study undoubtedly confirms that the dependence of households on usurious moneylenders economically drains the rural households in India.

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Causality among Development Expenditure, Economic Growth and Human Development in Haryana

Kirti and Devender

The foremost objective of the present analyses was to find out the impact of public expenditure, including overall expenditure as well as per capita income, education expenditure, and health expenditure, on human development in Haryana from 1990–1991 to 2019–2020. The results revealed that Haryana has improved in terms of human development. The findings revealed that, in the long run, there was a positive relationship among economic growth, education expenditure, health expenditure, and human development. On the contrary, in the short run, Per Capita Gross State Domestic Product (PCGSDP) and education expenditure found an insignificant negative impact on human development, and health expenditure found a significant positive impact on human development. The findings suggested that the government should emphasize public expenditure on human prior services to improve human development in the state.

Keywords: HDI, Economic growth, Education expenditure, Health expenditure, VECM, Granger causality

I Introduction

Public expenditure is an integral part of fiscal policy that has been assumed to be an indispensable instrument after the Keynesian revolution to boost the level of development, especially in developing as well as underdeveloped economies. Therefore, it is the most popular component of fiscal policy to stimulate economic growth and development (Canh 2018). The modern growth theories have emphasised that the growth potential should be converted into human resource development. Keeping human development at the centre, expenditure on social services has an indispensable role in the creation of human resources for any economy. Expenditure on social services is an essential part of development expenditure, which indicates the government priority human resource development. The United Nations Development Program (UNDP) understood the importance of these dimensions and included them both in the computation of the

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Human Development Index (HDI) to measure the level of human development at any place (Dreze and Sen 1995), along with the use of three dimensions, namely health, education, and real per capita income. Traditionally, to measure economic development worldwide, there was only one indicator widely used, i.e., per capita income. It is mentioned hereby that per capita income alone cannot represent the overall picture of development; therefore, the human development index includes a broader aspect of measuring the wellbeing of people along with real per capita income, including the health and education index. It is mentioned hereby that per capita income alone cannot represent the overall picture of development; consequently, the human development index comprises a broader aspect of measuring the well-being of people along with real per capita income, including the health and education index. It is pertinent to mention here that economic growth is directly linked to human development. However, present high economic growth does not ensure high human development (Haq 1995). Building upon the experience of various economies with government policies, UNDP concluded that human development could be achieved under two main conditions, i.e., "well-structured social services expenditure" and "growth with equal income distribution." Therefore, a close relationship between per capita income, education, and health expenditure may exist. The present study, thus, focused on assessing the relative performance of human development in Haryana since 1990. The study has focused on investigating the impact of per capita income, education expenditure, and health expenditure on HDI in the state. Moreover, due to the massive economic reforms in 1990, it is important to examine whether these reforms contributed to the improvement of human development. Therefore, in the present analysis, the time period is taken to be from 1990–1991 to 2019–2020.

Concept of Human Development

In its first HDR, released in 1990, UNDP launched a novel strategy aimed at enhancing human wellbeing. This new approach was introduced as many developing economies with high growth rates failed to diminish the disparity between different sections of society. Low income growing countries have performed well in human development (UNDP 1990). There have been numerous studies in the literature that have examined the connection between public expenditure and human development since the inception of the human development approach. Lucas (1988) held the view that public expenditure on education had boosted human capital, which would positively affect economic growth. He proposed a model of the neoclassical theory of growth and international trade, which emphasised the accumulation of human capital and technological change, in which human capital accumulation occurs through schooling and learning by doing. Chelliah and Sudarshan (1999) attempted to understand the trends in the growth rate of real per capita social services expenditure and the effectiveness of expenditures in terms of human development outcomes between 1974-1975 and 1995-1996. Their analysis found a sharp decline

in the growth rate of state per capita social expenditure during 1985-1992. Further, it was observed that low-income states spend nearly one-third of their per capita income on public health, including maternal facilities, compared to high-income states. Moreover, education and health services in India face three fundamental problems: lack of easy access, high costs and poor quality. Baldacci, Teresa, Siu and Mello (2002) estimated the association between public expenditure on education, health care services, and social indicators in developing countries. Their findings suggested that by mitigating adverse social problems such as high illiteracy, low income, and gender disparities in access to essential public services, relatively faster human development may be achieved. Ranis and Stewart (2002) have found a two-way relationship between economic growth and human development in Latin America. In their study, regression analysis revealed a substantial relationship between economic growth and human development; however, this relationship is not as strong elsewhere in the world. Dholakia (2003) studied the regional disparity and human development in India from 1977-1980 to 1997-2000. The study included 28 states and union territories and found that from 1981 to 1991, human development and social indicators depicted a marked decline in regional disparity. The study also showed that HDI had a positive impact on the per capita State Domestic Product. Ghosh (2006) investigated the performance of 15 major Indian states from 1981 to 2001 and found a divergence in human development among the states, where merely four states had a high level of human development. In contrast, seven states were in a very low stage. Mukherjee and Chakraborty (2007) investigated the association between environmental quality, economic growth and human development in the post-reform period. The findings revealed a non-linear relationship between environmental groups and economic growth. The findings also showed that individual environment groups and HDI scores have a learning N-shaped association. Moreover, the study suggested that individual states should adopt different policies based on disaggregate levels. Hasnul (2015) analysed the impact of public expenditure on economic development in the Malaysian economy from 1970 to 2014 using the ordinary least squares (OLS) approach and found a negative association between public expenditure and economic growth. However, it was also observed here that healthcare, education, defence, and other expenditures had an insignificant impact on economic growth. Omodero (2019) analysed the impact of public investment on human development in Nigeria, taking the data between 2003 and 2017. The study concluded that capital expenditure as well as the rate of inflation had insignificant negative impacts on HDI, whereas revenue expenditure had a substantial positive effect on HDI.

Relative Performance of Haryana State in Human Development to India

Haryana is one of the progressive states of India. Haryana has developed in different dimensions during the last three decades of economic reforms. It has

remarkably improved its position in social and economic indices. Even in HDI, its ranking among Indian states has been enhanced from 6th to 4th place over the study period. HDI assesses the completion of education levels, health facilities, and the standard of living in any place. On the international level, India stands at 130th place in HDI with an index value of 0.645 (HDR 2020). On the state level, Kerala has the highest HDI value, i.e., 0.76, and got 1st rank in India, whereas Haryana is situated at 4th rank with an index value of 0.70 in 2020. Over the study period, it is clearly visible that the HDI of Haryana state has been greater than the national HDI average (Figure 1).

Figure 1: HDI in India and Haryana
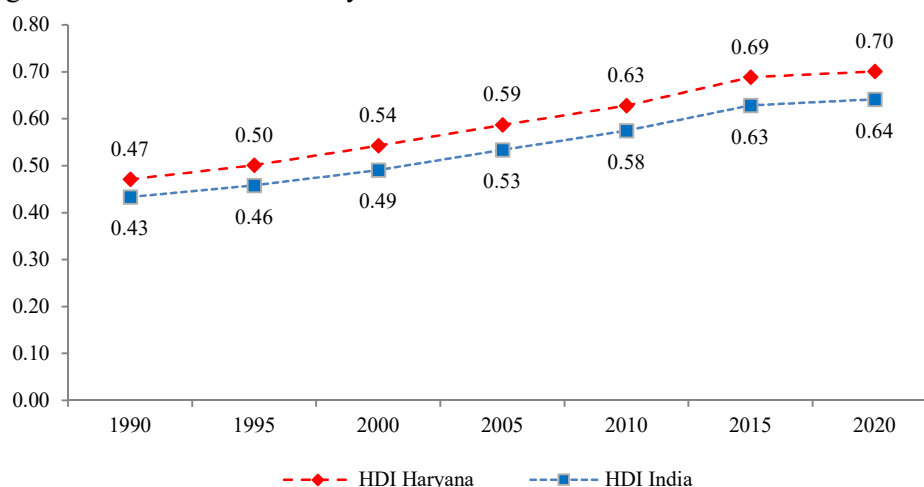
Source: Global Data base of Sub-national HDI.

Figure 1 depicts the situation of human development in Haryana as compared to India after the post-reform period. It may be observed that there has been steady growth in HDI values of Haryana and India. In 2020, Haryana reached at high level of human development, whereas the national average showed that India is at a low level of human development.

II Research Methodology

The present study focused on exploring the link between development expenditure and human development in two ways: one from economic growth to human development and the other from education and health expenditure to human development in Haryana state. The study is analytical as well as descriptive in nature, and it uses secondary data for the analysis. The data was collected from various published sources, including UNDP Human Development Reports, Global Data Lab, various issues of the National Human Development Report, Haryana Human Development Report 2009, Centre for Monitoring Indian Economy

(CMIE), Reserve Bank of India (RBI) Handbook of Statistics on the Indian States, and various issues of the Statistical Abstract of Haryana.

The study used secondary data from 1990–1991 to 2019–1920, which indicates that this data is time series data. The GSDP variable used in the study has been taken at constant prices for the base year 2011–2012. For analysis purposes, per capita gross state domestic product (PCGSDP) has been considered as a proxy for economic growth in the model, and the Human Development Index (HDI) has been considered as a proxy for human development. In the analysis, the HDI values have been taken as per the new method of UNDP (2010), published on November 4, 2010, in the Human Development Report (HDR). The HDR index has been computed by incorporating three dimensions: health, education, and standard of living. These dimensions are further categorised into four indicators, i.e., life expectancy at birth (LE), mean years of schooling (MYS), expected years of schooling (EYS), and per capita income (PCI) in US$. For computing HDI values, each indicator is required to be on a scale from 0 to 1. Moreover, the final aggregated human development index (HDI) value has been computed by the geometric mean of these dimension indices.

$$HDI= \sqrt[3]{LE + ED + PCI}$$

The relationship between PCGSDP, education and health expenditure, and HDI was investigated using the following functional form:

HDI= f (PCGSDP, EDU, and HE)   ...(1)

Where,
HDI- Human Development Index
PCGSDP- Per Capita Gross State Domestic Product
EDU- Education Expenditure
HE- Health Expenditure

The reason for including these variables is that education and health the most important factors affecting human development of people. All the variables have been taken in natural logarithm except HDI to avoid the problem of heteroscedasticity and Lin-Log model is applied to fulfil the study objectives. Further, the following specifications of variables have been used to fulfil the objectives:

HDI= f (LPCGSDP, LEDU, and LHE)   …(1)

Where,
LPCGSDP-Logarithm (Log) value of the PCGSDP at factor cost.
LEDU-Logarithm (Log) value of the education expenditure.
LHE-Log value of health expenditure.

It is vital for data to be stationary for further economic analysis; therefore, the Augmented Dicky-Fuller (ADF) and Phillips-Perron (PP) tests have been used to test the properties of stationarity of the variables. It is worth mentioning here that the standard technique of the Johansen co-integration test has been used for the determination of co-integrated vectors in the long run. After confirmation of the existence of co-integration between variables, the "Vector Error Correction Model (VECM)" was applied. Another reason for using VECM is that all variables were found stationary at the first difference as well as co-integrated, which makes the perfect environment for the use of VECM for analysing the data. The optimum lag selection was taken according to Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC). In the present study, according to both criteria, only one lag has found appropriate to analyse the relationship between the variables. Moreover, short-run causal relationship has been analysed through the Granger causality test. The functional form of VECM analysis for different models is given below,

$$\Delta HDI_t = \alpha + \beta \Delta LPCGSDP_{t-1} + \varphi \Delta LEDU_{t-1} + \gamma \Delta LHE_{t-1} + \mu_t$$

$$\Delta HDI_t = \alpha + \sum_{i=1}^{k-1} \vartheta_i \Delta HDI_{t-1} + \sum_{i=0}^{k-1} \beta_i \Delta LPCGSDP_{t-1} + \sum_{i=0}^{k-1} \varphi_i \Delta LEDU_{t-1}$$
$$+ \sum_{i=0}^{k-1} \gamma_i \Delta LHE_{t-1} + \omega ECT_{t-1} + \varepsilon_t$$

$$ECT_{t-1} = (HDI_{t-1} - \alpha - \beta LPCGSDP_{t-1} - \varphi LEDU_{t-1} - \gamma LHE_{t-1})$$

$$\begin{bmatrix} \Delta HDI_t \\ \Delta LPCGSDP_t \\ \Delta LEDU_t \\ \Delta LHE_t \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \end{bmatrix} + \sum_{i=1}^{n} \begin{bmatrix} \beta_{11,i} & \beta_{12,i} & \cdots & \beta_{14,i} \\ \beta_{21,i} & \beta_{22,i} & \cdots & \beta_{24,i} \\ \vdots & \vdots & \ddots & \vdots \\ \beta_{41,i} & \beta_{42,i} & \cdots & \beta_{44,i} \end{bmatrix} \times \begin{bmatrix} \Delta HDI_{t-1} \\ \Delta LPCGSDP_{t-1} \\ \Delta LEDU_{t-1} \\ \Delta LHE_{t-1} \end{bmatrix} + \begin{bmatrix} \omega_1 \\ \omega_2 \\ \omega_3 \\ \omega_4 \end{bmatrix}$$
$$\times (ECT_{t-1}) + \begin{bmatrix} \mu_{1t} \\ \mu_{2t} \\ \mu_{3t} \\ \mu_{4t} \end{bmatrix}$$

Where:
Δ - Represents the first difference of the respective variable.
HDI- Human Development Index.
LPCGSDP-Logarithm (Log) value of the PCGSDP at constant cost.
LEDU- Log value of education expenditure.
LHE- Log value of health expenditure.
ω - Refers to the parameter of speed adjustment.
μand ε - Random error or stochastic term.
α - Intercepts in the model, whereas β, φ, and γ are the short-run dynamic coefficients of respective parameters.

III Relationship between Development Expenditure, Economic Growth and Human Development in Haryana

In this section, public expenditure incurred on social services, especially education and health services, has been considered to analyse the impact of public expenditure on human development. Expenditure on social services is an essential part of public expenditure for economic redistribution and economic development in the economy. There-distribution effects of such expenditures commonly favour the poorer sections of society.

The findings from Table 1 clearly revealed that over the time, the value of HDI has increased from 0.47 in 1990-1991 to 0.71 in 2019-2020. Moreover, the value of PCGSDP has also increased continuously during this period and reached ₹197310 in 2019-2020 from ₹43525 in 1990-1991. On the other hand, a similar increasing trend has also been found in education and health expenditure. The expenditure on human priority sectors, i.e., education and health, increased from ₹331.97 crore and ₹87.11 crore to ₹14867.62 crore and ₹4982.60 crore, respectively. Moreover, the per capita education expenditure (PCEDU) as well as per capita health expenditure (PCH) also displayed an increasing trend over time. In which, the PCEDU increased from merely ₹201.19 in 1990-1991 to ₹5126.77 in 2019-2020, and PCH increased from merely ₹52.79 in 1990-1991 to ₹1718.14 in 2019-2020.

The study found that the education expenditure has always been higher than the health expenditure in Haryana. Even at the per capita level, PCEDU always has been more than PCH. During the entire study period, education expenditure was the main focus area of the government to promote human development. Moreover, with an increase in both income and expenditure, there has been an improvement in HDI also.

Table 1: Expenditure on Priority Sectors and Human Development Index in Haryana

Year	HDI	PCGSDP*	Education Expenditure#	PCEDU*	Health Expenditure#	PCH*
1990-91	0.47	43525.8	331.97	201.19	87.11	52.79
1991-92	0.47	42942.12	376.17	219.98	103.82	60.71
1992-93	0.48	41973.98	443.80	253.60	122.38	69.93
1993-94	0.49	42933.53	473.41	263.01	116.50	64.72
1994-95	0.49	44836.37	550.90	299.40	154.30	83.86
1995-96	0.50	44810.92	662.50	350.53	164.78	87.19
1996-97	0.51	48771.59	758.05	390.75	191.97	98.95
1997-98	0.52	48232.14	867.52	435.94	230.95	116.06
1998-99	0.53	49627.4	1244.04	609.82	303.37	148.71
1999-00	0.54	52065.46	1264.78	605.16	293.34	140.35
2000-01	0.55	55696.95	1334.47	632.45	297.95	141.21

Year	HDI	PCGSDP*	Education Expenditure#	PCEDU*	Health Expenditure#	PCH*
2001-02	0.55	58840.93	1479.65	685.02	321.87	149.01
2002-03	0.56	61438.8	1455.01	661.37	351.06	159.57
2003-04	0.57	66188.4	1540.68	684.75	359.42	159.74
2004-05	0.58	70405.1	1681.14	734.12	392.13	171.24
2005-06	0.59	75460.72	1992.78	855.27	467.11	200.48
2006-07	0.60	82410.66	2330.06	983.15	487.81	205.83
2007-08	0.61	87788.54	2838.07	1172.76	579.50	239.46
2008-09	0.62	93315.55	3944.84	1603.59	768.94	312.58
2009-10	0.62	102490.5	5320.25	2128.10	1096.54	438.62
2010-11	0.63	108270.1	5972.48	2351.37	1086.90	427.91
2011-12	0.64	115084.1	6364.26	2457.24	1248.11	481.90
2012-13	0.65	122177.7	7146.60	2717.34	1600.90	608.71
2013-14	0.66	130274.3	7532.48	2821.15	1752.46	656.35
2014-15	0.67	136834.6	9479.24	3497.87	2238.72	826.10
2015-16	0.68	150454.8	10118.69	3679.52	2524.90	918.15
2016-17	0.69	163865.1	11202.15	4015.11	3044.43	1091.19
2017-18	0.70	174872.8	12186.58	4306.21	3376.47	1193.10
2018-19	0.71	185493.1	13067.94	4569.21	4011.16	1402.50
2019-20	0.71	197310.4	14867.62	5126.77	4982.60	1718.14

Notes: *values in rupees; #values in crore rupees; PCEDU- Per Capita Education Expenditure; PCH- Per Capita Health Expenditure.

Source: Computed by Authors. Raw data extracted from Statistical Abstract of Haryana (Various Issues).

Correlation between Variables

Table 2 demonstrates the pairwise Pearson correlation coefficient (r) between the selected variables.

Table 2: Pairwise Pearson Correlation (r) Between Variables

Variables	HDI	DEV	ND	PCGSDP	EDU	HE
HDI	1.00	-	-	-	-	-
DEV	0.91 **	1.00	-	-	-	-
ND	0.89 **	0.99 **	1.00	-	-	-
PCGSDP	0.95 **	0.98 **	0.97 **	1.00	-	-
EDU	0.91 **	0.99 **	0.98 **	0.99 **	1.00	-
HE	0.85 **	0.98 **	0.99 **	0.96 **	0.97 **	1.00

Note: **Significant at one per cent level.
Source: Computed by Authors.

