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ARTHA VIJÑĀNA

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Articles

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Announcement

Artha Vijnana announces the institution of the Gopal Krishna Gokhale Memorial Annual Prize, awarded in recognition of the paper of most outstanding merit appearing in *Artha Vijnana*, irrespective of the author's age. This prize carries an award of ₹10,000, to be shared equally between all authors. In addition, *Artha Vijnana* announces the institution of the Prof. D R Gadgil Memorial Annual Prize, awarded in recognition of the paper of most outstanding merit appearing in *Artha Vijnana*, by a single author of below 40 years of age. This prize carries an award of ₹10,000.

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Contributions of Gokhale Institute of Politics and Economics on Studies in Co-operation

This article was requested from Prof. R.S. Deshpande. We thank him and other co-authors for writing this very important historical document.

R.S. Deshpande, Vikas Abnave, Khalil Shaha and Ashish Andhale

Introduction

Research on co-operatives, their success or failures is not frequenting the mainstream research agenda of social scientists in the recent past. The sheen seems to have been lost. In the wee years after independence research on co-operatives was one among the most favoured areas and good amount of work was done in understanding the nuances in this domain. One can identify broadly three traits in the researches on co-operation. The first being the theoretical enquiries into the questions why people co-operate? Not many researchers have gone in-depth of this question except in the writings on Common Pool Resources. Here researchers were also engaged in elaborating the principles of co-operatives and emphasising their unique applicability in many Indian situations to enhance welfare of the rural masses (Vekantappaiah and Rao 1982). The second group of researchers looked into the operations and management of co-operatives in differential contexts empirically and tried to establish the superiority of this approach as against the commercial approach towards a new enterprise. The third group looked into the stories of success and failures to reason out path for future policy. The success stories were the ones that emerged out of their own initiatives or needs and the

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failures are the ones which were imposed from above. This is our normal experience that the programmes that are conceived and implemented with an overt assumption that 'the society shall participate' usually fail to deliver the expected outcomes. In the most appropriate words of a vivid social thinker, "*the model (development model) is based less on coercing individuals and groups into new directions of action than on indulging them towards their own growth, albeit within a framework enacted from above. It is based on transcendence of individual's self-interest by reference to 'reason of state' than on reconciling such self-interest with the common good as interpreted by a legitimized elite in an idiom of persuasion*" (Kothari 1970: 9).

Co-operative efforts from below is one of the best alternatives to ensure the success. To the best of my knowledge, in the recent past, there has not been a good work reviewing research on co-operations in the country and provide a path for future directions. Gokhale Institute of Politics and Economics (GIPE) was undoubtedly a pioneer in the work on co-operation from early forties. A review of the work carried out by the researchers at the Institute will provide a blueprint for researchers in future and relevance of co-operation today. This will not only enhance the literature on co-operation but also those working on the group activities. I do not look at it just as a historical documentation of the work carried out but may provide a few important research leads in this important research domain.

Researchers at Vaikunthabhai Mehta National Institute of Co-operative Management, Pune, Institute for Rural Management, Anand and a few more institutions are still engaged in the research on co-operatives. GIPE, Pune has been almost the founder in the research on co-operation and that pursuit still continues. I may not be wrong, if I say that in Maharashtra the work on co-operation as well as co-operatives were initiated and strongly supported strongly by the work from GIPE. It is well-known that the first Agro processing co-operation in sugar sector at Pravaranagar was initiated at the behest of Dr Gadgil. His writings not only traced the prevailing situations during his times but he also indicated the future problems. The possible politicisation and over dependence on the state were hinted by him long back. He also indicated the primacy of financial discipline and if that collapses the entire spirit of co-operatives will be lost. Today in Maharashtra, the number of co-operatives in red are increasing very fast and so also their dependence on the government. The interdependences between political activities and co-operation in Maharashtra does not need any emphasis. All these phenomena require an in-depth understanding and research. Many of these aspects have been covered by researchers in their work on co-operation at GIPE. Their work has been highly commended and unique in many aspects. We, however, would not like to take a mechanical review of the work carried out on co-operation at GIPE but shall venture into some of the analytical issues that come out of these studies and have not been points of discussion thereafter. Our attempt here is to broadly review the available work on co-operation at the Institute to identify the milestones in the journey and provide some future research leads.

Early Works on Co-operation at GIPE

Issues on co-operation were not among the initial research pursuits at the GIPE in the thirties. The first survey conducted by GIPE was that of the Salaries of Public Officials in India conducted and authored by Professor D R Gadgil in 1931, and the survey kind of research continued till 1940, when a survey of Farm Business in Wai Taluka was conducted by Prof Gadgil. Possibly, this study provoked the idea of working on co-operations in GIPE as Dr Gadgil observed the conditions of farmers from a close angle. The work on co-operation at the GIPE can be reviewed in four distinct phases. The first phase of the work on co-operation at GIPE started by the then doyen of co-operation Shri Vaikunthabhai Mehta. He was a committed co-operator and also a Minister of Finance and Cooperation in Government of Maharashtra. The second longer phase was dominated by Dr D R Gadgil and Dr D G Karve, the two world known doyens on co-operation. Both wrote extensively on the subject and had a world recognition in the subject. In the third phase, we cover the studies by Dr Brahme and Dr Deshpande conducted during eighties and early nineties, precisely before the phase of liberalisation. They covered two important aspects namely the farmer co-operatives and state-co-operatives interface. The fourth phase includes the researches that are relatively of recent origin and most of them were conducted painstakingly by Dr Deepak Shah. His work also touches co-operation in the liberalisation context.

Coming to the first phase, Vaikunthabhai Mehta delivered the prestigious fourth Rao Bahadur R R Kale memorial lecture in 1942 at Gokhale Institute of Politics and Economics and published by the Institute. This was a well-researched and articulated piece among the first on record in GIPE. Mehta was then the Managing Director, Bombay Provincial Co-operative Bank, Bombay, for a long period of 35 years and after that he became the Minister of Finance and Co-operation, Government of Maharashtra. Sir Vaiknthabhai was a true co-operator and he packed his lecture with a lot of thoughts that were later on articulated by many researchers at GIPE. Some of these ideas are fresh even today, in the circumstances, when we have crossed three quarters of the century after he delivered that monumental lecture. The lecture was titled as "*A Plea for Planning in Co-operation*". At the end of the lecture he pleaded "*I do not claim that the thoughts I have presented in this address are any contribution to the drawing up of a programme of reorganization on co-operative lines; it is merely a plea for the co-operative movement being recognized as an eminently suitable agency for promoting rural development in its diverse forms. My purpose will be served if it stimulates thought among co-operators and economists and evokes some response among administrators and their financial advisers"* (Mehta, 1942, P. 26). This was the beginning of the thinking and the source of generation of ideas on co-

operation under the portals of GIPE. More recently, the 12th Plan approach paper carried the idea of constituting farmer groups for overcoming the problems of imperfect rural markets (Agarwal 2011). Bina Agarwal (2007, 2008), argued about getting farmers together to overcome the market imperfections. She also reiterated the argument in the report of the 'Working Group of the 12th Plan on Disadvantaged Farmers Including Women' (Agarwal 2011)

Vaikunthabhai was closely connected with GIPE as also with Co-operation. Prof Gadgil was then the Director of Bombay State Co-operation Bank along with Vaikunthabhai as its Managing Director during 1946-1960. He later on took charge as Chairman of Maharashtra State Co-operation Bank after the State reorganisation, when Vaikunthabhai was the Minister of Finance and Co-operation. Throughout the period hey seem to have gone hand in hand on issues on co-operation. In the fourth R R Kale memorial lecture Vaikunthabhai brought out many facets of Credit Co-operatives in the State. He appreciated the problem of agricultural indebtedness in the State of Bombay and argued that the credit co-operatives need to be invigorated. He writes "*It is the stupendous problem of agricultural indebtedness that stared at them in the face all the time. In the absence of a suitable machinery for agricultural credit amenable to social influences that evil of indebtedness was getting aggravated. The disruption of the village community, the centralisation of administrative authority in an agency out of touch with the daily life of the villagers, the introduction of our rigid judicial system -- with legal talent aiding the client having the larger purse -- the opening up of channels of investment and speculation for moneyed classes, and the gradual removal of restrictions on the impediments to easy borrowing, all these contributed during the last three quarters of a century towards the growth of an evil which was acute enough to engage the close attention of the founder of Indian economic thought, the Centenary of whose birth was celebrated a week ago."* (Mehta 1942, p. 9). Astonishing, it is unbelievable that this paragraph is penned only in the current year and speaks a lot about the collapse of agricultural credit sector in rural India. Mehta was pleading for a co-operative credit system at the time when it was not fully established in the country and there were still many hurdles. Unfortunately, almost after three quarters of the century co-operative credit structure still wriggles under the same problems even though the system has been well structured now and establishments are fully supported by the State.

While speaking on Primary Agricultural Credit Co-operatives, Vaikunthabhai was quite critical of operations in the co-operative sector. He surmises further that "*As it is the co-operative movement in India is looked upon as a part of the administrative machinery of government. This impression arises because of the attitude often erupted in official circles in several parts of the country, that is for co-operative department to lay down the law and even manage the affairs of co-operative institutions in certain circumstances. Such an attitude saps the sense of responsibility and kills initiative and enterprise*". (Mehta, 1942, p.15). Again, I reiterate that we have crossed almost three quarters of the century and it seems the time has stopped. The same problem still persists with the equal severity and in

fact the depth of the problems have intensified. We are today struggling to get proper role of co-operatives and it has become a den of the politicians.

Further, Vaikunthabhai was apprehensive of the co-operative credit system prevailing then and wanted to bring in significant changes in the system as the Managing Director of Bombay State Credit Co-operative Bank. Even during those times he pleaded his helplessness in getting the system on proper track. He also wanted to lead towards the overall development of the state economy keeping in view its resources and their use. As regards the natural resources of the state of Bombay, he wrote with agony that "*To give an illustration, in spite of recommendations made by the Bombay Provincial Banking Enquiry Committee, no investigations have been made hitherto into the natural resources available in various districts for works of minor irrigation and land development, and programmes drawn up for execution within a specified period*." (Mehta, 1942, P19). He advocated that co-operative organisations should utilise the natural resources for the local industries and groups of artisans. Giving an example from the recommendation of Bombay Economic and Industrial Survey Committee, he pleads that artisans should be organised on co-operative basis. The idea of using the local resources to create value addition on the basis of co-operatives was further illustrated in the lecture. It was here that the seed of producers' co-operation was sown.

It can be noted that Vaikunthabhai attempted to examine the suitability of banking for short-term requirements of agricultural producers, for improvement of land and other cottage industries through co-operatives. He was a strongly committed co-operator and hence recommended co-operative activities in many spheres of life. In order to support the planned policy, he invoked the recommendations of the Conference held at Wembley that stressed the co-operative principles. These were far-reaching recommendations. Throughout his lecture he emphasised cooperation as the tool and end for the purpose of economic development of the economically weak individuals and regions. The role of Vaikunthabhai Mehta in the history of cooperation in Maharashtra and that of GIPE is unique even today. As a Minister for Finance and Cooperation of the then Bombay State, he supported Dr Gadgil in all his endeavours on co-operation. He was quite strongly connected with Gokhale Institute and backed fully the experiment of first sugar co-operative as the Ministry of Finance and Co-operation of the Bombay Government.

GIPE: Getting in to Co-operatives

The roots of India's co-operative movement could be traced back to the report of Sir Fredrick Nicholson. In 1893, the then Government of Madras sent Sir

Nicholson to study the system of institutional credit in Europe. He came to the conclusion that '*Raiffesian type of rural society based on compact units and joint responsibility has most relevance to Indian context'*, (ICA, 1971: 65). Simultaneously, on the background of peasant's upsurge of 1875, against the money lenders, the Deccan Riots Commission recommended provision of credit through Agriculturalists Loan Act 1884 and Land Improvement Loan Act of 1888. Since these proved inadequate, British Government in India recommended establishment of Agricultural Credit Co-Operative Society and passed an act to that effect in 1904 and further revised in 1915. The acts thus initiated Government sponsorship and administration of co-operative movement. Nicholson's report expressed that a direct subvention by the State would not only be a source of immediate strength to the banks but such public sponsorship would also indicate Government's recognition of the co-operative banks. In those days, State sponsorship was most needed, especially in the sectors like banking, where money lenders were plentiful and ready to fleece the farm sector of the generated surpluses. The steps taken by the then British government did not help farmers build on their own strength but attach them to co-operative institutions (Deshpande, *et. al.* 1992, p. 12). These operations from above did not sprout from the soil and planted from above. That necessitated need for voluntary co-operative movement in the farm sector.

GIPE got into the studies on Co-operatives through the solid work by Professor D R Gadgil. He was connected with national and international bodies on co-operatives and brought in that experience as also modified the ideas to be implemented in India. Initially, it was Dr Gadgil who explained the process of co-operation that begins with bringing together the people and providing base to the group, in order to enable them to undertake economic activities. Thus, in a democratic society the role of the State enters the picture as the provider of basic confidence needed for establishment of a group. State in the Marxian terminology would mean the representative of economically dominant class, thereby holding down and exploiting the oppressed class. The definition presumes a large group of those who direct the State policies and at the same time control major share of the means of production. On the background of this, the concept of welfare State is diagonally different. Here the State is treated as a custodian of well-being and provider of welfare services. Under the capitalistic order of society, the State has the responsibilities of providing social security, achieving greater equity and justice. The role envisaged by this conception is wider and does not totally refute the existence of a shade of Marxist State due to the difficulty in perception of a politically neutral entity. Political economists view State as an admixture of these two conceptions. Indian State, no doubt has to balance the interest of the dominant political groups and serve the interest of the class comprising this group. Hence as a ground reality, the Indian State represents the interests of rich farmers, industrialists, capitalists and bureaucrats. Under these conditions, it is not surprising to come across an increased role of State in the co-operative movement. Therefore, Gadgil wrote "*By and large, the co-operative movement remained*

insignificant in all the states in relation to the totality of rural life, and in all the more essential aspects of agricultural credit supply and sale, to co-operative sector took a little effective part, in the absence of the State taking pro-active steps" (Gadgil, 1961: 32)". Today, the reality is different. The Indian State has become closely identified with the rich farmers, industrialists, capitalists and bureaucrats and therefore the co-operatives of small and weaker may have problem of survival. Deepak Shah (2007) observed the weaning away of the influence of credit co-operatives in rural Maharashtra.

The bypassing of co-operative principles is at the root of many of these problems. A special Committee of International Co-operative Alliance whose report was presented before the Co-operative Congress, 1937, discussed at length the co-operative principles. The recommendations were more on the basis of Rochdale Principles where open membership and democratic management were the premier concerns. Dr Gadgil had the ringside view of all these developments in the co-operative sector in the world as he had attended a few of these meetings and picked up threads in order to intertwine the co-operative sector in Maharashtra. The Paris Congress of 1937, was followed by the Second World War, arresting the progress of co-operative movement in many countries including in India. In 1964, the Central Committees of ICA set up a Commission to ascertain how far the principles of Rochdale as recommended in 1937, were followed in different countries. In the meanwhile, the Rural Credit Survey Committee (1954), of which Dr Gadgil was a member, recommended that only State sponsored co-operative institutions in the country will help to step up welfare. The survey conducted by Dr Gadgil at Wai (1931) to study the farm business clearly brought forth the issue of uneconomic farm sector and he was worried about that. It is noted in the survey "*It will be remembered that among other things, the data show the uneconomic character of the very small farm, the unprofitable character of certain crop combinations, the comparatively better terms afforded by cash tenancy and the importance of the income yielded by the livestock business. This study of farm business thus raises in concrete form some problems which demand attention*", (Gadgil and Gadgil, 1940, p. 131). It is in this survey report that Dr Gadgil speaks about the un-economic land holding as also the meagre net farm income. He hints at getting together of the farmers to overcome the income generation bottlenecks. This possibly acted as provocation to Dr Gadgil and his thinking on co-operation. Further, while talking about the origin of co-operation in India, Dr Gadgil wrote that "*the real history of modern developments in cooperation in India may be said to date only from 1945. The two committees appointed by the Government of India almost simultaneously in 1945, look into the future and faced a series of questions*" (Gadgil, 1961, p. 33). Possibly, Dr Gadgil overlooked the contributions by

Vaikunthabhai Mehta's RR Kale Memorial lecture held in 1942 and works by Dr D G Karve.

In the context of Maharashtra's co-operative movement, we can see two paradigms in the contributions of Gadgil and in that sense of GIPE. First, Gadgil gave a structure and planning process to the development of Maharashtra's co-operative sector and second, one of his major contributions was that he succeeded in redirecting the attention of co-operative movement towards the producer co-operatives. He also provided the needed intellectual base for the establishment of Pravaranagar co-operative sugar mill and that spurred the Sugar revolution in the State. As one of the important thinker in economic development, he turned towards the co-operative as the best alternative in the given economic structure. This could happen because of the very close relation of Gadgil with the Vaikunthabhai Mehta, Karve, Thakarasi and Devdhar and most of them thinking in similar manner.

Professor Gadgil: The Pioneer in Co-operation at GIPE

The second phase of work on co-operation at GIPE, Pune began under the leadership of Professor Dhananjayrao Gadgil who began his thinking and writing on co-operation while his contemporaries from Cambridge were busy with the esoteric issues in economics. Dr Gadgil's training in Britain was instrumental in his thinking on co-operatives and he was also impressed by the experience of co-operation in Britain, France and Germany. Additionally, he was also a strong believer of development from below. Therefore, it was not surprising that Dr Gadgil pioneered the work on co-operation at GIPE. Our historical review of research works on co-operation at the Gokhale Institute is substantially aided by the work done by Dr Gadgil himself. Of course, his was reviewed in an excellent paper contributed to *Artha Aijnana* by Dr Benjamin and Dr Mohanty. This paper by Dr Benjamin and Dr Mohanty includes appraisal of the contributions of Dr Gadgil on co-operation in a very perceptive and historical context. We are attempting here a review of the works on co-operation conducted at GIPE, therefore we include works of Dr Gadgil as a founder Director of Gokhale Institute and the studies that have been carried out by the others on co-operatives.

Professor Gadgil was unequivocally the pioneer among the researchers on co-operation at GIPE, as its founder Director and a committed co-operator. He was the Director of Gokhale Institute when he invited Vaikunthabhai Mehta to deliver the prestigious RR Kale Memorial lecture. This lecture of Vaikunthabhai must have strongly in the minds when he took the earlier works on co-operation. The work done by Dr Gadgil on co-operation is monumental indeed and fortunately all these are made available in an exhaustive book titled "Writings and Speeches of Professor D R Gadgil" published by Gokhale Institute, in 1975. Dr Benjamin and Dr Mohanty covered in their review the work on Co-operative Credit Society, Sugar Co-operatives, Co-operatives and Officialdom, De-politicisation and Co-Operative Farming (incorporated in this book). Besides Dr Gadgil, an authoritative work was done by Dr DG Karve and that was also published by GIPE in 1968. Dr

Karve was one of the leading academics of Maharashtra working with International Co-operative Alliance and highly respected during those days in the academic circles of Maharashtra. One can see a strong influence of Dr Karve's work in the writings and thinking of Prof Gadgil, but little did they refer to each other's works. This may be just incidental. In order to understand this, one needs to read the writings of Dr Karve, and his four lectures delivered at different points of time published by Gokhale Institute in the year 1968. A PhD thesis entitled "Political Economy of D R Gadgil" authored by V D Deshpande in 1978, brings out some of these facets besides Dr Gadgil's development thinking that includes co-operation.

Dr Gadgil held influential positions in the field of co-operation during his career. That helped him both in terms of authority as well as intellectual vantage point for thinking towards strengthening co-operative movement in Maharashtra. As a member of the Bombay State Co-operation Bank during the years 1946-60 and as the Chief Promoter and Chairman of Pravaranagar Co-operative Sugar factory during 1949-60, he not only contributed to the thinking on co-operatives but also brought co-operation in Agro processing industry on ground. His contributions to Agricultural Credit Co-operatives is also unique. Dr Gadgil as a member of the Board of Directors of Bombay State Co-operative Bank (1946-1960) contributed significantly towards development of co-operative credit. He was instrumental in establishing Pravaranagar Sugar factory along with Vitthalrao Vikhe Patil a strong farmer leader from Rahuri. At that time as the Director of the Bombay State Co-operative Bank Dr Gadgil could easily get done the initial requirements for the Pravaranagar Sugar Factory. It is also well known that the shortfall in the capital requirement was supported by Government of Maharashtra and Vaikunthabhai Mehta as the Minister for Finance and Co-operatives was instrumental in making good the shortfall in capital. Dr Gadgil was the first Chairman of the Pravaranagar Sugar Factory and at the same time also headed the Maharashtra State Federation of Co-operative Sugar Factories. He was elected president of the National Federation of co-operative Sugar factories. In 1963, Dr Gadgil was instrumental in galvanising National Co-operative Development Corporation and later on became the president of the Federation of all India State Co-operative Banks. All this establishes importance of Dr Gadgil's position in pioneering the co-operative movement in India. Largely, he was known for his work on co-operative in sugar industry but he also had quite in-depth thinking about co-operation in other fields of the economy. This section is therefore, justifiably occupied by the works of Professor Gadgil.

The collection of 'Writings and Speeches by Dr Gadgil' begins with his three lectures on 'Co-operative Commonwealth' in the Professor Brij Narayan Memorial Lecture series delivered at Punjab University Chandigarh in 1961. By

then Dr Gadgil was well known authority in the field of co-operation besides on developmental issues in the Indian economy. He begins his first lecture by explaining the Rochdale Pioneers and the circumstances that this experiment emerged in Toad Lane in 1844. That led to a revolution in British Consumer co-operative movement. The establishment of Co-operative consumer store was the only co-operative experiment during those days. The consumer co-operative movement spread very rapidly in England, Germany and also in France. The whole-sale societies were organised by the members of the retail societies and that had its impact on the business of the retail societies. British whole-sale societies were almost similar to the other trading concerns. He further elaborates on the objectives of Raiffesian society that demands the society to improve aggregate welfare of the members materially and morally. In short the Co-operatives have aimed at the enhancement of the overall welfare of members. Raiffesian models were established in rural Germany. He also dealt here with the issue of state support for the Co-operatives and argued in favour of that. The theoretical model that came to be accepted and advanced by Dr Gadgil as also many others was the Raiffesian model, and that suited to Indian conditions.

While talking about the international experience, Gadgil writes about the co-operatives in Denmark. He observed that agricultural sector is dominantly using co-operatives in Denmark to enter and dominate the domestic market. This was observed in Finland too. He records that industrial sector of the Scandinavian countries had a significant presence of co-operatives. Israeli Kibbutz was taken for illustration of the distance from private property. He observed that Co-operatives have not been so successful in rich countries but definitely had influence in middle and low income countries. He concludes in the words from the World Review of Co-operatives that *"In the economically underdeveloped countries the proportions of co-operative membership and trade are much lower, but progress in the last ten years has been rapid, although not wholly spontaneous, owing much, as will be seen, to the needs and the initiative of the State"* (Gadgil 1961, p. 22). His focus on the weak must co-operate to overcome the capital constraint becomes clear.

During the second Brij Narayan Memorial Lecture delivered at Punjab University, Gadgil made a point that the theoretical base of co-operatives is one of the complementary ways for the development, which he supported through his analysis. Gadgil had actually adopted middle path which bestrode with socialist principles on one side and western capitalism on the other. Gadgil gave priority to a way that keeps ownership structure safe along with equal distribution of surplus. He suggested China's agricultural co-operative model to Indian agriculture. But he is quiet on that or does not venture stepping out of the Rochdale principles in this endeavour. Proposing a general co-operative model after taking a note of experiences from China, Yugoslavia and Mexico, etc., he did not prefer to keep the administrative structure of co-operatives and other state agencies independent of each other. He writes "*the co-operative administrative structure has taken shape from the general administrative structure which has no much difference* (Gadgil 1961: 18). This must be viewed as a critical comment by Dr Gadgil, which

inherently accepts that the co-operative administration should be significantly different than the general administration and if the two are mixed or copy each other the success of co-operatives will be in peril. That seems to be our experience during the last seven decades. But the beginning of the State administration entering into the Board room of co-operatives had commenced at the time of framing of the Pravaranagar Co-operative rules. Dr Gadgil further, moves to the Government sponsored co-operatives and discusses their objectives and characteristics. Interestingly, he writes in the context of Government participation that "The *first is the idea that Government participation in share capital of a primary is wrong in principle and will lead to government's domination of the movement; and the second, that the only type of primary society to be established is that which attempts all functions and is confined to a single village*" (Gadgil 1961, p. 35). This needs to be looked at, a bit sceptically, as Gadgil accepted the State support to Pravaranagar sugar co-operative in the capacity of its Chairman with an intervention from Vaikunthabhai Mehta. In later years the Government dominated its operations even today (Deshpande, *et. al.* 1992).

He brings out the experience of provinces and suggests the path of development in co-operative sector in India. It is clear that not one design fits all in all the provinces. He writes *"By and large, however, the co-operative movement remained insignificant in all the states in relation to the totality of rural life, and in all the more essential aspects of agriculture, credit, supply and sale, the co-operative movement took little effective part"* (Gadgil 1961, p. 32). His idea that the co-operatives should not conduct only a specialised work and continue to focus on that but should endeavour to become a multi-task organisation appropriately designed and carry out different functions at the same time. Gadgil recognised also the vital role of co-operatives in rural credit and its connectivity with other similar institutions, he writes "*It is not possible to emphasise sufficiently the vital role co-operative marketing and processing and of its close relation with the operation of the credit system*" (Gadgil 1961, p. 41). He was a strong proponent of the emergence of co-operative leadership from the core rural areas and wanted the primary rural strata to take lead here. That was his model of development and he advocates the Co-operative Commonwealth quite systematically as an engine of development. Any unimpressive performance of co-operatives, according to him would be due to non-genuine co-operatives and lack of vigorous official policies as support system.