From the perusal of the above table, it may clearly be observed that all the variables are positively highly correlated with each other. Moreover, it may be

observed that the correlation between HDI and DEV is highly positive. Similar results have been observed in HDI, ND, PCGSDP, EDU and HE. However, merely analysing the correlation among variables is not sufficient to predict the negative or positive impact of development expenditure on human development. Therefore, there is a need to study these variables intensely and find out the explicit impact of the variables.

Stationarity of Variables

In order to find co-integration among variables, unit root tests have been applied. The standard tests, namely the Augmented Dicky-Fuller (ADF) and the Phillips-Perron (PP) tests, were used to examine the existence of the unit root. After the log transformation, the variables were found stationary at the first difference, i.e., presented in Table 4. Moreover, descriptive statistics of all the variables have been shown in Table 3.

Table 3: Descriptive Statistics of the Selected Variables

Variables	HDI	PCGSDP	EDU	HE
Mean	0.586467	89946.42	4294.271	1091.9160
Median	0.584000	72932.91	1836.960	429.6150
Maximum	0.708000	197310.40	14867.620	4982.6000
Minimum	0.465000	41973.98	331.970	87.1100
Std. Dev.	0.077064	47925.53	4422.997	237.6292

Source: Computed by Authors.

The outcomes of ADF and PP tests indicate that all the variables were non-stationary at the level I(0), which becomes stationary at the first difference I(1). In which the variables of HDI, DEV and ND are stationary at the first difference, and the rest became stationary after the log transformation at the first difference. At first difference, the p-value of all variables was nearly zero and found to be significant at a one per cent level. Consequently, the null hypothesis on the first difference can be rejected and proceed to further analysis.

Table 4: Stationarity Results of Variables

Variables	ADF		PP	
	I (0)	I (1)	I (0)	I (1)
HDI	0.9419	0.0006	0.9419	0.0006
LPCGSDP	1.0000	0.0069 *	1.0000	0.0082 *
LEDU	0.8686	0.0029 *	0.8714	0.0028 *
LHE	0.9933	0.0001 **	0.9962	0.0001 **

Notes: The one-sided p-values of ADF and PP test are based on MacKinnon (1996); The values of DF-GLS test are based on Elliot, *et. al.* (1996); * Significance at one percent, ** Significance at five per cent.
Source: Computed by Authors.

Co-integration among Study Variables

Further, the long-run relationship between the variables has been checked by applying the co-integration test. Table 5 demonstrates the findings of the Johansen co-integration test. The null hypothesis (H_0) is that "there is no long-run relationship among the variables." The findings of the Trace statistic and Max-Eigen statistic are observed to be higher than their critical values, which indicate that there is a long-run relationship among HDI, PCGSDP, education expenditure, and health expenditure in Haryana. Therefore, we may reject the H_0.

Table 5: Co-integration Results of Variables

H_0	Eigenvalue	λ_{trace}	Critical Value	Prob.**	λ_{max}	Critical Value	Prob.**
None*	0.681	57.083	47.856	0.005	31.966	27.584	0.013
At most 1	0.378	25.118	29.797	0.157	13.288	21.132	0.426
At most 2	0.239	11.830	15.495	0.165	7.651	14.265	0.415
At most 3	0.139	4.179	3.8415	0.041	4.179	3.841	0.041

Note: CV= Critical Values; * Rejection of the H_0 at the 0.05 level; ** P-values are based on MacKinnon-Haug-Michelis (1996).
Source: Computed by Authors.

Estimation of the Long-Run Coefficients

After finding the co-integrating, the coefficient of the co-integrating equation has been estimated which has been presented in Table 6. The results of coefficients also represent the elasticity of variables. Here, HDI was the dependent variable, and the per capita gross state domestic product (PCGSDP), education expenditure, and health expenditure were independent variables. According to the results, PCGSDP, education and health expenditure has found significantly positively related to HDI. The results showed that a one per cent growth in PCGSDP stimulated the HDI by 0.13 per cent. Similarly, one per cent increase in education expenditure stimulated HDI by 0.006 per cent, and one per cent increase in health expenditure stimulated HDI by 0.06 per cent. Moreover, the lagged coefficient of ECT indicated the speed of adjustment towards equilibrium, which should be negative and statistically significant to verify the presence of the long-run relationship (Gujarati 2004). The value of ECT was found to be significantly negative, which also indicates that there is a long-run relationship among variables.

Long-Run Equation

ECT_{t-1} = 1.00 HDI - 0.13LPCGSDP$_{t-1}$ - 0. 006 LEDU$_{t-1}$ - 0.06 LHE$_{t-1}$+ 0.28
                HDI = 0.13LPCGSDP$_{t-1}$ + 0.006 LEDU$_{t-1}$ + 0.06 LHE$_{t-1}$ + 0.28

Table 6: Estimation of the Long-Run Model

Variable	Coefficient	S.E.	t-statistics	p-value
HDI (-1)	1.000			
LPCGSDP (-1)	-0.138	0.039	-3.527	0.0020 *
LEDU (-1)	-0.006	0.027	-0.227	0.8220
LHE (-1)	-0.064	0.030	-2.110	0.0476
C	0.283			

Note: * significant at one per cent.

Source: Computed by Authors.

Estimation of Short-Run Coefficients

The short-run findings for the Model based on ECM are depicted in Table 7. The results showed that the ECT for the co-integrating equation with HDI as a dependent variable was found to be significantly negative. The ECT demonstrated that the independent variables adjusted 22 per cent of disequilibrium in a year. The results revealed that in the short run, the lag value of HDI had a positive impact on human development; however, it was not statistically significant. Moreover, the lag value of health expenditure (LHE) was found to have a significant positive impact on human development. Whereas the lag value of LPCGSDP and education expenditure (LEDU) had a negative impact on human development; nevertheless, it was not statistically significant. Furthermore, the value of R^2 is 0.68, which indicates that the independent variables explained 68 per cent variability of the dependent variable and presents the fitness of the model.

Table 7: Estimation of the Short-Run Model

Variable	Coefficient	S.E.	t-statistics	p-value
ECT (-1)	-0.224	0.068	-3.293	0.004 *
HDI (-1)	0.151	0.236	0.640	0.529
LPCGSDP (-1)	-0.006	0.059	-0.107	0.916
LEDU (-1)	-0.014	0.020	-0.698	0.493
LHE (-1)	0.123	0.038	3.227	0.004 *
C	0.007	0.003	2.583	0.017
Various Diagnostic Check Results				
R-Square			68	
Adjusted R-Square			65	
F-Statistics			4.2369	
Prob (F-Statistic)			0.0054	
Durbin-Watson Statistic			1.9354	
Breusch-Gogfrey Test (p-value of Chi-Square)			0.7686	
Breusch-Pegan-Gogfrey Test (p-value)			0.2030	
Variance Inflation Factors			<10	

Note: * significant at one per cent.

Source: Computed by Authors.

Model 2: D(HDI) = 0.22*(HDI - 0.13 LPCGSDP$_{t-1}$ - 0. 006 LEDU$_{t-1}$ - 0.06 LHE$_{t-1}$ + 0.28) + 0.15*HDI(-1) - 0.006*LPCGSDP(-1) -0.01*LEDU(-1) + 0.12*LHE(-1)) + 0.0068

Diagnostic Check of the Residual

To check the normality of the residual of Model, the present study applied the Jarque-Bera test. The probability value of this test was 0.935; therefore, the study accepted the H$_0$ for the model, which means that after taking the log values of variables, they became normally distributed. Moreover, the heteroscedasticity of the residuals of the model was checked by the Breusch-Pagan-Godfrey test. The probability value of this test was found to be 0.203; therefore, the study accepted the H$_0$ for the model, which indicates that the residuals are homoscedastic. On the other hand, to check whether the autocorrelation in the errors of the regression model is present or not, the study used the Breusch-Godfrey (BG) test. The probability value of this test is found to be 0.769; therefore, the study accepted the H$_0$ for the model, which reveals that there is no problem with autocorrelation. To check the long-run stability of the coefficient, the study used the "CUSUM Test and CUSUM Square Test," as depicted in Figures 2 and 3. It was found that the selected models were correctly specified as well as structurally stable, as the plots of both tests were within the critical limits of the confidence interval. Therefore, the selected models were correctly specified as well as structurally stable.

Figure 2: CUSUM Test for Model
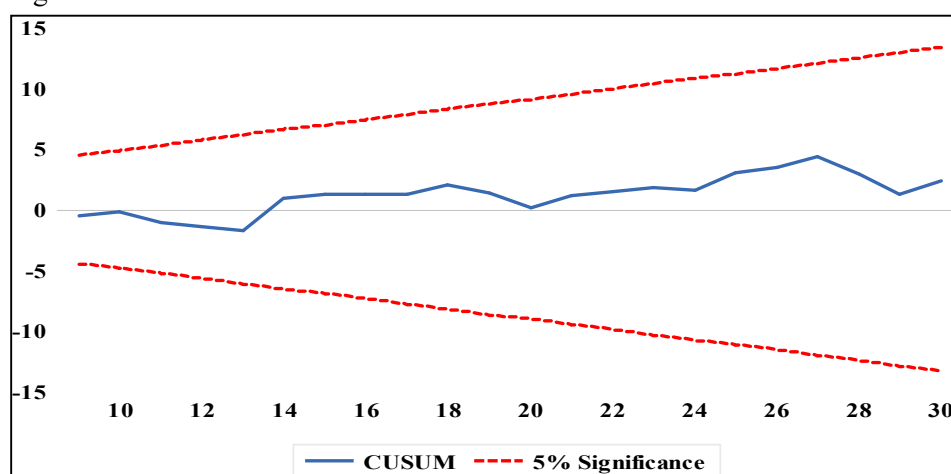
Source: Computed by Authors.

Figure 3: CUSUM Squares Test for Model
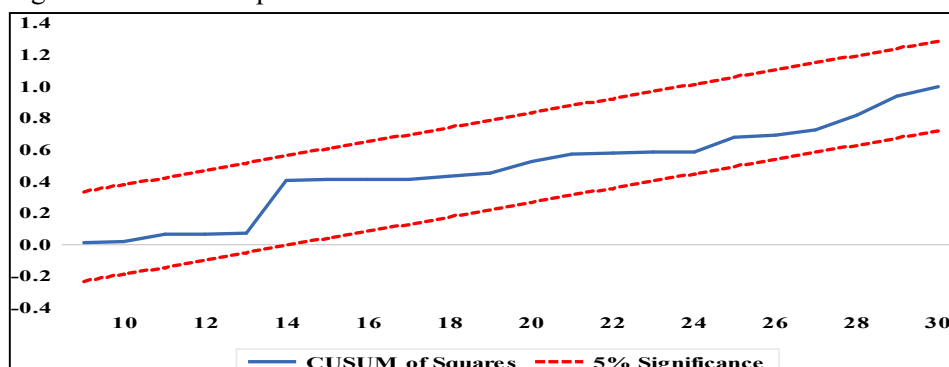
Source: Computed by Authors.

Granger Causality Test

The co-integration test demonstrates the existence of a causal relationship among the variables in the long run, but does not confirm the direction of causality. Therefore, pair wise Granger Causality test was used in the study as shown in Table 7. The null hypothesis of this test is that "there is no causality between variables". The findings confirmed unidirectional causality from LHE to HDI, from LPCGSDP to HDI, and from LPCGSDP to LEDU. Moreover, there is bidirectional causality from LPCGSDP to LHE.

Table 7: Results of Granger Causality Test

Pairs of the Variable	F-Statistics	P-value	Causality (at 0.05 level)
LEDU and HDI	0.369	0.695	No
HDI and LEDU	2.331	0.120	No
LHE and HDI	4.916	0.017	Yes *
HDI and LHE	1.360	0.277	No
LPCGSDP and HDI	11.000	0.0004	Yes *
HDI and LPCGSDP	0.001	0.999	No
LHE and LEDU	0.254	0.778	No
LEDU and LHE	0.160	0.853	No
LPCGSDP and LEDU	4.198	0.028	Yes *
LEDU and LPCGSDP	2.886	0.076	No
LPCGSDP and LHE	5.167	0.014	Yes *
LHE and LPCGSDP	3.471	0.048	Yes *

Note: *at five per cent level of significance.
Source: Computed by Authors.

IV Conclusion and Policy Implications

The economic theories have shown that merely an increase in GDP is not enough for economic development; growth potential should be converted to human development. For this, public expenditure has an important role, especially in development expenditure. Therefore, the present study had analysed the linkage among development expenditure, economic growth and human development. The findings confirmed that in Haryana, the level of human development had improved over the study period. Moreover, education and health expenditure have also increased in the state. However, the education sector has always given preference over health sector in Haryana. The findings revealed that in long run there was positive relation among economic growth, education expenditure, human development and health expenditure. Moreover, in the short run, PCGSDP, education has found an insignificant negative impact and health expenditure has significant positive impact. The study concluded that there is direct positive relationship between economic growth and human development. Further, granger causality test showed the presence of unidirectional causality from health expenditure to human development, PCGSDP to human development and from PCGSDP to education expenditure. A bidirectional causality was found in the study, from PCGSDP to health expenditure. All these results signify that the government should increase development expenditure on education and health services to enhance the level of human development. Besides the amount of expenditure, the government should also make an efficient mechanism for use of expenditure. Moreover, the government should make different policies to provide basic education and health facilities to the needy people. Conclusively, the study suggested that the government should focus on human prior services, especially on education and health for improvement in human development in the state.

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Do Dalit Villages Lag Behind in Occupational Opportunities and Social Infrastructure? An Analysis of Census Data for Marathwada, Maharashtra

Nageshwar Bansode

This paper investigates the relationship between caste and occupational structure, and access to infrastructure or amenities at the village level in Marathwada region. This statistical analysis is based on the District Census Abstract and Village Directory of the Census of India 2011, the explores the association between the presence of SC or Dalits in population and nature of workforce. We ranked all villages by the Dalit population in total population and grouped in fractile from the Marathwada region (eight district) of Maharashtra. In the last, we examine important characteristics of related to workers occupation and social infrastructure.

This statistical analyses shows a consistent picture across all districts in terms of the concentration of Scheduled Caste or Dalits population and characteristics of the village workforce.. As we move to villages with a higher proportion of SC, the share of cultivators falls sharply and that of agricultural workers rises. Further, Dalit-majority villages are worse off than other villages in respect of availability of school, health facilities, ration shops, ATMs, public libraries and other types of social and economic infrastructure.

Keywords: Dalit, Village, Occupation, Amenities, Marathwada, Census of India

I Introduction

There is a growing literature on the social and economic deprivation of Dalits in rural India in the contemporary period, and on forms of deprivation, exclusion and discrimination of Dalits. On most socio-economic parameters, persons of the Scheduled Castes fall behind those from other Hindu caste groups. The National Sample Survey 2013 reported around 58 per cent of Dalit households in rural India were landless (the corresponding proportion in Maharashtra was 51) as compared to 44 per cent among all households (Anand 2016, Bansode 2022). There have been studies based on village level data showing unequal access of Dalit households to land, assets, housing and other amenities (Ramachandran and

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Swaminathan 2012). Several studies show that that the major occupation among Scheduled Castes in rural India has been and continues to be as agricultural workers (Thorat 2009, Etienne 2007, Deshpande 1998 and Kumar 2012). There have been an important set of studies coordinated by Sukhadeo Thorat on discrimination faced by rural Dalits in access to education, school meals, ration shops, health services, and jobs.

The approach of this paper is somewhat different in that we look at villages -- not households or individuals--with a predominance of Dalits and ask if the nature of amenities and occupations are distinctly different in such villages than in villages with little or no Dalit presence. In other words, are entire villages additionally "backward" in consideration of material and social infrastructure and more limited in terms of occupational choice if they retain a more elevated population share of Dalits or SC? This type of backwardness is a form of externality in that all residents of the village are adversely affected irrespective of individual characteristics such as level of education (Bansode and Swaminathan 2021).

For this exercise, we have chosen Marathwada, one of the most backward regions of Maharashtra State, comprising the districts, Nanded, Latur, Jalna, Parbhani, Osmanabad, Bid, Hingoli, and Aurangabad (Human Development Report of Maharashtra 2012, Kumar 2019, Bansode 2015). Marathwada region also has a notable Dalit or SC population: persons of the Dalit or Scheduled Castes contained 16 of the shares of the population as per the Census 2011 as compared to 12 per cent for the State. (Note that we use Dalits and Scheduled Castes interchangeably.) The socioeconomic condition of Dalit households in the backward region of Maharashtra has received exiguous attention, particularly in the agrarian literature (Bokil 1996, Ramakumar 2011, and Bansode and Swaminathan 2019). Marathwada region has a history of struggles for the right to education, land, and livelihood, including the prominent *Name Change Movement* and *Gairan land struggle* (Omvedt 1980, Bansode and Swaminathan 2021).

This paper argues that within this "backward region" of Marathawada, villages with a high proportion of Dalits have a distinctive occupational structure, and are poorly off in absolute as well as relative terms in access to basic amenities. The paper suggests that in addition to focussing on the socio-economic status of Scheduled Caste persons and households, we also need to study features of villages with a substantial Scheduled Caste population and how Dalitness of a village affects all households in terms of physical and social infrastructure, and economic opportunities.

Using Census data, this paper explores whether there are systematic variations in occupational structure and access to amenities in villages with differing social composition. Are there differences across villages in respect of occupational opportunities and amenities as the Dalitness of the population changes? To answer this question, we create fractile groups of villages based on the proportion of Dalits in the population and then examine selected aspects of villages in each fractile. The statistical exercise is based on village-level data from

the District Census Handbook 2011 for around 8000 villages in all eight districts of Marathwada (Bansode and Swaminathan 2019).

II Data and Methodology

This paper attempts to capture (a) the pattern of employment or occupations and (b) the availability of basic amenities for around 8000 villages of the Marathwada region with varying caste composition of the population. Specifically, we ask the following questions:

1) Do the male and female work participation rates or worker population ratios vary as the proportion of Scheduled Castes in the population rises?
2) Does the composition of the workforce change (in terms of share of cultivators and share of agricultural labourers) as the proportion of Scheduled Castes in the population rises?
3) Does the availability of basic amenities in respect of education, health, sanitation, transport, communication, and banking vary as the proportion of Scheduled Castes in the population rises?

The two major sources of data for this paper are the Primary Census abstract and the Village Directory of the Census of India 2011. The village has been taken as a unit of study for this analysis of data. Marathwada comprises the following eight districts: Nanded, Latur, Jalna, Parbhani, Osmanabad, Bid, Hingoli, and Aurangabad.

The population of each village is subdivided in to three groups: Scheduled Castes, Scheduled Tribes and Others. For our analysis, first, in each district, all uninhabited villages were excluded from the Census data files. Secondly, in order to focus attention on Scheduled Castes, we have tried to exclude Scheduled Tribe-dominated or Adivasi villages. So, villages with no Scheduled Castes but some Scheduled Tribes have been excluded. We also excluded villages with Scheduled Castes but where Scheduled Tribes comprised more than 50 per cent of the population. Lastly, we divided the selected villages in to fractile groups based on the share of Scheduled Castes in the total population.

To illustrate, as shown in Table 1, in Nanded district, there were a total of 1485 villages at the Census of 2011, of which 118 were un-inhabited villages. There were 54 villages with no Scheduled Castes, but some Scheduled Tribes, and there were 59 villages with Scheduled Castes but with Scheduled Tribes comprising more than 50 per cent of the population. The final list for Nanded district thus comprised 1372 villages (Bansode 2022).

Table 1: Methodology of Village Selection, Nanded District of Maharashtra, 2011

Village type	No. of Villages
Census villages	1603
Uninhabited villages	118
SC 0 ST>0	54
SC>0 ST>50	59
Selected villages	1372

Applying the same method, from 8529 Census villages, our analysisi is based on 7958 villages in the eight selected districts (Table 2).

Table 2: Selected Villages of Marathwada Region by District, 2011

District	Number of Villages	Selected Villages
Aurangabad	1356	1238
Bid	1368	1324
Hingoli	711	592
Jalna	967	948
Latur	948	909
Nanded	1603	1372
Osmanabad	733	717
Parbhani	843	810
Marathwada	8529	7958

III Definitions

The definitions of variables used, from the Census of India, are as follows.

Workers

The Census of India classifies the total workforce into four industrial categories, namely, cultivator (CL), agricultural labour (AL), other workers (OW), and those engaged in household industries (HI). Cultivators and Agricultural laboures together constitute the agricultural workforce. In the Census of India (2011), "agricultural labourer" is defined as one who works in another person's land for wages in money or in kind or for share. A "cultivator" is defined as a person engaged in the cultivation of land owned or held from the government or held from private persons or institutions for payment in money, kind, or share. Cultivation includes effective supervision or direction in cultivation. Work participation rate is defined as the ratio of total workers, both main and marginal workers, to the total population. Literacy rate is the proportion of literates or persons who can read or write in any language in the population above the age of seven.

Amenities

We have used data from the Village Directory of the Census of India 2011 pertaining to educational amenities, health facilities and other amenities (including sanitation, transport and communication and banking).

Education

In educational amenities, the Census covers all learning institutions from nursery school to degree colleges and professional courses medical, engineering colleges and management colleges, and disaggregates them in terms of government and private institutions. We have selected information for pre-primary to senior secondary schools.

Pre-primary Schools (PP): Pre-primary schools cover the following: nursery, kinder garden, pre-basic, and play schools.
Primary Schools (P): Primary schools refer to schools from Standard I to IV.
Middle School (M): Middle schools refer to schools from Standard IV to VII.
Secondary School (S): Secondary schools refer to schools from Standard VII to X.
Senior Secondary Schools (SS): Senior Secondary schools refer to schools for Standard XI and XII.

Health

The Census Village Directory provides information on health amenities in terms of number, distance or access and status (private or public). For further analysis, we have selected Community Health Centres (CHC), Primary Health Centres or Sub centres (PHC), Maternity and Child Welfare Centres, Tuberculosis (TB) clinics, Veterinary hospitals, and mobile health clinics.

Other Amenities

We have analysed data on the following other amenities: access to tap water, electricity; bank and credit facility comprising ATM, commercial bank, cooperative bank and agricultural credit societies; communication and transport facilities comprising post office, public bus, and private bus services; and miscellaneous amenities comprising ration shop, mandi or regular market, Anganwadi centre, and public library.

IV Results

For purpose of brevity, only results for Nanded district are reported in the paper. In 2006, the Ministry of Panchayati Raj named Nanded as one of the country's 250

most backward districts (out of a total of 640) (Bansode 2022). Where results for other districts differ substantially from those of Nanded, they are discussed in the text. The ratio of Scheduled Castes to total population in Nanded district was 19.5, higher than the ratio for the Marathwada region (16). Note also that 48 per cent of villages in Nanded district have a share of Scheduled Castes higher than the district average.

Work Participation Rate (WPR)

The work participation rate for males and females in villages of Nanded district, arranged in fractile groups based on share of SC population in total population is shown in Table 3. Tabulations for other districts of Marathwada are available on request.

Table 3: Male and Female Work Participation Rate (WPR), Villages Ranked by Proportion of SC Population, Nanded District, Maharashtra 2011

Fractile group based on SC to population ratio	Number of villages	Percentage of villages	Male WPR	Female WPR
0-5	217	15.8	56.0	48.2
5-10	127	9.3	56.7	46.3
10-15	155	11.3	56.2	42.5
15-20	209	15.2	56.1	45.0
20-25	225	16.4	56.3	44.1
25-30	164	12.0	56.4	43.9
30-35	131	9.5	55.5	44.4
35-40	59	4.3	55.7	46.6
40-45	42	3.1	56.2	44.8
45-50	21	1.5	55.1	45.1
50+	22	1.6	58.3	49.6
Total	1372	100.0	56.2	45.2

The data shows that there is not much variation in male work participation rate across villages in Nanded district with differing proportions of Scheduled Castes. A similar result was obtained for the other seven districts of Marathwada region. Although we expected a rise in work participation ratio for villages with a higher proportion of Scheduled Castes, this was not the case. However, some variation was observed in the case of female work participation rate. In Bid and Osmanabad districts, WPR for females was higher in villages with low SC population than villages with higher share of SC population.
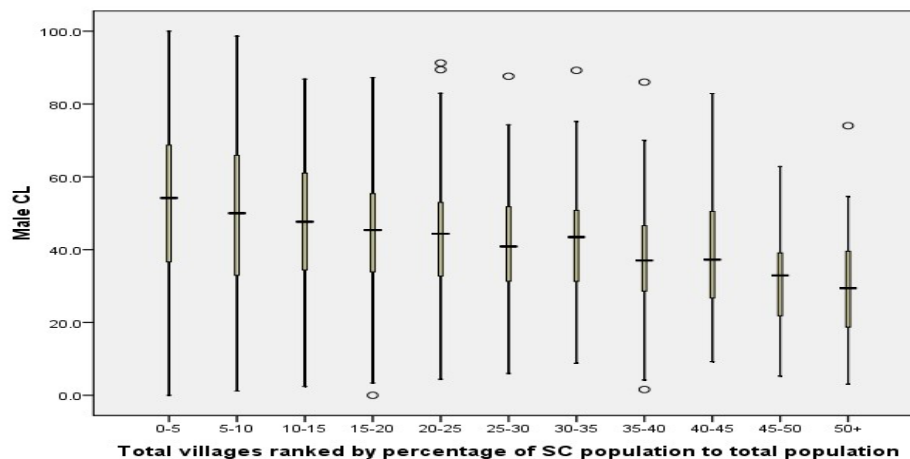
Cultivators

The variation in share of cultivators in total workers across villages is shown in Table 4 and Graphs 1 and 2 for males and females respectively.

There is a very systematic pattern in the data, with the share of cultivators in total workers declining steadily as we move from lower to higher fractile groups. Cultivators were 52 per cent of all male rural workers in villages with less than 5 per cent of SC population and less than 30 per cent in villages with SCs constituting over 30 per cent of the population. This difference is visually dramatic in a box plot (Graph 1).

Table 4: Proportion of Male and Female Cultivators to Total Main Workers (CLW), Villages Ranked by Share of SC Population Nanded, Maharashtra 2011

Fractile group based on SC to population ratio	Number of villages	Percentage of villages	Male CLW	Female CLW
0-5	217	15.8	52.2	41.3
5-10	127	9.3	49.1	38.9
10-15	155	11.3	47.4	40.0
15-20	209	15.2	44.9	36.9
20-25	225	16.4	43.7	32.9
25-30	164	12.0	41.9	32.5
30-35	131	9.5	41.8	31.3
35-40	59	4.3	37.8	27.4
40-45	42	3.1	40.9	28.3
45-50	21	1.5	33.1	22.8
50+	22	1.6	28.8	21.8
Total	1372	100.0	45.0	35.3

Graph 1: Boxplot of Ratio of Male Cultivators to Total Main Workers, Villages of Nanded, Maharashtra 2011

A similar pattern is observed for female cultivators (Graph 2). Female cultivators comprised 41 per cent of the female main workers in villages with SC population less than five per cent; the figure fell to 22 per cent in SC-majority villages.

Graph 2: Boxplot of Ratio of Female Cultivators to Total Main Workers, Villages of Nanded, Maharashtra 2011

The patterns are similar in all the remaining seven districts of Marathwada region.

Agricultural Labour

As expected, the share of agricultural labour to total main workers (ALW) was lower in villages with a low proportion of SCs and higher in villages with a high proportion of SCs. This was true for males and females (Table 5) in Nanded and remaining seven districts.

Table 5: Proportion of Male and Female Agricultural Labourers (ALW) in Total Main Male Workers, Villages Ranked by Share of SC Population, Nanded, Maharashtra 2011

Fractile group based on SC to population ratio	Number of villages	Percentage of villages	Male ALW	Female ALW
0-5	217	15.8	37.5	50.5
5-10	127	9.3	38.0	51.9
10-15	155	11.3	37.4	51.2
15-20	209	15.2	40.9	54.6
20-25	225	16.4	41.8	58.1
25-30	164	12.0	44.1	58.1
30-35	131	9.5	44.6	58.9
35-40	59	4.3	49.6	61.2
40-45	42	3.1	45.9	62.0
45-50	21	1.5	55.8	69.9
50+	22	1.6	60.0	66.8
Total	1372	100	41.7	55.7

Graph 3: Boxplot of Ratio of Male Agricultural Labourer in Total Workers, Villages of Nanded, Maharashtra 2011
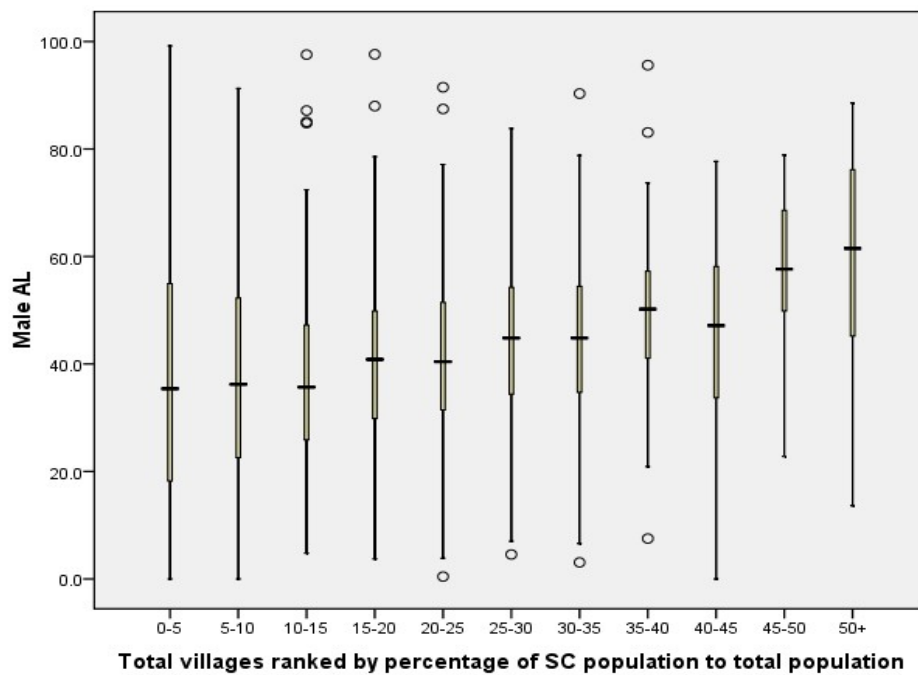
The data on agricultural labourers has findings of interest. First, in the Scheduled Caste majority villages, 60 per cent of male workers and 67 per cent of

female workers were classified as agricultural labourers. In short, agricultural labourers comprised the majority of male and female workers in villages with a high proportion of Scheduled Castes. Secondly, in every fractile group, the dependence of females on agricultural labour is higher than that of males, reflecting clearly more limited opportunities for women workers.

Graph 4: Boxplot of Ratio of Female Agricultural Labourers to Total Workers, Villages of Nanded District, Maharashtra, 2011
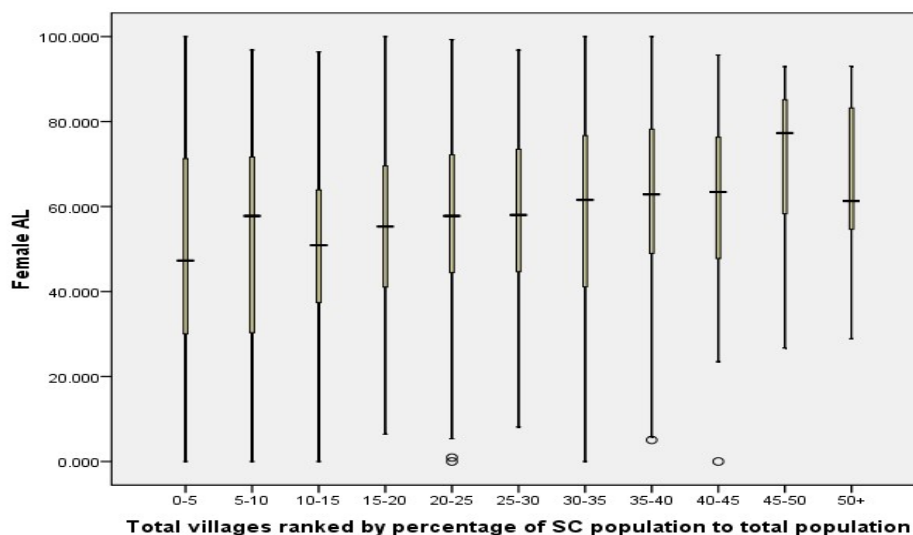
Non-Agricultural Workers

Lastly, we looked at the share of non-agricultural workers (NALW) in total workers (that is, those engaged in household industry or as other workers) across villages in the eight districts of Marathwada. The data for males and females is shown in Table 6.

While there was a clear difference in terms of share of cultivators and that of agricultural labourers across fractile groups, when added together, the share of the agricultural workforce was not significantly different across fractile groups. To put it another way, the share of non-agricultural workers was not only low but not very different across villages. This reflects the overall backwardness of the district and the predominance of agricultural activity. The results are similar for the remaining seven districts.

Table 6: Share of the Agricultural (AW) Non-Agricultural Workforce (NAW) in Total Main Workers by Population Group in the Villages of Nanded, Maharashtra, 2011

Fractile group based on SC to population ratio	Number of villages	Percentage of villages	AW	NAW
0-5	217	15.8	91.2	8.7
5-10	127	9.3	88.9	11.0
10-15	155	11.3	87.1	12.8
15-20	209	15.2	88.0	11.9
20-25	225	16.4	87.5	12.4
25-30	164	12.0	87.8	12.1
30-35	131	9.5	88.2	11.7
35-40	59	4.3	87.5	12.4
40-45	42	3.1	88.4	11.5
45-50	21	1.5	91.0	8.9
50+	22	1.6	89.5	10.4
Total	1372	100	88.5	11.4

Physical and Social Infrastructure

The availability of amenities is likely to be linked to the size of the village, with bigger villages having better infrastructure. Table 7 shows the population size of villages in different fractile groups.

Table 7: Average Size of the Population in Villages of Nanded District Ranked by Fractile Group of SC to Total Population in Numbers

Fractile group of population	Number of villages	Average size
0-5	217	846.5
05-10	127	1455.7
10-15	155	2003.0
15-20	209	2221.0
20-25	225	2071.6
25-30	164	1878.4
30-35	131	1526.7
35-40	59	1475.3
40-45	42	1240.2
45-50	21	1221.3
50+	22	775.0

In Nanded district, the larger villages (with 2000 or more people) are those where Scheduled Castes comprise 10 to 25 per cent of the population. As the proportion of Dalits rises above 25 per cent, the population size falls, on average. The smallest villages were the Dalit-majority villages. (The average population of

villages with more than 40 per cent Dalits was 1115). Note, however, that villages with less than five per cent of Dalits were also small villages.

The average size of villages varies in a similar way across fractile groups in the other seven districts too. In all the districts, the villages with 40 or 50 per cent of Dalits were the smallest though villages with less than five per cent of Dalits were also relatively small.

We have examined availability of units per village and not normalised with respect to population (schools per 1000 persons) as the village is a unit of residence and we want to locate infrastructure available at close proximity.

Schools and Infrastructure

How does educational infrastructure vary across villages? Given population size, we expect to find more infrastructure in the larger villages (with SC population constituting 10 to 25 per cent of total population), and this is the case. Nevertheless, what emerges is that as we move to higher grades of schooling, the availability of government schools falls as the share of SC population rises (Table 8). The availability of schools is poor even when compared to villages of a similar population size (that is, those with 0-5 per cent Scheduled Castes). Let us illustrate.

There was at least one middle school in villages where Dalits constituted 10 to 30 per cent of the population. In Dalit majority villages, the ratio was 0.27 implying that roughly one in four villages had a middle school. The ratio was 0.45 in the first fractile, indicating that there was one middle school for approximately two villages. When we move to Secondary and Senior Secondary schools, there were no such schools in villages where Dalits constituted more than 50 per cent of the population. The ratio was small but positive for villages in the first fractile.

The results were similar for remaining districts of the region, indicating that physical access to schooling is lower in villages with a high proportion of SCs in the Marathwada region.

Table 8: Government Schools Per Village in Nanded District for Villages Ranked in Fractile Group of SC to the Total Population in Per cent

School Type	0-5	05-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50+
Pre - Primary	1.97	2.47	2.98	3.16	2.98	2.84	2.50	2.51	2.36	2.19	2.09
Primary	1.20	1.55	1.72	1.86	1.64	1.62	1.34	1.42	1.31	1.33	1.18
Middle	0.45	0.87	1.15	1.21	1.20	1.05	0.86	0.90	0.71	0.71	0.27
Secondary	0.06	0.26	0.39	0.50	0.38	0.37	0.23	0.15	0.10	0.19	0.00
Senior Secondary	0.01	0.06	0.17	0.21	0.15	0.09	0.05	0.08	0.02	0.00	0.00
Number of villages	217	127	155	209	225	164	131	59	42	21	22

The availability of private schools was even lower in Dalit-majority villages (Table 9).

Table 9: Private Schools Per Village in Nanded District for Villages Ranked in Fractile Group of SC to the Total Population in Per cent

School Type	0-5	05-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50+
Pre -Primary	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Primary	0.01	0.04	0.07	0.08	0.12	0.03	0.03	0.00	0.02	0.00	0.00
Middle School	0.05	0.09	0.14	0.20	0.18	0.14	0.11	0.10	0.05	0.05	0.05
Secondary	0.01	0.02	0.06	0.12	0.09	0.05	0.05	0.00	0.00	0.05	0.00
Senior Secondary	0.00	0.03	0.05	0.06	0.04	0.04	0.00	0.00	0.00	0.05	0.00
Number of villages	217	127	155	209	225	164	131	59	42	21	22

Access to private schools in other districts of the Marathwada region was not very different. In Bid district, for example, there was no private school at any level in villages where Scheduled Castes comprised the majority.