In his third Brij Narain Memorial lecture Dr Gadgil took to elaborate on an important hypothesis connecting co-operation to transformation of the economy. The transformation is expected to take place with the generated surplus being shared by the members of the co-operatives. This hypothesis of Dr Gadgil to a large extent was possible on the ground, but the equality of distribution of surplus

and proper use of the surplus was in the hands of the management of co-operatives. That was the crux of the entire experiment and hence we see in some of the co-operatives only a few families becoming super rich, whereas, the members from the beginning staying at the same real economic levels. In co-operatives the membership is voluntary and non-restricted on the basis of Rochdale Pioneers. The principle of open membership became an acceptable practice all over the world and so also in India. The principle of democratic control brought in obviously political processes and the wider Indian process of politicisation influenced the cooperatives. That was not imagined as the forthcoming negative externality. The distribution of dividends was expected to share the gains with the members and that was also expected to bring prosperity to their doorsteps of the weaker members. Having seen this gain from the co-operation many activities came under small co-operatives like forests, quarrying, credit, wholesale, retail. Dr Gadgil believed that this would happen automatically. He was not so much carried by the spread of co-operatives as much he wanted to reign the rural exploitation. He writes "*The problem of distribution does not appear important in the era of dispersed small-scale economic entities when co-operators are concerned chiefly with preventing exploitation and are guided by the market prices in relation to all operations*" (Gadgil 1961, p. 51). Possibly, he could not imagine that even within co-operatives there could be an emergence of strong exploiters and local rural capitalists. This can be witnessed in the area of first co-operative sugar factory. Therefore, even though he was hinting at preventing exploitation, in coming years that became the hallmark of many co-operatives, model co-operatives still continue to be exceptions (Kisan Veer Sugar Factory). Naturally, being democratic institution, the ownership shall vest with the members of the co-operatives. That was the pre-condition conceived by Dr Gadgil for the 'Co-operative Commonwealth'. Therefore, he wished that the co-operative organisations should spread widely. He writes *"Moreover, in countries engaged in development planning there are two particular reasons why co-operative organisations should be encouraged to spread widely. Planning, in the ultimate analysis, can be effective only through action of each individual unit of activity in the economy; so that unless the planned target and the pattern of behaviour called forth by plan-requirements are communicated effectively to each individual dispersed unit, the success of the plan cannot be guaranteed.*" (Gadgil 1961, p. 57). This idea of establishing a Co-operative commonwealth can achieve this goal had his full support. It was stated in the later part of the lecture, that the co-operatives are essentially democratic and with the principle of open membership will help to achieve the goal of welfare to all, even though it may differ from socialism. The Commonwealth will help in spreading the gains in welfare across regions. He possibly could not read or foresee the evils of democracy and process of social caste ridden politicisation that emerged coming years within co-operatives. Co-operative commonwealth will be seen as very close to federalism and during those days Dr Gadgil observed the waning away of the importance of federalism due to leaning towards communism. He strongly believed that "*Co-*

operation by insisting on actual operation as far as possible in the economic sphere with the local primary, small scale scattered units reinforces the federal political ideology in the strongest possible terms. It thus, not only seeks to establish economic democracy but is also an essential in the working of political democracy." (Gadgil 1961, p. 71).

There were two extreme development philosophies which worked as under-currents in our development programmes. On the one hand, we had sprawling private enterprises spreading their business transactions but mostly confining themselves to the urban industrial sector. These groups wielded significant clout in the political decision making process. On the other hand, there was a group with strong commitment to democratic socialism. The political structures representing the weaker sections were comprised of the rural 'elites' and urban 'thinkers'. "*The weak elements (smallest peasantry and landless labourers) were also those who cannot exercise any political power and for which none of the usual institutional and organizational devises thrown up by industrial societies could not prove appropriate*" (Gadgil 1961: 4). This thinking was at the back of mind of Dr Gadgil when he elaborated on the producers' co-operatives and wrote extensively on various issues in which co-operation can be the best economic alternative moving towards equality of welfare. Therefore, the natural alternative was to induce the poor to get together and help them draw a blueprint of their own planned development and destiny.

Co-operative efforts thus formed the crux of many development activities in the country. People with small means of production got together and pooled their resources in order to venture a task which was otherwise difficult for them. Small scale units together will thus overcome the constraints of scale, capital, incidence of risk, distribution of gains, economic and political concentration (Gadgil 1975, Karve 1968). Thus the process of co-operative efforts is germane to the social-political structure of the country. While concluding Prof Brij Narain Memorial lectures, Prof Gadgil said, "*I should reiterate my belief that the Indian situation, political and economic, require today a categorical rejection of competitive philosophy and psychology and the assertion of a belief in co-operation. Such an act of assertion followed by the implementation of a programme of concrete logical action is alone likely to lead us out of our present situation*" (Gadgil 1960: 71). This makes us to rethink about the current liberal market centric policies and the sustenance of co-operatives in that.

The possible future misreading in this context by Dr Gadgil, is the observation of the political rapids that were visible with their sprouting signals during those years. Political scenario of India was changing very fast and the typology of emerging politics was quite visible on the horizon during sixties, when we had completed two general elections and were getting ready for the third. Social

politicisation and caste already started playing a dominant role. The belief that co-operatives as democratic institutions will help to change the fortunes of the poor was rather a huge idealistic expectation on this political scenario. This belief is bellied now, when we analyse the present situation in the co-operative sector. Naturally one question peeps in our mind, did Dr Gadgil misread the future of co-operatives, even after observing the rapids in the political scenario and the emerging political economy in their functioning? Weaker economic elements and among them small and marginal farmers were at the worst end.

Co-operative farming was first touched by Vaikunthabhai in his lecture recognising the problem of small holders and he thought that co-operative farming would be a good alternative. Dr Gadgil also had some guarded faith in co-operative farming experiment in a note included in the volume. Dr Sulabha Brahme after about two decades, visited this issue in her paper published by ISS, The Hague, based on a farmer's co-operative society (1984). This note by Dr Gadgil on co-operative farming included among his writings is somewhat a cautious note. While he believed that co-operative farming will be quite useful to enhance the bargaining power of the weaker farmers he does not want to rely on replication of the successful experiments available elsewhere. The chase of the mirage called replication of the success stories is quite common in India. In this context Gadgil writes "*Lastly, I would like to draw attention to the problem of replication. It has been our experience in India that an initial successful experiment is quickly copied nearby in similar environment. The slowness of our progress is due largely to the fact that we have no plan of deliberate experimentation fully backed by social approval and state assistance and further that we have no means whereby successful experiments are studied and reproduced later larger and larger areas*". (Gadgil 1961, pp. 78-79). Dr Gadgil submitted a note to National Development Council, 1959, on policies for development of co-operation in India. This was in response to the NDCs resolution on co-operation based on the document submitted by the working group constituted for that purpose. His contention was about the lack of research, investigation or any good study on the structure of co-operation as background before the GoI brought a resolution in front of the NDC. Dr Gadgil sites many documents to bring forth emphatically that any policy relating to co-operation must consider future path of development based on past understanding, the enormous variety of conditions, structure of economy and stages of development in the country. He called for a good public debate before presentation of such policy frame but that did not happen.

In the volume on Writings and Speeches includes Dr Gadgil's views on leadership in co-operation. In co-operatives leader is a critical fulcrum who decides the success or failure of the entire experiment. Dr Gadgil elaborated on the requisites of leadership in co-operatives in a seminar on that issue conducted by the International Co-operative Alliance in November 1960. He was quite acquainted with essence of the emergence of rural leadership. Therefore, when he writes "*Another aspect of our traditional society is its hierarchical structure. The different close groups, castes and communities, are usually ranked in an order*

which traditionally indicates socio economic status. In such a society the group's ranking higher find themselves privileged in relation to those that rank lower and it is expected that those who rank lower will differ in most matters to those who rank high year." (GIPE, 1975, p. 91). This recognition of the hierarchical caste system got reflected in the co-operatives in the past seven decades and dominated the experiments. Gadgil underscores the requirement of natural leaders, of course knowing fully that the hierarchical society may not allow such natural leader to emerge from bottom up. He believed that this could happen in credit co-operative sector. Further very succinctly, he writes about the development of co-operative movement as also the future of the co-operative credit in India. His beliefs in co-operative credit and its capability to meet the demand in the rural areas is noteworthy. Of course, he mentions a continued State support in the co-operative credit system and in that case runs an inherent risk that the credit structure will be placed at the beck and call of the government. In fact, he writes "*Reserve Bank officials must have informal contacts with an intimate knowledge of, those in charge of co-operative organisations and must be able to function in an informal advisory capacity.*" (GIPE, 1975, p. 115). It was an indication of the State getting into the arena of co-operative credit, and the question that will it not jeopardise the very purpose of co-operation?, remains unanswered.

Dr Gadgil was Chairman of the Maharashtra State Co-Operative Bank and therefore, his belief in the structure and health of its resources is unquestionable. He foresaw a strong role for co-operatives including "Cooperative Socialist Commonwealth", in order to bring in a co-operative social order. He was suggesting changes in co-operative organisation and its structure in such a way to make these conducive to the social order. He certainly was not a novice in understanding the social structure prevailing during those days and he also mentions it sporadically. Therefore, this thinking was only a wishful thinking and not necessarily a pragmatic view. Naturally, his idea did not catch roots possibly due to the relative strength of the existing social order as against that of co-operatives. Dr Gadgil in his lifetime touched many other aspects in co-operation and these included: Education, Planned Development, International Co-Operative Alliance, Sugar Co-Operatives and Co-operative Training. The span and depth of Dr Gadgil's thinking on co-operatives is unimaginable. Through his writings and lectures he brought forth five important aspects in co-operatives. First he focused on co-operative institutions as a liberator of the rural areas (weaker elements) from the clutches of the money lenders. He pleaded for a strong network of credit co-operatives and the supported by the state. Being a co-operative bank and heading the apex body of co-operative credit societies, it was quite expected that his speeches and writings largely focused on co-operative credit. It is however well known that the co-operative credit system in Maharashtra later got into strong

political triangulation. Second, he was concerned about the stronger dependence and implementation of co-operative principles. His approach was rather more dogmatic and stuck to the strict principles. This according to him, was a solution for the emancipation of the poor and arresting the usury leading to overall economic development. Third, having seen the world and travelled extensively across the countries in the world, Dr Gadgil had an extensive view of the operations of co-operatives in the world. Sincerely enough, he wanted to get the best out of that implemented in India. His speeches and writings often revolve around organisations in many countries that include developed as well as developing. But at the same time, he demonstrated the understanding of the unique hierarchical Indian social structure, even though he has not said it, he hinted that the structure may cause problems for development of co-operatives. Which indeed is the current experience. Fourth, being a committed planner, Dr Gadgil wanted co-operative planning to be one of India's important policy frame. This aspect of his thinking did not get sufficient elaboration, possibly because of his untimely demise, except in the Memorandum he submitted to NDC. Last, the status of Dr Gadgil in Maharashtra was quite high and he was considered as the guiding force for development of the State. He lived to that image and tried to provide as much material to the development of the state has also ideas. Many of these came on the ground like Agro processing co-operatives and he personally took interest for leading them to success. The first sugar factory on co-operative basis was started in Maharashtra at the behest of Dr Gadgil as its founding Chairman and that functioned very satisfactorily. Therefore, in co-operation GIPE contributed significantly both in theory, futuristic thinking, ground planning and analytical reasoning with major work coming from Dr Gadgil. He single-handedly dominated this area of research along with his other contributions on planning and economics.

Dr D G Karve on Co-operation

Gokhale Institute in 1968, published another monumental work that included four important lectures delivered by Dr DG Karve. This monograph was titled "Co-operation: Principles and Substance". The first lecture in this monograph included Dr Karve's elaboration on Co-Operation in the lecture delivered at Copenhagen, Vienna, and Manilla at different times. These lectures by Dr Karve, very lucidly lead us to the substance of Co-operation, elaborating the quintessence of the process. Initially, he presented his views on the report of the Commission on Co-Operative Principles appointed by the Central Committee on Co-Operatives of ICA in 1964, of which he was a member. Dr Karve was also a very committed co-operator and his belief in co-operation was fundamental. He writes *"Co-operation is something more than a way of doing business. It is a way of organising an important part of our life in a manner conducive to the achievement of certain social and moral ideals. These ideals, as enunciated by the Rochadale Pioneers, give moral sanction and material substance to what now come to be described as*

principles of cooperation." (Karve 1968, p. 3). Further he elaborates on the principles of co-operation in detail and as a researcher, I must say that these are the principles which one must read before analysing impact of a co-operatives. That discipline is not to be seen among the researchers now. He closes the first lecture at Copenhagen on a very positive note stating "*The ideals of democracy, peace and human welfare are so widely accepted, and opportunities of combined co-operative action on the part of the peoples of the world are so large that on the basis of a firm understanding of the objectives and the basic principles of Rochdale Pioneers, it should be possible for co-operators everywhere to go forward to achieve progress over an ever widening field*." (Karve 1968, p. 12). In the second lecture, he continued illustrating the Rochdale tradition and highlighting important aspects of it. This lecture was given at Vienna in 1966. It is interesting that Dr Karve had very open mind about the obligations of these principles in the coming years. He was not in favour of treating them as ritualistic but allowed flexibility according to the situation and time, keeping the spirit undisturbed. He writes in the Vienna lecture "*Whether the Rochdale Principles, so defined and stated, meet the needs of co-operative movement, having regard to the present day economic, and political situation, or whether any of the principles should be reformulated in order to achieve better contribution to the fulfilment of the aims and tasks of the co-operative movement in its different branches*" (Karve 1968, p. 14). Further he states that "*Circumstances in which principles are practised are variable; and this affects the correct formulation of even those principles which are generally accepted as fundamental truths by co-operatives*" (Karve 1968, p. 16). It was reflected in the lectures that Dr Karve was a visionary and could foresee the future possible changes in the co-operative principles and necessary to amend the principles in the new conditions. When we look at the needs and structures of co-operatives today, we reaffirm unhesitant faith in what he spoke about the flexibilities. This he took up in his third lecture delivered at the Symposium on Co-operative Principles held at Manila in 1966. Once again he emphasised the Rochdale principles but at the same time he hints only at the core spirit of these principles by saying "*The creation of an equalitarian, harmonious and just society was the objective of the Rochdale Pioneers, and it has continued to be the objective ideal of co-operators around the world. Quite obviously, this ideal or ultimate objective, is much more important and exalted than a principle of routine co-operative activity. It rests on the pedestal of its own.*" (Karve 1968, p. 23). His non-dogmatic commitment to the co-operative principles and the substance of co-operation is unequivocal and he reiterates that in his lectures. He showed full awareness of the possible changes in future needed according to the circumstances. He was not so much in favour of rigidity and he argues that saying "Self-Help and

Co-operation" as the theme of co-operation. This is a theme he carried further when he delivered the fourth lecture in memory of Vaikunthabhai Mehta.

We must note that Dr Karve had come from a very parsimonious background, as he had lost his father in early childhood and completed his education in strenuous conditions and rose to become Chairman of ICA. His understanding of the society was bottom up and that he always cared for the last man in the social rung. He was a flexible and a different breed of academician, who held very important positions in the International co-operative arena. He was one of the highly respected co-operators and even though he did not work on the ground, like Dr Gadgil, his understanding of the ground in co-operation was quite unique. He was Deputy Governor of Reserve Bank of India, Director of Bombay State Co-operative Bank and many important economic bodies. One must appreciate his conceptual flexibility and his in-depth commitment to cooperation and understanding of the substance of co-operation. He was a guiding force across the world in the principles of cooperation as the Chairman of the International Commission on the co-operative Principles. In the fourth lecture delivered in the memory of Vaikunthabhai Mehta, he writes heralding Mehta's policy on co-operatives that "*Thus raising co-operation from the level of one of the several alternatives which were open to individual citizen without any indication of the choice of the community as a whole, to that of the highly regarded and integral part of national policy was the principal feature of the new co-operative policy which was enunciated under Vaikunthabhai's leadership".* (Karve 1968, p. 44). By this he puts co-operation as a strategy on a very high pedestal. Dr Karve's contribution on minutely clarifying the principles of co-operation, emphasising their flexibility according to the needs of the time and then connecting these to the current issues, is a unique contribution that we should note. Most important is his flexibility as a people friendly social scientist and his principles even though did not essentially spelt out were core socialistic in content. He was a unique visionary with keen observation of the oncoming changes.

Co-operation: The GIPE Experiment on Ground

One of the unforgettable contributions of GIPE in co-operation initiated personally by Dr Gadgil was to bring co-operation on ground and in practice. Those days the concept of research activism was not even known. Dr Gadgil worked very strenuously to establish the first sugar factory in co-operative sector and through that entered agro-processing sector in co-operatives. One can see the thread connecting to his first economic survey of Wai taluka, where he observed that processing can be a joint activity. After independence through the Constitution of India, co-operation was transferred included as a State subject, Bombay state was the first to have its independent law on co-operative societies led by Vaikunthabhai Mehta. Actually, the first sugar factory in Maharashtra was Saswad Mali sugar factory, which started with the initiative of farmers (of Mali (Gardener) Community). It was established as a manufacturing company by a group of active

farmers led by Girme, Boravake, Pandhare and others as a company on 17th November 1932 (Kane 1959). Therefore, it cannot be termed as co-operative effort in the sense of the concept that became an acceptable one afterwards. In fact, it was noted that the irrigation water of the Deccan canal system was quite underutilized. The Committee on Water Utilization which examined the question of water utilization in the canal system decided to invite sugar factories in the area. Initial steps towards establishment of sugar factory began in the conference of irrigators in the region which adopted a resolution to that effect ((Attwood 1985)). But before this, the state had the co-operative banking structure operating in the region with Bombay Provincial Co-operative bank as an apex body. The first step towards establishment of co-operative sugar factory began with the initiative of Late Shri Vitthalrao Vikhe Patil of Rahuri. Born in the family of a farmer, he visualized the potential of agro-processing, of coming together and establishing a co-operative effort in sugar production. Thus the experiment was rightly described as 'Peasant Owned Sugar Factory in Bombay State' (GIPE, 1975, p. 203).

The initial task of starting a producers' co-operative was described as extremely difficult by the first Managing Director of Pravaranagar. The attitude of the State was more cautious about any outright support. Majority of the members of the factory were small and marginal farmers, with a small proportion holding lands above 20 acres. The average size of holding of farmers was only 1.6 acres. Thus the experiment truly represented an initiative of the peasant community of the region. Actual steps towards establishment of the factory began in 1947 when the scheme was discussed with the Bombay Provincial Co-operative Bank and initial Capital of ₹ 2 lakhs was collected by the end of 1949. The society was registered and the two crucial appointments of Managing Director and Chief Engineer were made (GIPE, 1975, p. 206).

Pravaranagar sugar factory became the first co-operative sugar factory started in Maharashtra and that impelled a revolution in agro-processing co-operatives. The socio-political scenario of the state also underwent many fold changes since then and sugar industry became the principle axis of rural politico-economic structure. The role of GIPE and especially that of Dr Gadgil was unique in the establishment of this co-operative sugar factory that stimulated a revolution in Sugar industry of Maharashtra (Attwood 1977, 1985). It is aptly said by Baviskar (1985) that '*one cannot understand the politico-economic structure of Maharashtra without considering the role of sugar factories and vice versa*' (Bawiskar 1985). The issue of development of co-operatives in Maharashtra does not remain confined to technical relations alone but penetrates in the structural aspects of the co-operative. Here the number of interests and interests group grow around the basic structure of sugar production.

It is important to look back and pick up a few lessons from the experiment that was carried out during early years of independence in the form of a co-operative sugar factory at Pravaranagar. First, the Agro processing co-operatives began in Maharashtra in the sugar production sector. This experiment became an ideal followed for many sugar factories in the State. Deshpande et al (1992) wrote an interestingly section titled "Pravara to Pushpavaty: A Travelogue of Co-operatives in Maharashtra", in the names of the two rivers on which the two sugar factories began one at Rahuri and another at Yavatmal. The first one in 1947 at Pravaranagar and the second in the mid-90s at Yavatmal. The first sugar factory was started with an initiative of the farmer and an academician and the Pushpavaty was backed by a former Chief Minister of Maharashtra incidentally flouting many norms and hoodwinking the officialdom (Deshpande, *et. al.* 1992, pp. 30-38), the journey that navigates the political economy of sugar industries in the state of Maharashtra for a period of five decades. It is no secret that sugar co-operatives played a very important and decisive role in Maharashtra's politics for long (Chausalkar 1992). This was of course not the intention of Dr Gadgil when he initiated the first sugar factory at Pravaranagar but the impact of co-operative sugar factories infusing the role of caste and class in the State politics remains monumental (Lele 1990). Second, Dr Gadgil's hypothesis that the sugar factory (agro-processing) in the co-operative sector will bring prosperity to all in the region and help the poor to reach a better lifestyle. To some extent his expectations came true and Pravaranagar became a hub, as an agro processing unit but the spread of educational institutions became more prominent than the sugar co-operative. Certainly, a few families of the region could achieve very high income levels & prosperity based on their participation in the sugar co-operative and more so in the educational institutions that began in the region. The family of the original promoter is quite well known in the region as one of the most affluent families. Third, should we say that the hypothesis, with which Dr Gadgil began, that prosperity will be fairly shared in the region has been betrayed? In one of the recent study of the region, it was noted that this region confronts significant inequality and the prosperity has not reached nook and corners, as was designed and expected. Last, even though Pravaranagar gave lead to many of the sugar factories in the co-operative sector in Maharashtra the role of the state and interference in the co-operative sector increased significantly (Deshpande, *et. al.* 1992). It was true that Dr Gadgil needed and asked for the State support in order to establish the factory at the beginning but today sugar co-operatives have become significantly dependent on the State and State exchequer. That is irony of the situation.

Post Gadgil Phase of Studies on Co-operation

The third phase of studies on co-operation began long after the departure of Dr Gadgil sometime in early eighties. Initially, there were not many researchers opting to work on co-operation. There were of course a good number of research students in the state of Maharashtra, who worked on co-operative sugar factories

and co-operative credit structure for their degrees. Similarly, a large number of researchers outside of Gokhale Institute worked on co-operatives and issues pertaining to co-operatives in various universities. This one can be understood as a positive spill over of the initial work on co-operatives. After the opening of Vaikunth Mehta Institute of Co-Operative Management (VAMNICOM) at Pune, a large amount of work was carried out at that place and as it was an Institute for specialised purpose, most of the work on co-operation was handled by VAMNICOM. However, since these were not carried out at Gokhale Institute we have not included any of them here in this review. Besides, we also did not include some of the minor studies which were not accessible even from the library of the Institute.

We begin this section with the study by Dr Sulbha Brahme, who worked on an important issue of producers' co-operatives. This came out as an occasional paper from the Institute of Social Studies The Hague. Dr Brahme worked on producers' cooperative experience in Maharashtra but she took an effort in farm co-operatives. She collected data from a village which she named as "Migao', and the co-operative Society located in the village was also called VFS for the purpose of anonymity. She has also taken an example of a successful fisherman's co-operative society from Kerala as another case study. Right from the beginning Dr Brahme was not positively placed with the idea of co-operation and she writes "*The co-operative idea was originally formulated in Europe during the early stages of capitalism. In the beginning co-operative efforts were directed towards funding model communities that were closed and small and whose structure and operations were guided by the co-operative 'gospel'*." (Brahme 1984, p. 2). Her sarcasm of using the word 'gospel' makes her disposition very clear right from the beginning. Dr Brahme seem to have been looking at the co-operatives from the angle of socialistic principles and therefore, from the beginning she seems to be little sarcastic about the entire experiment due to the end results. This observation of hers is not untrue but leads us to an anti-thesis of Dr Gadgil's original thesis. She further writes "*These efforts to withdraw from contemporary society and establish autonomous ideal communities based on cooperative principles failed for obvious reasons*" (Brahme 1984, p. 2). She does not keep any hope of developing a wide spread co-operative structure in the country. By the time she carried out this study, the evils of co-operation had already started emerging out of the black holes. The co-operative barons were dominating the State politics demonstrating filthy wealth and it was only the character of the top person in the co-operative ensured the principles of co-operation in sporadic places (Such as Hutatma Kisan Aheer Sahkari Sakhar Karkhana, Walve, see Deshpande et al 1992). She is quite sceptical about the spread of co-operatives and therefore, she writes a little sharply that "I*n the poverty-stricken and insecure, underdeveloped*

economy of India, given the absence of those policy measures which are essential to develop co-operative moments, the co-operative activity that had been initiated on an official basis and continued through the zeal of some registrars of co-operatives and certain philanthropic individuals, could not gain vitality and strength. Consequently, co-operatives could hardly take root in India during the colonial period and the co-operative movement remained insignificant" (Brahme 1984, p. 3).

Dr Brahme's study has a focus on co-operative farming under VFS society at "Migao". She looked into the development of co-operatives in Maharashtra and with a large statistical data established that Maharashtra has remained on the forefront of spread in co-operative movement. She takes a full review of farmers' co-operatives in Maharashtra and the systematically traces the emergence of VFS as a co-operative in the selected village with the initiative of Mr V, a person who initiated the co-operative. One of her genuine concern is about the social structure of the village. She observed rightly that any success or failure of co-operative efforts are on the bedrock of caste system and caste relations prevailing in the village. Dr Brahme felt that VFS members were not very enthusiastic to work on the joint farm as the drudgery of the work was little more than what they expected. Due to the lack of adequate work participation the work schedule could not be met with and planting of grapevines could not be adhered to the schedule. Her study could be looked from two perspectives. First, the socio economic survey of a village and the consequent farm economy. Second, the success and failure of the co-operative initiated in the village under the name VFS with a leadership emerging under bottom up approach. Dr Brahme while analysing the factors determining the operations of the VFS writes very poignantly that "*There are several other specific factors that have helped the formulation and development of the VFS. The co-operative was founded on the sole initiative of Mr V, who is a prominent landowner in Migao village and enjoys special recognition there. He earned this recognition mainly through the leading and crucial role he played in the village level co-operative lift irrigation scheme*" (Brahme 1984, p. 19). Possibly she was hinting at the primacy of leadership in the success of co-operatives and the emergence of the power equations that the leader has with the population, who participate in the co-operative. She found that it is the personality of Mr V, that had changed the situation and there was quite a bit of positive social impact on ironing out the caste differences in the village. This is exactly the situation of Hutatma Kisan Ahir co-pperative society. Nagnath Naikwadi and for Pravaranagar the strength of Vithalrao Vikhe Patil; were the powers behind the establishment. She also got into the role of the weaker sections so also the women in the success of the entire experiment. Her description of the model of Mr V is that of 'harmony' and therefore Mr V did not step out of the traditional jacket of a village society. She combines the analysis of the VFS society along with a fishermen co-operative society from Kerala. The fishermen co-operative in the Kerala village also works under the guidance of one individual namely Bishop P. The Trivandrum Social Service Society supported the fishermen co-operative and

the link was strong. While concluding Dr Brahme has been critical of the experience on various counts. She writes that "*The formula of co-operatives was that the poor would pool their resources and the state would extend some aid, since the resource base of the poor was too meagre to provide even a bare subsistence income. Experiences with co-operatives in India point to the basic untenability of this approach*" (Brahme 1984, p. 34). This is an approach diagonally opposite of that of Dr Gadgil's and Dr Karve's, who dreamt that co-operatives could be the saviour of the poor. Dr Brahme further states an interesting argument and she writes "*Cooperatives can play a dynamic role in India only if the structure of property relations is changed. When the means of production are socialized, the role of cooperative changes from being merely a protective and defensive organisation, because the state takes over responsibility for satisfying the basic needs of the society*". (Brahme 1984, p. 35) This argument is beset with strong inherent confusion. If the means of production are socialized, where is the need to cooperate? But in a nutshell, Dr Brahme sees little scope for co-operatives as saviour of the poor.

Around the same time Kamath (1985), published a paper in EPW on 'Co-operative Movement in Maharashtra, and he shows strong hopes that co-operatives will make a difference in the development of the state. He writes in a most optimistic way that "*The co-operative sector in Maharashtra has still the potential and the capacity to provide leadership not only to the weaker sections in this state but also for the co-operative movement and its beneficiaries in the whole country."* (Kamath 1985, p. AS 38). Interestingly we have arguments from Gadgil Karve to Kamath, who demonstrate hopes but Brahme looks at it differently. Possibly the whole scenario got entangled due to the strong control of the State agencies on the co-operative sector.