Health Facilities

With the exception of PHC, all basic health amenities are absent in villages with SC comprising more than 45 per cent of the population (Table 10). The argument that smaller villages lack health amenities doesn't hold as similar size villages in the first fractile do better than villages in the last two fractiles. There was no Community Health Centre, Maternity and Child Welfare Centre, TB Clinic or Mobile Health Clinic in Dalit-majority villages. Even the Primary Health Centre was only located in 5 per cent of the villages in the last two fractiles, a lower proportion than in all the other fractile groups.

Table 10: Health Facility in Nanded District for Villages Ranked in Fractile Group of SC to the Total Population in Per cent

Health Amenities	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50+
Community Health Centre	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Primary Health Centre	0.11	0.31	0.35	0.44	0.41	0.39	0.21	0.19	0.12	0.14	0.05
Maternity & Child Welfare Centre	0.01	0.05	0.06	0.10	0.08	0.04	0.00	0.02	0.00	0.00	0.00
TB Clinic	0.01	0.05	0.06	0.10	0.08	0.04	0.00	0.02	0.00	0.00	0.00
Veterinary Hospital	0.04	0.06	0.10	0.18	0.11	0.12	0.05	0.07	0.05	0.00	0.00
Mobile Health Clinic	0.01	0.02	0.02	0.03	0.02	0.02	0.02	0.05	0.02	0.00	0.00
Number of villages	217	127	155	209	225	164	131	59	42	21	22

The overall context is important, as health infrastructure in the entire district is rather inadequate. There were, for example, only three Community Health Centres in the district.

Water and Electricity

We examined a few other amenities from the data in the Census of India Village Directory (Table 11). Access to clean drinking water is a basic need, and we calculated the share of villages with treated tap water in each population group. Only 36 per cent of Dalit-majority villages (the last fractile group) had treated tap water. This was the lowest proportion across fractile groups, and in all other fractile groups, the corresponding proportion was 70 per cent or more (except the first fractile group where it was 60 per cent).

Table 11: Selected Basic Amenities Per Village in Nanded District for Villages Ranked in Fractile Group of SC to the Total Population in Numbers and Per cent

Other Amenity	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50+
Tap Water treated	130	93	123	117	178	131	101	51	32	15	8
	0.60	0.73	0.79	0.56	0.79	0.80	0.77	0.86	0.76	0.71	0.36
Power supply for domestic use	217	127	155	209	225	164	131	59	42	21	22
	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Number of villages	217	127	155	209	225	164	131	59	42	21	22

All villages of the district, irrespective of population composition, reported availability of electricity. This does not, of course, tell us about the extent of use of electric power.

Similar results were found for the seven remaining districts of the Marathwada region.

Banking and Credit Facilities

The Census of India provides data on the availability of amenities including commercial banks, cooperative bank, and agricultural credit, ATM at the village level. There was no single ATM, and branch of commercial bank, and cooperative bank in any of the Dalit-majority villages or fractile (Table 12). The statistical exercise shows that one of the most widespread credit institutions in the rural Nanded district was the Agricultural Credit Society or PACS (Bansode and Swaminathan 2021). Even PACS were present in only 8 of the 22 Dalit-majority villages. If we consider access to any one banking facility, 36 per cent of Dalit majority villages had such access, a proportion lower than all other fractile groups but one.

Table 12: Banking and Credit Facilities Per Village in Nanded District for Villages Ranked in Fractile Group of SC to the Total Population in Numbers

Banks and Credit Societies	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50+
ATM	2	4	3	1	9	2	1	1	0	0	0
	0.01	0.03	0.02	0.00	0.04	0.01	0.01	0.02	0.00	0.00	0.00
Commercial Bank	3	9	13	24	22	8	5	3	2	1	0
	0.01	0.07	0.08	0.11	0.10	0.05	0.04	0.05	0.05	0.05	0.00
Cooperative Banks	5	12	29	44	40	24	10	7	3	1	0
	0.02	0.09	0.19	0.21	0.18	0.15	0.08	0.12	0.07	0.05	0.00
Agricultural Credit Society	51	59	97	144	151	96	74	34	17	7	8
	0.24	0.46	0.63	0.69	0.67	0.59	0.56	0.58	0.40	0.33	0.36
Anyone Credit Source	54	62	97	146	155	100	79	34	19	9	8
	0.25	0.49	0.63	0.70	0.69	0.61	0.60	0.58	0.45	0.43	0.36
Number of villages	217	127	155	209	225	164	131	59	42	21	22

Communication and Transport

Next, we investigate access to transport and communication facilities (Table 13). Public bus services are essential for low-income people and workers to travel within and beyond the district. As Dalit majority villages are depended more on the nearest villages, tehsil and district for the work, and education. There is only 82 per cent of Dalit-majority villages reported a public bus service (MSRTC), and none had a private bus service. And, only 5 out of 22 of these villages had a post office. Many Dalit majority villages could not receive postal code for the parcel. Dalit majority villages are depended to nearest village to receive any formal letters or any postal services.

Table 13: Communication and transport facility per village in Nanded district for villages ranked in Fractile group of SC to total population in numbers

Communication	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50+
Post office	57	66	105	154	139	107	41	26	10	7	5
	0.26	0.52	0.68	0.74	0.62	0.65	0.31	0.44	0.24	0.33	0.23
Public Bus Service	166	113	142	201	213	158	122	55	35	20	18
	0.76	0.89	0.92	0.96	0.95	0.96	0.93	0.93	0.83	0.95	0.82
Private Bus Service	1	6	12	20	24	12	8	3	0	2	0
	0.0*	0.05	0.08	0.10	0.11	0.07	0.06	0.05	0.00	0.10	0.00
Number of villages	217	127	155	209	225	164	131	59	42	21	22

Note: * The figure is 0.005.

Miscellaneous Infrastructure

Lastly, we explore the appearance of ration shops or Public Distribution System (the PDS), regular mandis or local markets, Anganwadi centres and public libraries in different villages (Table 14). Ration shops were in a large majority of villages in all fractile groups except the last (Dalit-majority villages). However, the Dalit-majority villages have to walk nearest village to collect the ration from the PDS shop. Discrimination is common to Dalits in nature at the market level transactions such as PDS, local market, and government hospitals (Thorat 2018). There was an Anganwadi centre in every village, the one success story in terms of social infrastructure. Given that the Dalit-majority villages are likely to have a relatively high dependency on the PDS, this is particularly worrisome. There was no public library in any of the Dalit majority villages nor was there a regular mandi/market.

Table 14: Miscellaneous Facility Per Village in Nanded District for Villages Ranked by in Fractile Group of SC to Total Population in Numbers

Miscellaneous	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50+
PDS shop	149	107	138	201	208	149	120	51	38	19	11
	0.69	0.84	0.89	0.96	0.92	0.91	0.92	0.86	0.90	0.90	0.50
Regular Market	0	2	7	20	10	6	1	0	0	0	0
	0.00	0.02	0.05	0.10	0.04	0.04	0.01	0.00	0.00	0.00	0.00
Anganwadi Centre	210	126	154	209	224	164	131	58	41	21	22
	0.97	0.99	0.99	1.00	1.00	1.00	1.00	0.98	0.98	1.00	1.00
Public Library	8	22	53	93	81	61	26	14	3	3	0
	0.04	0.17	0.34	0.44	0.36	0.37	0.20	0.24	0.07	0.14	0.00
Number of villages	217	127	155	209	225	164	131	59	42	21	22

V Conclusion

This paper anaylsed PCA and Village Directory of the Census of India for villages in eight districts of Marathwada region. The paper grouped villages by the share of SC in the total population and then examined occupational characteristics and acccess to basic social and economic amenities across these villages. The data shows a discriminatory pattern of occupation and infrastructure across all eight districts, and we reported data from Nanded district to illustrate the findings.

The first set of findings showed that the work participation rate did not seem to vary across villages differing in the strength of Scheduled Castes, but there remained a clear difference in occupational structure across villages. As we move to villages with a higher proportion of Scheduled Castes, the share of cultivators drops and that of agricultural workers rises. The traditional association between caste and occupation thus continues to prevail in these villages of Marathwada, and in villages with a higher proportion of Dalits, employment opportunities were largely as unskilled manual labour .

Secondly, in terms of a range of basic amenities and infrastructure, including schools, health facilities, banking, communication and transport, Dalit-majority villages were worse off than other villages (excluding wholly Adivasi or Scheduled Tribe villages). In a relatively backward region (Nanded district and the region of Marathwada as a whole) with poorly developed social and economic infrastructure, villages with a high proportion of Scheduled Castes lacked many basic amenities. This absolute and relative lack of amenities can affect many outcomes. When there is no secondary school within a village, for example, and in a region of poor transport, drop-outs among young girls may be expected.

To conclude, Dalit-majority villages have a propensity to be small villages in terms of population size. If the population size matter to form the social and economic infrastructure, then the Dalit-majority village likely exclude and under-served to social and economic progress. There is more matter of inability to form policies to address the question of Dalits-majority villages. The lag behind comes from the caste question that

Lastly, Dalit-majority villages tended to be relatively small villages in terms of population size. Suppose the size of the population becomes a key factor in the planning of social infrastructure. In that case, Dalit majority villages are likely to remain under-served with respect to social and physical infrastructure amenities. While addressing the lack of infrastructure in the district and region, priority attention must be paid to villages with a significant proportion of Scheduled Castes.

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Fiscal Performance and the FRBM Act: Special focus on Assam

Banalata Saikia

Objectives: *The primary objective of the study is to evaluate the fiscal efficacy of the North Eastern states, with a particular focus on Assam, a special category state, and to examine the effects of the FRBM Act on the state's performance for a time frame of 40 years, from 1980–1981 to 2019–2020.* ***Methods:*** *The ordinary Least Square method has been used to examine the impact of the FRBM Act and other fiscal indicators on fiscal deficit. Further, trend Analysis has been employed to check the growth performance of the North Eastern states of India.* ***Findings:*** *The state of Assam is performing better than the majority of the other North Eastern states in terms of deficit indicators, while for the other fiscal indicators, the state's performance is not up to the mark. Further, the trend analysis and regression analysis results demonstrate that the state of Assam has had a beneficial and statistically significant impact of the FRBM Act.* ***Novelty:*** *The present study tries to analyse the fiscal performance of the North Eastern states with a special focus on Assam, which has not been covered by existing literature. As the state of Assam is fiscally prudent after the FRBM Act, this will be beneficial for the state with a goal-oriented and time-bound framework with adequate transparency and monitoring mechanisms, may encourage growth and prosperity.*

Keywords: Chow test; Fiscal efficacy; North eastern states; Trend analysis

I Introduction

Fiscal responsibility legislation has developed into an important mechanism for enhancing fiscal administration and guaranteeing fiscal discipline. This is especially true in federal countries, whose subnational administrations actively engage in fiscal indiscipline (Borkakati and Singh 2021). Due to the fact that India is constituted in a federal system, the country's overall fiscal performance is heavily dependent on the fiscal performance of its states. If state governments strengthened their financial management and became more prudent, faster economic expansion might lead to a broader economic base (Sinha and Ganguli 2019). To safeguard the economic and social environment of the nation as a whole, it is crucial to reduce the interstate disparities that currently exist between the states. The Planning Commission and the Finance Commission work to facilitate

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this goal by redistributing resources from the central government to indulge the fulfillment of the several states. The fiscal system, which includes the allocation of expenditures, management of debt, and generation of revenue, needs to be constantly monitored to ensure fiscal discipline and ensure that the macroeconomy is well balanced (Sarma 2018). As a result, the Government of India is implementing into effect several fiscal reform incentive schemes, one of which is called the Fiscal Responsibility and Budget Management Act (FRBMA), implemented in 2003, with the intention of preserving fiscal balance across the state.

There are twenty-nine states in total, and eleven of those states, including Arunachal Pradesh, Assam, Himachal Pradesh, Jammu and Kashmir, Manipur, Meghalaya, Nagaland, Sikkim, Tripura, and Uttarakhand, are considered to be in a special category. These states were struggling with several issues, including a lack of capital and natural resources, a lack of physical and social infrastructure, and a low economic base. In addition, centuries of economic deprivation and geographic isolation from India's other regions had led to a high rate of unemployment, poverty, and economic backwardness. They were receiving grants and loans in the proportions of 90:10, respectively, to fulfill their demands for development, in contrast to the general category states, which were only receiving grants and loans in the ratio of 30:70. In addition, unlike General Category States, Special Category States do not have to adhere to any strict budget constraints. This is because the central transfer is significantly higher, and these states also enjoy the marked benefit of debt relief and debt swapping after the enactment of the FRBM Act. However, after the 14th Finance Commission recommendations and the Planning Commission's abolition, there is no categorization of states into General and Special categories, and the central funding pattern is reduced and restructured. However, these states continued to receive fewer benefits than other states, which were continued after the 14th Finance Commission recommendations (Bhattacharjee 2018). As a result, it is of the most crucial importance to analyze the economic efficacy of the policies implemented by the various governments and to do so using a standard measurement system. This would show where they stand with respect to one another as well as the broad category of states.

Several studies have examined how the FRBM Act affects federal and state fiscal performance. Most research is theoretical and focuses on all states or major states of India. Singh, Prasad and Sharma (2017) remark that the FRBMA, 2003 outlines fiscal guidelines to encourage Central Government fiscal discipline and create a stabilized budget with revenue efficiency management. By using the Ordinary Least Squares technique from 1980-1981 to 2008-2009, Sucharita and Sethi (2011) studied how the FRBM Act restored fiscal sustainability in India and identified the main reasons for fiscal imbalance. The FRBM Act does not affect the ratio of gross fiscal deficit to GDP. Nonetheless, the GDP growth rate has negatively affected the ratio of gross fiscal deficit to GDP. Badaik (2017) evaluated how Fiscal Responsibility Legislation (FRL) affected state budgets in India between 2000-2001 and 2009-2010 using panel data for 28 states. Fixed-

effect and random-effect models yield regression coefficients. FRLs improve state performance. Singh (2015) examined the Finance Commission and Planning Commission funding of special category states by the Central Government. Dash (2011) evaluates Tripura's fiscal performance as a special category state from 1990-1991 to 2009-2010 after the FRBM Act was implemented. The analysis finds that the FRBM Act has improved the state's budgetary performance. Singh and Srinivasan (2006) examined how the intergovernmental transfer system and tax assignment affect governance, government spending, tax structure efficacy, fiscal well-being of various levels of government, and economic growth. Jacob and Chakraborty (2020) evaluate Karnataka's budgetary prudence from 2011-2012 to 2017-2018. By utilising various CAG Reports, NIPFP, and CSO databases, we can see fiscal factors like expenditures, revenue, debt management, and more. The author found that states have cut capital expenditures, education, social welfare, and nutrition, which hurts human growth. Chakraborty and Dash (2017) examine the fiscal rule's implications on India's 14 most populous states' fiscal balance from 2000-2001 to 2013-2014. The fiscal standard eliminated budgetary disparities in states, according to the research. The states also cut development spending to satisfy the fiscal rule's deficit target. Mukherjee (2019) examines how fiscal regulations affected the Indian state budget from 2001 to 2016. All states can reduce revenue and fiscal deficits post-FRBM, according to fiscal variables including income, spending, and debt.

Nonetheless, there is an urgent need for extensive research on the theoretical concerns and policy implications of the FRBM Act on the fiscal performance of NER states, all of which are categorised as Special Category. Several studies have been conducted regarding the fiscal performance of state government finances, as it pertains to the aforementioned central issue; however, the majority of these studies have focused on general category states or a specific state, whereas there have been relatively few studies focusing specifically on Assam as a Special Category State in comparison to the North Eastern states. As a result, the aim of this study is: to assess the fiscal efficiency of the state of Assam in its capacity as a special category state; and to investigate the results of the application of the FRBM Act for the state finance performance of Assam. The preceding situation in India has attracted the attention of both policy officials and researchers, who are now attempting to measure the fiscal performance across the states to learn more about the fiscal sustainability of those states.

The subsequent section of the present paper is organized in the following manner: The present section, namely the introduction, provides an overview of the study's background and objectives and presents a brief review of the existing literature. The second segment of the paper outlines the data sources and methodology employed, whereas the third section pertains to the results and subsequent discussion. The fourth section of the analysis pertains to the examination of the conclusion segment.

II Methodology

This paper exclusively relies on secondary data obtained from official government sources, such as the Handbook of Statistics on State Government Finances published by the RBI and the EPW Research Foundation. The research endeavour seeks to cover a duration of four decades, commencing from 1980-1981 and concluding in 2019-2020. The duration of the investigation is bifurcated into two distinct phases, namely Pre-FRBM (1980-1981 to 2004-2005) and Post-FRBM (2005-2006 to 2019-2020).

Trend Analysis

By examining the provisions and regulations implemented by the contemporary FRBM Act, its efficacy and suitability have been determined. To analyze the implications of the FRBM Act on fiscal measures and the performance trends of key fiscal indicators, such as Revenue Deficit (RD), Gross Fiscal Deficit (GFD), Primary Deficit (PD), Revenue expenditure (RE), capital expenditure (CE), Revenue Receipts (RR), Capital Receipts (CR), States' Own Tax Revenue (SOTR), States' Own Non-Tax Revenue (SONTR), Revenue Expenditure (RE), Capital Expenditure (CE), Internal debt (ID), Outstanding Liabilities (OLS) and Central Grants (GRT) have been analyzed over time for all the NER states and it also analyzed for the state Assam before and after the FRBM Act. All of the reported indicators are expressed as a percentage of their associated Gross State Domestic Product (GSDP).

Ordinary Least Square (OLS) Approach

Further, the study employs Ordinary Least Square (OLS) to examine the effects of significant policy changes, such as the implementation of the FRBM Act, on the financial state of Assam over a period of time. Before performing regression analysis, it is essential to assess the stationarity of the data series. To achieve this, the Phillips-Perron (PP) test, introduced by Phillips and Perron in 1988, and the Augmented Dicky Fuller (ADF) test are commonly employed. Moreover, the Johansen cointegration test has been employed to investigate the long-run association among the variables.

Once the stationary characteristics of the indicators have been established, the OLS method is used to examine the impact of the FRBM Act for equation (1).

$$GFD_{it} = \alpha_o + \beta_1 Gr_{GSDP(it-1)} + \alpha_1 RE_{it} + \alpha_2 SOTR_{it} + \alpha_3 IND_{it} + \alpha_4 D_{FRBMit} + \varepsilon_{it} \quad ...(1)$$

Where GFD shows the percentage share of fiscal deficit to GSDP; Gr_{GSDP} stands the GSDP growth rate; RE is the proportion of revenue expenditure to GSDP; SOTR is states' own tax revenue to GSDP ratio; IND is the ratio of internal debt

to GSDP; D_{FRBM} is the dummy of the FRBM Act (here, '0' stands before enactment and '1' after enactment) and ε is the stochastic term of the equation. The present equation is taken for analysis, after the diagnostic tests of autocorrelation and multicollinearity.

III Results and Discussion

Fiscal Performance of the North East India

The economic reform process in India has not achieved regional development equity (Ahluwalia 2002). For the period of both the pre-reform and post-reform eras, there was a substantial disparity in performance levels among the Indian states (Sachs, Bajpai, Ramiah, 2002). The reform process favours states that are already well-governed. Due to multiple impediments, such as less desirable social, economic, and political conditions, the backward states have never been capable of taking benefit of reform opportunities. In particular, Special Category States, which include all eight North Eastern states, were hampered in a variety of ways due to their limited resources, lack of infrastructure, and geographical location along international borders. Hence, their capability for revenue collection, expenditure management, and debt sustainability is compromised (Saikia, Roy & Shah, 2022). In the next section, trend analysis of the major fiscal indicators is discuss with respect to deficit, revenue generation, expenditure, and debt from 1980-1981 to 2019-2020.

Trends in Major Deficit Indicators: The North Eastern States

Table 1: Fiscal Performance of the North Eastern States: Deficit Indicators

Year	Variable	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura	NER	All States
1980 - 1981	GFD	--	-0.006	-0.024	-0.027	--	--	--	-0.038	-0.096	0.031
	RD	-0.012	--	-0.038	-0.143	-0.103	--	--	--	-0.152	-0.437
	PD	0.021	--	-0.013	-0.038	-0.031	--	--	--	-0.051	-0.133
1990 - 1991	GFD	0.088	0.086	0.079	--	--	--	0.210	0.553	0.094	0.090
	RD	-0.346	0.022	-0.191	-0.081	--	--	--	0.005	-0.591	0.027
	PD	0.035	0.047	0.019	0.044	--	--	--	0.115	0.260	0.051
2000 - 2001	GFD	0.187	0.334	0.284	11.811	0.678	0.187	0.558	14.469	0.257	0.429
	RD	-0.106	0.095	0.123	-0.060	6.079	0.000	-0.364	0.120	5.887	0.162
	PD	0.182	0.082	0.081	0.155	8.630	0.312	-0.103	0.275	9.613	0.108
2010 - 2011	GFD	0.145	0.484	0.192	8.726	0.276	0.317	0.140	10.271	0.226	-0.010
	RD	-1.603	-0.004	-1.146	-0.141	0.403	-0.721	-0.139	-0.452	-3.803	-0.004
	PD	-0.391	0.006	0.178	0.045	5.370	-0.071	0.129	-0.112	5.154	0.051
2019 - 2020	GFD	0.596	0.343	0.414	6.787	0.739	1.040	0.804	11.300	0.403	0.578
	RD	-1.496	0.053	-0.216	0.057	-1.131	0.111	0.671	-0.256	-2.207	-0.001
	PD	0.234	0.417	0.022	0.129	4.885	0.318	0.785	0.527	7.318	0.133

Note: '--'indicates data unavailability.

Source: Authors' Calculation based on State Finances : A Study of Budgets, RBI and EPWRF data series.

The trend of the principal deficit indicators of the eight North Eastern states is analyzed by evaluating their revenue deficit, fiscal deficit, and primary deficit as a ratio of GSDP (*Table 1*). The revenue deficit signifies the extent to which present receipts are insufficient to cover current revenue expenditures when it comes to borrowing for financing purposes. Conversely, the fiscal deficit can be derived from the deficiency of the government's total receipts to cover the total expenditure. The primary deficit is obtained by subtracting the fiscal deficit, representing the net inflow of borrowings, from the interest payments, which represent a net outflow of borrowed funds in the form of transfer payments.

During 1980-1981, only four NER state's data are available, and all of them show fiscal and revenue surplus as a percentage of GSDP. In case of primary deficit Manipur, Meghalaya, and Mizoram have primary surplus and the state of Arunachal Pradesh has deficit. However, NER states in total show surpluses in terms of all three deficit indicators, while all Indian states together in the year demonstrate revenue and primary surpluses and fiscal deficit of 0.031 per cent of GSDP. In period 1990-1991, all the NER states show fiscal deficit, so the total of NER (0.094) and all states together (0.90) also show deficit, which is slightly more for the NER states together. Similarly, in case of primary deficit as a percentage of GSDP ratio also shows that the individual NER states show deficit and they together have a higher percentage of deficit with 0.260 than the percentage amount of all states share (0.051). The entire states of NER and the states together, which is less than that of the all Indian states together, show fiscal deficit during 2000-01. In case of revenue deficit, only the states of Arunachal Pradesh, Mizoram, and Sikkim have shown revenue surplus, and all the states except for Sikkim, demonstrate primary deficit. Besides, the total NER has high percentage of deficit than the share that all combined states of India. Further, in the period 2010-2011, all the NER states show fiscal deficit, despite having revenue surpluses by all the states except for Mizoram. The surplus amount of NER together is almost four per cent of GSDP, which is four times more than that of all Indian states share. Furthermore, in the period 2019-2020, the states of NER show high fiscal and primary deficit to GSDP ratio and it is highest for the state of Tripura. The percentage share of fiscal deficit for the NER states together is 0.403, which is less than the share of all Indian states (0.578), while for the primary deficit, it is very high for the NER states together with almost seven times more than the share that all states have. In the same period, the states of Arunachal Pradesh, Mizoram, Manipur, Tripura, and all NER together have revenue surpluses. Thus, it is clear that the NER states' performance is quite good in terms of share of revenue deficit to GSDP, it might be either an increase in their own capacity or the fiscal assistance they were getting from the centre. However, the state of Assam has deficit in all three indicators over time except for the fiscal deficit in 1980-1981 and the revenue deficit in 2010-2011. Again in case of all Indian states, there is revenue surplus in all the periods except 1990-1991 and 2000-2001, inspite of the implementation of various fiscal rules through economic reforms during the period.

Trends in Tax Revenue Indicators: the North Eastern States

The primary factor in determining a state's ability to tax is its tax revenue. It can be calculated using the gross domestic product (GSDP), which is a proxy for a nation's tax base. Therefore, total revenue and the capital receipt share can be viewed as the main indications when analysing the revenue capacity of a specific state. Other critical indicators include the own non-tax revenue and own tax revenue to GSDP ratio. Also, for the NER states as Special Category States, central grants play a major role, so it is considered for the analysis. From *Table 2*, it is evident that all major indicators of state governments' revenue accounts show an increase in tax capacity for all states. The increasing share of all the revenue indicators is more for the NER states together than the share of all states of India together. Besides, in case of the states' own and non-tax revenue indicators, the share is less for the state of Manipur, but considering the revenue and capital receipt, the state shows high revenue generation. Besides, the central grant is also increasing for all the NER states till 2010-2011 but certainly falling during 2019-2020. However, for all the states, the rate of states' own tax and non-tax revenue fluctuates across the states over time. Thus, inter-state variation has been observed within the region in respect of various revenue-generating indicators. Also, variation in revenue indicators has been observed in the NER states and all Indian states together.

Table 2: Fiscal Performance of the North Eastern States: Government Revenue

Year	Variable	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura	NER	All States
1980 - 1981	RR	--	0.122	0.387	0.308	--	--	--	0.522	1.339	0.136
	CR	--	0.042	0.143	0.022	--	--	--	0.064	0.272	0.047
	SOTR	--	0.015	0.009	0.017	--	--	--	0.016	0.057	0.055
	SONTR	--	0.062	0.106	0.075	--	--	--	0.136	0.378	0.027
	GRT	--	0.022	0.247	0.191	--	--	--	0.319	0.779	0.022
1990 - 1991	RR	0.276	0.849	0.680	--	--	--	1.209	4.253	0.332	1.239
	CR	0.211	0.151	0.182	0.106	--	--	--	0.313	0.963	0.123
	SOTR	0.009	0.065	0.037	0.069	--	--	--	0.063	0.244	0.152
	SONTR	0.141	0.043	0.051	0.036	--	--	--	0.045	0.316	0.046
	GRT	0.805	0.092	0.521	0.420	--	--	--	0.720	2.557	0.063
2000 - 2001	RR	0.685	1.492	1.288	26.086	2.682	3.169	2.054	39.417	0.680	1.962
	CR	0.443	0.227	0.285	0.371	9.546	0.503	0.350	0.561	12.285	0.321
	SOTR	0.042	0.172	0.070	0.135	0.454	0.106	0.242	0.157	1.379	0.332
	SONTR	0.130	0.064	0.060	0.099	1.272	0.083	1.062	0.119	2.887	0.090
	GRT	1.553	0.245	1.129	0.868	21.606	2.336	1.602	1.482	30.820	0.109
2010 - 2011	RR	1.681	4.611	2.407	45.304	4.448	3.023	2.886	69.532	1.311	5.173
	CR	30.754	16.302	19.679	7.556	29.748	10.065	4.058	7.726	39.889	5.597
	SOTR	0.205	0.433	0.227	0.323	1.746	0.202	0.277	0.347	3.760	0.646

Year	Variable	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura	NER	All States
	SONTR	0.506	0.173	0.221	0.170	1.970	0.163	1.129	0.074	4.405	0.129
	GRT	3.775	0.492	3.322	1.407	33.657	3.469	1.096	1.838	49.058	0.229
2019 - 2020	RR	2.592	5.168	3.526	53.557	5.910	2.419	2.711	84.223	2.051	8.340
	CR	7.607	6.805	10.022	104.070	8.034	7.556	6.052	27.288	7.736	12.143
	SOTR	0.688	0.664	0.582	0.708	4.053	0.497	0.485	0.518	8.196	0.940
	SONTR	0.365	0.223	0.065	0.199	2.897	0.176	0.346	0.067	4.337	0.200
	GRT	2.252	0.832	2.564	1.042	29.873	3.549	0.441	1.088	41.640	0.411

Note: '--'indicates data unavailability.

Source: Authors' Calculation based on State Finances : A Study of Budgets, RBI and EPWRF data series.

Trends in Major Expenditure Indicators: the North Eastern States

The position of the NER states' revenue and capital expenditure expressed in proportion to GSDP is used to evaluate the trend of the main expenditure indicators. *Table 3* demonstrates that all the NER state's share of both revenue and capital expenditure to GSDP ratio is increasing over the period. Surprisingly, the expenditure ratio in revenue and capital account shows that the NER states together are very high than the share that all Indian states have together. As a result, the central government ought to praise them on their expenditure management while adhering to a deficit target. Besides, the state of Assam has fewer shares of revenue and capital expenditure, than the other NER states. The state of variation in revenue-generating indicators will lead to disparities in major expenditure heads of the states.

Table 3: Fiscal Performance of the North Eastern States: Government Expenditure

Year	Variable	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura	NER	All States
1980 - 1981	RE	--	0.083	0.248	0.205	--	--	--	0.368	0.905	0.124
	CE	--	0.093	0.308	0.144	--	--	--	0.237	0.782	0.066
1990 - 1991	RE	0.893	0.299	0.659	0.599	--	--	--	1.213	3.662	0.359
	CE	0.484	0.120	0.313	0.183	--	--	--	0.283	1.383	0.097
2000 - 2001	RE	1.857	0.779	1.616	1.229	32.189	2.682	2.803	2.174	45.329	0.841
	CE	0.609	0.147	0.357	0.391	8.378	0.784	0.676	0.503	11.845	0.152
2010 - 2011	RE	3.568	1.677	3.465	2.265	45.643	3.727	2.887	2.434	65.667	1.307
	CE	1.746	0.219	1.732	0.429	9.934	1.236	0.526	0.703	16.527	0.317
2019 - 2020	RE	6.844	2.645	4.953	3.583	52.424	6.021	3.090	3.296	82.857	2.145
	CE	2.358	0.670	0.881	0.525	9.626	1.015	0.575	0.394	16.045	0.540

Note: '--'indicates data unavailability.

Source: Authors' Calculation based on State Finances : A Study of Budgets, RBI and EPWRF data series.

Trends in Debt Indicators: The North Eastern States

Table 4: Fiscal Performance of the North Eastern States: Debt Indicators

Year	Variable	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura	NER	All States
1980 - 1981	OLS	--	0.171	0.273	0.103	--	--	--	0.241	0.787	0.202
	IND	--	0.022	0.094	0.044	--	--	--	0.097	0.258	0.037
1990 - 1991	OLS	0.969	0.675	0.841	0.420	--	--	--	1.261	4.167	0.641
	IND	0.097	0.076	0.296	0.069	--	--	--	0.334	0.873	0.096
2000 - 2001	OLS	1.510	1.242	2.671	1.579	43.308	3.030	3.130	2.989	59.458	1.737
	IND	0.217	0.497	0.857	0.515	15.181	1.445	1.425	0.919	21.057	0.523
2010 - 2011	OLS	3.349	1.934	5.282	2.451	62.558	5.248	2.430	3.400	86.653	2.564
	IND	1.698	1.308	2.650	1.406	25.104	3.585	1.647	1.854	39.251	1.677
2019 - 2020	OLS	6.792	2.955	5.517	4.615	49.912	7.159	3.974	4.479	85.404	4.111
	IND	3.527	2.115	3.388	3.110	20.639	4.650	2.650	2.717	42.796	3.023

Note: '--'indicates data unavailability.

Source: Authors' Calculation based on State Finances : A Study of Budgets, RBI and EPWRF data series.

The trend of crucial debt indicators for the NER states has been assessed using their outstanding liabilities, internal debt, and interest payments in proportion to GSDP. *Table 4* demonstrates that, in terms of debt indicators, viz., outstanding liabilities and internal debt have increased significantly among states over time. The ratio of internal debt and outstanding liabilities is increasing more for the state of Mizoram. Moreover, the ratio shared by all the NER states together is more than the ratio shared by all Indian states and it is very high during 2000-2001 to 2019-2020. Thus, it is clear that the NER states had more debt obligations than the other states, leading to a burden of debt in the future.

Fiscal Performance of Assam: Impact of FRBM

The state Assam is a Special Category State among the eleven states in this category. The Special Category States were largely constrained for their geographical, topographical, and socio-economic disadvantages. However, the fiscal performance of these states is not up to the level of General Category States (Saikia, Roy & Shah 2021). The Special Category States were also following the fiscal rules, that were implemented by the centre and other states of India. During 20005-06, the state of Assam implemented the FRBM Act for better management of state finances. In this section, an analysis of the major fiscal indicators trend has been shown during the Pre- and Post-FRBM period. *Table 5* shows that the fiscal deficit for the state increased, while the revenue deficit turned out as surplus during the Post-FRBM period. The primary deficit to GSDP ratio is also declining for the state than the Pre-FRBM era. The revenue receipts, capital receipts, states' own tax and non-tax revenue, and central grants are also increasing for the states during the Post-FRBM period. The increasing rate is more with respect to capital receipts,

states' own tax revenue, and central grants. Further, the ratio of both the revenue and capital expenditure share of GSDP increased after the implementation of the FRBM Act. The internal debt and outstanding liabilities are also increasing, which leads them into indebtedness. But, if the state uses the debt amount in a productive way, that may lead them toward a growing economy.

Table 5: FRBM Act's Impact: State Finance of Assam

Variables	Pre-FRBM	Post-FRBM
GFD	0.077	0.155
RD	0.017	-0.092
PD	0.015	0.010
RR	0.406	1.956
CR	0.223	10.247
SOTR	0.096	0.503
SONTR	0.047	0.192
GRT	0.152	0.587
RE	0.423	1.864
CE	0.120	0.335
OLS	0.757	2.096
IND	0.228	1.349

Source: Authors' Calculation based on State Finances : A Study of Budgets, RBI and EPWRF data series.

In this section, the growth trend of the fiscal indicators is analyzed over time, which will give a clear picture of the transition in the trends before and after the implementation of the FRBM Act for the state of Assam.

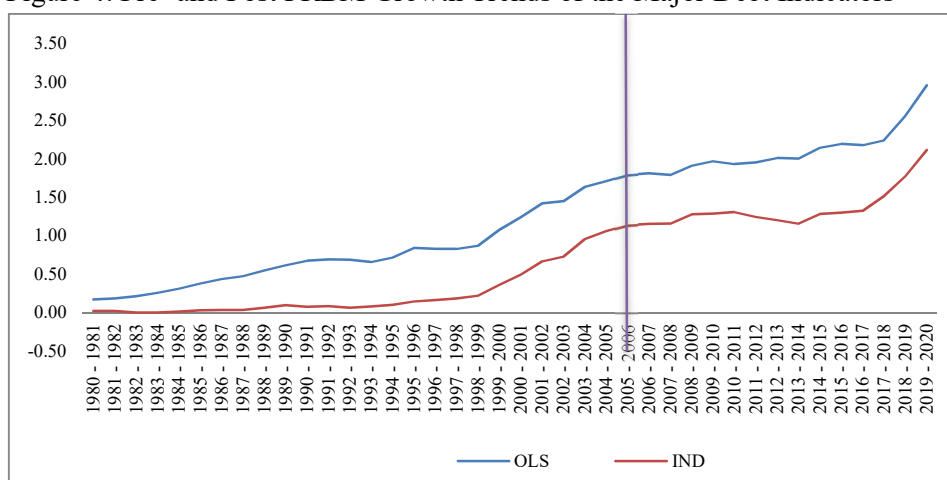Figure 1: Pre- and Post-FRBM Growth Trends of the Major Deficit Indicators
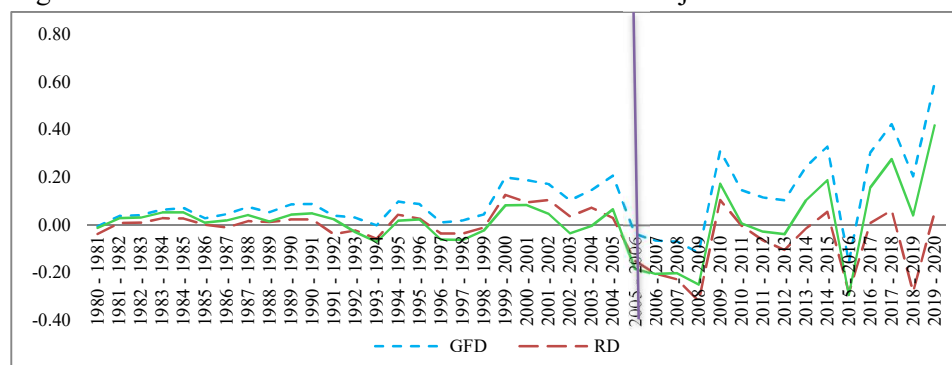
Source: Authors' Calculation based on State Finances : A Study of Budgets, RBI and EPWRF data series.