Followed by this there was a study carried out by Deshpande along with a few of his colleagues on "State Co-operation Interface" in the year 1992. Other few of the studies carried out in the Gokhale Institute on co-operation remained unpublished but have been considered as important contributions in the field. Dr Deepak Shah's studies on co-operatives have been of recent origin and he has covered quite a few issues. Our review here broadly follow these studies.

Interrelation between Government and Co-operatives

The issue of the increasing control of the State on the co-operatives came for discussion at many forums in early nineties. It was noted that the co-operatives are increasingly drawing financial support from the Government treasury and the dependence has been increasing. On one hand, the dependence of co-operatives on the state increased significantly, whereas, on the other the control of the State

machinery on the functioning of co-operatives increased sharply. This issue of the State taking control was envisaged in the earlier writings of Dr Gadgil and Dr Karve, but did not receive prominence as during those days the sector was just growing and the State support was most needed. In the Committee set up by International Co-operative Alliance under the Chairmanship of Prof D. G. Karve, the principles of co-operative were discussed elaborately and the issue of State support did feature. The tone and tenor of the argument was that the co-operatives should be independent entities and the dependence on State must be minimum (Karve 1968). It is interesting to quote Dr Karve here "*There is, however, a feeling that we are not doing enough. Especially in the matter of dropping the crutches of Government assistance and securing support from all our country men on the basis of convincing performance, co-operative as a class do not seem to be doing enough*" (Karve 1968: 32). One must appreciate the visionary statement of Dr Karve pertaining to the role of State in Co-operatives. We recognize that the views regarding State co-operative interaction changed over time even in the academic circle. Initially, the role perceived for the State was that of initiator and provider of only needed support. Prof Gadgil visualized this role of the State and to that extent of assigning a responsibility to the State of impregnating co-operative values in the spheres of economy (Gadgil 1960: 62). He also noted, elsewhere that the Government participation by way of subscribing to the share capital should not be confused as domination, but added that "*Currently the greatest obstacle in the way of progress of co-operatives in India is the situation in relation to direction of co-operative policy at the centre. This is high handed and perverse and is at the same time weak and vacillating. The most important feature of the situation is that co-operative policy is no longer made in the co-operative way*" (Gadgil 1960: 43). These early views express a caution about the role of the State but at the same time it is not expected to be nil. Actually, any discussion about the role of State in co-operative sector would be a function of structural parameters of the co-operative vis a vis State. The basic actor here would mainly be the strength of co-operative spirit, the internal cohesive nature of the society in question and the perception of the concept of State.

Therefore, the conventional understanding of State either as welfare State or State in Marxist paradigms does not fit clearly in the framework of the discussion here. Deshpande, *et. al.* (1992), attempted to trace the State co-operative inter relationship as it started from the first sugar factory established at Pravaranagar to Pushpavaty sugar factory, which was under construction in Yeotmal district in 1991-1992. (Deshpande, *et. al.* 1992, p. 29). Here it must be understood that the very nature of co-operative structure is built on the principle of self-help. Nicholson's recommendation of Raiffesian type of rural society based on compact units and joint responsibilities, was recommended keeping in view the structure of co-operative credit society. In the most cautious words it was recorded by ICA that "*It may be advisable, possibly necessary, for the Government at first to assist the nascent banks either by subvention or by guarantee"* (ICA, 1971: 65). It was further added that in the conditions prevailing in India, a direct subsidy by the State

would mark Government's recognition of the co-operative's operations but it was not imagined that such initial help will become detrimental to the growth.

Deshpande, *et. al.* (19920 also brought forth the role of Government as summarized in the resolution passed at the FAO technical meeting on co-operatives in Asia and the Far Eastern Countries way back in 1949. The resolution stated "*The role of Government in relation to co-operative societies should be one of the active usefulness intended to stimulate co-operative enterprise, to guide it and to keep it on sound lines without either attempting to compel or to replace local initiative and self-help*" (Quoted in ICA, 1971, p. 73). The role of the State began with the establishment of the first Co-operative with Dr Gadgil as its Chairman at Pravaranagar. Initially, the designed scheme of Pravaranagar Co-operative was based on the initial capital of ₹25 lakhs but the devaluation and cost of machinery caused an increase in the initially estimated capital outlay by 50 percent. The contribution from the members in the form of share capital could reach only ₹5 lakhs out of ₹6 lakhs. At this juncture, it may be stated that there was a stipulated upper limit on holding of shares which was fixed by the State Government at ₹10,000. With persuasion it was raised to ₹15,000 but hardly a few members could afford that. This financial bottleneck brought in the role of the Government to subscribe to the share capital. Prof Gadgil recorded this as "A representation was made to the Government of Bombay, dwelling on the unique character of the experiment, its vast size in relation to the resources of the cultivators and the great potential benefits of its successful operation to the co-operative movement in all directions of farming. It was a lucky circumstance for the society that the Finance Minister, who also held the portfolio of co-operation, was the leading and veteran co-operator Shri V. L. Mehta" (Gadgil 1952: 206). The Government agreed within a few months heralding the first step in the long march of the role of the State co-operative sugar factories.

The structure of co-operative mainly formed on the principles of self-reliance and democratic regulation and control. The role of the State started increasing slowly and steadily through the legislative controls. Deshpande eta al (1992) presented a comparison of the laws governing co-operatives and changes therein between 1960 and 1991 and demonstrated the increasing legal control of the State on co-operatives (Deshpande, *et. al.* 1992, pp. 52-59).

Gadgil while defending the support from the State says "*Government participation is here required for widening initially the owned resources base and to start developments. Whether this will lead to official domination or not depends on the tradition and temper of local officialdom and the strength and quality of non-official workers"* (Gadgil 1961: 36). His wishful thinking that the temper of local officialdom and the non-official workers will keep the control, did not come true. Due to the weakness of Government's participation in co-operative societies,

the government kept a hold on co-operatives through their legal hand. Gadgil's view regarding the government intervention in co-operative society was quite different from Karve's view that the co-operative society should remain an independent factor, people participation should be base and their dependency on government should be less (Karve 1968).

Gadgil was expecting the optimistic and positive role of the State. He felt that the government should take initiative or responsibility to begin co-operatives in such areas where there will be less chance of establishment of co-operative societies (Gadgil 1960: 62). There should be not be a misrepresentation that the government would be superior authority through a system of share capital purchases. The main obstacle to the progress of co-operative societies in India is the direction of the co-operative related decision of the Central Government (Deshpande, *et. al,* 1992). The irony is that the policies pertaining to co-operatives are not fixed and change from state to state. Gadgil's initial opinion was cautious about the role of Government, but possibly became critical in later years. Gadgil in his memorandum to NDC in 1959, pointed out that the co-operative societies could not perform as expected in India because the lack of vibrant government policies' backing up and decentralised local leadership. There is no doubt, we had well-structured co-operative policies but due to the Indian social structure, the true decentralisation could not come about.

Co-operations in the Liberalisation Context

Research on co-operatives remained out of fashion for quite some time after the departure of Dr Gadgil from the scene. Not for any other reason, but due to the emerging contemporary issues like poverty, input-output analysis, regional disparities and such important areas occupied the centre stage. Besides, Vakuntha Mehta National Institute of Co-operative Management (VAMNICOM), was established at Pune and their focus was entirely on research on co-operation. The studies and training at VAMNICON also indirectly reduced the interest in the area of research. Some of the excellent faculty members from GIPE also joined VAMNICON. But still some researchers continued their pursuit of studies on co-operation at GIPE. We have noted the studies conducted by Dr Sulbha Brahme (1984) and Dr R S Deshpande (1992) in the earlier phase and that is prior to 1999. These two studies were conducted in the environment prior to liberalisation. It is quite known that liberalisation process has impacted the co-operative sector significantly because of differential market orientation (Dubhashi 1992). Liberalisation has strengthened the market centralism and the co-operatives now have to compete with a few corporate giants. During this phase, Dr Deepak Shah conducted quite a few studies on co-operation. He touched many aspects that included credit, Infrastructure bottlenecks, milk co-operatives, marketing co-operatives and in the liberalisation process.

Co-operative credit has been one of the major area in which Dr Deepak Shah worked intensively. His work largely covers the period from late eighties onwards

covering the initial years of liberalisation and when the process was in full operation. He found that the co-operative credit sector in Maharashtra is weakening and it is confronting larger NPA issues in the recent past. His paper published in *Agricultural Economics Research Review* in 2007, clearly brought out the weakening of the sector. It was observed that credit flow out of credit co-operatives has slowed down and there is decline in the amount as also number of borrowers. While testing the determinants of loan borrowed through econometric analysis he noted that membership of the society had a negative influence on the loan borrowed. Which in itself is a surprising result but tells a bit about the impact of the process of liberalisation. He concludes "*The findings of this investigation have clearly shown lackadaisical approach of PACS towards SC/ST members, particularly in terms of their coverage, pattern of loan advances to them and recovery pattern*" (Shah 2007, p. 29). In another study on co-operative credit sector in Maharashtra, Dr Shah compared one developed and another under-developed district from Maharashtra in their performance in co-operative credit. He chose Sangli District Credit Co-operative Bank (SDCCB) and Buldana District Credit Co-operative Bank (BDCCB) for this purpose. He noted that both SDCCB and BDCCB showed a decline in their financial health and economic viability during late nineties as against in early nineties. Nonetheless, this deterioration in financial health witnessed particularly during the second half (between TE 1992-1993 and TE 1998-1999) of the overall period (TE 1986-1987 and TE 1998-1999) was found to be more pronounced in the case of BDCCB as not only various financial ratios estimated for this bank had declined during this period. It was observed that majority of them were seen to be beset with negative values, especially during late nineties. It was quite clear that the liberalisation impacted credit co-operatives in both developed and developing regions but the impact is sharp in the developing regions in discouraging the co-operative structure.

In another study on milk co-operatives Dr Shah used primary data from Jalgaon and Kolhapur districts of Maharashtra to understand the impact of the co-operatives on the household economy of the members of the co-operatives. In the producers' co-operatives, it was noted that income has a strong seasonality but effectively helps the family in enhancing their lifestyle. The authors noted the dynamic role of milk cooperatives as well as their multiplier effect in the economy. Even though milk cooperatives in Maharashtra do not compare any way with Amul, it is important that the milk co-operatives have recorded success in these two districts. Their success in the process continued even after the liberalisation of the market, even though a good number of private players compete with the co-operatives. Dr Shah also studied elaborately the co-operative marketing societies in Maharashtra to investigate into the reasons of their success and failure. He notes that the success of the marketing co-operatives in Maharashtra depends on the

capital intensity as well as spread of membership. He is also very specific about the market participation of these co-operative societies and the process of politicisation. Even though the study was carried out in 2004, a,b, he could not specifically focus on the impact of the liberalisation. There is a unique difference between the work of Dr Shah and earlier works on co-operation at the Gokhale Institute. Dr Shah relied more on the empirical data collected from the field, somewhat like Dr Brahme, and he utilised econometric techniques for the purpose of getting at his hypothesis.

Liberalisation has posed quite a few challenges in front of the co-operative structure in Maharashtra. The studies by Dr Deepak Shaha indicate impact on the credit co-operatives but at the same time he underscores the success of producer co-operatives even in the presence of liberalised forces. In the recent past, the researchers at the Gokhale Institute of Politics and Economics have not touched the aspect of co-operatives and politicisation, the changing role of state in the context of liberalisation supporting cooperatives, the state policies dealing with cooperatives and the role of NPAs significantly bringing down the viability of the co-operative credit structure. These are some of the areas which would need attention in the coming years.

Conclusions

The co-operative structure of Maharashtra covers three major areas namely Sugar co-operatives, Agro processing, Dairy Societies and Co-operative Credit Societies (PACs). Historical development of co-operatives in Maharashtra began with the work of Dr Gadgil and Dr Karve. The R R Kale lecture by Vakunthabhai Mehta has been one of the monumental document on the initial thinking about cooperatives in Gokhale Institute. These historical studies have set up at and opened up many issues to the researchers. Over years Maharashtra has witnessed significant development in cooperatives as well as the issues also multiplied. Large number of research work has been carried out at Gokhale Institute and here in our attempt we covered as much was available to us. If we look at the changing structure of co-operatives in the State through the lens of GIPE studies, four broad changes are visible. First, the increase in the number of co-operative societies and membership is quite substantial and that the member density per societies is steadily increasing. A substantial increase in number of the members per co-operative society was observed during the last decade 1981-91, compared to earlier decades. Second, there has been a substantial increase in capital flows in co-operative sector over the three decades. A substantial increase can be noted in working capital. Besides these trends Deepak Shah (2001, 2002 a, b, 2003, and 2007) observed that the density of capital has increased many fold during these three decades. Among the three major components of the co-operative structure, sugar co-operatives are naturally the single largest contributor to the increase in capital stock. Third important observation is that the increase in the membership and factories is not substantial in this sector as compared to dairy co-operative or

credit societies but the capital density is much larger and therefore, higher money power is concentrated in the hands of lesser number of people. Last, the capital flow in sugar co-operatives is about 18 times of an average dairy co-operative or double of the credit co-operatives. Keeping this view, the capital intensive structure of the sugar co-operatives, the density of capital is not surprising but is rather an indicator of the level of transactions and therefore the political prominence of these (Deshpande, *et. al.* 1992).

Gokhale Institute of Politics and Economics has been in the field of studies on co-operation since 1940s. The contributions of the Institute have been monumental both in terms of the theoretical paradigms put forth as also some of the interesting empirical studies. Bringing the Rochdale principles in the foreground with deliberate and been pointed discussion was done in the earlier years. Over and again the earlier researchers had insisted co-operation as one of the most important saviour of the weaker sections from rural India. Given the fact that rural India survives on margins especially with the tiny holdings and meagre resources. If these individuals have to enter into the market either as producers or as consumers, they confront hostile market situations. Market is the place where these individuals having small marketable surpluses and imperfect information about the price behaviour is suffered at the hands of market operators. In order to overcome this lacuna, it is felt essential to enhance the bargaining capabilities of these individuals. The solution was institutional and this has been recommended way back in the Britain in the form of Rochdale principles. The experience of cooperatives in India, has not been that encouraging and therefore, studies on co-operatives fell on back foot. Rochdale Pioneers and the principles governing cooperation elsewhere in the world came to the help of Indian rural masses. Vaikunthabhai Mehta, Dr Karve and Dr Gadgil had that important exposure to the international world of co-operation and brought forth significant information to be sown in the land of rural India. Almost at the same time India was reeling through an important crisis of credit market failures and domination of informal credit institutions in the form of money lenders. The fleecing of the farmers by the money lenders certainly became an important centrifugal point of their economic thinking. The initial experience of co-operation was quite successful as well as their principles in co-operation very well accepted by academia as also polity. Strengthened, with this theoretical understanding it was not difficult for them to get into putting certain experience on ground. This began with credit co-operative societies and then spread to Agro processing cooperatives. The first ever experiment of Agro processing cooperatives in sugar at Pravaranagar was successful with a strong intervention from the two giants in the co-operation sector namely Vaikunthabhai and Dr Gadgil. Around that time, Dr Gadgil contributed to many issues confronting co-operative sector and these became starting point for

many studies. After the departure of Dr Gadgil, the work on co-operation slowed down at GIPE but different issues were taken by researchers at the Institute. These included the farmers' cooperative and determinants of its failure or success by Dr Sulbha Brahme, taking a specific case study of a co-operative in Western Maharashtra and fishermen co-operative in Kerala. Dr Brahme however was not impressed by the experiment of the farm cooperatives and actually pick up a few weak spots while discussing the success of these two experiments. Dr Gadgil had made it very clear earlier in his study that the leadership matters a lot in the success of co-operation and Dr Brahme reiterated the findings by Dr Gadgil. During the early years of co-operation and the experience carried out in the State of Maharashtra the government had backed the co-operative strongly. Initially the role of government was only to support but slowly this role increased significantly. In that context the unpublished work by Dr R S Deshpande and others became an important milestone. The State co-operative interface significantly penetrated the co-operative sector and finally made co-operatives strongly dependent on the government or in the clutches of the State. That was not sufficient but slowly the government's role in the co-operative increased as a dominant administrator. With this ended the third phase of studies on co-operation at the Gokhale Institute of Politics and Economics. The fourth phase began with strong empirical studies by Dr Deepak Shah covering credit co-operatives, banking sector, infrastructure, marketing cooperatives and also milk cooperatives. The empirical work brought forth two important issues namely the credit co-operatives are weakening and so also the marketing infrastructure in the co-operative sector. But at the same time producers' co-operatives have been keeping abreast despite the process of liberalisation. In the background of liberalisation, Dr Shah noted that co-operative spirit can weaken as the market operations became intensified and more than that the credit discipline had got into peril due to intense you politicisation of the process. In an overall perspective, the studies on co-operation carried out at Gokhale Institute provided a strong platform for the researchers and students of co-operation, it is however essential to continue this spirit in the new context following the study and the working group report by Dr Bina Agarwal, who stated that getting together is an important intervention called for in the rural areas. She writes very poignantly that "*A group approach could also enable small and marginal farmers to undertake a lump investment by pooling financial resources. It is not economically viable for small farmers operating one or two hectares, especially if further fragmented, to invest in irrigation or machinery such as tractors or even keep a pair of Bullocks all-round year*" (Agarwal 2007, p. 17). She also voiced a strong concern in the Working Group of the 12th plan headed by her reiterating need for getting together by the small and marginal farmers is not on co-operative basis but on the basis of an informal group. In short, co-operation is the only saviour for the small and marginal farmers for credit, Agro processing or many of their needs which require confronting the hostile market and that was very strongly underscored by the studies carried out at Gokhale Institute of Politics and Economics.

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Growth of Non-Banking Financial Sector in India: Trend and Determinants

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In this article we have analyzed the trend growth of non-banking financial companies (NBFCs) in India as well as the impact of number of NBFCs, policy intervention by RBI, ratio of market to bank borrowings and economy's investment rate on the asset size of NBFCs. Our results highlight the significant negative impact with first two variables and positive but insignificant impact with the other two. This requires policy intervention by RBI to be calibrated in tune with containing the systemic risk and facilitating the growth of NBFCs sector. The optimized policy intervention requires redefining the concept of systemically important NBFCs in India.

Keywords*:* Non-banking financial company (NBFC), Regulations, Asset size, Systemically important.

I Introduction

Non-Banking Financial Companies (NBFCs) are an integral part of Indian financial system. They are lender of first resort for the large group of niche segments which remains underserved by the mainstream banking sector such as financing of second-hand vehicles, construction equipment, working capital financing, customized loans to micro and small industries, etc. Moreover, they also provide basic financial services such as micro-insurance, loans, savings instruments etc. to the poor and marginalized sections which do not have access to mainstream banking (Bhaskar 2014). Therefore, it won't be wrong to say that the NBFCs are the bank of the poor. Apart from this, NBFCs also broaden the capital base of the economy by providing finance to the infrastructure projects and invest heavily in the real estate segment through Infrastructure Finance Company (NBFC-IFC), Infrastructure Debt Fund (NBFC-IDF) and Housing Finance Company (HFC). Importance of the NBFC sector is also evident by its increasing share in the Indian economy which is reflected in the robust increase in the share of its asset size to the gross domestic product (GDP) at current price from 7.94 per cent in 2005-2006 to 16.6 per cent in 2019-2020.

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Healthy and robust growth of the NBFC sector is thus a definite indicator of the growth of small and marginalized segments of economy. Hence, it is extremely important to analyze the trend of growth of the NBFC sector. The total number of non-banking financial companies has fallen from 13,014 in 2005-2006 to 9618 in 2019-1920 (refer Appendix Table A1). In contrast to it, asset size of the non-banking financial company sector has increased multifold during the same period (refer Appendix Table A2). In terms of asset size, with compound annual growth rate of 18.7 per cent per annum during 2005-2006 to 2019-2020, NBFCs are one of the fastest growing segments of the Indian financial system. Surge in the growth of assets may be on account of several factors which may involve some sector-specific and few macro-variables. With regard to sector specific factors, one of the most important factors is the source of funds for the non-banking financial company's sector. Funds are mobilized from two sources namely banks borrowings and market borrowings. However, due to Infrastructure Leasing and Financial Services (IL&FS) crisis and its impact on the investor's confidence, the share of market borrowings shrank and dependence on bank borrowings increased (Report on trend and progress of banking in India, 2019-2020) which is evident from the decline in the ratio of market borrowings to bank borrowings from 3.1 in 2016-2017 to 1.9 in 2019-2020. Further, the investment rate of the economy, ratio of gross fixed capital formation to gross domestic product, is a major macro-economic variable that can affect the NBFC sector. It has fallen from 32.7 per cent in 2005-2006 to 28.7 per cent in 2019-2020. Apart from these factors, the most important factor which contributed to the growth of NBFCs in India is the fact that they are lightly regulated vis-à-vis banks and imposition of lighter regulations provided them space to breathe freely and expand at a faster pace.

Above growth story of non-banking financial companies is accompanied with the consistent tightening of regulatory norms on the sector. Reserve Bank of India introduced a revised regulatory framework in 2014 in which the threshold of asset size for identifying the non-deposit taking systemically important non-banking financial companies is revised from ₹100 crore to ₹500 crore. Moreover, the threshold of minimum net owned (NOF) increased from ₹2.5 million to ₹20 million and the capital adequacy framework was further strengthened by raising the requirement of Tier I capital for NBFC-ND-SI and NBFC-D up to 10 per cent in a phased manner by March 2017. Moreover, asset classification and income recognition norms were also subsequently introduced. Despite shielding the non-banking financial companies with a number of regulations, the sector was hit by a major crisis in 2018 when a large core investment company (NBFC-CIC) named Infrastructure Leasing and Financial Services (IL&FS) defaulted on several of its debt obligations and triggered a liquidity crisis in the NBFC sector which in turn affected the flow of funds in this sector. This shook the confidence of investors who are actively investing in the sector and hence in order to restore the confidence, RBI took a slew of regulatory and supervisory measures which are now tightening the loosened hold on this sector. Some of the important policy responses were amendments in the RBI Act 1934 through Finance Bill 2019 which

conferred powers on RBI to supersede the board, remove the directors of NBFC and several other governance measures, liquidity risk management framework for NBFCs in 2019 and scale-based regulatory framework for NBFCs in 2021. All the aforementioned measures were taken with the objective of protecting the NBFC sector from any major collapse which could amplify and may transform in a systemic risk contagious to other segments of the financial system due to high interconnectedness and hence pushing the financial system in a state of paralysis. Undoubtedly the objective behind these measures is a noble one, but it also carries the potential to slow down and negatively affect the growth of NBFC sector. The statement is not without logic as the prudential norms introduced by RBI in the recent past is imposed on two important sub-sections of the NBFC sector namely deposit taking NBFCs (NBFC-D) and non-deposit taking systemically important NBFC (NBFC-ND-SI). Among the two, NBFC-ND-SI holds 85.7 per cent of total assets of the NBFC sector. Imposition of regulations on this segment implies covering almost 86 per cent of NBFCs asset under relatively strict regulations. Instead of extending the regulations to such a large segment, it is important to place prudential regulations on few handful of companies which are identified to be posing a threat to the financial system. In global space such financial institutions are tagged as systemically important financial institutions (SIFI).

Globally, the tag of systemically important is assigned only to those financial institutions that have crossed thresholds of defined qualitative and quantitative parameters and are posing a threat to the financial system in such a manner that may cause systemic failure due to their collapse. In India, on the other hand, the term systemically important is used to denote the non-deposit taking NBFCs that have crossed the asset size limit of ₹500 crores, the threshold of which has now been revised to ₹1000 crore in recently published scale-based regulations for NBFCs, with the underlying assumption that they all pose systemic threat to the financial system and hence they do not undergo any filtration process. This classification of the systemically important is not only in wide divergence with the spirit in which it is used across the globe but is also the cause of encompassing the entire NBFC sector within the ambit of newly introduced regulations on the NBFC sector. Therefore, in the light of increasing relevance of the NBFC sector in Indian economy and impact of regulations on its rate of expansion, it is important to study the trends of various growth indicators of the NBFC sector and impact of some sector specific and macro-economic indicators on its rate of expansion.

II Literature Review

The purpose of this article is to analyse the growth of non-banking financial companies in India and investigate the impact of several factors affecting the growth of assets of non-banking financial companies. In this context, Ordonez (2018) has highlighted that the regulation such as capital requirements on banks are both blessings and a curse as it, on the one hand, compels banks to avoid investment in risky asset but it also prevents investment in highly efficient assets

that are mis-classified as risky. Shadow banking covers the avenues which provide banks with an option of superior investment opportunity along with highly risky investment option. He further found that presence of shadow banking in an economy optimizes the allocation of funds. Moreover, shadow banking expands on account of asset bubbles and higher leverage. He also concluded that tightening of regulation on shadow banking in United States of America through Basel III accord and Dodd-Frank Act, is not healthy for the growth of shadow banking because in spite of the fact that it reduces risks, simultaneously it also quashes the possibility that banks could invest in more efficient financial product. Although facilitating shadow banking activities pose high risk of crises, it also equips economy with larger investment efficiency. Therefore, he proposed that banks should be allowed to decide whether they want to be regulated or unregulated. If they choose to be regulated then, they should be subsidised and those that chose to avoid regulations should be taxed. Therefore, banks with superior assets would choose to avoid regulation and prefer to invest in risky assets but banks with inferior asset would prefer to be regulated. They will optimize both the risks and investment efficiency. He also showed that although regulators face trade-off between discouraging excessive risk-taking and preventing efficient investment, optimization lies in not discouraging the shadow banking.

Apostoaie and Bilan (2019) have assessed the determinants of growth of shadow banking in 11 Central and Eastern European countries for the period 2004-2017 using the panel data estimation technique. For independent variable, they have considered real gross domestic product growth rate, growth rate of total financial assets of insurance corporation and pension funds, term spread, money market rate, growth of assets of monetary and financial institutions and growth rate of total reserves except gold. Growth rate of total financial assets of other financial institutions (excluding pension funds and insurance companies) and growth rate of total financial assets of other financial institutions (excluding pension funds and insurance companies and investment funds) are the dependent variables. They found that economic growth has a positive impact on the expansion of shadow banking sector. Further, funds demanded by the institutional investors also have a positive impact on the expansion of shadow banking sector. During the low interest rate period, investors head towards shadow banks in search for better yields, leading to a positive impact on growth of shadow banks. Lastly, shadow banks grow in pro-cyclical manner with the development of the rest of the financial system, especially banks.

Green and Broomfield (2013) have criticized the old view of policy debate and regulatory framework on shadow banking. They have considered origin of non-bank entities as a consequence of regulation on regular shadow banking system. They also cynically discussed the application of prudential bank regulation on NBFCs and efforts to limit the exposure of commercial banks from entities and activities outside the regular banking system. According to them, in the present complex financial system, banks and non-banks cannot be examined in isolation. They further appreciate the Financial Stability Board's move to address the

shadow banks on the basis of economic function rather than as entities. Regulation should be imposed by examining the activities rather than simply on the basis of entities. It will be far flexible and won't be blocking the growth of non-banks. Similarly, Financial Stability Oversight Council made the move to designate systemic activity and address the issues of regulation on them rather than simply identifying the non-bank systemically important financial institutions and extending banking laws to them, because banking regulation have matured overtime, to tackle the function of a special kind of financial institutions. And their extension to non-banks is dubious. Moreover, since the origin of non-bank was caused by excess regulation on commercial banks, therefore, simply extending the banking regulation to non-banks will again shift the risk beyond the scope of regulation. There is a need to adopt a tailored regulatory framework that will contain the risk without nudging it to shift beyond regulatory framework. Lastly, they have concluded that non-banking activities are an entrenched component of financial system and there is a need to adopt policies that retain the benefits of shadow banks and maintaining the diversity and resilience of the financial system.