Figure 1 shows that, till 2005-2006 (the FRBM implementation year of the state), the trend of revenue fiscal and primary deficit to GSDP demonstrated less fluctuation. During, 2006-2007 to 2019-2020, the fluctuation of the ratio is more,

indicating that the FRBM Act failed to maintain the stability in deficit management. All three indicators follow a similar pattern of fluctuation over time but only revenue and primary account have surpluses in the years of 2008-2009 and 2015-2016. Again, in the year 2018-2019, the state had a revenue surplus, it might be due to increasing revenue generation through SGST (State Goods and Service Tax), for which the state gets around 50 per cent share of total revenue.

Figure 2: Pre- and Post-FRBM Growth Trends of the Major Revenue Indicators
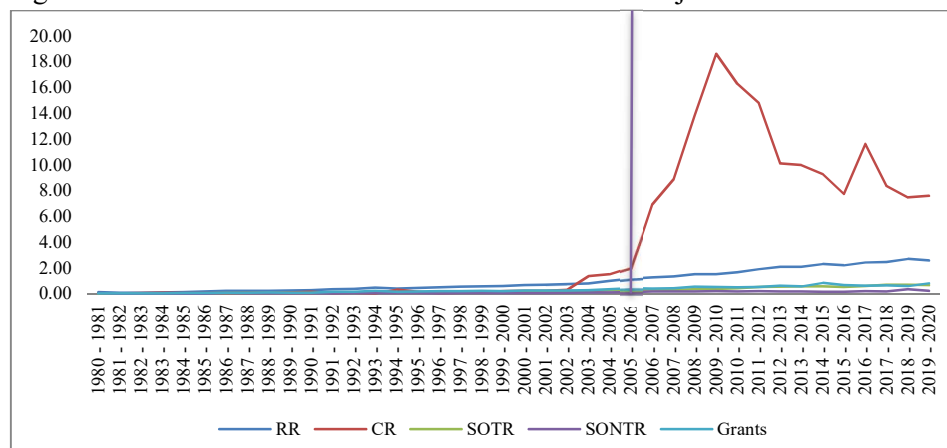
Source: Authors' Calculation based on State Finances : A Study of Budgets, RBI and EPWRF data series.

Figure 2 represents the trend of major revenue expenditure indicators over time. The trend line shows that all the indicators are increasing after the FRBM Act implementation, while the increasing rate is very high for capital receipts, due to receiving more internal debt amount. However, for the other indicators, the trend line follows almost similar growth over time. The state's own and non-tax revenue trend growth is very low for the state before and after the implementation of the FRBM Act. The capital and revenue expenditure is increasing with an increase in revenue and capital receipts. However, the increasing rate of revenue collection is less than the rate of revenue and capital expenditure, indicating that the state borrows more to cover the expenditure.

Figure 3: Pre- and Post-FRBM Growth Trends of the Major Expenditure Indicators
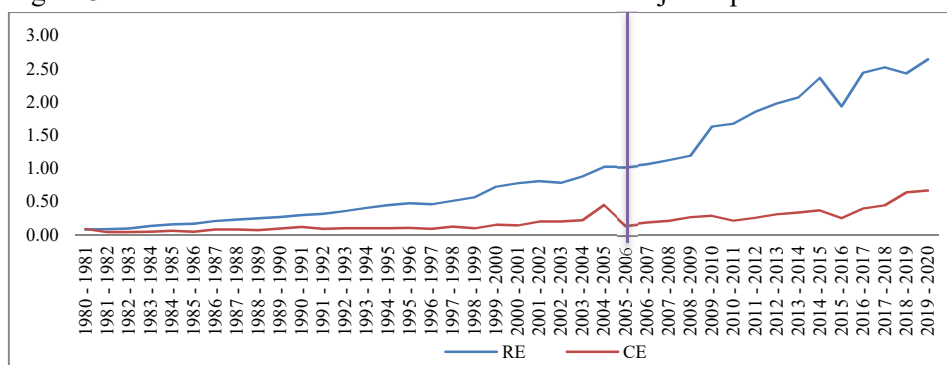
Source: Authors' Calculation based on State Finances : A Study of Budgets, RBI and EPWRF data series.

Figure 3 shows a growing trend, with respect to both revenue and capital expenditure and it is growing more over time with the variation in various deficit indicators as shown in *Figure 1*. The rate of increase is more during the Post-FRBM period. Therefore, it is clear that the state is able to utilize the revenue towards development needs. The variation in the revenue expenditure of the state is more than the capital expenditure after the FRBM Act implying larger extent of expansion in the economic and social services.

Figure 4: Pre- and Post FRBM Growth Trends of the Major Debt Indicators

Source: Authors' Calculation based on State Finances : A Study of Budgets, RBI and EPWRF data series.

Figure 4 demonstrates that there is a growing trend of outstanding liabilities and internal debt of the state over time. The growing rate is high for the outstanding liabilities. During 2019-2020, both trends reached the highest rate of outstanding liabilities (2.96) and internal debt (2.12). Thus, it is clear that both outstanding

liabilities and internal debt are increasing after the enactment of the FRBM Act, leading to more future indebtedness for the state.

The Response of the Fiscal Policy Function

In this section, the ordinary least squares is used to check the effect of FRBM Act implementation and the other fiscal indicators on the ratio of fiscal deficit to GSDP. Before choosing the ordinary least squares approach, the first step is to look into the time-series properties and long-run correlation (cointegration) among the variables over time.

Unit Root Test: Testing Stationarity

Before selecting the ordinary least squares method, an examination of the time-series attributes of the various variables was performed. These variables include the share of Fiscal deficit-GSDP, the rate of GSDP growth, FRBM dummy, Revenue Expenditure, states' own tax revenue, and internal debt as a proportion of GSDP. The ADF and PP tests were utilized in this investigation. The null hypothesis posits the presence of a unit root at the level in both cases, while the alternative hypothesis asserts the stationarity of the data series. The results obtained from both experiments indicate that all variables remain stable at their respective levels, as presented in *Table 6*.

Table 6: Estimates of Unit Root Tests

Variables	ADF-Test	PP-Test
	Level	Level
GFD	-4.652 ***	-4.780 ***
GR_{GSDP}	-4.908 ***	-4.949 ***
RE	-2.538 **	-2.547 **
SOTR	-6.002 **	-4.975 **
IND	-8.482 **	-8.527 **
D_{FRBM}	-6.106 **	-6.106 **

Note: *** and ** denote one and five per cent level of significance respectively.

Source: Authors' Calculation based on State Finances : A Study of Budgets, RBI and EPWRF data series.

Cointegration Test: Searching Long-run Co-Movement

Meanwhile, all the indicators were initiated to be I(0) in terms of both ADF and PP tests, the next step is an attempt to test the presence of long-run steadiness among the indicators, by using cointegration tests. In this regard, the Johansen cointegration test has been used, where the null hypothesis posits the absence of cointegration, while the alternative hypothesis posits the presence of cointegration throughout the series. The results of the test statistics reveal evidence of

cointegration, indicating a co-movement between the variables over time (Table 7).

Table 7: Estimates of Panel Cointegration Tests

Linear deterministic trend
Series: GFD Gr_{GSDP} RE SOTR IND D_{FRBM}

No. of CE	Eigenvalue	Trace Statistic	Critical Value	Prob.**
None*	0.790	154.872	95.753	0.000
At most 1*	0.664	95.422	69.818	0.000
At most 2*	0.420	53.879	47.856	0.012
At most 3*	0.351	33.117	29.797	0.020
At most 4*	0.268	16.642	15.494	0.033
At most 5*	0.117	4.750	3.841	0.029

Notes: Trace test indicates 6 cointegration eqn(s) at five per cent level; * denotes rejection of the hypothesis at five per cent level.
Source: Authors' Calculation based on State Finances : A Study of Budgets, RBI and EPWRF data series.

Table 8: Results of Ordinary Least Square

Dependent Variable GFD/GSDP				
Number of Observations = 40				
Regressors	Coeff.	Std. Error	t-stat.	Prob.
GR_{GSDP}	-0.567	0.435	-1.301	0.201
RE/RR	0.638	0.144	4.410 ***	0.000
SOTR/GSDP	-1.570	0.579	-2.712 ***	0.010
IND/GSDP	0.021	0.071	0.308	0.759
D_{FRBM}	-0.214	0.070	-3.066 ***	0.004
cons	-0.049	0.023	-2.123 **	0.040
R-squared	0.694			
Adjusted R-squared	0.649			
S. E. of regression	0.085			
Log-likelihood	44.821			
F-statistic	15.438			
Prob (F-statistic)	0.000			
Mean dependent var	0.106			
S.D. dependent var	0.144			
Akaike info criterion	-1.941			
Jarque Berra		4.486 Prob. 0.106		
Breusch Pagan Test		0.830 Prob. 0.537		
Breusch-Godfrey Serial Correlation LM Test:		1.044 Prob. 0.363		

Note: *** and ** indicates one and five per cent significance levels, respectively.
Source: Authors' Calculation based on State Finances : A Study of Budgets, RBI and EPWRF data series.

Further, the study utilized Ordinary Least Squares (OLS) to examine the effects of significant policy changes, such as the implementation of the FRBM Act, on the financial status of Assam over a period of time. Before analysis, the indicators were assessed for their stationarity and cointegration properties. According to *Table 8*, the OLS analysis indicates that the impact of the FRBM Act on the percentage of fiscal deficit-GSDP is statistically significant at a one per cent level for the state. The coefficient of the FRBM dummy variable is negative, indicating that the implementation of the FRBM Act had a favourable impact on the fiscal deficit of the state. The implementation of the FRBM Act has been observed to hold considerable importance in the management of fiscal deficits. The findings indicate that, at a significance level of one per cent, there is a positive correlation between revenue expenditure and GSDP for the state. It also observed that the state's own tax revenue has a notable and adverse effect on fiscal deficit. Specifically, a reduction of one per cent in states' own tax revenue to GSDP results in a corresponding increase of -1.570 per cent in the fiscal deficit.

IV Conclusion

The present study provides a comprehensive examination of the fiscal performance of the North Eastern Region (NER) states, with a particular emphasis on Assam, both before and following the implementation of the FRBM Act. The findings indicate that Assam's deficit and expenditure account performance is comparatively inferior to that of other NER states. The collective performance of the NER states was satisfactory across various fiscal indicators, with the exception of outstanding liabilities and internal debt. Following the implementation of the FRBM Act, most of the states in the NER region experienced a surplus in revenue and sustained revenue-generating activities; however, in terms of debt sustainability and fiscal deficit, the performance was not particularly satisfactory. The causes of the aforementioned situation may be attributed to the differential utilisation of central resources by states, with the majority of states effectively leveraging these resources in accordance with their capacity to achieve sustained fiscal stability, while a few states have failed to do so and are heavily dependent on central grants. The regression analysis reveals that the state of Assam experiences a statistically significant negative impact of the FRBM Act, resulting in a decrease in the ratio of fiscal deficit to GSDP, subsequent to its implementation. The potential negative impact of the 14th Finance Commission's recommendation to eliminate discretionary disbursements associated with Central grants, Centrally Sponsored schemes, and Special Plan Schemes on the state's future is a matter of concern.

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Appendix

Variable	Obs.	Std. Dev.	Min	Max
GFD	40	.106	-0.157	0.595
GSDP	40	.043	-0.050	0.156
SOTR	40	.248	0.015	0.703
RE	40	.963	0.083	2.645
IND	40	.648	-0.008	2.115
D_{FRBM}	40	.375	0	1

Does Intraday Bitcoin Market Anomalies Have Geographical Nexus? Discussion and Future Research

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This paper provides evidence for differential behaviour of market participants in trading differently at different intervals of the day by examining intraday anomalies in Bitcoin. One-minute interval prices of Bitcoin from January 2021 to June 2022 were collected and used heatmaps and student's t-tests for the analysis. Short-run intraday anomalies are found during some hours of both Bitcoin exchanges. These anomalies have casual geographical nexus to stock market timings of US, Canada, India, China, Saudi Arabia, and Netherlands. As far as the authors are concerned, this study gives conclusive evidence for short-run intraday anomalies in Bitcoin markets and its geographical nexuses.

Keywords: Intraday anomaly, Bitcoin, Cryptocurrency, Informational inefficiency, Abnormal returns, Time-of-the-day effect

I Introduction

Cryptocurrency has become a buzzword among financial market participants during the last decade. The expeditious growth of cryptocurrencies has captured the attention of investors to speculators. The introduction of Bitcoin, the first cryptocurrency, has led to the sprouting up of several other coins later which are popularly referred to as altcoins. Presently, cryptocurrencies hold an overall market capitalisation of more than a trillion dollars (Coinmarketcap.com 2023). Empirical research on cryptocurrencies is on the rise marking approximately, a twenty per cent increase in the number of publications in 2022 compared to the previous year (based on the number of publications from Scopus). Being a 24/7 highly volatile market, studies have advanced in the area of informational efficiency, volatility connectedness, herding behaviour of investors, safe haven properties of cryptocurrencies, etc. (Ballis and Verousis 2022, Bouri, Gupta and Raubaud 2019, Dumrongwong 2021, Duc Huynh, Burggraf and& Wang, 2020, Hussain Shahzad, *et. al.* 2020, Kumar, *et. al.* 2022, Shahzad, *et. al.* 2019, Shahzad,

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et. al. 2021, Urquhart 2016). Whether cryptocurrencies can be considered as a financial asset? Whether its markets are efficient? What about its price dynamics? and so on are still long pending research questions that need conclusive evidence.

Out of all the cryptocurrencies, Bitcoin still holds the first mover advantage. Holding a substantial part of market capitalisation, Bitcoin has attracted people to confidently invest and trade. Abnormal gains in the Bitcoin market were found common during its initial years (Urquhart 2016, Vidal-Tomás and Ibañez 2018, Aharon and Qadan 2019). Later, at least a 'weak form of efficiency' is occasionally reported in the Bitcoin market (Nataraj and Chu 2017, Tiwari, *et. al.* 2018, Dumrongwong 2021). Contradicting to the theory of market efficiency, price anomalies have also been analysed by Aharon and Qadan (2019), Caporale and Plastun (2019 a,b), Ma and Tanisaki (2019), Kellner and Maltritz (2022), and many others.

More often, their analyses were made based on the daily closing prices of Bitcoin. These are low-frequency data which are not useful for examining intraday dynamics. On the other hand, high-frequency data, i.e., prices recorded at every one minute, every ten minutes and so on available for the Bitcoin market offers scope for intraday dynamics (Vidal- Tomás 2022a). These tick-by-tick data are highly reliable and show the absolute characteristics of the data compared to low-frequency data. The higher the number of observations, the more accurate the estimators and more precision can be ensured (Gencay, *et. al.* 2001, Mallinger-Dogan and Szigety 2014). A study by Bariviera and Merendiz -Zola (2021), stated that a lion's share of research in cryptocurrency has used daily data for their analysis. Only 12 per cent the of studies have considered intraday data like one-minute, five-minute, ten-minute, hourly prices, etc. Therefore, simply a few studies have explored the advantages of high-frequency data and their findings regarding the presence or absence of intraday anomalies are not decisive (Baur, *et. al.* 2019, Eross, *et. al.* 2019, Wang, Liu and Hsu 2020). A consistent finding is yet to be added to the literature. In this paper, we re-examine whether intraday anomalies are really present in the Bitcoin market and establish some nexus to the timing of those anomalies in terms of stock market timings across the globe.

The structure of the rest of the paper is organised as follows. The second section represents an overview of the literature related to price anomalies in the Bitcoin market. The third section describes the sample and methodology used for the analysis of the study. Later, section four explains the empirical analysis followed by a discussion of the empirical results obtained. Finally, the last section provides the concluding remarks.

II Review of Literature

The Efficient Market Hypothesis (EMH) by Fama (1970), one of the pioneering works in market efficiency, had been tested and retested several times by numerous researchers in varied global contexts like stock markets (Narayan, Liu and Westerlund, 2016, Rizvi SAR, *et. al.* 2014, Wang, *et. al.* 2010), commodity

markets (Kristoufek and Vosvrda 2014, Kumar and Pandey 2013) and currency markets (Kang 2019, Phiri 2022). With the advent of cryptocurrencies, the informational efficiency of cryptos was also examined using the same methodology for market efficiency as in the case of stock, commodity and currency markets (Ajith and Kumari 2022, Dumrongwong 2021, Tiwari, *et. al.* 2017, Urquhart 2016). Urquhart (2016) empirically tested informational efficiency in 2013 and confirmed inefficiency in the Bitcoin market. His works later found weak form of efficiency during later periods (2013-2016). Later, Tiwari, *et. al.* (2017), Nadarajah and Chu (2017), and Dumrongwong (2021) found that the Bitcoin market appears to be often efficient. Noticeably, Vidal-Tomás and Ibañez (2018) found no evidence for semi strong form of efficiency in the Bitcoin markets while examining the influence of Bitcoin on external information.

Even though the EMH theory assumes the rationality of market participants, there are numerous evidence for the irrational behaviour of market participants (Daniel and Titman 1999, Ko and (James) Huang 2007, Lin, Tsai,& Lung. 2013, Vasileiou 2017). Anomalies in the prices occur when market participants behave irrationally (Khresna Brahmana, Hooy and Ahamad 2012, Brav, *et. al.* 2002, Lawrence, McCabe and Prakash 2007). Calendar anomaly is one of the price anomalies that refers to the existence of a particular pattern in the prices of financial assets during any specific period that can be designated as 'time-of-the-day', 'day-of-the-week', 'month-of-the-year' and so on. Several stock market studies across the globe have reported these kinds of patterns existing in stock market data which is contrary to EMH (Basher and Sadorsky 2006, Plastun, *et. al.* 2020, Raj and Kumari 2006).

Research addressing calendar anomalies in cryptocurrencies has risen recently. The day of the week and volatility of Bitcoin prices were examined by Aharon and Qadan (2019) who found that high returns and volatility exist on Mondays. Similarly, Ma and Tanisaki (2019), observed significantly different patterns in crypto price volatility on Mondays as well as on Thursdays. Caporale and Plastun (2019b) identified a significant pattern in the returns of Bitcoin on Mondays. Later, Kinateder and Papavassiliou (2021) documented that there is no evidence of the conventional day-of-the-week patterns in Bitcoin returns during the period 2013-2019. Again, Kaiser (2019) examined the patterns in the cryptocurrency market and found no consistent evidence for patterns in the crypto markets except some confirmations for the Monday effect in the Bitcoin market. Subsequently, Dumrongwong (2021) made an analysis using the daily returns of five major cryptocurrencies and didn't find any specific patterns in the cryptos, except for Ethereum and Litecoin. However, Kumar (2022) found the turn-of-the-month (TOM) effect in Bitcoin, Ethereum and Litecoin. He also added that the returns at TOM were positive, and they are significantly higher compared to non-TOM returns. Unlike the previous studies on calendar anomalies, he identified that Bitcoin is more consistent with the assumptions of a weakly efficient market, confirming the conclusion of Urquhart (2016).

In addition, asset prices can display intraday anomalies during the trading session, a phenomenon commonly known as intraday anomalies. Substantial research has identified numerous instances of such anomalies. Notable intraday anomalies discussed in previous literature include half-of-the-day effects, last-hour and first-hour effects, as well as hour-of-the-day effects in the stock market (Bogousslavsky 2021, Caporale, *et. al.* 2016). Moreover, Caporale, *et. al.* (2016) reported that securities tend to experience upward movement in the first 45 minutes and the last 15 minutes of a trading day. In addition to the aforementioned anomalies, Khademalomoom and Narayan (2019) elucidated three other time-of-the-day effects in currency markets: the local market post-opening effect, major market activities effect, and market overlapping effects. The local market post-opening effect denotes the tendency for prices to depreciate during the post-opening hours in local markets. The major market activities effect refers to fluctuations in currency returns occurring during the opening and closing times of global markets. Finally, an anomaly observed during overlapping trading times between major markets is termed the overlapping times effect. This study focused on currency markets, and the results consistently supported these findings.

The literature recently addressed the intraday anomalies in Bitcoin returns using high-frequency data. Baur, *et. al.* (2019) analysed the price and volume of Bitcoin during the period from 2011 to 2017 and found no patterns among the different calendar effects studied by them. However, Eross, *et. al.* (2019) found intraday patterns in Bitcoin volumes traded, i.e., the volume of trade shoots up during afternoon periods of the day (UTC). Later, Wang, *et. al.* (2020) examined a sample of Bitcoin prices up to 2019 and found intraday patterns in volatility and volume of trade in Bitcoin. Followed by these studies, Bouri, *et. al.* (2021) made a study on 5-minute prices of Bitcoin and revealed an opportunity to predict intraday returns. They had eliminated Bitcoin prices during COVID-19, to avoid the possible effects of COVID-19. Also added that the predictability of Bitcoin is not strong enough.

The current literature is not conclusive about the efficiency or otherwise of the Bitcoin market. Some studies have identified anomalies and patterns in the volume as well as in the price volatility of the Bitcoin market. However, intraday anomalies addressed with high-frequency data like one-minute price data are rare. Therefore, our study aims to examine whether Bitcoin markets behave irrationally during any period in a trading day (intraday anomaly). Similarly, the study addresses a fresh query regarding the geographical nexus of the anomaly timings with stock market timings across the globe.

III Materials and Methods

Data

The USD (United States Dollar) prices of Bitcoin at one-minute intervals available with Bitcoincharts.com were used for the analysis. The crypto market being a 24-

hour market, the data on Bitcoin prices across the exchanges from hour 00 to hour 23 are collected. The data timestamps are as per Coordinated Universal Time (UTC).

Among five hundred-plus crypto exchanges around the world, the top two Bitcoin exchanges based on the volume of trade (Approx. 70 per cent), viz., Kraken and Bitstamp, were chosen to collect price data. In light of the research by Vidal-Tomás (2022b), highly liquid Bitcoin exchanges were selected to avoid problems related to the adequacy of data. The previous studies on bitcoin intraday patterns, especially the latest study by Bouri, *et. al.* (2021) considered data up to 2020 for detecting anomalies. Thus, we chose the sample period from January 2021 to June 2022.

The initial analysis aimed to divide the trading day into quarterly segments, driven by previous studies in both stock and currency markets that indicated differences in market behaviour during different hours of the day. Past research has shown that early trading hours often experience high market volatility (Bogousslavsky 2021, Kalev and Pham 2019, Ochiai, Takada and Nacher 2014). Furthermore, Ohta (2006) observed that price clustering is typically pronounced during market openings, gradually diminishes as trading progresses and exhibits a high magnitude again at the end of the day. Consequently, it is imperative to segment a trading day into logical subdivisions to derive meaningful findings.

For the analysis, a trading day (24 hours) is divided into four quarters of six hours each: Quarter 1 (Q1), Quarter 2 (Q2), Quarter 3 (Q3), and Quarter 4 (Q4). This division enables us to examine whether different quarters exhibit distinct behaviours, as each quarter encompasses different times of the trading day. Q1 comprises the initial six hours, from hour 00 to hour 05. Q2 spans from hour 06 to hour 11, Q3 covers hour 12 to hour 17, and Q4 encompasses the final hours, from hour 18 to hour 23. The summary statistics of the full sample and subsamples are shown in Table 1.

Table 1: Summary of the Data Set

Sample Period		01 January 2021 to 30 June 2022				
Sample		Full Sample (Q1 to Q4)	Subsample			
			Quarter 1 (Q1)	Quarter 2 (Q2)	Quarter 3 (Q3)	Quarter 4 (Q4)
Timestamp (UTC)		24 hours	Hour 00 to Hour 05	Hour 06 to Hour 11	Hour 12 to Hour 17	Hour 18 to Hour 23
No of observations	Kraken	784496	196200	196200	196200	195896
	Bitstamp	785160	196560	196560	195480	196560

Note(s): The table I shows the summary of the data collected from 01 January 2021 to 30 June 2022. The number of observations in the quarters is not equal due to some of the missing observations.

Tools for Analysis

The analysis was done using one-minute interval returns. The one-minute interval returns of Bitcoin were calculated by,

$$Rt = [Pt / (Pt-1)]-1*100 \qquad \qquad \ldots(1)$$

Where Rt is the return calculated, Pt stands for the closing price at time t, and P(t−1) is the closing price at time t-1.

Our study uses heatmaps to check the presence of intraday anomalies in the returns of Bitcoin using the colour variations in the heatmaps (Baur, *et. al.* 2019). Heatmaps contain different cells where each cell exhibits a corresponding numeric value, i.e., one-minute returns of Bitcoin. Heatmaps are graphical representations generally used to visualize the intensity of variables and anomalies in data. The deepness of the colour indicates the extreme values (either abnormally high or abnormally low) in the Bitcoin returns. The lighter the colour, the lesser will be the value and vice versa. (Lane, *et. al.* 2020).

Referring to the studies of Kaiser (2019) and Baur, *et. al.* (2019), we also used t-statistics to identify intraday patterns in Bitcoin. The t-statistics confirms the presence or absence of anomalies in the Bitcoin returns by comparing the hypothesized value and sample mean. The middle value of the sample is the hypothesised value considered for testing.

IV Empirical Analysis

Descriptive Statistics

The full sample covers the 24 hours in a trading day, and subsamples are four quarters of 6 hours each (Q1 to Q4). Table 2 and Table 3 report the descriptive statistics of the sample from the two exchanges, Kraken and Bitstamp.

Table 2: Descriptive Statistics of the Sample from Kraken

Kraken					
Sample	Full Sample	Subsample			
Hours	Q1 to Q4	Q1	Q2	Q3	Q4
Mean	7.60E-06	-3.21E-04	2.14E-04	-7.81E-06	2.31E-04
Median	2.70E-06	1.94E-05	3.04E-05	4.35E-05	1.67E-05
Std. Deviation	0.1186	0.1108	0.1118	0.1324	0.1180
Variance	0.014	0.012	0.013	0.018	0.014
Skewness	0.113	0.058	-0.697	0.248	0.653
Kurtosis	140.65	159.04	394.19	55.37	43.86
Minimum	-09.11	-06.64	-09.11	-03.78	-03.27
Maximum	08.07	06.67	08.07	05.21	04.93

Note(s): The table 2 presents the descriptive statistics of the sample collected from Kraken exchange from 01 January 2021 to 30 June 2022.

Table 3: Descriptive Statistics of the Sample from Bitstamp

Sample	Full Sample	Subsample			
Hours	Q1 to Q4	Q1	Q2	Q3	Q4
Mean	6.01E-05	-3.40E-04	2.03E-04	-9.18E-07	2.09E-04
Median	5.80E-06	9.08E-06	7.01E-06	-1.08E-04	2.80E-06
Std. Deviation	0.1250	0.1190	0.1156	0.1390	0.1251
Variance	0.016	0.014	0.013	0.019	0.016
Skewness	-0.004	0.202	0.245	0.084	-0.497
Kurtosis	54.83	81.70	30.17	40.53	67.59
Minimum	-06.90	-05.11	-03.41	-03.52	-06.90
Maximum	05.00	05.00	02.81	03.64	03.25

Note(s): Table 3 presents the descriptive statistics of the sample collected from Bitstamp exchange from 01 January 2021 to 30 June 2022

The mean and median of all the quarters are negligible as it is minute-wise returns. Therefore, the figures are represented in their standard form (exponential form), and tables with detailed figures were attached in the appendix for further reference (*see* Table A1 and Table A2). Kurtosis measure reveals that the data are leptokurtic.

Heatmap and Mean Test Results of the Full Sample

First, we plotted the log returns calculated from the full sample to heatmaps. Since the heatmaps drawn using one-minute price data were complex to display, the average return of 15-minutes time interval is plotted in the heatmap for managing a decent presentation. Heatmap identifies the relational magnitude of Bitcoin returns in terms of the colour of the heatmap, which varies from blue to ivory based on the magnitude of returns. The deep blue colour in the heatmap indicates higher returns and the lighter ivory colour indicates lower returns. Figures 1 and 2 show the heatmap of Bitcoin returns from Kraken and Bitstamp. Since 15 minutes' average returns are plotted, there are four data points in an hour. H00.00 minute in the heatmap represents the average return of the first fifteen minutes of each quarter. H00.15 minutes represents the average return of the next fifteen minutes and so on.

Figure 1: Heatmap of the Full Sample of Kraken
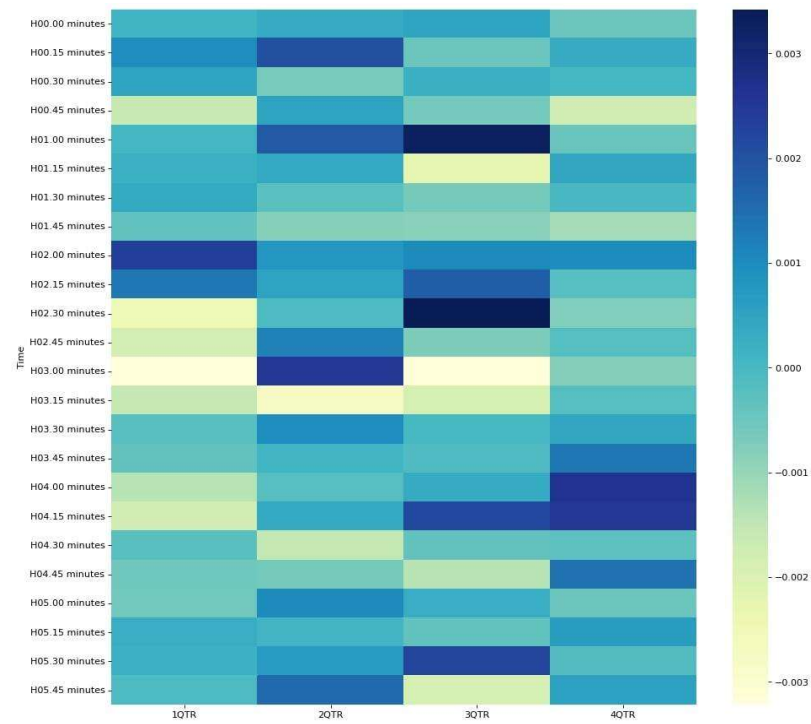
Figure 2: Heatmap of the Full Sample of Bitstamp
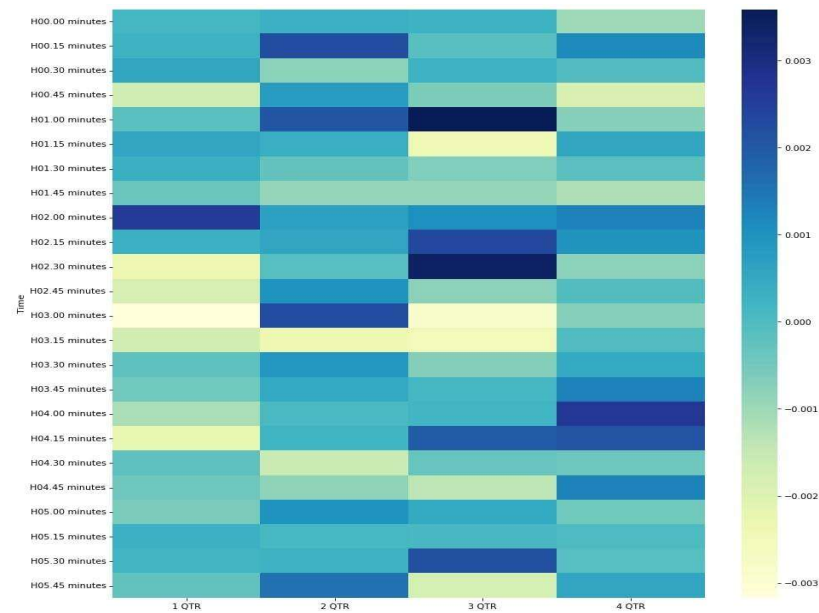
The heatmap of both the exchanges show similar patterns of returns throughout the full sample period. The intensity of colours in Figure 1 and 2 reveals that the highest value was observed in Q3, whereas Q1 holds the lowest value. There are no signs of anomalies within the quarters. The mean test conducted (*see* Table 4) comparing the mean of Bitcoin returns in each quarter with the middle value of returns in the respective quarters also confirms no anomaly as these values are not statistically different (p value > 0.00).

Table 4: Student's t-Test Results of the Full Sample

Exchange	Kraken				Bitstamp			
Quarters	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Mean	-0.0003	0.0002	-0.0000	0.0002	-0.0003	0.0002	-0.0000	0.0003
P- value	0.167	0.378	0.933	0.351	0.248	0.384	0.348	0.656
t statistic	-1.381	0.881	-0.085	0.932	-1.154	0.871	0.938	0.446

Note(s): The table 4 shows the t statistic and p-value of the student's t-test employed on the full sample taken from Kraken and Bitstamp exchanges.

Heatmap and Mean Test Results of Subsample

We further moved to check the presence of anomaly in each quarter based on hourly data in both the exchanges. Each quarter is consisting of six hours each and the heatmaps are drawn hour-wise based on the average return of every two minutes in each hour (see Figures 3 to 10).