In a report named Strengthening the Regulation and Oversight of Shadow Banks, prepared by Gelzinis (2019), it is emphasized that the lack of regulation and supervision on large and deeply interconnected shadow banks was one of the chief factors behind the Global Financial Crisis of 2007-2008. Failure of large systemically important non-bank financial companies such as AIG and Lehman Brothers, heavily damaged the financial system of United States of America. Absence of a centralised regulatory and supervisory body which could look across the financial system led to creation of various arbitrages which were used by financial institutions to establish their operations in line with these arbitrages. All these factors led to the passing of Dodd-Frank Act which established Financial Stability Oversight Council (FSOC) with the power of identifying the systemic risk and mitigating it. And one such power was designating systemically important non-bank financial companies and imposition of enhanced prudential norms on them. However, during the Trump administration, the FSOC was significantly diluted by reducing its budget, cutting down of staffs and introduced major amendments in the designation procedure. These steps made the financial system of USA more exposed to threats. The Report recommended four policy proposals to strengthen the regulatory framework shadow banks which will further make the financial system more resilient and robust.

Oncu (2013) has explained the definition of shadow banking in detail. The term shadow banking was coined by economist Paul McCulley and the most popular definition is given by the Financial Stability Board (FSB) which is explained as the credit intermediation involving entities and activities outside the regular banking system. In Indian context, Reserve Bank of India considers non-banking financial company as analogous to shadow banking system because they perform the credit intermediation activities outside the ambit of regular banking system of India. Reserve Bank of India has classified non-banking financial companies on the basis of functions they perform, their systemic importance and

the acceptance of deposits. The author has broadly classified the non-banking financial companies into investment and finance companies. Among the non-deposit taking systemically important non-banking financial companies, finance companies form almost 70 per cent of total assets of all systemically important ones in 2011 and are actively performing the credit intermediation function along with relatively higher interconnectedness with the banks.

Acharya, *et. al.* (2013) have analysed the growth of non-banking financial companies (NBFCs) in India and found that NBFCs in India are a substitute of banks in non-urban regions for direct lending. They have considered the dataset of non-deposit taking systemically important non-banking financial companies (NBFC-ND-SI) constituting two major sets namely investment and financing companies for the period 2006-2011. Since NBFCs depend significantly on the funds given by banks as source of their funding, they studied the impact of NBFC-Bank linkage on the credit growth along with variation in linkage across different types of banks, i.e., public sector as well as private sector banks, rural versus urban bank and between investment and financing type of NBFCs. Further, they also studied the impact of global financial crisis 2008 on these linkages. They have found that bank's lending to NBFCs varies with bank's allocation to priority sector lending and is inversely related with the expansion of bank's branches in the non-urban region. Moreover, this NBFC-bank linkage exists and affects only the credit growth of loan financing NBFCs and not of investment companies. Therefore, they reached the conclusion that the NBFCs are viewed as substitute of bank's lending in non-urban parts of India. After the global financial crisis 2008, bank's lending to NBFCs contracted due to shift of term deposits.

Research Gap: Due to lack of enough detailed study on growth of non-banking financial companies in India, it has become mandatory to undertake detailed exercise regarding the growth of their asset size and factors which have impacted their growth over the years 2005-2006 to 2019-2020. It is also important to have detailed analysis because of increasing regulations through recently introduced scale-based regulations which will bring massive fundamental change in the structure of NBFCs and consequently will affect the growth of the non-banking financial company sector.

III Objectives and Hypotheses

In view of the fact highlighted in the research gap that there is hardly any detailed study regarding growth of non-banking financial companies and factors that have impacted the growth over the years 2005-2006 to 2019-2020, we have formulated two objectives:

1. To analyze the pattern of growth of non-banking financial companies in terms of their numbers and asset size.

2. To analyze the factors affecting the asset size of non-banking financial companies.

Given the introductory background, we have observed that there has been a decline in the number of non-banking financial companies over the period under study (2005-2006 to 2019-2020) which doesn't augur well for expansion of their volume of business growth in the country. As regards the association between the number of non-banking financial companies and their asset size, we have hypothesized that:

H_{a0}: There exists no relationship between number of non-banking financial companies and their asset size.
H_{a1}: There is a significant negative relationship between number of non-banking financial companies and their asset size.

In addition, it is also been observed in the introductory background that policy intervention by Reserve Bank of India, specially since 2014, has gained pace which could prove detrimental in the efforts put up by non-banking financial companies to expand their activities. Hence, in order to trace the impact of policy changes on the growth of asset size, our hypothesis is as follows:

H_{b0}: There exists no significant negative impact of policy interventions by Reserve Bank of India on asset size of non-banking financial companies.
$H_{b1:}$ There is a significant negative relationship between policy interventions by Reserve Bank of India and asset size of non-banking financial companies.

Further, one expects cyclical movement of growth of asset size of non-banking financial companies with ratio of market borrowings to bank borrowings as well as with the investment rate in the economy. In this context, we have hypothesized that:

H_{c0}: There exists no relationship between ratio of market borrowings to bank borrowings and asset size of non-banking financial companies as well as between investment rate and asset size of non-banking financial companies.
$H_{c1:}$ There is a significant positive relationship between ratio of market borrowings to bank borrowings and asset size of non-banking financial companies as well as between investment rate and asset size of non-banking financial companies.

IV Methodology and Data Source

The number of non-banking finance companies and their asset size are plotted for the period 2005-2006 to 2019-2020. Growth rate of number of non-banking finance companies and their asset size is calculated using the Compound Annual

Growth Rate (CAGR). The generalized compound annual growth rate is obtained through following equation:

$Y_t = ab^t$

where Y is the variable for which compound annual growth rate is to be estimated, a is constant, b is regression coefficient, t is time period and compound annual growth rate is estimated using following formula:

CAGR = (Exp(b)-1) *100

We have also estimated the linear growth rate of a number of non-banking financial companies for the periods 2005-2006 to 2016-2017 and 2016-2017 to 2019-2020 by estimating β in the equation:

$N_t = \alpha + \beta t$

Where N is the number of non-banking financial companies, α is the constant, β is the regression coefficient and t is time. Once β is estimated, linear average growth rate for each time period is computed by dividing β with the mean of N. Further, weighted linear average growth rate which is the horizontal weighted summation of two linear average growth rates from 2005-2006 to 2016-2017 and 2016-2017 to 2019-2020 is estimated as follows:

$N_t = (w_1N_1 + w_2N_2)/ (w_1 + w_2)$

Where N_t is weighted linear average growth rate at time t, w_1 is weight assigned to the linear average growth rate for the period 2005-2006 to 2016-2017 (N_1) and w_2 is weight assigned to the linear average growth rate for the period 2016-2017 to 2019-2020 (N_2). These weights are on the basis of number of years covered in each of the two periods.

In order to capture the impact of policy intervention of Reserve Bank of India in the non-banking financial companies (NBFCs) sector which gained pace since 2014 and were further strengthened post Infrastructure Leasing and Financial Service (IL&FS) crisis, along with the impact of a number of non-banking financial companies, we have applied the dummy variable regression model as it is a regression model with the admixture of both qualitative and quantitative parameters. We have considered the log values of a number of non-banking financial companies and a dummy variable as explanatory variable assigning values 1 since 2017-2018 and 0 otherwise. We have analyzed their impact on the dependent variable which is the log values of the asset size of non-banking financial companies. The regression equation, therefore, is:

$Ln (A_t) = \alpha_1 + \beta_1(Ln\ N_t) + \beta_2(D_i) + u_t$

Where A_t is the asset size of non-banking financial companies at time t, α_1 is the intercept term, β_1 is regression coefficient associated with the number of non-banking financial companies at time t (N_t) and β_2 is the regression coefficient associated with dummy variable (D_i), such that $D_i = 1$ for the period 2017-2018 to 2019-20 and 0 otherwise for the period 2005-2006 to 2016-2017, u_t is the error term.

Further, we have performed a multiple regression analyses to analyze the determinants of growth of NBFCs assets with NBFC asset as dependent variable and a number of NBFCs, dummy variable, ratio of market borrowings to bank borrowings and investment rate in the economy as four explanatory variables. The multiple regression model is shown as follows:

$$\text{Ln}(A_t) = \alpha + \beta_1 \text{Ln}(N_t) + \beta_2(D_i) + \beta_3 \text{Ln}(\text{MB\_BB}) + \beta_4 \text{Ln}(\text{gfcf\_gdp}) + u_t$$

Where A_t is asset size of non-banking financial companies at time t, α is the intercept term, β_1 is regression coefficient associated with the number of non-banking financial companies at time t (N_t), β_2 is regression coefficient associated with dummy variable (D_t), such that $D_t = 1$ for the period 2017-2018 to 2019-2020 and 0 otherwise for the period 2005-2006 to 2016-2017, β_3 is regression coefficient associated with ratio of market borrowings to bank borrowings of non-banking financial companies (MB_BB) and β_4 is the regression coefficient associated with ratio of gross fixed capital formation to gross domestic product at current price (gfcf_gdp) and u_t is the error term. We have also plotted the ratio of market borrowings to bank borrowings of the non-banking financial companies' sector for the period 2005-2006 to 2019-2020.

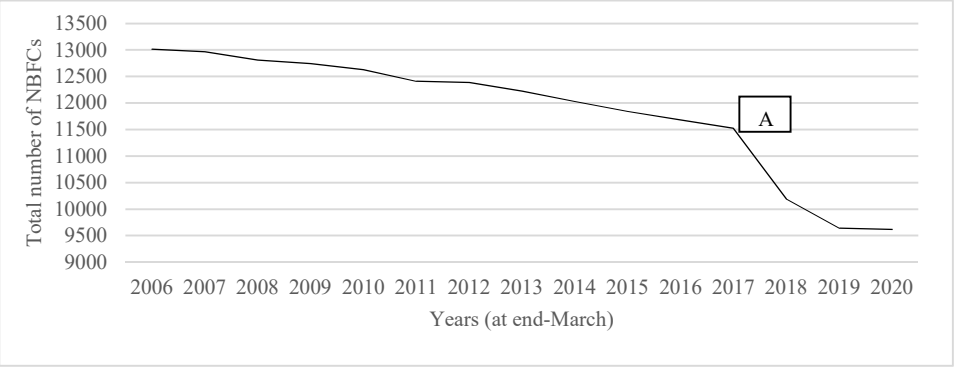
Data of numbers of non-banking financial companies, their asset size and ratio of market borrowings to bank borrowings is accumulated from various editions of report of trend and progress of banking in India for the period 2005-2006 to 2019-2020. Data of gross fixed capital formation and gross domestic product at current prices is obtained from the website of ministry of statistics and programme implementation (MoSPI). We have taken up the period after 2005-2006 because of the introduction of a new category of non-banking financial company namely systemically important non-deposit taking non-banking financial companies (NBFC-ND-SI) which have a major share in total assets of the NBFC sector.

V Analysis

Keeping in view the first objective, we have analyzed the growth of non-banking financial companies in terms of their number and asset size for the period 2005-2006 to 2019-2020. In 2005-2006, the total number of NBFCs was 13,014 which declined to 9,618 in 2019-2020. However, asset size of NBFC sector has increased from ₹2,88,593 crores to ₹33,89,267 crores in the said period. A macro look at

trend of total number of NBFC shows that the decline has been steady up till 2016-17 and then the reduction has become more steep after 2016-2017 (refer Figure 1).

Figure 1: Trend of Growth in Number of Non-Banking Financial Companies



Source: Report on Trend and Progress of Banking in India, 2005-2006 to 2019-2020.

The decline in the number of NBFCs has been at a rate of 2.1 per cent, since 2005-2006 to 2019-2020 (refer Table 1). However, a closer scrutiny of this broad trend (refer figure 1) shows a point of kink at A corresponding to year 2016-2017, post which there is a steep fall in number of non-banking financial companies. This could be regarded as an important point of change in the pattern of decline in the number of non-banking financial companies. It has in fact split the overall trend into two different linear paths with latter being far steeper than the former. Therefore, year 2016-2017 could be regarded as the *year of great divide* in the one and half decadal history of number of NBFCs. Considering 2016-2017 as the year of great divide, the weighted average growth rate of the two linear paths (one prior to A and other after it) is in excess of CAGR for the entire period (refer Table 1). This reflects the steeper tendency of decline in NBFCs than what otherwise one could have inferred just on the basis of CAGR of the number of NBFCs. This is a matter of concern and requires investigation to know the rationale behind this pattern of decline in the number of NBFC.

Table 1: Various Growth Rates Pertaining to Number of NBFCs and Their Asset Size

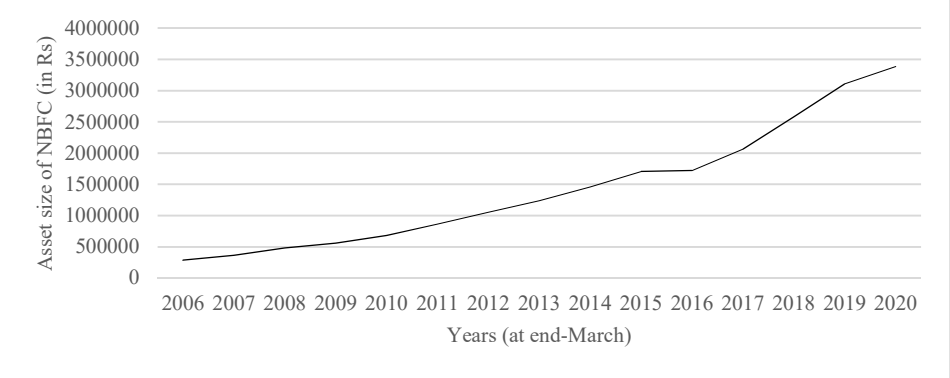
(in % per annum)

	Compound Annual Growth Rate (CAGR)			
Period	2005-06 to 2016-17	2017-18 to 2019-20	2005-06 to 2019-20	
Asset size	19.6	14.5	18.8	
Period	Linear Growth Rate		Weighted Linear GR	CAGR
	2005-06 to 2016-17	2016-17 to 2019-20	2005-06 to 2019-20	2005-06 to 2019-20
Number of NBFCs	-1.11	-6.1	-2.3	-2.1

Source: Authors' estimation based on data from Report on Trend and Progress of Banking in India, 2005-2006 to 2019-2020.

The continuous decline in the number of non-banking financial companies was on account of greater cancellation of certificate of registration as compared with the new registrations. The increase in cancellation of certificate of registration was consistent because of non-compliance with the strict entry point norm which requires maintenance of a minimum net owned funds of ₹2 crores. Moreover, certificate of registration has also cancelled due to exit of NBFCs from the business of deposit taking. However, since the Infrastructure Leasing and Financial Service (IL&FS) crisis in 2018, there has been continuous policy intervention by RBI to strictly monitor and regulate the business activity of NBFCs that accentuated the decline in their numbers (refer Table 1). As a contrast to the number of NBFCs, total asset size of NBFCs has continuously increased since 2005-2006 (refer Figure 2). The estimated CAGR of the total assets of the NBFCs since 2005-2006 is 18.76 per cent (refer Table 1).

Figure 2: Trend of Total Asset Size of Non-Banking Financial Companies



Source: Report on Trend and Progress of Banking in India, 2005-2006 to 2019-2020.

Considering 2016-2017 as the *year of great divide,* the computed compound annual growth rate of asset size of NBFCs for the period 2005-2006 to 2016-2017 and from 2017-2018 to 2019-2020 stood at 19.6 per cent and 14.5 per cent respectively (refer Table 1). Obviously, the rate of expansion of the asset size of NBFC sector slowed down in the second phase from 2017-2018 to 2019-2020. Two immediate factors that have emerged from analysis which have tended to slow down growth of asset size are steeper decline in number of NBFCs overtime and other is the stricter policy intervention by RBI, especially since 2017-2018. These observations require empirical support to hold true which has been provided by fitting a regression equation between the growth of asset size as dependent variable and number of NBFCs along with dummy variable for policy intervention since 2017-2018, for which D_i=1 and 0 otherwise. The estimation of this regression equation has also enabled us to verify first two hypotheses: that of significant association between asset size, number of NBFCs and policy intervention. The estimated regression equation is given in Table 2:

Table 2: Results of Estimated Regression Equations

Regression Results when Dummy (D_i) = 1 for 2017-18 to 2019-20 & 0 Otherwise			Regression Results when Dummy (D_i)=1 for 2016-17 to 2019-20 & 0 Otherwise	
Intercept term and Regressors	Regression coefficient	Adj. R^2	Intercept term and Regressors	Adj. R^2
Constant	-147.7* (10.52)	0.924	87.8 (4.4)	0.741
Log of number of non-banking financial companies	-14.2* (-9.54)		-7.8 (-3.7)	
Dummy variable	-2.0* (-5.50)		-0.32 (-0.67)	

Notes: Figures in the parenthesis are t-values, * Shows significance at one per cent probability level.

Source: Authors' estimation based on data from Report on Trend and Progress of Banking in India, 2005-2006 to 2019-2020.

From Table 2**,** it is evident that regression coefficients associated with the number of NBFCs and dummy variable (D_i=1 since 2017-2018 and 0 otherwise) are negative and significant. One percent increase in number of non-banking financial companies is associated with a 14.2 per cent decrease in asset size of the non-banking financial companies. Moreover, the years of regulatory interventions, reduces the of asset size of non-banking financial companies in a greater proportion, keeping all other factors constant. Therefore, null hypothesis stands rejected and alternative hypothesis is accepted, regarding significant negative association between asset size and number of non-banking financial companies along with response of policy changes as is measured by dummy variable. More than 93 per cent of variations in the log values of asset size of NBFCs is explained by explanatory variables. This means that events unfolded since 2017-2018 have significantly affected asset size.

It is in place and necessary to mention another important finding from Table 2, that if we just shift the dummy variable to immediately preceding year (i.e., D_i = 1 since 2016-2017), the regression coefficient associated has changed dramatically (refer Table 2) and has become insignificant. Though, one may argue that the period of last three years for which D_i takes value 1 is short, it is pivotal in the sense that the moment we drag the dummy one year back, the dummy variable loses its significance which implies that we cannot ignore the policy change since 2017-2018, which has been instrumental in impacting the growth of asset size. This shows convincingly that there were some events since 2017-2018, that have turned those insignificant regression coefficients into significant ones. Those events include both the policy interventions introduced by Reserve Bank of India since 2014 and the crises crippling the NBFC sector, as well as the policy responses to those crises. In 2018, Infrastructure Leasing and Financial Service (IL&FS) defaulted on several of its debt obligations which led to rating downgrades and liquidity stress in the NBFC sector. As a policy response to which, RBI and government of India took a slew of measures such as introduction of Finance Bill 2019, which conferred powers on RBI to strengthen the governance of NBFCs, liquidity risk management framework etc. Externalities arising out of crisis along with the tightening of regulation on entire NBFC sector, led to a fall

in the growth rate of asset size of NBFCs from 19.6 per cent in 2005-2006 to 2016-2017 to 14.3 per cent in 2017-2018 to 2019-2020.

In addition to these two factors, there are other factors too that have bearing on growth of asset size of NBFCs which should be included in the regression model so that the behavior of these two variables (i.e., number of NBFCs and dummy variable representing stricter policy regulation) along with other plausible factors, could be comprehensively captured. In this context, an additional factor that influence asset size, is ratio of market borrowings to bank borrowings of NBFCs, because both of them are important sources of funds to NBFCs. And movement in their ratio would obviously exert its clout on asset size of NBFCs. Besides this, another important factor is investment rate of the economy, increase in which implies surge in aggregate demand for goods and services that requires financial institutions including NBFCs to cater the emerging financial needs of the economy. Both these additional variables are expected to cause positive impact on growth of asset size of NBFCs and whether their positive impact is strong enough to dilute the negative impact of other two variables (i.e., number of NBFCs and dummy variable representing stricter policy regulation). The inclusion of the two additional variables namely ratio of market to bank borrowings and investment rate of the economy, has also facilitated in verifying the third hypothesis regarding the significant positive impact of ratio of market to bank borrowings and investment rate on the asset size of NBFCs. Thus, in all, there are four plausible determinants of growth of asset size of NBFCs. The impact of all these four variables on the growth of asset size is highlighted in Table 3, which shows the results of fitted regression equation:

Table 3: Results of Estimated Regression Equation

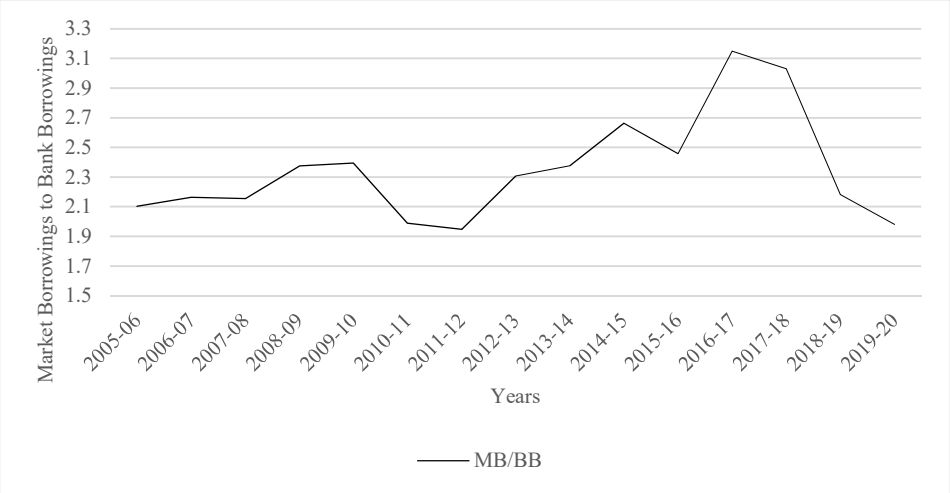
Intercept term and Regressors	Dependent term: Ln of asset size of NBFCs	t	p-values
	Regression Coefficients		
(Constant)	172.224	7.392	.000
LnNBFCno	-16.598	-7.107	.000
Dummy	-2.265	-5.348	.000
LnMB_BB	.977	1.930	.082
Lngfcf_gdp	2.660	1.644	.131

Source: Author's estimation based on data procured from Report on Trend and Progress of Banking in India and NAS, MoSPI.

The value of adjusted R^2 for the model stood at 0.935 whereas Durbin-Watson d statistic (d*) stands at 1.8 which falls within the range of $d_U < d^* < 4\text{-}d_U$ (Koutsoyiannis 2011) implying that the null hypothesis of no autocorrelation is accepted. Moreover, we also tested for multicollinearity using the Klein's rule of thumb (Gujarati, *et. al*. 2012) and found absence of severe multicollinearity among the regressors. The value of R^2 for the model, i.e., when asset size is regressed on rest of four explanatory variables, is 0.953 which is greater than the R^2 obtained

from the auxiliary regression which is obtained by regressing the independent variables namely investment rate, ratio of market borrowings to bank borrowings, number of non-banking financial companies and dummy variable, on each of three others, the value of R^2 for which is 0.851, 0.480, 0.951 and 0.909 respectively. Clearly in each case the value of R^2 is less than the overall R^2. Hence, as the Klein's rule of thumb states that the multicollinearity may be troublesome only if the R^2 obtained from an auxiliary regression is greater than the overall R^2, it is clear from the above that there is absence of severity of multicollinearity. Table 3 shows that the impact of number of NBFCs and dummy variable is negative and significant on the growth of asset size which is in consonance with the results displayed in Table 2. One percent rise in number of non-banking financial companies reduces the asset size by 16.5 per cent whereas the years of regulatory interventions on the non-banking financial companies sector depress their assets in a greater proportion. However, ratio of market borrowings to bank borrowings of the NBFC sector (LnMB_BB) and investment rate (Lngfcf_gdp) in the economy have positive but insignificant impact on the NBFC assets. Here, alternative hypothesis stands rejected while null hypothesis is accepted, regarding association of ratio of market borrowings to bank borrowings and investment rate in the economy, with the asset size of non-banking financial companies. Now, one needs to dig deeper into the insignificance of the coefficient associated with the ratio of market borrowings to the bank borrowings and investment rate (refer Table 3). The insignificant and positive association of ratio of market borrowings to the bank borrowings with the assets of NBFC sector implies that the change in ratio of market borrowings to bank borrowings couldn't significantly prop up the asset size of NBFC sector. We have plotted the ratio of market borrowings to bank borrowings with respect to years under analysis (2006-2020) (refer Figure 3).

Figure 3: Ratio of Market Borrowings to Bank Borrowings of NBFCs



Source: Report on Trend and Progress of Banking in India, 2005-2006 to 2019-2020.

The movement of the curve (refer Figure 3) exhibit two important years of change when there was a steep fall in this ratio, one in 2009-2010 and other in 2017-2018. The initial point of change appears to be transitory in nature emerging from the global financial crisis 2008 which compelled NBFCs to streamline their market borrowings while the second year of change happens to be permanent in the sense that it has emerged because of certain regulations imposed by RBI which cannot be set aside unless regulations are repealed. But there is little possibility on any stepping by the Reserve Bank of India in regard to reallocation of prudential norms on selectively identified NBFCs as future course of action has already been put forth by RBI in the form of Scale Based Regulatory (SBR) Framework to be implemented with effect from October 1, 2022. This permanent shift occurring since 2017-2018 has caused the ratio of market borrowings to bank borrowings to exert insignificant impact which otherwise would have been significant. Our inference is also supported by the fact that the dummy variable continued to exercises negative and significant impact on the asset size of NBFC (refer Table 3). This dummy also points to the changes since 2017-2018 have adversely affected the NBFCs growth of asset size. It is interesting to notice that the second year in which ratio of market borrowings to bank borrowings has declined steeply is coinciding with the year of structural change that was diagnosed while analyzing the trend of growth of NBFC sector when the number of NBFCs has also declined and this decline is steep, which is also a consequence of tightened regulatory norms.

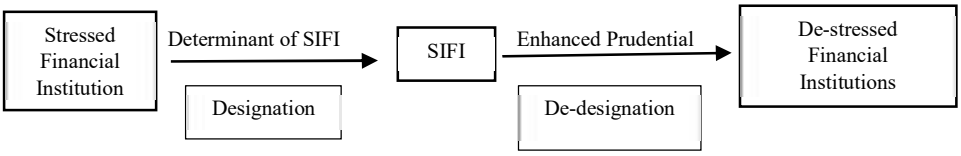
Lastly, investment rate defined in terms of ratio of gross fixed capital formation to gross domestic product at current price, has a positive but insignificant impact on the asset size of NBFCs (refer Table 3). The disconnect between investment rate and asset size of NBFCs implies that the NBFCs have their penetration in those segments which are not actively catered to by the mainstream investments due to highly risky nature of those segments. Risky nature of segments requires a specialized financial institution which can precisely optimize the risk and investment efficiency. Hence such financing is undertaken by the NBFCs sector which specializes in undertaking loans and demands of those segments. For instance, NBFCs target second-hand vehicle finance, promoter finance, buy now pay later, etc., which are lightly touched by the mainstream investments. Due to their active involvement in these segments, NBFCs develop an eye to see more in less, i.e., they can cater to the customer efficiently on individual basis and optimize the risk associated with them. Moreover, NBFCs are the chief innovators in the financial system as they play a vital role in innovating the financial instruments which can be later adopted by the banks in the long run. Loans against gold and housing finance in India are prime examples of such innovations which were later embraced by banks. Recently, buy now pay later (BNPL) mode of credit disbursement is being pioneered by the NBFCs and is widely accepted by mainstream banking system.