Figure 3: Heatmap of Q1 of Kraken
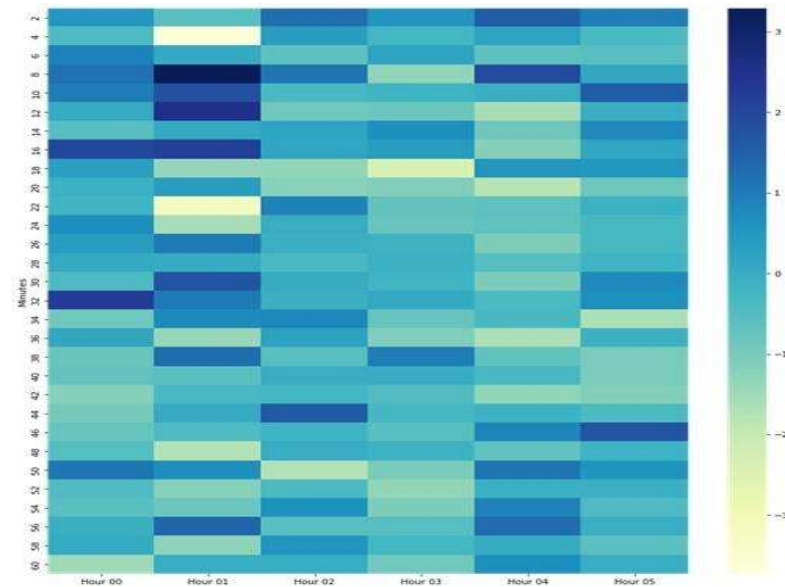
Figure 4: Heatmap of Q2 of Kraken
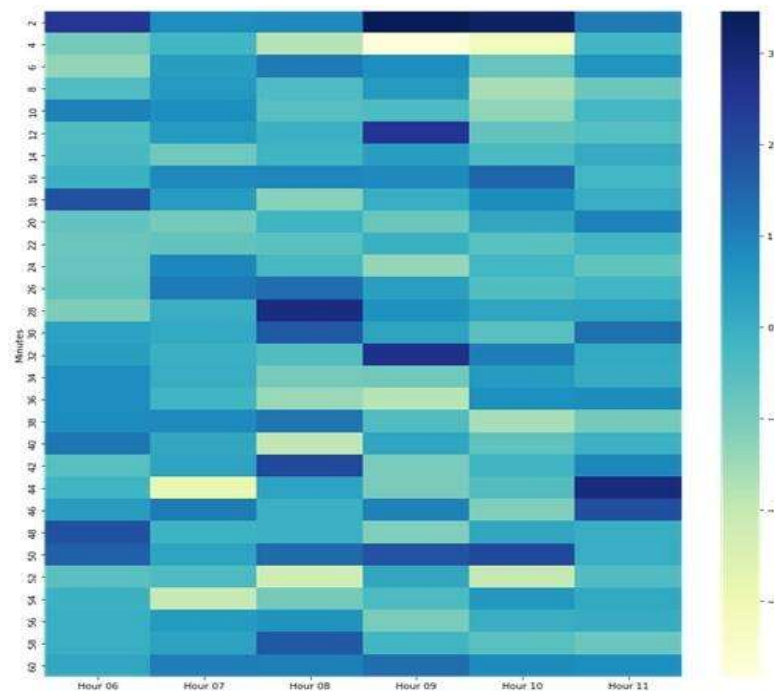
Figure 5: Heatmap of Q3 of Kraken
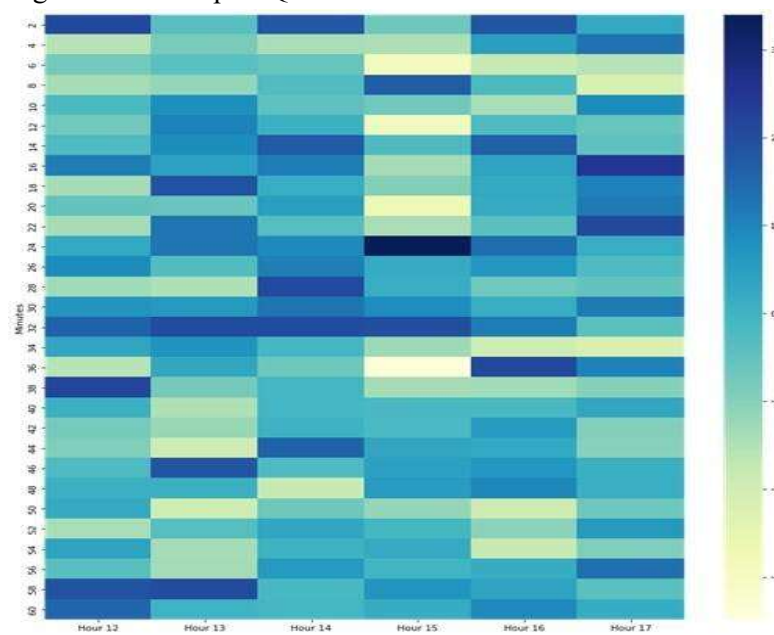
Figure 6: Heatmap of Q4 of Kraken
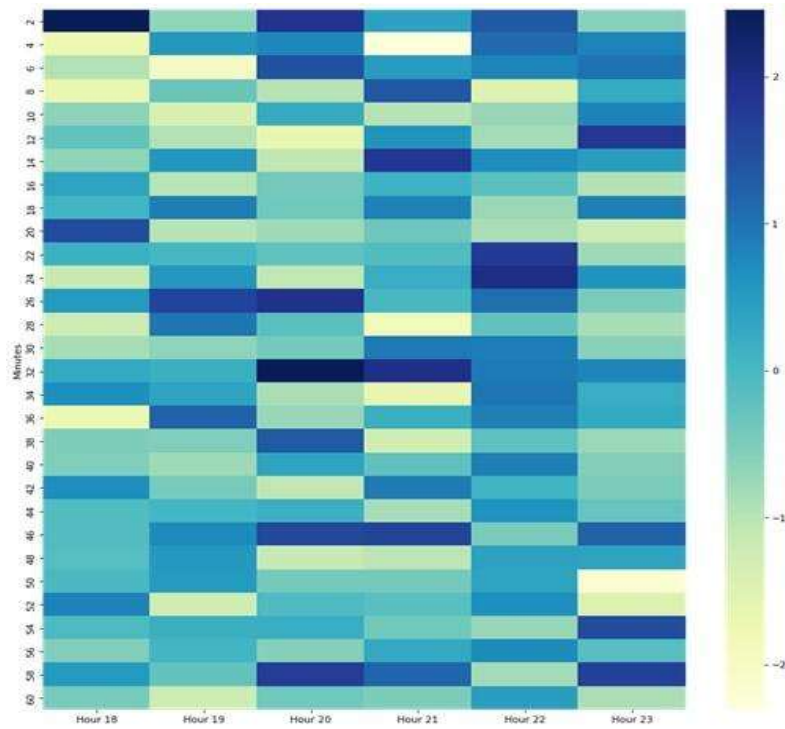
Figure 7: Heatmap of Q1 of Bitstamp
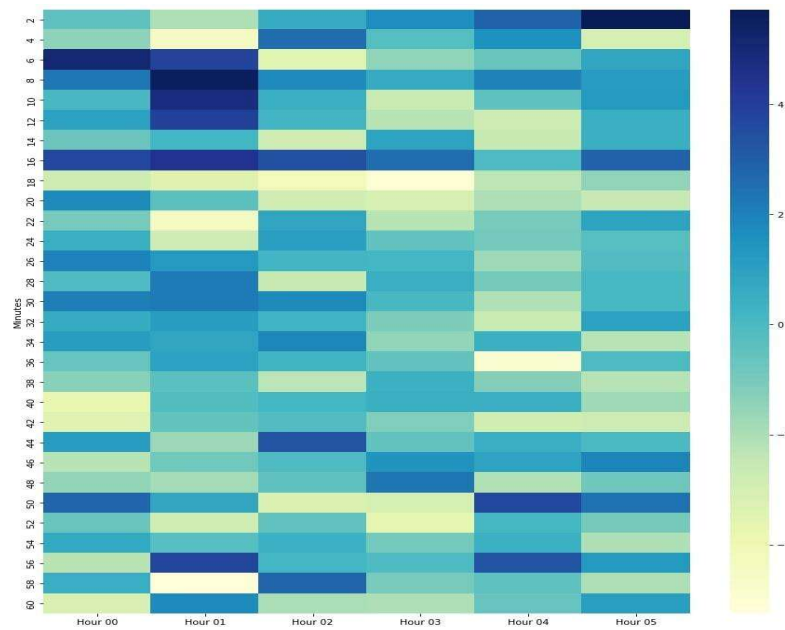
Figure 8: Heatmap of Q2 of Bitstamp
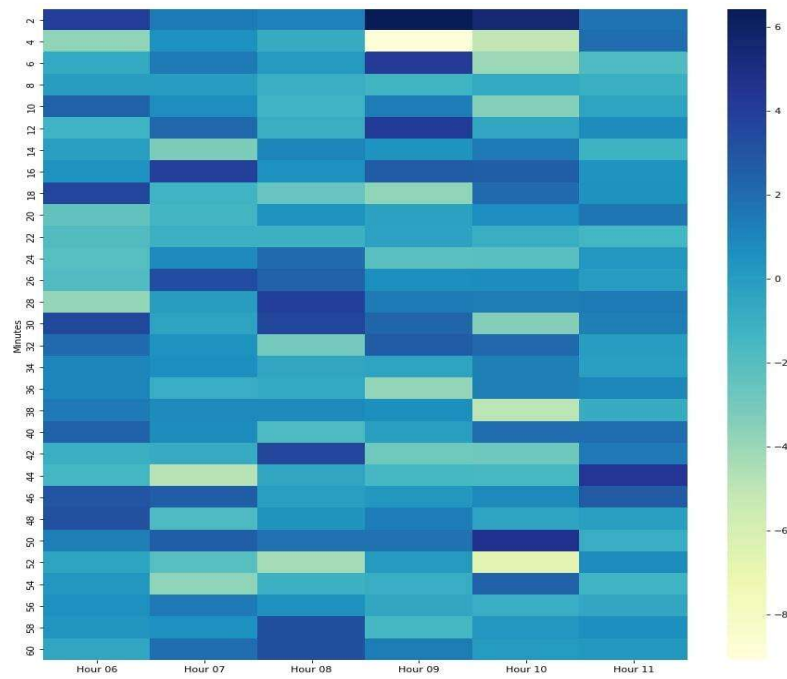
Figure 9: Heatmap of Q3 of Bitstamp
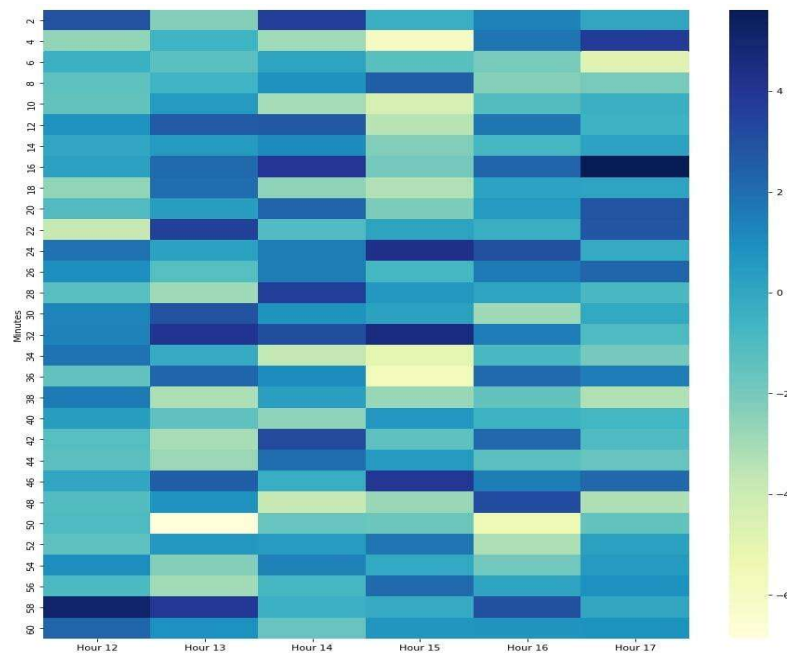
Figure 10: Heatmap of Q4 of Bitstamp
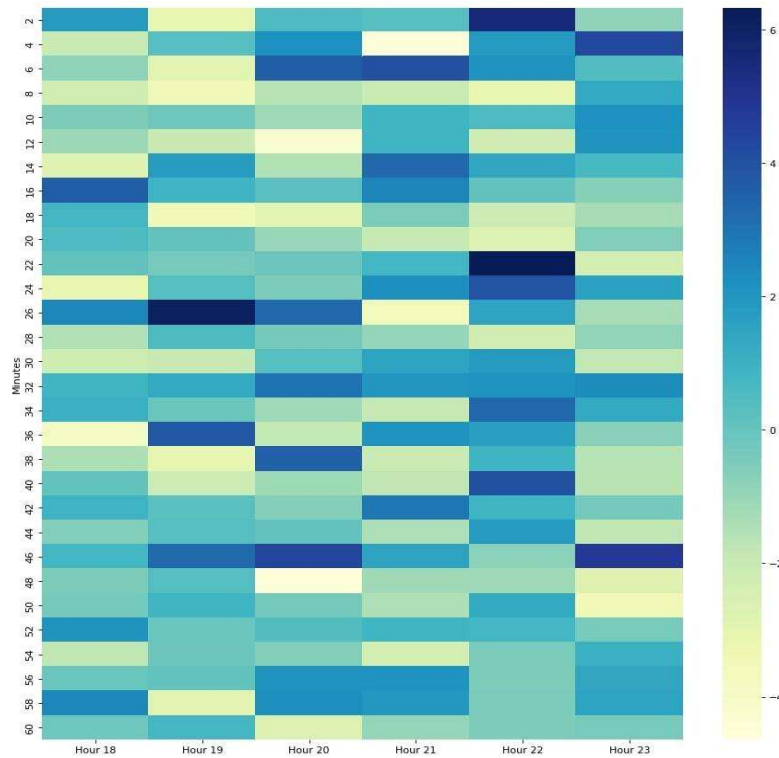
Out of Figures 3 to 6 (Kraken Q1 to Q4) anomaly is visible in the hour 3 (*see* Figure 4), hour 14 (*see* Figure 5), and 22 (*see* Figure 6). Similarly, Figures 7 to 10 (Bitstamp Q1 to Q4) show anomalies in hour 3 and hour 14. These observations from the heatmaps are further confirmed in the mean test run on the hourly returns (*see* Table 5).

Table 5: Student's t-Test Results for Q1, Q2, Q3 and Q4

Quarters	Hours	Exchange	P-value	Mean	t statistic
Q1	Hour 00	Kraken	0.782	-0.0001	-0.277
		Bitstamp	0.954	-0.0000	0.057
	Hour 01	Kraken	0.885	0.0001	0.144
		Bitstamp	0.923	0.0000	0.097
	Hour 02	Kraken	0.581	-0.0003	-0.552
		Bitstamp	0.818	-0.0002	-0.230
	Hour 03	Kraken	0.014 **	-0.0014	-2.467
		Bitstamp	0.027 **	-0.0013	-2.215
	Hour 04	Kraken	0.084 *	-0.0010	-1.725
		Bitstamp	0.125	-0.0010	-1.532

Quarters	Hours	Exchange	P-value	Mean	t statistic
	Hour 05	Kraken	0.877	0.0000	-0.155
		Bitstamp	0.953	0.0000	-0.058
Q2	Hour 6	Kraken	0.316	0.0006	1.003
		Bitstamp	0.348	0.0006	0.870
	Hour 7	Kraken	0.578	0.0003	0.556
		Bitstamp	0.618	0.0003	0.499
	Hour 8	Kraken	0.327	0.0005	0.981
		Bitstamp	0.316	0.0006	1.003
	Hour 9	Kraken	0.605	0.0003	0.517
		Bitstamp	0.766	0.0002	0.298
	Hour 10	Kraken	0.410	-0.0005	-0.824
		Bitstamp	0.468	-0.0005	-0726
	Hour 11	Kraken	0.237	0.0007	1.182
		Bitstamp	0.209	0.0008	1.257
Q3	Hour 12	Kraken	0.940	0.0000	-0.075
		Bitstamp	0.904	0.0000	-0.120
	Hour 13	Kraken	0.908	0.0000	-0.116
		Bitstamp	0.905	0.0000	-0.120
	Hour 14	Kraken	0.050 **	0.0015	1.963
		Bitstamp	0.088 *	0.0014	1.958
	Hour 15	Kraken	0.066 *	-0.0014	-1.836
		Bitstamp	0.389	-0.0013	-0.861
	Hour 16	Kraken	0.881	0.0001	0.149
		Bitstamp	0.775	0.0001	0.286
	Hour 17	Kraken	0.758	0.0002	0.308
		Bitstamp	0.363	0.0000	0.910
Q4	Hour 18	Kraken	0.498	-0.0004	-0.678
		Bitstamp	0.766	-0.0005	-0.297
	Hour 19	Kraken	0.558	-0.0004	-0.585
		Bitstamp	0.689	-0.0003	-0.400
	Hour 20	Kraken	0.584	0.0004	0.547
		Bitstamp	0.974	0.0000	-0.033
	Hour 21	Kraken	0.716	0.0002	0.364
		Bitstamp	0.795	0.0002	0.260
	Hour 22	Kraken	0.033 **	0.0014	2.138
		Bitstamp	0.257	0.0015	1.135
	Hour 23	Kraken	0.960	0.0000	0.05
		Bitstamp	0.835	0.0001	0.208

Note(s): The null hypothesis rejection is indicated by **at five per cent and *at 10 per cent level of significance.

V Discussion

The study examined the intraday anomaly in Bitcoin returns using one-minute price data collected from the Kraken and Bitstamp exchanges. The pioneering study by Baur, *et. al.* (2019) that examined intraday anomalies with high-frequency data of Bitcoin couldn't bring any conclusive finding regarding the presence of price anomaly in the market. However, the results of our research confirm short-run intraday anomalies in the Bitcoin market. The hourly analyses of Bitcoin return for the sample period witnessed abnormal returns during the 3rd and 14th hour (UTC) in both exchanges. Likewise, hours 4, 15 and 22 (UTC) are also showing anomalies in the Kraken exchange.

Following the results obtained, the study further sought the possibilities of geographical connections to the time when anomalies were identified. Therefore, the authors cross-checked the UTC timing of anomalies found in the study with the stock market timings across the globe to casually link the anomalies to stock market timings (see Table 6). Interestingly, the hours 3 and hour 14 (UTC) found in the study that have anomalies throughout the sample period are the opening hours of Indian stock markets and the US and Canada, respectively. Also, hour 15 corresponds to the opening hour of the Chinese Stock markets. Similarly, hour 22 represents the hour next to the closing time of stock markets in the U.S. and Canada. Hour 3 (UTC) is equivalent to 09.00 a.m. as per Indian Standard Time (IST). Indian stock markets, viz., the Bombay Stock Exchange (BSE) and National Stock Exchange (NSE) commence trading at 09.00 a.m. The working hours of these stock exchanges are from 09.15 a.m. to 03.30 p.m. (IST). The 14th hour of UTC represents 09.00 a.m. in EST/EDT (Eastern Standard Time/ Eastern Daylight Time), the opening time of bourses in the U.S., specifically, the New York Stock Exchange (NYSE), NASDAQ and Toronto Stock Exchange in Canada. The hour 15 UTC represents the 9.00 a.m. in CST (Central Standard Time), i.e., the opening hours of Chinese stock markets (Shanghai Stock Exchange and Shenzhen Stock Exchange). Hour 22 (UTC) represents 05.00 p.m. (EST) which is the adjacent hour to the closing time of the U.S. and Canadian markets.

This phenomenon resembles the 'major markets activities effect' as discussed in the study conducted by Khademalomoom and Narayan (2019). The major market activities effect pertains to the significant fluctuations observed in asset prices during the opening and closing times of major financial markets.

This shows a prospect of having a geographical connection to these anomalies found in the Bitcoin market. This adds a further scope for analysis in future studies to examine whether there exists any causality between these nexuses. Therefore, the possibility of market integration among the Bitcoin and stock markets around the world cannot be eliminated completely.

Table 6: Stock Market Timings and Bitcoin Market Anomaly

Name of the exchange	Rank**	Continent	Time Zone*	Trading hours	UTC trading hours	Presence of anomaly at UTC hours
New York Stock Exchange (NYSE), United States	1	North America	EST[a]	09.30 am- 04.00 pm	14.30-21.00	Anomaly at hour 14
Nasdaq Stock Market, United States	2					
Toronto Stock Exchange (TSX), Canada	5					
Shanghai Stock Exchange (SSE), China	3	Asia	CST[b]	09.30 am- 03.00 pm	15.30- 21.00	Anomaly at hour 15
Shenzhen Stock Exchange (SZSE), China	6			09.30 am- 2.57pm	15.30- 20.57	
National Stock Exchange, India	8		IST[c]	09.15 am- 3.30 pm	03.45-10.00	Anomaly at hour 3
Bombay Stock Exchange Ltd., India						
Saudi Stock Exchange, Saudi Arabia	9		AST[d]	10.00 am- 03.00 pm	14.00-19.00	Anomaly at hour 14
Euronext Amsterdam, Netherlands	4	Europe	CEST[e]	09.00 am- 05.30 pm	07.00- 15.30	Anomaly at hour 15

Note(s): **The ranking of exchanges was based on the market capitalisation of listed companies as of August 2022 (source: statista.com, 2022).

*Time zones followed by the stock exchanges are reported, i.e.,

[a]Eastern Standard Time (EST), [b]Central Standard Time (CST), [c]Indian Standard Time (IST), [d]Atlantic Standard Time (AST), and [e]Central European Summer Time (CEST).

VI Conclusion

The study examined the presence of intraday anomalies in the Bitcoin market with high-frequency one-minute data. We found evidence of anomalies, particularly in some of the trading hours on all days. These short-run intraday anomalies provide opportunities for making abnormal profits for traders and investors. Similar to stock and currency markets, short-run anomalies in the Bitcoin markets even offer chances for arbitrage profits.

The anomaly timings identified in the study coincide with the opening times of major stock markets globally, resembling the 'major markets activities effect' found in previous literature on currency markets (Khademalomoom and Narayan, 2019). Further inquiries and robust methods of analysis must be employed to affirm the causality of the geographical nexus between Bitcoin intraday anomaly and stock market timings. New studies that include more Bitcoin exchanges may further confirm the intraday arbitrage possibilities across Bitcoin markets. Similarly, analysis of trade volumes in the Bitcoin markets may confirm the influence of retail and institutional investors in the market.

List of Abbreviations

UTC	-	Co-ordinated Universal Time
BTC	-	Bitcoin
EMH	-	Efficient Market Hypothesis
TOM	-	Turn of the Month
USD	-	United States Dollar
Q1	-	Quarter 1
Q2	-	Quarter 2
Q3	-	Quarter 3
Q4	-	Quarter 4
NYSE	-	New York Stock Exchange
NASDAQ	-	National Association of Securities Dealers Automated Quotations
TSX	-	Toronto Stock Exchange
EST/EDT	-	Eastern Standard Time/ Eastern Daylight Time
SSE	-	Shanghai Stock Exchange
SZSE	-	Shenzhen Stock Exchange
CST	-	Central Standard Time
IST	-	Indian Standard Time
AST	-	Atlantic Standard Time
CEST	-	Central European Summer Time

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