In the light of major determinants of growth of non-banking financial companies in India, it is quite evident that regulatory interventions are a major

factor. Recently with the advent of scale-based regulatory framework and prompt corrective action framework for non-banking financial companies, Reserve Bank of India has clarified its objective of tightly regulating the non-banking financial company sector and imposing bank-like regulations on some of them. Regulatory interventions are done with the aim of curbing the risks emanating from the non-banking financial sector. However, are detrimental in the growth path of the NBFCs as is clear from the above analysis. Therefore, it is important to understand the extent of coverage of regulations on the non-banking financial companies. It is in place to mention that the risk-taking is a unique selling proposition (USP) of NBFCs in which they specialize as they target specific segments and understand deeply the credit-worthiness of the loanee. Curbing the risk by putting uniform regulations on the NBFCs will be the beginning of restraining the growth opportunities of NBFCs and hence the sector in which they finance actively. It is very important to analyze the risk versus investment efficiency before imposition of enhanced prudential norms and large companies whose risk has exceeded the investment efficiency are the ones which are systemically important for the economy and hence their business must be cut-down to the extent that risk posed by them is less than or equal to their investment efficiency. Only such companies must be tagged as systemically important and made subject to enhanced prudential norms. The devil lies in details of usage of term systemically important with respect to NBFCs in India.

Currently, NBFCs are classified on the basis of their asset/liabilities structure, systemic importance and type of activities. In terms of systemic importance, non-deposit taking NBFCs are classified into systemically important non-deposit taking NBFCs (NBFC-ND-SI) and other non-deposit taking NBFCs (other NBFC-ND). Non-deposit taking NBFCs having an asset size greater than ₹500 crore are classified as NBFC-ND-SI, threshold of which has now proposed to be revised to ₹1000 crore, in recently published scale-based regulations with effect from 01 October 2022. The methodology of assigning the tag of systemically important is the Achilles heel for the entire NBFC structure. The definition of systemically important NBFCs is in wide divergence with the way it is defined elsewhere in the world. For instance, in United States of America, Financial Stability Oversight Council (FSOC) lays down six determinants to identify the systemically important financial institutions (SIFIs) which were size, interconnectedness, substitutability, leverage, liquidity risk and maturity mismatch. And based on these indicators, FSOC defined SIFI as "if material distress at US NBFC, could threaten the financial stability then that particular entity must be designated as systemically important financial institutions. And once a financial institution is tagged as SIFI, it is made subject to enhanced prudential norms such as risk management rules, liquidity norms, capital requirements etc. These enhanced prudential norms have a penalizing implication for the designated SIFI and it is made sure that the institution must scale-down its operations or business to the extent that it is no more posing a threat to the financial stability which implies that there is a proper set mechanism to rescind the designation of SIFI (refer Figure 4).

Figure 4: Process of Designating and De-Designating a SIFI



In sharp contrast to this, India has neither any mechanism of designation of systemically important nor is there any procedure in place to rescind the tag of systemically important as the tag is not given with the spirit of penalizing the financial institution. Rather, the term systemically important is used merely as a basis of distinction based on the asset size without any calculation of the perceived riskiness of NBFCs having an asset more than ₹500 crore which is now being revised to ₹1000 crore in recently published scale based regulations. That is, it has been implicitly assumed by RBI that all the non-deposit taking NBFCs which once cross the asset size limit of ₹500 crore will start posing systemic risk and hence are classified as systemically important. Moreover, NBFCs having an asset size as low as ₹500 crore and NBFCs having an asset size as high as ₹1,00,000 crore are all identified as systemically important which is far away from any logical explanation. Once the NBFCs cross the asset size threshold of ₹500 crore, they are designated as systemically important and are made subject to prudential norms. Due to the ill-defined structure of NBFC sector on the basis of their systemic importance, the policy interventions by RBI are also affecting the innocuous NBFCs. It is in place to mention that there is strict need for RBI to use the term systemically important in the same spirit as is done elsewhere and impose enhanced prudential norms only on those handfuls of designated systemically important ones which should have penalizing implications with the objective of rescindment of the tag of systemically important. Moreover, it is also necessary to calibrate the regulations on the lightly regulated NBFC sector but it should be done with extreme caution, keeping in mind that the growth of the NBFC sector remains unscathed.

Therefore, it can be conclusively observed that if there is any exogenous shock in the form of new prudential norms, say scale-based regulatory framework, then it may inhibit the asset growth of NBFCs and there is hardly anything to wonder that it may lead to significant positive association between the growth rate of asset size and declining growth of number of NBFCs which would be a matter of deep concern especially for those areas where NBFCs have active involvement in terms of financing such as financing of second-hand vehicles. In an effort to protect the sector through a heap of prudential norms, the regulatory measures may become a hammer of collapse for the entire NBFC sector leading to the simultaneous setting off the bigger NBFCs or their exit from the sector leading to a shrink in the growth of asset size of an NBFC.

VI Conclusion and Policy Recommendation

Non-banking financial companies have shown a stupendous growth miracle in the past few years and have successfully taken care of largely un- catered segments of the Indian economy. This is evident from the fact that though the number of non-banking financial companies have registered a decline at a compound annual growth rate of 2.1 per cent, their asset size has grown at an annual compound growth rate of 18.76 per cent. This emphatic growth of asset size, despite the declining number of NBFCs, is fading away since 2017-2018. A severe crisis in the form of default of Infrastructure Leasing and Financial Services (IL&FS) on its debt obligations has hit the sector hard in 2018. Along with it, policy responses since 2014, which were further intensified after the Infrastructure Leasing and Financial Services crisis, have further slowed down the growth of asset size. These observations are evident by the decline in the compound annual growth rate of asset size of NBFC for the period 2005-2006 to 2016-2017 and 2017-2018 to 2019-2020, which stood at approximately 19.6 per cent and 14.3 per cent respectively. An intricate analysis regarding the determinants of growth of asset size of NBFCs for the period 2005-2006 to 2019-2020 has revealed interesting findings. It has been observed in our analysis that the declining growth of a number of NBFCs has a significant negative impact on the growth of assets of NBFCs coupled with the significant negative impact of dummy variable taking the value 1 since 2017-2018 and 0 otherwise. Although the period for which dummy takes the value 1 seems small, it withholds its importance due to the fact that shifting the dummy to incorporate one preceding year, makes it insignificant, which implies that the major policy interventions and economic events in the period of 2017-2018 to 2019-2020 has a significant negative impact on asset growth of non-banking financial companies. This corroborates with our observation that the tightening of regulatory norms on the non-banking financial sector have tended to slow down the pace of growth of assets of NBFCs. Moreover, ratio of market borrowings to bank borrowings has an insignificant positive impact on the growth of assets of NBFCs. Our thorough probe regarding the rationale of insignificant impact of ratio of market borrowings to bank borrowings has revealed that policy intervention by RBI to reduce dependence on market borrowings has led to a fall in the ratio of market borrowings to bank borrowings. With respect to investment rate in the economy, it has been observed that it has insignificant positive impact on the growth of assets of NBFC sector which is due to the fact that NBFC's application of fund is mostly concentrated in those segments that are lightly touched by the mainstream investments due to highly risky nature of such segments such as financing of second-hand vehicle, buy now pay later, promoter financing etc. NBFCs actively participate in these segments due to their specialization in taking and managing efficiently, the risks associated with these sectors. In this light, it becomes imperative to look at the incidence and effects of prudential norms imposed on the NBFC sector to contain the contagion of systemic risk. Prudential norms are mostly concentrated on non-deposit taking

systemically important which contributes almost 86 per cent of total asset size of NBFC sector. Recommending blanket prudential norms for handling the spread of systemic risks, on all non-deposit taking systemically important is counter-productive for the growth of entire sector. Instead, a risk-based approach is a wiser way to contain the contagious systemic risks in the Indian financial system. It is required to adopt a targeted, nuanced and risk-based approach, to not only foresee any financial contingency emanating from non-deposit taking systemically important NBFCs but also facilitate the continuation of growth miracle of the NBFC sector. This can be done only by revisiting the definition of systemically important in India which is in wide divergence with the global usage. In India, there are no procedures in place for designation of systemically important financial institutions, imposition on enhanced prudential norms on them and finally the process of de-designation. At the preliminary stage, there is need to correctly identify companies through a defined procedure, and then impose enhanced prudential norms on such companies. Therefore, correct diagnosis is required for effective policy response and there is a need to correctly identify the companies which may pose substantial systemic risk to the financial system. Effective policy response implies that regulations should be optimized in such a way that growth is not hampered in view of protecting the NBFCs and that can be done only by re-structuring the NBFC sector by identifying systemically important NBFCs. Narrative on growth of non-banking financial companies will differ once the structure of NBFCs will be re-defined just by nudging.

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Appendices

Table A1: Number of Non-Banking Financial Companies (NBFCs)

Year	Number of NBFCs
2005-06	13014
2006-07	12968
2007-08	12809
2008-09	12740
2009-10	12630
2010-11	12409
2011-12	12385
2012-13	12225
2013-14	12029
2014-15	11842
2015-16	11682
2016-17	11522
2017-18	10190
2018-19	9642
2019-20	9618

Source: Report on Trend and Progress of Banking in India, 2005-2006 to 2019-2020.

Table A2: Total Assets of Non-Banking Financial Companies (NBFCs)

(₹ crore)

Year	Asset size of NBFCs
2005-06	288593
2006-07	366452
2007-08	483267
2008-09	560035
2009-10	683018
2010-11	866700
2011-12	1057500
2012-13	1242600
2013-14	1462700
2014-15	1707900
2015-16	1723100
2016-17	2063765
2017-18	2581063
2018-19	3112900
2019-20	3389267

Source: Report on Trend and Progress of Banking in India, 2005-2006 to 2019-2020.

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Gendered Patterns of Unpaid Care Work Distribution in India: An Empirical Exploration from First Large Scale Time Use Survey 2019

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The purpose of the paper is twofold: one is to explore the debates surrounding unpaid care work, and another one is to examine empirically the patterns of unpaid care work distribution across the gender lines in India. The domestic labour debate has been overviewed highlighting the critical arguments put forth by feminist scholars from the late 1960s to the present. Then, with the help of the data from the first pan Indian Time Use Survey-2019 (ITUS-19), we examined the working of the gender dynamics both in the rural and the urban spaces. The findings show the existence of a sharp gender gap, both in terms of participation and average time allocation, in unpaid care work across the rural and urban places of residence in India.

Keywords: Unpaid care work, Time use, Gender, Social reproduction.

I Introduction

Feminist economists have long argued to broaden the scope of economics to encompass the unpaid work performed in the domestic sphere. The Marxist feminists, during the 1970s, emphasized the problems of unpaid care work, referring it to 'housework', 'domestic labour', or 'reproductive labour' (Berik and Konger 2021, p. 6). Their critical argument was that women primarily serve men within the household as well as sustain the capitalist economy through their reproductive role (Hartmann 1979, pp. 1-33). It is worth noting that the strand of Marxist feminist scholarships, by the end of the 1980s, was subsided, and hence, the explanation of women's oppression at the domestic space owing to the labour theory of value remained overlooked. However, the role of unpaid care work remained at the forefront of discussion in academic scholarship.

One crucial debate that went on amongst feminist economists was whether unpaid care activities fall within the domain of "work" or not. Margaret Reid (1934) pioneered developing the theories and methodologies for consumption within the domestic spheres. Her third-party criterion suggests that unpaid care can be treated as "work" since caring activities like child care, elder care, cooking, cleaning, etc., can be delegated to a third person.

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The definition of care work has evolved and broadened over time. Attempts have been made to "delineate it from the category of domestic labour" (Moos 2021, p. 90). Himmelweit (1995, p. 9) defines care work considering the relationship between a carer and her work. It is similar to the definition provided by Folbre (2018a)- she calls it "direct care work" which requires a high degree of intimate, personal, or direct relationship between a caregiver and a care receiver (as in the case of child care per se). The term "indirect care work", on the other hand, refers to work that requires less personal or intimate engagement between the caregiver and care receiver, for instance, cooking, cleaning, laundry, etc. (Folbre 2018b). Folbre's typology also includes a third category called "supervisory care" or "passive care[1]"- supervision of children or any other dependent adults while performing other household tasks simultaneously. Hence, unpaid care work is a broader term that encompasses both direct and indirect unpaid care work, on the other hand, household labour which is termed as "housework" includes only indirect care work (Moos 2021, p. 91).

II The Domestic Labour Debate (DLD): An Overview

The framework of the Marxist political economy has provided wide-ranging insights on theorizing human subordination under capitalism. Women's unremunerated activities at the domestic space-often called "domestic labour" or "unpaid care work" or "unpaid household tasks" are no exception. The framework has provided a ground for a materialist analysis of women's oppression since the late 1960s.

The value of the commodities bought from the market is transferred, through domestic labour, to the end-product called "labor power" (Hensman 2011, p. 7). However, the question arises- does the household labour produce value? The answer is a big "yes" because domestic labour contributes to the production and reproduction of labor-power which is, like any other commodities, sold in the labour market (op. cit., p. 7). Although domestic labour does not produce exchange value, it produces use value. Substantial components of it contribute to the consumption basket of all the household members (Himmelweit and Mohun 1977, p. 16). Regular and continuous individual consumption is required to maintain labour power. This is mainly because the labour power- the ability to work is used up every day and thus, ceases to exist over time (if an individual stops consuming domestic services continuously).

It is worth noting down that labour power of a particular person (labourer) does not remain eternal. As they (labourers) grow older and die, society's stock of labour power changes. Hence, the birth of children-reproduction of the human species becomes inevitably necessary for reproducing the labour power continually (op. cit., p. 16) and sustaining the capitalist economy.

One crucial aspect, then to observe, is whether domestic labour produces surplus value or not. Domestic labour, performed by a housewife per se, does not receive any wage directly from the market. But she is remunerated (more or less)-

most often, in terms of kind,out of her husband's wage obtained from the employer. Hence, a housewife is indirectly paid by her husband's employer (capitalist) for the domestic services she performs. She wouldn't be producing any surplus value if her husband pays her equal to or more than the value of domestic services provided in the market. On the other hand, if she is paid less than the value of her services by her husband's employer, then the employer is not paying part of the wages. These unpaid wages add up to his (employer's) surplus value (Hensman 2011, p. 8). The processes through which the surplus value arises, give rise to a model of unequal exchange- "first, between capitalist and worker, over the purchase and sale of labour-power and second, between husband and wife, over the exchange of her labour-time for part of the commodities bought with his wage" (Himmelweit and Muhun 1977, p. 24). In this way, a housewife's unpaid domestic labour indirectly produces surplus value.

When time spent on domestic labour is extended unduly, the reproductive labour produces an extra-surplus value which is appropriated by the capitalist (Hensman 2011, p. 8). This appropriation becomes possible by exploiting the women in the domestic space and subsidizing the production of labor-power. It is worth noting here the comparison made between the value of unpaid domestic services carried out at home and the value of the same services transacted in the market. Domitila Barrios de Chungara- the Bolivian women's leader and miner's wife opines that "One day I got the idea of making a chart. We put as an example the price of washing clothes per dozen pieces and we figured out how many dozens of items we washed per month. Then the cook's wage, the babysitter's, the servant's. . . Adding it all up, the wage needed to pay us for what we do in the home . . . was much higher than what the men earned in the mine for a month[2]" (Hensman 2011, p. 9).

Interestingly, the "indirect care work" can easily be mechanized and thus, its burden can be reduced[3] (Hensman 2011, p. 16). On the other hand, "direct care work" can't be mechanized. This is mainly because caring and nurturing activities are labour intensive and encompass affective and cognitive elements (op. cit., p.16). One simple way through which the burden of unpaid household tasks can be reduced is the mechanization of the work formerly performed manually. The process has already started and reached a great height in the first world countries, but the same is not true for the countries like India. For instance, the use of refrigerators can reduce the amount of time spent on shopping and cooking and is common amongst the upper strata of society. However, millions of poor households, who are living in rural areas and urban slums, can't use it as they can't afford it. Most regions also lack infrastructural facilities like power supply. Women in these regions bear an enormous amount of unpaid household tasks as they spend the most time fetching water, collecting firewood, and so on. Reproduction of labor-power also gets undermined as women succumb to deterioration in health which results from smoke (while cooking with firewood, they suffer from respiratory diseases), poor sanitation facilities (results in water-borne diseases), etc. Hence, the state must intervene to facilitate the reproduction

of labor-power, and reduce the unpaid work burden on women. The provisioning of "subsidized housing, electricity, potable running water, sanitation, and solar-powered stoves" can reduce the domestic work burden on women. In this respect, Maxine Molyneux (1979) suggests adopting practical measures such as "elimination of gender division of labour in employment, equal sharing of domestic labour between men and women, provision of crèches and nurseries for all children whose parents need childcare and sheltered accommodation or home-care for adults who need it, shorter working hours, and regular part-time jobs, flexible working hours to suit the needs of the employees – for both men and women who have caring responsibilities" (Molyneux 1979, p. 27).

As Folbre (2017) argues, care services are, most often, offered with the hope of mutual benefit- with an expectation of payback, or a promise of remuneration. This can take place either in a formal or informal exchange process. Unpaid care services, in household settings, are provided through an informal exchange process (Folbre 2017, p. 751) and thus, freedom to entry or exit is greatly hindered, unlike participation in a competitive market where participants enjoy the freedom to entry and exit and confront a large number of consumers and producers. However, in a family, members are morally and legally obliged to each other. Still, adult male members of the family exit from the commitments since their work involves less emotional attachment. However, women, in the family, get strongly attached to younger children while providing care services per se, and hence, they can't exit easily from the commitment. Interest to provide care services also arises out of altruistic motives and thus, the caregivers are concerned about "fostering the well-being of care recipients compromising their subjective happiness" (op. cit.).

Paula England (2005, pp. 381-399) discusses five emerging theories of care work (both paid and unpaid). These five theoretical frameworks provide competing answers to the same question and also distinct answers at different times. The theories are vital for understanding the mechanisms of care work in an economy. They have been discussed as follows;

Devaluation theory illustrates that care work is underpaid or unpaid because this work refers to female-identified occupations. The gender pay gap arises in the paid labour market mainly because men and women are engaged in different jobs (Petersen and Morgan 1995, pp. 329-365). The differential payment to men and women for the same job hardly prevails in the contemporary world. Female-identified jobs are paid lesser than male-oriented jobs after "adjusting for measurable differences in educational requirements, skill levels, and working conditions (Steinberge 2001, pp. 2393-2397). The devaluation theory can be applied to both race and gender (England 2005, p. 384). For instance, paid care work requires a certain level of educational degree which is met and performed by white women (in the context of western countries). On the other hand, women of colour perform paid care work without having such a degree, and hence, they receive the lowest remuneration from the market.

The public good framework explains that care jobs have both implicit and explicit benefits within an economy and thus market fails to reward care work.

This theory, therefore, suggests state intervention for efficient market equilibrium. Care work, both paid or unpaid, improves the capabilities-intellectual, physical, and emotional, of its receivers. They (care receivers) develop skills-including cognitive skills that enhance the earning capacities, values, and habits which benefit themselves as well as spillovers to others. The benefits received directly from the caregivers also benefit indirect recipients. But how did this happen? One obvious example is education. A teacher (paid caregiver) provides education to his/her students (care receivers). After completing the term of education, students benefit themselves by becoming able to earn from the market and also benefit employers, society with educative values, and their family members. The spill-overs or the externalities that accrue to the indirect recipients make the care work arguably a public good (op. cit., p. 385). Dolla Costa and James (1972, pp. 79-86) pointed out that Marxist feminists' argument in this regard was quite similar but narrower. They critically viewed that women are exploited by the capitalists as their caretaking responsibilities make, their husbands and the next generation, productive and they (women) do not receive a wage from the market equivalent to their value of labour. Hence, capitalists accrue surplus value by exploiting both homemakers and paid workers. However, the advocates of the framework of the public good go beyond the idea of Marxist feminists. According to them, indirect benefits accrued from care work do not merely benefit the capitalists, but all the persons in an economy. "The extent to which benefits of caring labor will go beyond the direct beneficiary to others depends, in part, on how altruistic the beneficiary is—which is often a function of the kind of care she or he received" (England 2005, p. 386).

The term "prisoners of love" was coined by Folbre (2001). 'Prisoners of Love' phenomenon describes that individuals involved in care jobs become more caring (emotionally attached). Because of the emotional bonding that occurs between caregivers and care recipients, the former hesitate to demand more wages from the market for their service. They do not demand any wages when the task is performed at the household level where the degree of emotional bonding remains to be quite high. Hence, employers pay less to the caregivers taking advantage of their intrinsic caring motives in the market and husbands underpay or often do not pay them in the household.

Hochschild (1983) pioneered the ideas behind the commodification of emotion coining the term "emotional labour" in her seminal work "The Managed Heart". Her study pointed out that the provisioning of care services through the market harms the caregivers. Many jobs require caregivers to show positive feelings even when they do not feel so (feeling is not natural). For instance, flight attendants need to be cheerful even when they are sad. As per Hochschild, this deep emotional acting leads to psychological distress (England 2005, p. 391). She has viewed that care work is more alienating than other kinds of work. Many women, as well as men, clean houses or work in factories and restaurants. They even migrate to other countries, leaving their children and other care-dependent persons in the households, in search of a better livelihood and work as nannies.

She remarks, drawing insights from Marx, that selling one's heart (emotional labour or caring labour) is always alienating and exploitative. It is worse when employers of one country demand laborers of other countries for care work (op. cit., p. 392).

The theory behind "love and money", proposed by Nelson (1999, 2004) and Zelizer (2002a, b), rejects the idea of an "oppositional dichotomy between the realms of love and self-interested economic action". Since men and women are viewed as the opposite, and a tacit assumption is made about gender, a dualistic view emerges: "Women, love, altruism, and the family are, as a group, radically separate and opposite from men, self-interested rationality, work, and market exchange" (Nelson and England 2002, pp. 1-18). As per Zelizer (2002a), this oppositional dualism is nothing but the view of a "hostile world". Self-interested economic action and profit motives rule the market. Thus, markets are antithetical to genuine care. On the other hand, caring values rule the families, non-profit, and governmental organizations. "Love and Money" perspective, hence, argues that genuine care can be found in families, communities, non-profit organizations, and state actions. Therefore, the theory suggests that care provisioning should, ideally, not operate through market mechanisms.

Kabeer's (2021, p. 99) consideration of the concept of capabilities and their contribution to livelihood is commendable. Capabilities mirror out the interaction between the resources and abilities to translate them into valued goals. Patriarchal structure, during the contemporary period, constrains women's capabilities in comparison to that of men worldwide. Although the constraints vary across the countries, they depict some sort of commonalities. For instance, a grave inequality persists in the distribution of critical resources between men and women. The gendered division of labour, owing to social norms, allocates a disproportionate share of unpaid reproductive responsibilities to women in the household domain (op. cit., p. 100). As a result of which women tend to curtail their opportunities to participate in the economic and political spheres. The hegemonic gendered ideologies view women as inferior to men (women as lesser capable than men) and undermine their sense of "self and social worth".

The contemporary social reproduction theory (SRT) could be regarded as the carrier of the legacy left by domestic labour debates (Moos 2021, p. 92). Bhattacharya (2017, p. 1), in her introductory remarks to an edited volume on Social Reproduction Theory*,* questions that "If workers' labour produces all the wealth in society, who then produces the workers?" Notably, this question is central to the theory of social reproduction. From a Marxist perspective, human labour drives production and reproduction in an economy. The SRT theory goes beyond the analysis of commodity production and explores the production and reproduction of human life itself. The fundamental idea behind the theory is to locate human labour at the centre of production and reproduction of the society as a whole (op. cit., p. 2).

It has been pointed out that material ingredients required to produce the worker such as "food, housing, or time for education, for intellectual development,

or free play of his (her) own physical and mental powers" (Bhattacharya 2021, p. 76) lies beyond the ambit of recognition within the capitalist production process. This is mainly because capitalists are always oriented towards valorizing capital and are not concerned for the social development of the workers. Hence, workers lack, in a capitalist economy, in what they should ideally possess from social viewpoints. This negligence within the capitalist economy leads to class struggle and provokes the workers to demand wages to compensate for their unfulfilled livelihoods. Social reproduction theory explains this owing to the relationship between "worker's existence outside the circuit of commodity production" and "productive lives under the direct domination of capitalist" (op. cit., pp. 68-69).

In the contemporary period, unpaid care work is conceptualized from a broader perspective; especially a three-way classification is made (Budlender 2010, ILO 2018). It includes unpaid domestic services, unpaid direct caregiving services, and unpaid volunteer and community services. Such a finer disaggregation helps in exploring the different patterns and replications across the sub-categories of unpaid care work. Neetha and Plariwala (2010, p. 105) found out, employing India's pilot time use survey 1998-1999[4], that women spend relatively more time than men across the components of unpaid care work in the country as a whole. But such female-biased gendered patterns don't hold across the rural and urban regions, while observed individually. Their findings reveal, for instance, that rural men devote a higher amount of time to unpaid care work relative to urban men. Considering all the three components of unpaid care work, they found out that men take the maximum share of unpaid volunteer and community services in rural areas unlike that in urban areas (op. cit.). Men's unpaid care work typically reflects the "masculine" activities i.e. house-repair per se, especially when their total share of unpaid care work tends to be lower (ILO 2018). Though unpaid care work is indispensable for the survival of human society, most of it goes unrecognized, undervalued, and unaccounted for (Boserup 1970, Bineria 1992). In the case of voluntary work, gender asymmetricity is significantly higher (Bineria 1992, p. 1550).

It is important to empirically examine such nexuses in the contemporary period, especially in the context of a developing country like India. We have done so, considering all the three components of unpaid care work, with the help of India's first large-scale time use survey-2019.

III Research Questions and Objectives

Scant attention has been paid in the literature, especially in third-world countries, with respect to exploring empirical evidence on the gender-biased distribution of unpaid care work. This is mainly due to the unavailability of nationally representative time-use data. With the help of India's first large-scale time-use survey data, we have empirically examined the gendered patterns of unpaid care work distribution.

Given the theoretical arguments, we seek to answer the following questions: To what extent do the men and women take a share of unpaid care work in India? And, does the gendered time allocation pattern on unpaid care work vary substantially across its components?

Keeping in mind the above research questions, we have formulated two specific objectives:

(1) To empirically examine the asymmetric distribution of unpaid care work and its components (unpaid domestic services, unpaid direct caregiving services, and unpaid volunteer and community services) between men and women in India.
(2) To unfold the variation in such gender patterns across the rural and urban regions.

IV Data and Key Concepts

The main source of data considered in the study is India's first large-scale time-use survey conducted by National Statistical Office (NSO) in 2019. The survey is the most recent one and covers the whole country, except for the Andaman and Nicobar Islands[5]. Data on time use was gathered from the persons who were of age 6 years and above. Since the objective of the survey was to capture time use information on a daily basis, a 24-hour recall interview method was employed with the reference period starting from 4:00 AM on the day before the date of the interview to 4:00 AM on the day of the interview. The sample size was quite large enough: 4,47,250 individuals out of which 2,73,195 individuals were from rural India and 1,74,055 individuals were from urban India.

We have adopted two important measures such as the percentage rate of participation and the average time spent per participant. The percentage rate of participation in an activity refers to the proportion of persons participating daily in that activity. Mathematically, it can be expressed as;

Percentage rate of participation in activity "A"

$$= \frac{Number\ of\ Persons\ Participating\ in\ Activity\ "A"}{Total\ Nuber\ of\ persons} \times 100$$

Likewise, the average time spent per participant refers to the mean time spent in a day on a particular activity. This can be expressed as follows;

$$\text{Average time spent per participant} = \frac{Total\ Time\ Spent\ in\ a\ Particular\ Activity\ "A"}{Total\ Nuber\ of\ Participants\ in\ Activity\ "A"}$$

Unpaid care work is defined to be the production of services, and hence, not of goods, either for own final consumption or for others (ILO 2018). These services are rendered for meeting the care needs of the household members that do not receive any direct remuneration from the market. The activities included under the domain of "unpaid care work" adhere to Margarate Reid's (1934) third-party criterion- a third person can replace the activity. Hence, it does not involve the activities such as sleeping, eating, bathing, grooming, etc., so far as someone else can't replace these activities. Unpaid care work encompasses three components- (1) unpaid domestic services for the household members, (2) unpaid direct caregiving services for the household members, and (3) unpaid volunteer and community services (ILO 2018, Budlender 2010). The unpaid domestic services for the household members, i.e., cooking, cleaning, shopping, etc., are also termed as secondary or indirect care work. This is mainly because the nature of the activities is such that it does not give rise to the direct or intimate relationship between the caregiver and care receiver. On the other hand, unpaid direct caregiving services, i.e., childcare, elder care, care for the sick and disabled household members, etc., build such kind of relationship involving emotional and cognitive elements. Unpaid volunteer and community services are also termed as help to other household members. In simple parlance, it includes the care-related services rendered voluntarily for the members of other households. Such caregiving services could either be direct care work or indirect care work (domestic services).

V Empirical Results and Discussion

Before proceeding with the analysis, we have provided the summary statistics of the variables used in the study.

Summary Statistics

Table 1: Summary Statistics of the Variables Used in the Study

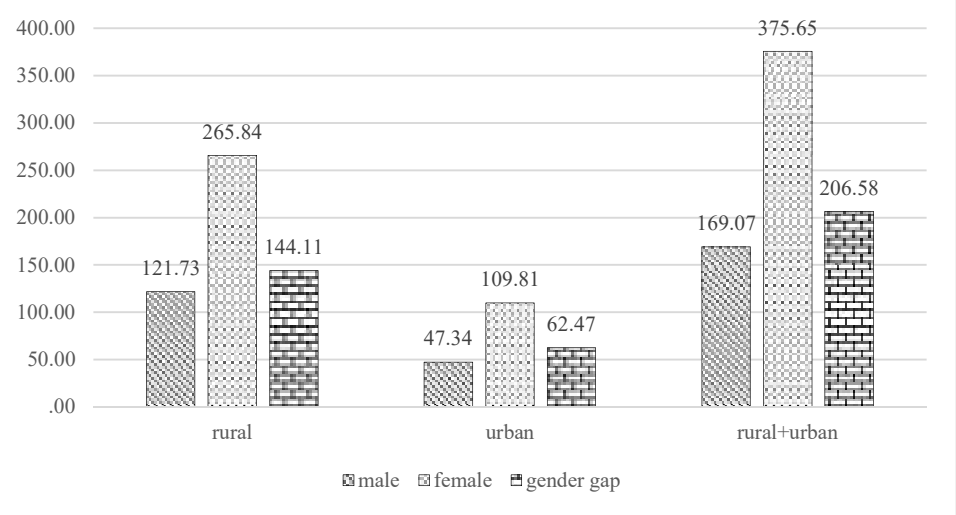
	Time spent on unpaid care work	Time spent on unpaid domestic services	Time spent on unpaid direct caregiving services	Time spent on unpaid voluntary and community services
N	265889	237907	93330	7050
Mean	265	248	114	99
Median	240	240	90	60
Sndard Deviation	186.51	160.90	83.11	100.02
Min	10	10	10	10
Max	1170	990	1170	990
Skewness	0.45	0.30	1.53	2.75
Kurtosis	2.16	2.10	6.97	12.88

Source: Author's calculation from Indian Time Use Survey-2019, NSSO, MOSPI, India.

As we can see from the Table 1, the number of observations is quite large across the variables and ranges from 7050 (for unpaid voluntary and community services) to 265889 (for unpaid care work as a whole). Unpaid domestic services stand out to be the largest component of unpaid care work. The magnitude of the mean time spent on unpaid care work, on a daily basis, is 265 minutes. Among the components of unpaid care work, the mean time spent in unpaid domestic services is relatively higher (248 minutes) compared to unpaid direct caregiving services (114 minutes) and unpaid voluntary and community services (99 minutes). Likewise, the median time devoted to unpaid care work, on a daily basis, is 240 minutes. In the case of unpaid domestic services as well, it remains to be 240 minutes but varies substantially between unpaid direct caregiving services (90 minutes), and unpaid voluntary and community services (60 minutes). The magnitude of the values of mean time spent remains to be relatively higher than the values of the median time spent, for all the variables under study. The standard deviation is higher for unpaid care work (186.51) and unpaid domestic services (160.90), but noticeably lower for unpaid direct caregiving services (83.11) and unpaid voluntary and community services (100.02). Hence, the values of unpaid care work and unpaid domestic services are highly dispersed (from the mean) compared to the values of unpaid direct caregiving services and unpaid voluntary and community services. The minimum value of time spent remains to be the same (10 minutes) for all the variables. However, the maximum values differ significantly. The maximum values remain to be 1170 minutes for unpaid care work (combined) and unpaid direct caregiving services (one of the components); whereas, it is 1170 minutes and 990 minutes respectively for unpaid direct caregiving services and unpaid voluntary and community services. The distribution of values of all the variables is positively skewed (coefficient of skewness>0). The degree of skewness is higher for unpaid direct caregiving services (1.53) and unpaid volunteer and community services (2.75) relative to unpaid care work (0.45) and unpaid domestic services (0.30). The time spent on unpaid care work and unpaid domestic services represents platykurtic curves (values of kurtosis<3). However, the time spent on unpaid direct caregiving services and unpaid volunteer and community services are leptokurtic (the values of kurtosis>3).

Patterns of Unpaid Care Work Distribution: The Gender-Space Interaction

Figure 1: Absolute Number of Participants in a Day in Unpaid Care Work (in Million) by Gender and Place of Residence (Age 6 years and above)



Note: *gender gap=female-male.

Source: Author's estimation from Indian Time Use Survey-2019, NSSO, MOSPI, India.

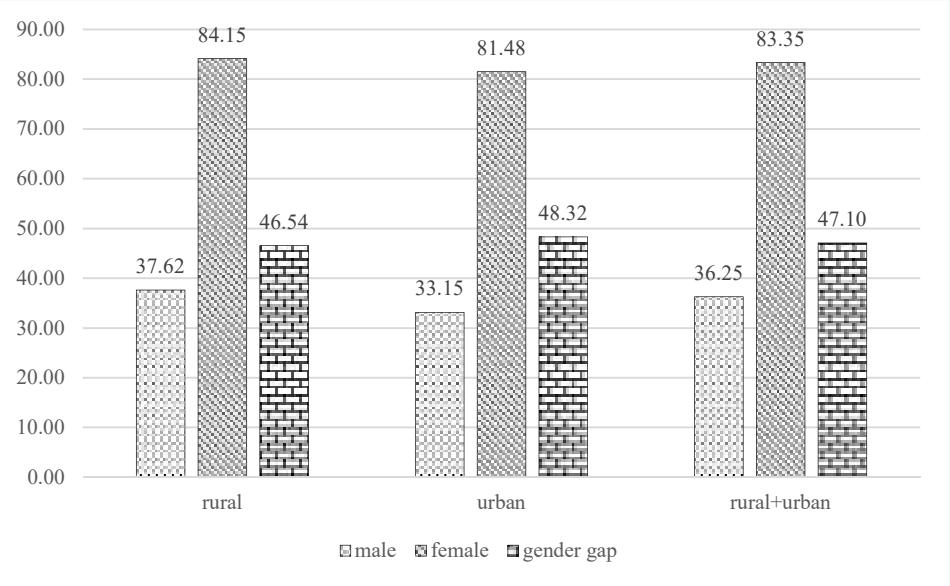
It could be observed from Figure 1 that there exists a striking gender disparity as well as a rural-urban difference in the distribution of unpaid care work. The estimated result shows that a gender gap of 206.58 million appears in the country as a whole (rural + urban). The absolute number of women carrying out unpaid care work stands out to be more than twice (2.22 times higher) compared to that of the male counterparts in the country as a whole. It has been estimated that 375.65 million females (6 years of age and above) are carrying out unpaid care work and only 169.01 million males (6 years of age and above) are carrying out such work. However, this gender difference is significantly lower in urban India (62.47 million) than in rural India (144.11 million). While 109.81 million females and 47.34 million males are carrying out unpaid care work in urban India, 265.84 million females and 121.73 million males are carrying out such work in rural India (Figure 1).

However, the aforementioned differences in unpaid care work distribution are in terms of absolute no. of participation. This could arise, for instance, due to the differences in population across the rural-urban stratum. Hence, it is imperative to understand the dynamics in terms of the percentage rate of participation.

As can be seen from Figure 2, a stark gender gap exists, in terms of the percentage rate of participation, in unpaid care work in the rural and the urban areas separately as well as in the country as a whole (rural + urban). A gender gap

of 47.10 per cent exists in the country. Simply put, the proportion of women engaged in unpaid care work (who are 6 years of age and above) is more than twice (2.30) compared to that of their male counterparts. The extent of this gender gap remains more or less equal in the rural and urban regions of the country: the rural-urban difference for the gender gap, specifically, being rural-biased is 1.78 per cent[6].

Figure 2: Percentage Rate of Participation in a Day in Unpaid Care Work by Gender and Place of Residence (Age 6 years and above)

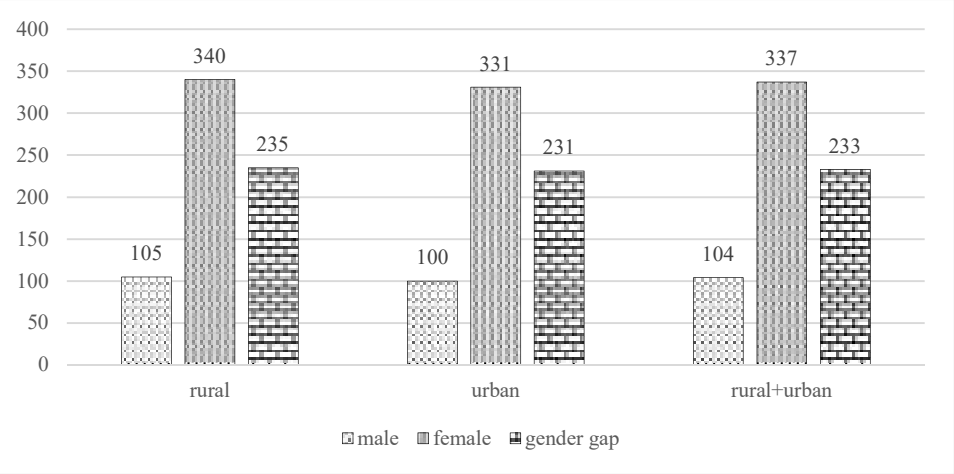


Note *gender gap=female-male.

Source: Author's estimation from Indian Time Use Survey-2019, NSSO, MOSPI, India.

The gender gap, in terms of average time spent per participant in a day, in unpaid care work is a matter of concern. The gap stands out to be 233 minutes, on average, in the country as a whole. While girls and women are devoting 337 minutes, on average, a day, boys and men are devoting only 104 minutes, on average, a day. Simply put, females, who are of 6 years of age and above, are spending time more than thrice (3.24) in unpaid care work in comparison to that of their male counterparts. In urban India, the gender gap in the average time allocated to unpaid care work is 231 minutes and in rural India, this is 235 minutes. Females are devoting, on average, 331 minutes a day, and males are devoting, on average, only 100 minutes a day in urban India. In rural India, females are devoting, on average, 340 minutes a day, and males are devoting, on average, only 105 minutes a day.

Figure 3: Average Time (in Minutes) Spent Per Participant in a Day in Unpaid Care Work by Gender and Place of Residence (Age 6 years and above)



Note: *gender gap=female-male.
Source: Author's estimation from Indian Time Use Survey-2019, NSSO, MOSPI, India.

No significant difference, from that of urban India, in gendered time allocation pattern on unpaid care work is there in rural India. Hence, the intra-family time allocation on unpaid care work is strongly on gender lines, and persisst more or less equally in rural and urban regions of the country. It is worth noting down here, that girls and women are not only participating more in unpaid care work, but they are also bearing more time while performing such work relative to their male counterparts.

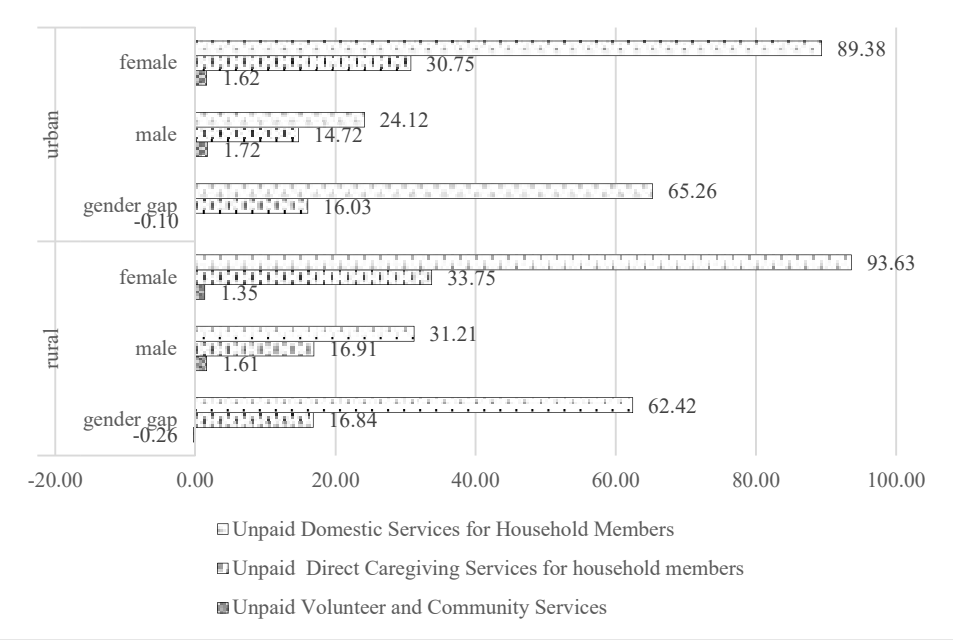
Gender Dynamics in the Components of Unpaid Care Work

Unpaid Domestic Services for the Household Members

It is worth illustrating the distribution of unpaid care work across the gender and places of residence considering its components (sub-categories of unpaid care work). The unpaid domestic services carried out within the household premises receive the highest proportion of participation among other components both in rural and urban regions (Figure 4 and Figure 5). The participation rate of both males and females is the highest for this category of unpaid care work, though a sharp gender gap persists both in rural and urban regions. It has been estimated that around 89 per cent of females during their productive age (15-59), in urban India, are engaged to provide unpaid domestic services for the household members (Figure 4). Only around 24 per cent of urban males, during their productive age (15-59), are engaged to provide such services. There exist a gender gap of around 65 per cent, in the case of the participation in unpaid domestic services for the household members, in urban India. In rural India, the spatial dynamics of the rate

of participation in unpaid domestic services seem to be marginally different from that of urban India. As can be seen from Figure 4, around 94 per cent of the rural females, in their productive age, are engaged to provide domestic services for the household members, and only around 31 per cent of the rural males are engaged to perform such tasks. There exist a gender gap of around 62 per cent for this category in rural India. The proportion of working-age girls and women engaged in this category is around four times (3.71) higher than boys and men in urban regions. However, the proportion of working-age girls and women engaged in this component stands out to be three times higher than boys and men in the rural regions.

Figure 4: Percentage Rate of Participation in the Components of Unpaid Care Work by Gender and Place of Residence (15<= Age <=59)

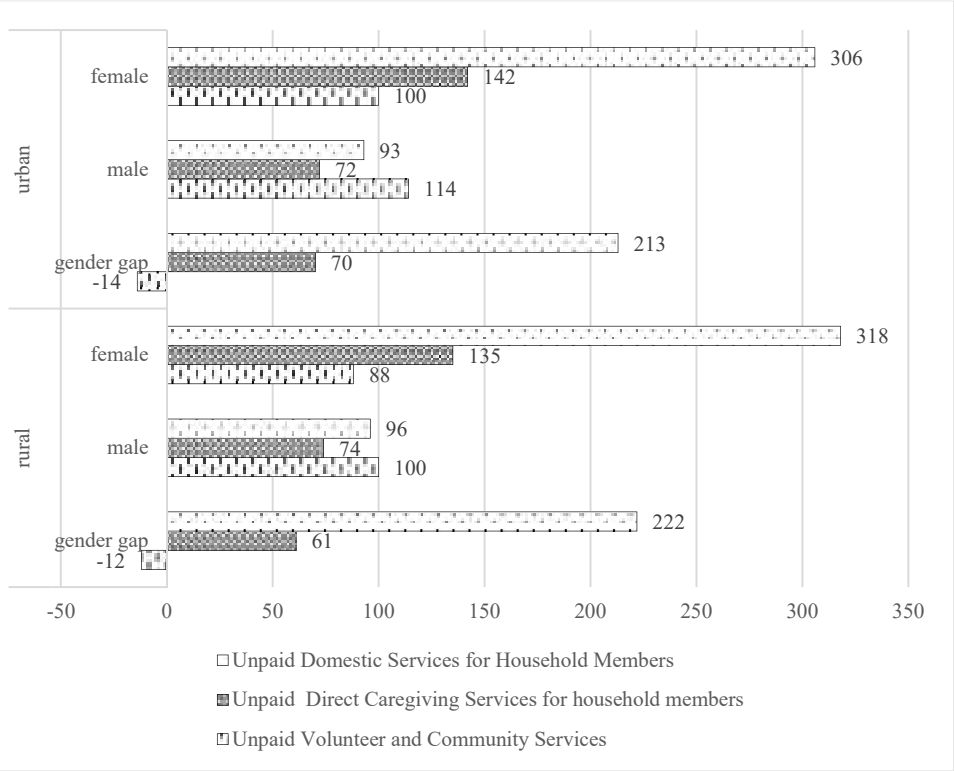


Note: *gender gap=female-male.
Source: Author's estimation from Indian Time Use Survey-2019, NSSO, MOSPI, India.

The gender relation, in terms of the time utilization, in the components of unpaid care work is quite interesting. As can be seen from Figure 5, females belonging to the working-age cohort are devoting, on average, 306 minutes per day to unpaid domestic services carried out for household members in urban India. However, males are devoting, during their working-age period, on average, only 93 minutes per day to such services in urban India. The average time spent per participant, on a daily basis, by females is more than three times (3.29) in comparison to the male counterparts. There exists a sharp gender gap of 213 minutes, on average, in this region. In rural India, females are spending, on

average, 318 minutes per day, while males are spending only 96 minutes per day on such services. Females, in this region, are also spending more than three times (3.31) on unpaid domestic services. A gender gap of 222 minutes exists in rural India which is moderately higher than that in urban India. The average time allocated to unpaid domestic services both by males and females is, though not visibly large, higher in rural India than in urban India (Figure 5).

Figure 5: Average Time (in Minutes) Spent Per Participant in a Day in the Components of Unpaid Care Work by Gender and Place of Residence (15 <=Age<=59)



Note: *gender gap=female-male.
Source: Author's estimation from Indian Time Use Survey-2019, NSSO, MOSPI, India.

Unpaid Direct Caregiving Services for the Household Members

The second crucial component of unpaid care work is the component of unpaid direct caregiving services carried out for the household members. The estimated result shows that around 31 per cent of urban females and around 15 per cent of urban males, who belong to the age cohort 15-59, are providing such services on a daily basis. There exists, evidently, a gender gap of around 16 per cent in terms of participation in this component in the urban areas. Around 34 per cent of rural

females and around 17 per cent of rural males are providing such caregiving services on a daily basis. A gender gap of around 17 per cent exists in terms of the rate of participation in such caregiving services in rural India. The extent of the proportion of participation in unpaid caregiving services is marginally rural biased.

Rural females are spending 135 minutes a day, on average, in this component; whereas urban females are devoting around 142 minutes, on average, per day to such caregiving services. Hence, females residing in urban India are devoting a marginally higher amount of time to unpaid caregiving services when compared with rural females'. Male members are devoting the least amount of time, on average, to such services: rural males are devoting 74 minutes, on average, a day, and urban males are devoting 72 minutes, on average, a day. In the case of this component, a gender gap of around 61 minutes persists in rural India, whereas a gender gap of 70 minutes persists in urban India.

As the figure reflects, the gender gap in terms of average time allocated to unpaid domestic services is lower in urban India, when compared with that of rural India, if compared with the gender gap in terms of average time spent in unpaid direct caregiving services. This finding indicates that girls and women residing in urban India, though spend lesser time in the indirect caregiving services like cooking, cleaning, decorating the house, etc., spend a higher amount of time in direct caregiving services like childcare, elder care, caring for the disabled persons residing in the household, etc. Hence, though the notion of patriarchy prevails more or less the same in rural and urban India, its influence on the activities under unpaid care work remains to be slightly different.

Unpaid Voluntary and Community Services/Help to Other Household Members

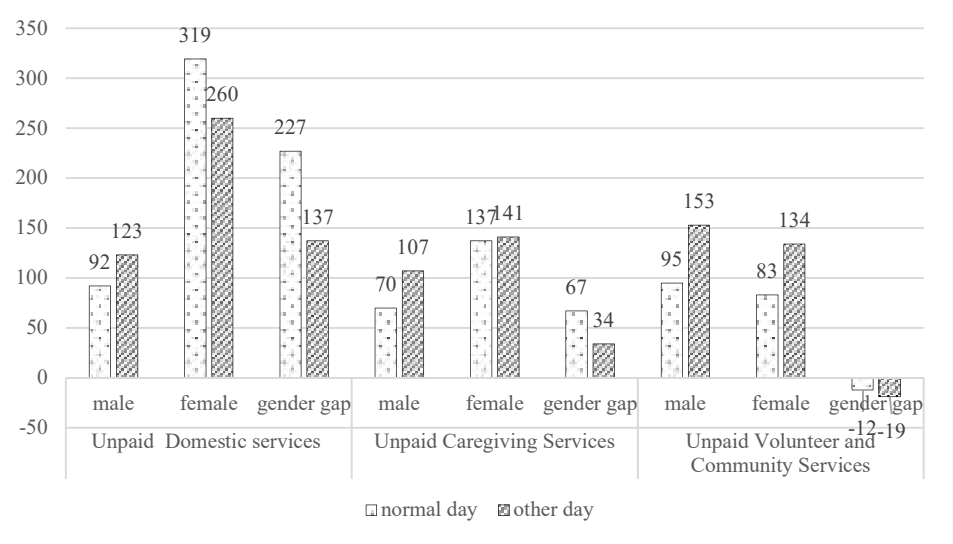
Finally, unpaid volunteer and community services/help to other household members receive the least proportion of participants, in between 1-2 per cent, both in rural and urban regions. Since male members are more likely to participate in such services, the gender gap stands out to be negative. This is the single component of unpaid care work where a higher proportion of male members participate. However, the negative gender gap, in terms of participation, for this component is higher in rural India (-0.26) than that in urban India (-0.10).

In terms of average time spent as well, male members are spending a higher amount of time in comparison to that of their female counterparts, both in rural and urban India. In rural areas, on an average, 100 minutes are devoted to such services by males and 88 minutes by females. A gender gap of -12 minutes prevails in rural India. In urban India, male members devote 114 minutes, on average, per day and female members devote 100 minutes, a day, on average. A gender gap of -14 minutes prevails in urban India for this component. Hence, male members bear a slightly larger share of unpaid volunteer and community services in urban India than in rural India.

Distribution of Unpaid Care Work During the Normal Days and Other Days

The nature of the day on which unpaid care work is carried out, plays a vital role in determining the quantum of time allocated to unpaid care work across the gender. It is quite intriguing to scrutinize the intra-family allocation of time on unpaid care work, specifically on the components of unpaid care work, throughout normal days and other days. The normal days are the usual days on which household members perform their routine activities. On the other hand, other days are the days on which the household members' routine activities are altered. For instance, a household member's time allocation pattern for routine activities may get distorted because of social obligations or unforeseen reasons like illness, ceremonies, hospitalization of a household member or duties thrust upon due to an accident, etc. besides, weekly off-days, holidays, or days of leave. On such days (other days), the gendered time allocation pattern alters considerably as discussed below;

Figure 6: Average Time (in Minutes) Spent Per Participant in a Day in the Components of Unpaid Care Work by Gender, and Type of Day (15=<Age>=59)



Note: *gender gap=female-male.

Source: Author's estimation from Indian Time Use Survey-2019, NSSO, MOSPI, India.

As Figure 6 shows, male members are devoting 92 minutes on average per day to unpaid domestic services on normal days, whereas the quantum of time allocated to it increases significantly to 123 minutes per day , on average, on other days. Conversely, female members are devoting 319 minutes, on average, on a normal day; and 260 minutes, on average, on other days to unpaid domestic services. It is worth noting down here that a male's quantum of time allocated to

unpaid domestic services, increases by 31 minutes and a female's time allocated to unpaid domestic services decreases by around 60 minutes, due to alteration in the nature of the day (change from a normal day to other days) (See Figure 6). Hence, on other days, male members devote a higher amount of time (around half an hour more) to unpaid domestic services and female members devote a lower amount of time (around an hour less) to it. The gender gap in terms of time allocated to unpaid domestic services, is higher on a normal day and lower on other days. This indicates that male members are mostly available in the family during the other days, and hence are allocating extra time to unpaid domestic services. However, the reduction of minutes devoted to unpaid domestic services by females is higher than the increase in the minutes devoted to it by males. This could be due to the strict notion of patriarchy that is holding them back, and as a result of which they (men) are not compensating fully for the reduction of time on unpaid domestic services which was earlier being performed by females in the household.

Male members devote 70 minutes, on average, on a normal day, and surprisingly 107 minutes, on average, on other days to unpaid direct caregiving services. Likewise, female members devote 137 minutes, on average, on a normal day, and 147 minutes, on average, on other days in such services. Hence, the time devoted to unpaid domestic services increases both for males and females; but the quantum of increase is higher for males (34 minutes more) than that for females (only 4 minutes higher). This could be because male members become more caring during an unusual time like when family members succumb to sickness or injuries due to accidents. They spend more time on person-care activities like hospitalizing the sick or injured family members on other days. The gender gap in terms of time devoted to unpaid direct caregiving services is lower (around half) on the other days than that on a normal day.

In the case of unpaid volunteer and community services as well, both the males and females spend a higher amount of time on the other days in comparison to the normal days. For males, time utilization on this component of unpaid care work increases by 58 minutes, on average, during unusual days; and, for females, it increases by 51 minutes, on average, during unusual days. The finding suggests that despite bearing the bulk of unpaid domestic and caregiving services, girls and women spare extra time for volunteer and community services during unusual times. In the case of the males, though, the time devoted to this component remains to be relatively higher during normal times and increases further during unusual times. The gender gap remains to be negative on both the normal days and the other days, but the gap is considerably larger on the other days than that on the normal days. This finding again suggests the prevalence of the patriarchal notion which is consequently responsible for the gender-biased time allocation during unusual times: male members spare a relatively higher amount of time on out-of-home activities (voluntary and community services per se) during the other days. So far as voluntary and community services are preferred out of one's own choice owing to altruistic motives, male members allocate a higher amount of time, as the findings suggest, to such tasks and often enjoy improved social statuses.

VI Concluding Remarks

The purpose of the paper is twofold: one is to explore the debates surrounding unpaid care work, and another one is to examine empirically the patterns of unpaid care work distribution across the gender lines in India. With the help of the data from the first pan Indian Time Use Survey-2019 (ITUS-19), we examined the working of the gender dynamics both in the rural and urban spaces. The findings show the existence of a sharp gender gap, both in terms of participation and average time allocation, in unpaid care work in India. The disproportionate participation and time allocation of Indian women in unpaid care work could be due to socio-religious constraints, the failure of markets and states to provide basic amenities in the domestic sphere, and the low opportunity cost of unpaid care work in the market (Singh and Patnaik 2020). The over-representation of women in unpaid care work makes them vulnerable on many grounds i.e. in terms of socio-economic status, participation in the paid labour market, freedom of choice over working opportunities, etc. which results in depriving them of many rights. Hence, the development practitioners, authorities, and policymakers must pay attention to designing gender-sensitive care policies in India. The three R-approaches, as suggested by contemporary feminist scholars, of responding to the gender-biased distribution of unpaid care work such as Recognition, Reduction, and Redistribution need to be considered.

Endnotes

1. The term "passive care" has been coined by Himmelweit (2007).
2. For the detailed information, look at Barrios de Chungara and Viezzer 1978, p. 35.
3. However, cleaning is a special case and can't be mechanized as it is labour intensive and its product can be noticed only when the work is not done (Hensman 2011, p.16).
4. The survey was a pilot one, and hence, did not cover the entire country. Only six states were considered for the survey.
5. This is mainly due to the difficulty in accessing the respondents.
6. Rural and urban difference in the gender gap (%)= gender gap in urban area (%)-gender gap in rural areas (%).

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Comparative Analysis of Public Debt Sustainability in Andhra Pradesh and Telangana

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This paper provides a brief assessment of the debt sustainability situation in residuary Andhra Pradesh (AP) and Telangana (TS) in comparison with the pre-bifurcated United Andhra Pradesh (UAP). Mainly two approaches, the Intertemporal budget constraint approach (IBC) and the Fiscal policy reaction approach (FPR), are used for testing debt sustainability. IBC analysis shows the debt is unsustainable in AP, but UAP and TS had sustainability at low levels making the long-run risk for solvency. FPR approach is used with four distinct models for explaining debt sustainability. All the models failed to prove debt sustainability in AP and UAP but provided evidence for weak sustainability in TS.

Keywords: Intertemporal budget constraint, Fiscal policy reaction, Debt sustainability, DSA, Andhra Pradesh, Telangana.

I Introduction

The problem of Debt sustainability has been at the forefront of macroeconomic policy issues for the last three to four decades. Debt Sustainability Analysis (DSA) has become a part of various reports from finance commissions, RBI, and other financial institutions. In this context, this paper provides a brief assessment of the debt sustainability situation in residuary Andhra Pradesh (AP) and Telangana (TS) in comparison with the pre-bifurcated United Andhra Pradesh (UAP). Erstwhile, UAP was bifurcated in 2014 after decades of the political movement for a separate state of Telangana. Bifurcation has resulted in certain difficulties in restructuring the financial situation in both states. After bifurcation, both states incurred large deficits in their budgets every year. Due to this, Debt has become a large concern in handling state finances. Particularly, AP's situation is considered difficult according to the AP Fiscal Responsibility and Budget Management FRBM Act 2005, 15th Finance Commission and Comptroller and Auditor General (CAG) Reports. Thus, a vivid understanding of the real scenario of Debt needs to be analyzed.

Based on the literature, three approaches to the debt sustainability problem have been popular in recent studies. They are 1. Indicator-Based Approach; 2. Intertemporal Budget Constraint Approach (IBC); 3. Fiscal Policy Reaction

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Approach (FPR). Of the three main approaches, the indicator-based approach deals with selected indicators in which no specification is made on debt sustainability values by logical necessity. These indicators are selectively chosen variables by various researchers for simple understanding. They lack any robust statistical or econometric properties for understanding public debt sustainability. In this paper, econometric models with analytical validity for debt sustainability are considered for hypothesis testing. Mainly two approaches, IBC and FPR, are used for testing debt sustainability of AP and TS in the post-bifurcation period with United Andhra Pradesh before bifurcation.

To test the debt sustainability of AP, TS, and UAP, monthly data is taken for analysis, unlike the common trend of annual data. Since these are state governments, there is no flexibility for government to adjust deficits through monetary financing. UAP was bifurcated into AP and TS in March 2014, so we take them as three separate states rather than the single data set of the state with structural break analysis. For AP and TS, data is taken from June 2014 to July 2020, whereas for UAP data period is May 2008 to May 2014. So, there will be 73 data units for each variable of each state. The monthly data is taken from the accounts of the Comptroller and Audited General (CAG) office in which monthly key indicators data is presented for the years 2008-2020 for both the states and United Andhra Pradesh. NSDP deflator is used to change the nominal variables into the real variables, and year 2008 is taken as the base for UAP data and 2011 as the base year for AP and TS.

II IBC and FPR Approaches

Intertemporal Budget Constraint Approach (IBC)

Public debt affects consumption and income patterns of the present generation and future generation, which makes it an intergenerational or intertemporal issue. Intertemporal budget constraint is prominent advancement in understanding the problem of debt sustainability. By adding the balance sheet of the public sector and its assets and liabilities in constraint form to Barro's (1979) intertemporal Budget Constraint function, Buiter (1983) has shown that for sustainable fiscal policy, the growth rate of public sector net worth should be equal to output growth rate (natural). Buiter (1985) developed a solvency constraint and expressed it as the present value of intertemporal differences in budgets equal zero. For him, non-Ponzi financing is a compulsory condition for reducing ambiguous results from applying intertemporal budget constraint. Solvency constraint characterizes the deviational aspects of measures for the solvency condition of government.

Hamilton and Flavin (1986) were the first to conduct an empirical analysis of deficits through Buiter's (1985) intertemporal budget constraint or, as price volatility studies call it, the Transversality condition. Hamilton and Flavin (1986) assessed limits on borrowing by extension of the IBC model for U.S. data. They confirmed the stationarity of debt series as a necessary condition for the

sustainability of public debt. Conditions imposed by intertemporal budget constraint states a long-term relationship between expenses and revenue, totally reducing the scope for the study of any short-term fiscal burden. Thus, all short-run deficits are automatically balanced in this constraint condition. Since the balancing condition of constraint restricts fluctuations in the gap between revenue and expenditure paths, a relation between the two paths must exist. Trehan and Walsh (1988) thought developments in cointegration theories would be of great help in the perspicacious understanding of the IBC condition. They adopted cointegration of revenue and expenditure inclusive of interest payments, in order to prove that this is a necessary condition. Wilcox (1989) advanced the intertemporal budget Approach for Debt Sustainability Analysis (DSA) of the stochastic economy. He relaxed a few assumptions of Hamilton and Flavin (1986) and proposed another way of assessing debt sustainability. The stochastic nature of real interest rates is put forward for analysis rather than fixed rates. Noninterest surplus is not necessarily stationary in his model. Any infringement in borrowing constraint need not imply it as non-stochastic, although there can be stochastic violations. Dynamically efficient economies always ensure intertemporal budget constraint satisfaction. Wilcox (1989) treated the U.S economy as dynamically efficient based on previous studies. He differentiated sustainable and unsustainable fiscal policies as,

> *"a sustainable fiscal policy is one that would be expected to generate a sequence of debt and deficits such that present value borrowing constraint would hold…. An unsustainable fiscal policy is one that does not cause the expectation of the discounted value of the debt to go to zero in the limit."* (p. 294)

If only half of the interest on debt can be accounted for with a surplus, the constraint equation shows an explosive increase in surplus and it is non-stationary. But this restriction fulfils the IBC constraint.

Buiter and Patel (1992) were mainly concerned with inflationary repercussions of monetized public sector deficits and government solvency. To avoid Ponzi-financing, India is considered a dynamically efficient economy with transitory periods of inefficiency. Given the initial debt stock, debt growth should be lower than the interest rate over the period. Continuous high debt-GNP ratios were found to be sustainable because solvency is the weak criterion. Under the weak criterion of solvency, the government is capable of continuing these unending debts through taxation. A strong practical criterion for solvency needs both discounted and undiscounted series to be absent of the deterministic or stochastic trend, whereas a weak criterion needs this condition for only discounted series. An alternative method of weak and strong conditions is provided by Quintos (1995) in which either cointegration of revenue and expenditure or stationarity of debt process are only sufficient conditions for debt sustainability. He developed further criteria for strong and weak sustainability that are presented in models adopted in this paper.

Fiscal Policy Reaction Approach (FPR)

Bohn (1998) made a huge improvement in Debt Sustainability Analysis by identifying the Debt sustainability approach through policy reactions. Since the governments are forced to take measures for controlling their high debt levels, their responses will be reflected in primary deficit or surplus changes. Bohn (1998) constructed the FPR model by assuming dependency of Primary balance on debt stock of government along with cyclical factors like GDP, expenditure, interest rate, and inflation.

Bohn (1998) felt Debt Sustainability Analysis (DSA) based on the IBC approach is quite misleading and can be observed from contrary results of U.S. Debt studies. The stationarity and cointegration tests are casuistic because changes in policy decisions are not accurately projected in those results. Bohn (1998) recommended a new approach in which changes in primary surplus due to policy shifts are monitored through changes in government debt. The superiority of his approach is its ability to include variations in income changes, cyclical fluctuations of the economy and government spending. The critical restrictions of interest-economic growth rate relations risk adversity, uncertainty, and discounting rate choice problems pointed out by Bohn (1995) are now irrelevant for sustainability analysis. Stochastic economy complications are no longer a concern and sustainability of debt found by Positive Response Function, fulfills the IBC constraint or transversality condition. Bohn (2005; 2007) also critically dismissed the stationarity and cointegration tests are of no use in establishing sustainability implications on Public Debt. Frickle and Greiner's (2011) introduction of time-varying parameters into DSA has further improved the consistency and efficiency relevance of FPR in empirical analysis.

In General, the FPR approach has distinctly advanced features compared to the previous ones presented above. One such astonishing feature is that there are no limits suggestive for debt sustainability. As long as the responsive nature of the Primary Balance to Debt position holds, debt sustainability is guaranteed. The unexplainable term of changes in primary balance can be taken through different variables such as revenue, expenditure, income changes, etc. Since it is a comparatively recent approach in DSA, its analytical preference for statistical properties and various framework developments are found in the empirical literature.

Of both approaches, testing procedures were changed by individual assumptions of various researchers. But the essence of the analysis is the same. In IBC, the present value of outstanding public debt should be equal to the summation of all discounted primary balances. Thus, it needs discounted debt series to be stationary or revenue and expenditure of government to be cointegrated. In FPR, the significance of the independent variable coefficient of debt should be positive. Studies such as Shastri and Sahrawat (2012), Pradhan (2014), and Mohanty and Panda (2019) developed policy implications of DSA in the Indian context by combined Centre and state debt analysis and conclusions on these studies are very

helpful in the formulation of my research hypothesis. To get a brief understanding of each approach, each model for assessment is explained in the next section.

III Theoretical Framework and Models of IBC and FPR for UAP, AP, and TS

Intertemporal Budget Constraint Approach (IBC)

For analytical understanding, we adopt the model frameworks described by Hamilton and Flavin (1986), Hakkio and Rush (1991), Buiter and Patel (1992), presented in the papers of Quintos (1995) and Pradhan (2014) for DSA. In general, any government can have Expenditure and Revenue imbalance giving rise to deficits or surpluses. Let R_t be the total Receipts of the government during time period t, G_t is the total expenditure of the government excluding interest payments on last year's debt or can be called as primary expenditure, B_t and B_{t-1} are market values of central Government debt in time periods t and t-1, GE^r_t is government total expenditure including interest payment on the debt of time period t-1, thus

$$GE_t^r = G_t + r_t\, B_{t-1} \quad \ldots(1)$$

Here r_t, the interest rate is assumed to be stationary around mean r. In any time period t, the budget constraint of government can be written as

$$\Delta B_t = GE_t^r - R_t \quad \ldots(2)$$

This means the change in government debt can be expressed as the difference between government expenditure and receipts, thus the whole amount of fiscal deficit is taken under debt since seigniorage is not an option for state governments. the above equation 3.2 can be interpreted as

$$B_t - B_{t-1} = G_t + r_t\, B_{t-1} - R_t \quad \ldots(3)$$

$$B_t = (1 + r_t)B_{t-1} + G_t - R_t \quad \ldots(4)$$

Take $PB = R_t - G_t$, PB is Primary Balance

$$B_t = (1 + r_t)B_{t-1} - PB \quad \ldots(5)$$

Since equation 4 and 5 holds for every financial year, recursive equation of infinite path can be written as

$$B_t = \sum_{s=0}^{\infty} Z^{s+1}\,(R_{t+s} - E_{t+s}) + \lim_{s \to \infty} Z^{s+1}\, B_{s+t} \quad \ldots(6)$$

And

$$B_t = \sum_{s=0}^{\infty} Z^{s+1} PB_{t+s} + \lim_{s \to \infty} Z^{s+1} B_{s+t} \quad \ldots(7)$$

Taking equation 6 as difference operator from 2 and substituting 1 we get

$$GE_t^r - R_t = \sum_{s=0}^{\infty} Z^{s-1} (\Delta R_{t+s} - \Delta E_{t+s}) + \lim_{s \to \infty} Z^{s+1} \Delta B_{t+s} \quad \ldots(8)$$

Where $E_t = G_t + (r_t + r)B_{t-1}$

To make equation 8 satisfy the intertemporal budget constraint, it should satisfy

$$E_t \lim_{s \to \infty} Z^{s+1} \Delta B_{t+s} \leq 0 \quad \ldots(9)$$

Or $E_t \lim_{s \to \infty} Z^{s+1} B_{t\,s} \leq 0$ in 6

Which makes equation 8 represent equality of the sum of all future primary surpluses taken in present values to the market value of the public debt or market value of public debt is less the sum of all future PSs. while the first situation indicates the exact sustainability and the second the super sustainability. Equation 3.8 could be tested based on two popular methods for debt sustainability requirements.

1. As implied, 9 should get satisfied.

Or its implication

2. $B_t \leq \sum_{s=0}^{\infty} Z^{s+1} (GE_{t+s}^r - R_{t+s})$ …(10)

Either of them implies sustainability of public debt in intertemporal budget constraint condition. This was traditionally tested through two time-series tests of analysis. Earlier, debt series are tested for stationarity which is a simple univariate approach for satisfying condition 1 and proving the mean reversion nature of debt series. Debt series should be stationary at level or first difference to fulfill the above condition. Another test is of multivariate approach for which finding of cointegration relation between revenue and expenditure is needed for the sustainability of deficit or debt. For this test, take equation 8, since GE^r_t and R_t are total expenditure and revenue of governments, their first differences will be stationary only when both are cointegrated of order 1 or $GE^r_t - R_t$ will be stationary with cointegration vector [1 -1] when both variables are first difference stationary.

Cointegration regression model for this can be written as

$$R_t = a + bGE_t^r + \varepsilon_t \quad \ldots(11)$$

With the non-Ponzi game condition, b =1 should be tested. Hakkio and Rush (1991) rejected any other possibility of sustainability of debt except for $0 < b \leq 1$ getting satisfied with cointegration relation. For them, these are necessary and sufficient conditions for debt sustainability. Quintos (1995) argued that $0 < b \leq 1$ as a sufficient and necessary condition is acceptable, but cointegration is only sufficient but not a necessary condition. He also pointed out that although $0 < b < 1$ is sufficient enough for debt sustainability, this has long-run problems on the debt path with rising expenditure more than raising receipts of the government.

Quintos (1995) classified debt sustainability conditions for weak and strong criteria based on the values of b. He states that if $0 < b < 1$ is satisfied with Total Revenue (R_t) and Total Government expenditure (GE^r_t) are I (1), then error term being I (0) or I (1) has no role and debt is weakly sustainable. Thus, cointegration of R_t and GE^r_t is not a necessary condition. Debt satisfies strong sustainability criterion when b = 1 with cointegration between R_t and GE^r_t and the error term is I (0). In contrast, debt is again weakly sustainable even if b =1, there is no cointegration between R_t and GE^r_t. Finally, if both are I (1) but b =0, then cointegration exists or does not have any role and debt is unsustainable.

Fiscal Policy Reaction Approach (FPR)

As FPR model tests for the response of primary balance relative to changes in debt levels of government. The model taken here was adopted from Renjith and Shanmugam's (2019) analysis of debt sustainability in the major states of India. The model of FPR for AP, TS, and UAP is

$$pb_t = \propto_0 + \beta_1 d_{t-1} + \beta_2 RVAR + \beta_3 EVAR_t + u_t \quad \ldots(12)$$

Where pb_t is the primary balance taken as a percentage of Total receipts, RVAR and EVAR are the revenue and expenditure gap variables through their fluctuations from long term trend. This analysis differs from any of conventional Bohn's FPR models because of two reasons, one is due to the lack of GSDP data for monthly figures. Another reason is Bohn (1998) needed a variable for explaining business cycle factors from the revenue or output side. Total revenue of state governments also works similarly and that's why all variables that need to be taken as the ratio of GSDP are taken as the ratio of Total receipts. Long term trend of these variables is estimated through Hodrick- Prescott (HP) Filter. The choice between the Fixed Effects (FE) and Random Effects (RE) model was done using the Hausman test. FE model is supported by the test; thus, Ordinary Least Squares (OLS) will be used rather than the RE model of Feasible Generalized Least-squares.

To control inflationary factors, nominal variables are converted to real variables by using the NSDP deflator. Interest payments can also affect changes in primary balance, though not in a direct relation, the burden of IP will be visible in the accounting sense. Post-bifurcation, AP received various types of grants as

compensatory loss due to bifurcation. Central government transfers other than tax devolution can have significant effects on deficit reduction and debt control. Even some state governments are dependent on central transfers for the elimination of their deficits completely. Interest payments effects can be included through variable i_t and that of central fiscal transfers or Grants from the centre by c_t.

Table 1: Grants from the Centre

	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	Total
AP	16211.00	21927.46	23346.38	22760.71	19456.72	21875.96	31872.00	157450.20
TS	7118.10	9394.12	9751.90	8058.80	8177.78	11598.42	15471.13	69570.25

Source: Budget documents.

The grants received by AP appears to be more than twice that of TS from above table. But Andhra Pradesh has received the revenue deficit grants alone of ₹59,497 crores. Telangana government didn't have revenue deficit problem till 2020. Also, as per finance minister's clarification in Parliament on 10 August 2021, ₹19,427 crores were released in the last seven years? for AP under AP reorganization act (APRA) 2014. However, ₹11,182 Crores of this grant were allocated as part of reimbursement to Polavaram Project expenditure dues demanded by state government for a long time and ₹1750 Crores for backward districts grants which are applicably provided for even Telangana. Thus AP, on the developmental aspect, has not received any advantageous grants compared to Telangana. Despite that, Grants from centre will be taken into consideration for analysis as there is a huge difference in total grants received by both the states in the last seven years.

Fiscal transfers from the central government may mislead results due to no explicit mention of the effectiveness of fiscal policy without central support. Thus, the primary balance will be adjusted for Grants from the centre and the model will be reassessed. Subsidization effects of grants from the centre on primary balance can be estimated through excluding GFC from primary balance and estimating another model for sustainability without central support or sustainability of own fiscal policy of state government. This model can be shown as

$$m_t = \propto_0 + \beta_1 d_{t-1} + \beta_2 RVAR + \beta_3 EVAR + u_t \quad \ldots(13)$$

In the above model, m_t refers to adjusted primary balance for Grants from centre taken as the ratio of total receipts. Based on the IBC framework, the government adjusts their taxes to changes in the debt levels, either increasing debt may be shifted by burdening taxes or declining debt levels should reduce the taxes. Thus, debt needs to be correlated with state revenue generation factors. This can be modelled by taking the state's own revenue as a dependent variable which can be explained by changes in debt, revenue changes and expenditure changes. Taking theoretical backdrop of David Leeper (2011)'s paper, estimation model will be

$$sor_t = \propto_0 + \beta_1 d_{t-1} + \beta_2 G_r + \beta_3 EVAR + u_t \quad \ldots(14)$$

Where sor_t is State own revenue as a percentage of Total Receipts, the variable RVAR of equation 14 is replaced by the growth rate of Total Receipts. These three independent variables are expected to be having positive coefficients.

IV Results of the Analysis

Stationarity Tests

Stationarity tests provide for preliminary analysis of the nature of data to be studied. In this study, ADF and PP tests of stationarity are done for UAP, AP, and TS on 18 different variables of state finances. The ADF test has the null hypothesis of unit root present in the series and the PP test revivifies the ADF unit root test results in the null hypothesis. The optimal lag length of each variable under the Schwartz information criterion was taken. For combined Andhra Pradesh all variables are stationary at level except the Debt series. Debt series of UAP are Integrated of order 1, i.e., I (1). Details of the all variables in the study are provided below.

Variable	Symbol	Explanation
Primary Balance	PB	It is difference between primary expenditure and total revenue.
Adjusted Primary balance	APB or m	Calculated by reducing the grants from centre from the Primary balance
Total Receipts	TR	Contains all receipts items of capital and revenue accounts of the budget
Total Expenditure	TE	Contains all expenditure items on capital and revenue account of budget
Adjusted Total Receipts	ATR	All the Total receipts items except the Borrowings and other liabilities amounts.
Public Debt	D	It is the total outstanding debt stock of the government
Primary Expenditure Gap	EVAR	The different between current year Primary expenditure to Potential expenditure.
Revenue Gap	RVAR	The difference between current year Total Revenue and Potential Total Revenue
State own Revenue	SOR	Total revenue generated by state government other than fiscal transfers from central government.
Interest payments	IP	Interest payments on outstanding debt amount will be taken by monthly payments.
PB-Total Receipts ratio	pb	Primary balance as percentage of total receipts ratio
Debt -ATR ratio	d	Public debt as percentage of total receipts ratio
SOR- ATR ratio	sor	State own tax revenue as percentage of Total receipts ratio
GFC- ATR ratio	c	Grants from centre as percentage of total receipts
APB- ATR ratio	apb	Adjusted primary balance as percentage of Total receipts
IP- ATR ratio	ip	Interest payments are taken as percentage of total receipts

Post bifurcation data variables of both states are taken for similar stationarity tests and found all variables to be stationary except for Debt which is stationary at

first difference as seen from United Andhra Pradesh. Though debt is not stationary at level, Debt as a percentage of Total Receipts is found to be stationary at level. This indicates the series is not so deviating from their constant mean value and this implies that variations in debt can be estimated through cointegration analysis for revenue and expenditure. All the three states have their debt difference as stationary at a level indicating debt sustainability condition satisfied by traditional analysis. But this should be checked with cointegration analysis as stationarity simply can't imply underlying factors for debt sustainability analysis.

Cointegration Analysis for Debt Sustainability under IBC Approach

The equilibrium relation implied by revenue and expenditure variables of cointegration analysis is the basis for debt sustainability. Unlike previous debt sustainability studies on aggregate level data of state governments, this study provides state-specific relations with adjusted variables such as Total receipts without including debt receipts like ATR, primary balance adjusted for grants from centre as APB.

A few popular cointegration tests are the Engle-Granger cointegration test, Johannsen cointegration test and ARDL bound tests etc., test suitability for data will define the choice of the test by the researcher. For this study, we use Auto-Regressive Distributive Lag (ARDL) bound tests for the cointegration relationship between expenditure and revenue along with the cointegration of debt and primary balance. In case, if revenue and expenditure are not cointegrated, that doesn't imply debt is completely unsustainable. Unlike other methods, ARDL bound tests are flexible in accommodating variables of different levels of I (0), I (1), i.e., integrated of order zero or one into cointegration analysis. Based on empirical tests, the ARDL method is best suited for small samples. The long-run relationship and short-run dynamics between the variables can be estimated using ARDL bound tests. Error correction mechanism results will explain the speed of adjustability of variables of cointegration. In our study, the adjustment of revenue to changes in expenditure can be explained through ECM. Considering these factors, we are proceeding with ARDL method of cointegration in our analysis.

Distributed lag model implies that the regression function includes unrestricted lag of the regressors. The ARDL (p,q) model specification for our analysis is

$$TE_t = \beta_1 + \beta_2 TR_t + u_t$$

It implies an estimation model of co-movement relation between TE and TR. If the error term u_t is assumed to be stationary and independent of the TR as well as TE and their lags, then models can be estimated through ordinary least squares.

As by Quintos (1995) conditions the coefficient of revenue should be positive and less than or equal to one, should be satisfied for debt sustainability and cointegration relation is not useful when it is not satisfied, i.e., $0 < b \leq 1$ should be

satisfied. In the long-run relation between variables in four models specified for UAP, all are cointegrated in ARDL bound test.

Table 2: ARDL Bound Test to Cointegration of UAP (08- 14)

H_0: No Levels Relationship
H_1: H_0 is not true

Estimated Model	Number of lags (p, q)	F-statistic	Cointegration
F_{TE} (TE |ATR)	1, 1	51.876 *	Yes
F_{TR} (TR|TE)	1, 0	1474.295 *	Yes
F_{PB} (PB|D)	1, 1	203.660 *	Yes
F_{APB}(APB|D)	1, 1	187.529 *	Yes

Source: Critical values of F-statistic are given by Pesaran, *et. al.* (2001) for case III (unrestricted intercept and restricted trend).

Table 3: ARDL Test Results of Long-Run Relationship of UAP (08-14)

							Heteroscedasticity Test		Serial Correlation Test	
Sl. No.	Dependent Variable	Exogenous	Coefficients	Std. Error	T-stat	P-value	F-stat	P-Value	F-stat	P-Value
1	TE	C	6128.59	775.11	7.906	0.000	0.311	0.578	0.200	0.655
		TE(-1)	-0.193	0.201	-0.962	0.339				
		ATR(-1)	-0.009	0.214	-0.041	0.966				
2	TE	C	6117.863	777.87	7.864	0.000	0.313	0.577	0.184	0.668
		TE(-1)	-0.209	0.561	-0.373	0.709				
		TR(-1)	0.011	0.589	0.019	0.984				
5	PB	C	1607.325	460.67	3.489	0.000	1.067	0.349	0.444	0.642
		PB(-1)	0.350	0.306	1.144	0.256				
		PB(-2)	-0.112	0.125	-0.895	0.373				
		D(-1)	-0.686	0.323	-2.120	0.037				
		D(-2)	0.683	0.322	2.118	0.037				
6	APB	C	1125.84	395.20	2.848	0.005	0.033	0.855	0.360	0.550
		APB(-1)	-0.254	0.117	-2.171	0.033				
		D(-1)	-0.004	0.011	-0.372	0.710				

Notes: Numbers in brackets () are the lag order; ARCH Test: Test for heteroscedasticity; BG Test: Breusch-Godfrey Serial Correlation LM Test.

But these cointegration relations cannot guarantee debt sustainability in UAP, because the coefficient value is positive only in TR and TE relation, that too minimal, implying very weak sustainability in UAP.

Table 4: ARDL Test Results of Short Run Error Correction Mechanism of UAP (08-14)

							Heteroscedasticity Test		Serial Correlation Test	
Sl. No	Dependent Variable	Exogenous	Coefficients	Std. Error	T-stat	P-value	F-stat	P-value	F-stat	P-value
1	ΔTE	C	49.808	276.51	0.180	0.857	0.356	0.552	0.039	0.842
		ΔTE(-1)	-0.299	0.148	-2.022	0.047				
		ΔATR(-1)	-0.057	0.131	-0.438	0.662				
		ECM(-1)	-0.853	0.183	-4.644	0.000				
2	ΔTE	C	50.192	276.58	0.181	0.856	0.414	0.521	0.016	0.896
		ΔTE(-1)	-0.217	0.400	-0.543	0.588				
		ΔTR(-1)	-0.129	0.412	-0.313	0.755				
		ECM(-1)	-0.854	0.183	-4.646	0.000				
3	ΔPB	C	27.434	768.636	0.035	0.971	1.169	0.317	0.411	0.664
		ΔPB(-1)	0.349	0.468	0.746	0.458				
		ΔPB(-1)	-0.031	0.117	-0.271	0.786				
		ΔD(-1)	-0.617	0.344	-1.793	0.077				
		ΔD(-1)	0.579	0.671	0.863	0.391				
		ECM(-1)	-1.089	0.659	-1.653	0.103				
4	ΔAPB	C	378.897	306.59	1.235	0.220	0.006	0.937	1.456	0.231
		ΔAPB(-1)	-0.1053	0.108	-0.973	0.333				
		ΔD(-1)	-0.480	0.309	-1.552	0.125				
		ECM(-1)	-0.783	0.248	-3.160	0.002				

Notes: Numbers in brackets () are the lag order; ARCH Test: Test for heteroscedasticity; BG Test: Breusch-Godfrey Serial Correlation LM Test.

Although the problem of weak sustainability of debt exists for UAP, the Error correction mechanism should push the deviations of revenue from expenditure to sustainability path, the speed at this adjustment happens is explained with 85.4 per cent in UAP. Thus, short-run adjustments of fluctuations in debt are presenting a continual path of weak debt sustainability.

Table 5: ARDL Bound Test to Cointegration of AP (14-20)

H_0: No Levels Relationship
H_1: H_0 is not true

Estimated Model	Number of lags (p, q)	F-statistic	Cointegration
F_{TE} (TE |ATR)	1, 1	40.469 *	Yes
F_{TR} (TRTE)	1, 0	55.687 *	Yes
F_{PB} (PB|D)	1, 1	661.387 *	Yes
F_{APB}(APB|D)	1, 1	259.859 *	Yes

Source: Critical values of F-statistic are given by Pesaran, *et. al.* (2001) for case III (unrestricted intercept and restricted trend).

Table 6: ARDL Test Results of Long-Run Relationship of AP (14-20)

Sl. No.	Dependent Variable	Exogenous	Coefficients	Std. Error	T-stat	P-value	Heteroscedasticity Test F-stat	Heteroscedasticity Test P-Value	Serial Correlation Test F-stat	Serial Correlation Test P-Value
1	TE	C	11474.90	1437.168	7.984	0.000	7.686	0.007	1.441	0.234
		TE(-1)	-0.025	0.119	-0.217	0.828				
		ATR(-1)	-0.405	0.190	-2.132	0.036				
2	TE	C	10350.40	1406.01	7.361	0.000	30.286	0.000	4.870	0.010
		TE(-1)	-0.036	0.129	-0.277	0.782				
		TR(-1)	-0.146	0.148	-0.984	0.328				
5	PB	C	2163.297	709.44	3.049	0.003	0.032	0.858	0.307	0.580
		PB(-1)	0.011	0.121	0.094	0.925				
		D(-1)	0.014	0.007	1.875	0.064				
6	APB	C	927.281	699.481	1.325	0.189	0.633	0.534	0.145	0.704
		APB(-1)	0.005	0.121	0.041	0.967				
		D(-1)	0.014	0.008	1.789	0.077				

Notes: Numbers in brackets () are the lag order; ARCH Test: Test for heteroscedasticity; BG Test: Breusch-Godfrey Serial Correlation LM Test.

For post bifurcation in Andhra Pradesh, the TR and TE model of cointegration along with all the models did not find any positive coefficient value despite all models being cointegrated. This proves debt as clearly unsustainable post bifurcation for AP. So, the error correction mechanism which is the similar speed of adjustment of UAP, cannot be used for AP series to be adjusted for short-run relation. Even heteroscedasticity and autocorrelation are found to be high, making the models uninterpretable.

Table 7: ARDL Bound Test to Cointegration of TS (14-20)
H_0: No Levels Relationship
H_1: H_0 is not true

Estimated Model	Number of lags (p, q)	F-statistic	Cointegration
F_{TE} (TE |ATR)	1, 0	1515.395 *	Yes
F_{TR} (TRTE)	1, 0	114.9085 *	Yes
F_{PB} (PB|D)	1, 1	785.893 *	Yes
F_{APB}(APB|D)	1, 1	475.584 *	Yes

Source: Critical values of F-statistic are given by Pesaran, *et. al.* (2001) for case III (unrestricted intercept and restricted trend).

For Telangana, all models satisfied cointegrating conditions along with a positive coefficient value in each model. The coefficient value TE and ATR model is higher among all other models analyzed and also the TE and TR model has a positive coefficient even greater than the UAP model of weak sustainability. The values of coefficients for these models are 0.098 and 0.0368 which are almost close to unsustainability, but we take it as weakly sustainable but better than UAP.

Table 8: ARDL Test Results of Long-Run Relationship of TS (14-20)

							Heteroscedasticity Test		Serial Correlation Test	
Sl. No.	Dependent Variable	Exogenous	Coefficients	Std. Error	T-stat	P-value	F-stat	P-Value	F-stat	P-Value
1	TE	C	7061.217	841.19	8.394	0.000	0.187	0.666	0.925	0.339
		TE(-1)	-0.147	0.157	-0.932	0.354				
		ATR(-1)	0.098	0.185	0.533	0.595				
2	TE	C	7203.372	806.351	8.933	0.000	0.181	0.671	0.512	0.476
		TE(-1)	-0.129	0.524	-0.246	0.806				
		TR(-1)	0.0368	0.471	0.078	0.937				
5	PB	C	2245.887	453.133	4.956	0.000	0.484	0.488	0.049	0.825
		PB(-1)	-0.144	0.116	-1.242	0.218				
		D(-1)	0.008	0.006	1.342	0.183				
6	APB	C	1655.345	452.329	3.659	0.000	1.257	0.266	0.151	0.698
		APB(-1)	-0.141	0.117	-1.201	0.233				
		D(-1)	0.007	0.006	1.186	0.239				

Notes: Numbers in brackets () are the lag order; ARCH Test: Test for heteroscedasticity; BG Test: Breusch-Godfrey Serial Correlation LM Test.+

Table 9: ARDL Test Results of Short Run Dynamic Relationship of TS (14-20)

							Heteroscedasticity Test		Serial Correlation Test	
Sl. No	Dependent Variable	Exogenous	Coefficients	Std. Error	T-stat	P-value	F-stat	P-value	F-stat	P-value
1	ΔTE	C	40.508	287.681	0.140	0.888	0.198	0.657	0.765	0.384
		ΔTE(-1)	-0.190	0.122	-1.551	0.125				
		ΔATR(-1)	0.013	0.126	0.105	0.916				
		ECM(-1)	-0.939	0.160	-5.843	0.000				
2	ΔTE	C	44.102	288.651	0.152	0.879	0.192	0.662	0.637	0.427
		ΔTE(-1)	-0.069	0.357	-0.193	0.846				
		ΔTR(-1)	-0.111	0.324	-0.342	0.732				
		ECM(-1)	-0.923	0.160	-5.741	0.000				
3	ΔPB	C	63.974	424.796	0.150	0.880	0.165	0.685	0.645	0.424
		ΔPB(-1)	-0.185	0.104	-1.772	0.080				
		ΔD(-1)	-0.000	0.006	-0.088	0.929				
		ECM(-1)	-0.958	0.162	-5.902	0.000				
4	ΔAPB	C	1121.006	904.492	1.239	0.219	1.123	0.293	1.951	0.167
		ΔAPB(-1)	-0.027	0.119	-0.230	0.818				
		ΔD(-1)	-0.619	0.488	-1.269	0.208				
		ECM(-1)	-0.606	0.384	-1.574	0.120				

Notes: Numbers in brackets () are the lag order; ARCH Test: Test for heteroscedasticity; BG Test: Breusch-Godfrey Serial Correlation LM Test.

The ECM is also found to be higher compared to the other two states, providing reconfirmation for our interpretation of debt of Telangana to be more sustainable than AP and UAP. A more detailed analysis of structural models designed for fiscal policy response will be analyzed in the next section.

Results of Fiscal Policy Response Models

To understand the debt sustainability of UAP, AP, and TS through fiscal policy response, four different models of regression analysis are used. These models are constructed based on the analysis of debt sustainability by Renjith and Shanmugam (2019). Results of the three states are presented in Tables 10, 11, and 12.

Table 10: UAP FPR Analysis

	Model 1	Model 2	Model 3	Model 4
d_t	0.013 (-0.958)	-0.0047 (-0.805)	-0.013 (-0.931)	0.0001 (2.946)*
EVAR	-0.0129 (2.116)*	0.0074 (2.849)*	0.0128 (2.082)*	-0.001 (-2.600)*
RVAR	-0.0168 (-2.583)*	-0.0058 (-2.046)*	-0.0176 (-2.679)*	
c_t		-1.209 (-1.714)***		
i_t		6.439 (17.545)*		
ATR Growth				-0.044 (-3.090)*
Error term	1.000	1.000	1.000	1.000
Intercept	60.950 (3.041)*	-13.220 (-1.080)	50.769 (2.506)*	84.348 (42.365)*
Observations				
R-Square	0.106	0.844	0.110	0.253

Notes: *, **, *** indicate the level of significance at one per cent, five per cent, 10 per cent respectively.

In United Andhra Pradesh, the model 1 values of EVAR and RVAR are statistically significant but negative, which means with the Revenue receipts growth and expenditure growth above their potential, long-run levels have reduced Primary balance. Debt is statistically insignificant, but this model has a low R-square value, making the model invalid for explaining the response function. However, model 1 of AP and TS are statistically significant and the primary balance is positively responding to EVAR in both models. Surprisingly RVAR is again negative, implying the rise in revenue from its potential level is not increasing PB, but reducing it. Since R- square value is comparatively good in TS Model 1, Telangana Debt can be sustainable, but a lower value of coefficient at 0.0087 makes it weakly sustainable.

In model 2, grants from centre and interest payments variables are chosen to explain the changes in PB. Only AP had significant value for debt compared to others but it has less R-square value. AP and TS models failed to get significant relation for the GFC coefficient, which shows the grants from the centre are in no way the determining factor of increasing primary surplus and debt sustainability.

Interest payments turned out to be an important variable explaining the rise in PB, but this relation shows that a rise in IP has increased primary Balance, which is not possible in general.

Table 11: AP FPR Analysis

	Model 1	Model 2	Model 3	Model 4
d_t	0.0149 (2.892)*	0.0116 (2.409)*	0.0143 (2.778)*	0.000005 (0.044)
EVAR	0.0027 (1.717)***	0.0029 (2.001)*	0.0023 (1.460)	0.00092 (1.391)
RVAR	-0.0114 (-4.526)*	-0.0147 (-5.791)*	-0.0129 (-5.142)*	
c_t		0.642 (1.410)		
i_t		2.622 (3.564)*		
ATR Growth				-0.0510 (-1.267)
Error term	1.000	1.000	1.000	1.000
Intercept	43.805 (4.590)*	4.957 (0.334)	25.298 (2.647)*	80.868 (21.331)*
Observations				
R-Square	0.308	0.428	0.339	0.038

Model 3 explains the adjusted primary balance as a dependent variable which is taken after deducting GFC from PB. But the relevance of significant variables can be compared only for TS because only that has some explainable R-square value compared to others. But subsidization of PB through Grants has a significant effect on states to achieve debt sustainability. For Telangana, it increased the potential to increase primary surplus by a factor of 0.0006, but for Andhra Pradesh, it decreased that potentiality.

Table 12: TS FPR Analysis

	Model 1	Model 2	Model 3	Model 4
d_t	0.0087 (2.594)*	0.0013 (0.527)	0.0093 (2.784)*	0.0010 (0.878)
EVAR	0.02025 (10.576)*	0.0181 (12.879)*	0.0206 (10.873)*	0.00048 (0.845)
RVAR	-0.0223 (-11.128)*	-0.0201 (-13.434)*	-0.0231 (-11.55)*	
c_t		0.2130 (0.780)		
i_t		2.652 (7.880)*		
ATR Growth				-0.0313 (-1.332)
Error term	1.000	1.000	1.000	1.000
Intercept	41.163 (8.163)*	16.686 (3.212)*	30.343 (6.057)*	88.911 (54.525)*
Observations				
R-Square	0.693	0.847	0.708	0.030

Notes: Model 1 and Model 2 have Primary balance to TR ratio as the dependent variable, model 3 has Adjusted primary balance to TR as Dependent variable, and model 4 has State Own revenue to TR as the dependent variable.

Finally, model four did not have any significant values of debt or expenditure variation in AP and TS. The significant values of UAP are very low, almost negligible with low R-square, making the models not suitable for any debt sustainability when taking SOR as a dependent variable. However, the least explanatory possible, explains that states are Ponzi Financing their Debts.

Almost all the models are showing significant values for EVAR and RVAR, with complete opposite relation of what is generally assumed. It shows that the rise in expenditure above its normal value is raising/increasing the pb rather than reducing it and rise in ATR above its normal value is decreasing the pb rather than increasing it. Since pb is PB-ATR ratio, above results imply that the rise in expenditure is also causing the rise in borrowings and thereby fall in ATR and therefore rise in pb. In RVAR case, the rise in borrowings amounts has the denominator effect of high ATR growth and numerator effect of rising Primary expenditure component of PB, and finally, the fall in pb. Thus, accumulated borrowings are playing a huge role in rising Primary Expenditure, Primary balance is increasing with the rise in expenditure and falling with the rise in Revenue. R-square values are low for all models except Telangana. Telangana explanatory models indicate debt as a Sustainable but weak response to changes in debt.

The monthly data of state government is highly fluctuating with outlier effects on the regressions. Same was found to be true in the monthly data taken for analysis with UAP, AP and TS. There are two major reasons for this. Firstly, all state governments in India try to balance or adjust their budgetary figures in the year end to present budgetary sessions. Secondly, uncertain circumstances affect the state finances. For example, bifurcation movements in 2011 in UAP, the leadership changes due to political turmoil, financial crisis 2008, election years, sudden changes in the fiscal policies (either expenditure side or revenue side or both). Suppressing these outliers has improved the R-square value and significance of the models.

To validate the results, the diagnostics tests such as Correlogram, Breusch-Godfrey Serial correlation LM test, Breusch-Pagan-Godfrey Heteroskedasticity test, ARCH heteroskedasticity test, Histograms, Ramsey RESET test for specification errors, CUSUM and CUSUM squares test for stability, Shapiro-Wilk Normality test, Kolmogorov-Smirnov Normality test are done for all the 12 models of cointegration in IBC approach and 12 regression models of FPR approach. The problem of outliers has been a recurrent problem in stability tests and normality tests. Good results are found in all the tests. Suppressing the outliers have resulted in resolving the problems in stability and normality tests. But as monthly outliers are an intrinsic part of data, they cannot be removed for fitting of the model. Even if the disturbance term is not normally distributed, OLS estimators are normally distributed under the assumption of homoskedasticity (which is satisfied in this study). Further study is recommended for identifying the outlier effects and restricting them with including filtered significant variables in the regression models.

V Conclusion

In this paper, two approaches are discussed on DSA of AP, TS, and UAP. Theoretical construction of these models, along with their application for DSA of AP, TS and UAP are examined. IBC for DSA involves stationarity and Cointegration analysis, the results of the analysis show the debt is unsustainable in AP, but UAP and TS had Sustainability at low levels, making the long-run risk for solvency. On the other hand, the FPR approach is used with a framework implemented for four distinct models for explaining debt sustainability. All the models failed to prove debt sustainability in AP and UAP but provided evidence for weak sustainability in TS in all these models. The results indicate Primary balance for AP and TS is nowhere near sustainability, whereas TS is better compared to those both. However, the latter has long-term problems with sustainability of debt and cointegration revenue and expenditures.

IBC and FPR approaches present DSA through econometric estimation models and their properties. The difference series of outstanding debt stocks of UAP, AP, and TS are stationary at level, implying debt paths will equilibrate primary surpluses and debt stock at some point based on the IBC approach. The results of the ADF test are backed by similar results in PP stationary test. All the cointegration results pinpointed that the relationship between revenue and expenditure exists, but positive coefficient values are found only for TS and UAP. Among these, TS has a slightly stronger relation than UAP, but both are weakly sustainable under the IBC hypothesis. Even ECM adjustments are better in TS compared to the other two states.

Response of state governments to rising debt levels is important and is traditionally estimated through the response of PB to Debt Stock. All the models constructed for AP and UAP are found to be indecipherable for catching policy responsiveness of these states to debt variations. TS has positive PB changes with debt increase but it is a very weak relation. Even UAP has a possible sustainability case when interpreted, but that is very less sustainable of debt relative to TS. AP needs to ask the centre for rightful grants under APRA 2014 and assistance in other forms such as central support projects in the form of capital outlay. Because of the bifurcation disadvantages, the initial phase of revenue deficit path is inevitable. AP needs to focus more on stability in generating the state's own revenue. The expenditure of all three states is positively affecting primary balance, which needs further analysis through more apt DSA model construction.

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Health Shocks and Vulnerability to Poverty in India

Priyanka Dasgupta and Subrata Mukherjee

Using data from National Sample Survey (NSS) 75th health round (2017-18) and three-step feasible generalized least squares (FGLS) method, we attempt to estimate vulnerability to poverty due to health shocks in India. We find that 40.97 per cent of Indian households are vulnerable to poverty. Households with higher share of ill members are more vulnerable to poverty. Also, location of the household, gender and education of household head, household hygiene characteristics and presence of uninsured members affect vulnerability to poverty. Quite interestingly, households with at least one member having government sponsored insurance coverage are found to be more vulnerable to poverty.

Keywords: Vulnerability to poverty, Health status, Health shock, NSS, India.

I Introduction

Any illness or injury weakens the health status of household member(s) and generates a welfare loss for households (Dhanaraj 2016). Presence of any member with illness/injury might result in hospitalisation or death of the member in future. This can lead to limited ability to perform work-related activities due to poor health status or disability of ailing member for entire life along with loss of income of care-giving member (Atake 2018, Mitra, Palmer, Mont and Groce 2016). The impact of health shocks on household welfare is a matter of concern among the policy makers. While aggregate shocks in the form of droughts and floods are found to have profound effects on household welfare, health shocks are idiosyncratic and unpredictable in nature and pose serious challenges to those households that face it (Narayan, Chambers, Shah and Petesch 2000). When households are faced with health shocks in short term, they are forced to reduce basic consumption and substitute it with healthcare spending (Somi, Butler, Vahid, Njau and Abdulla 2009, Kabir, Rahman, Salway and Pryer 2000). In long term, it

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tends to reduce net investment flows for productive activities (Somi, *et. al.* 2009). This implies that there is a certain possibility that high health expenditure induced by health shocks might lead households to poverty in future or make them even poorer.

Empirical evidence also shows that health shocks have significant negative impact on household current welfare (Lucas and Bloom 2006, Devereux, Baulch, Macauslan and Sabates-Wheeler 2006). As such households are exposed to the medical poverty trap, a situation when medical costs lead a household into poverty or increase the poverty of those who are already poor (Whitehead, Dahlgren and Evans 2001). Under these circumstances, a household is said to be vulnerable to poverty due to health shock if the net value of its consumption expenditure falls below poverty line, due to occurrence of any illness/injury which results in payment of high out-of-pocket (OOP) health care expenses. Vulnerability to poverty is a forward looking or ex-ante measure of welfare defined as "a probability: the risk a household will fall into poverty at least once in the next few years" (Duflo 2005).

India faces a high risk of financial burden as its share of out-of-pocket (OOP) expenditure is 62.7 per cent of the total health expenditure (WHO 2018). In fact, household health spending is growing faster than household consumption expenditure in India (Mohanty, Ladusingh, Kastor, Chauhan and Bloom 2016). Evidence also suggests that 3.5 per cent of the population is pushed below poverty line in 2011-2012 as a result of OOP medical payments in India (Hooda 2017). However, these analyses are ex-post in nature and do not capture ex-ante impact of illness shocks on household welfare. This implies that the effect of health shocks realised as high OOP healthcare expenses on the future well-being or vulnerability to poverty of households has been grossly ignored in empirical literature, especially in the Indian context. With a dearth of studies on vulnerability to poverty due to health shocks among Indian households, our contribution in this regard is to estimate a forward-looking measure of welfare, i.e., vulnerability to poverty and to analyse whether household health status affects vulnerability to poverty in India. This study also aims to identify the socio-economic determinants of vulnerability. To the best of our knowledge, this is one of the first studies that have examined the relation between household health status and vulnerability to poverty among Indian households.

II Methodology

Study Design and Sample Selection

The study uses secondary data from the latest 75th Health Round of National Sample Survey (NSS) (2017-2018) conducted in July 2017-June 2018 with a sample size of 113,816 households (NSS 2019). Adopting multi-stage stratified sampling method, the survey collected detailed household and individual level

information, along with information on reported morbidity, health care utilization and health care expenditure. The recall period for any information on hospitalisation and outpatient (OP) care is one year and 15 days preceding the survey respectively.

Variables

Dependent Variable: Net household consumption expenditure has been used as the dependent variable in vulnerability estimation. It is calculated by subtracting total health expenditure from total consumption expenditure of the household. For estimating total health expenditure, total outpatient expenditure (reference period is 15 days) and total inpatient expenditure (reference period is 365 days) is calculated separately for the households. Then they are converted into monthly estimates and added to get total health expenditure. The choice of net household consumption expenditure as the dependent variable can be validated on two grounds. First, a household with high health expenditure is not considered as poor, even if its consumption of basic commodities has fallen below the poverty threshold during that time. Second, a household living below poverty line but resorting to borrowing to finance the healthcare expenses will not be considered as poor since total expenditure will rise above the poverty line. Thus, subtracting health expenditure can best reflect the impact of health shocks on expected mean consumption expenditure, while ignoring it will result in an overall-underestimation of vulnerability.

Independent Variable: In this study, the proxy of health shocks is the health status of the household. This variable has been approximated by standardization of any event of illness and/or injury in the household. This is done by dividing number of members who are suffering from any illness/injury during the last 15 days preceding the survey or any event of hospitalisation during the last 365 days preceding the survey with the total number of household members (Atake 2018, Novignon, Nonvignon, Mussa and Chiwaula 2012).

Household hygienic condition proxied by presence of safe drinking water and hygienic sanitation facilities are included to complement the household's health status (Atake 2018, Novignon, *et. al.* 2012). Households with drinking water sources like bottled water, piped water in dwelling or outside, tube well/bore well (inside/outside), water supplied through containers (tanker/truck/drum) and having a community RO plant, are considered as having safe drinking water facilities. On the other hand, households having drinking water sources like protected well (inside/outside), protected spring/pond, unprotected source (river/canal/spring/ pond/ well) and other sources are considered as having unsafe drinking water facilities. Households with hygienic sanitation facilities are those which have either flush and/or pit latrines; while households having no latrine facilities or defecating in open space and other types of latrines have been classified as having unhygienic sanitation facilities.

Other variables which might affect household welfare are sector (rural/urban), household size (number of members in household), household occupational category (self-employed, casual labour, regular wage /salaried and others), having at least one member with health insurance coverage, type of insurance coverage (government sponsored insurance coverage, insurance sponsored by private employer, insurance arranged by household, other types of insurance), caste group (Scheduled Tribe (ST), Scheduled Caste (SC) and Other Backward Caste (OBC)/others), region (north-central, east, north-east, west, south) and gender of household head (male/female) and education status of household head (no education, primary, secondary, tertiary) (Atake 2018, Mitra, *et. al.* 2016, Novignon, *et. al.* 2012). In addition, the presence of at least one child, one elderly person and one female in the reproductive age-group in the household are also considered, as these groups are more likely to be ailing at any given point of time thereby increasing their health expenditure in the process (Dhanaraj 2014, Joe 2015).

III Data Analysis

Empirical Approach

In the empirical literature, there are 3 principal approaches that can be used to estimate vulnerability- vulnerability as expected poverty (VEP), vulnerability as low expected utility (VEU) and vulnerability as uninsured exposure to risk (VER). These approaches provide a model that estimates a measure of welfare (Christiaensen and Boisvert 2000). VEP is the probability that expected consumption expenditure of a household will fall below the poverty line in future (Christiaensen and Boisvert 2000). VEU, on the other, is the difference between utility derived from a certain consumption level that would be its equivalent and to which or beyond which, the household will not be considered as vulnerable. VER approach captures the welfare loss of household, due to lack of efficient risk management mechanism (Ligon and Schechter 2003).

Our study uses the VEP approach (Novignon, et. al. 2012, Chaudhuri 2003) to analyse vulnerability resulting from health shocks. There are two reasons which justify the choice of VEP approach over VEU and VER approaches. First, VEP approach allows the use of cross section data for estimation of vulnerability, unlike VEU and VER approaches which require panel data (Novignon, *et. al.* 2012, Chaudhuri 2003). Second, contrary to VEU approach, VEP approach allows ex-ante estimation of vulnerability due to any negative shock (Novignon, *et. al*. 2012).

The probability that a household h will find itself consumption poor in time t+j is given as

$$V_{ht} = Pr\ (lnC_{h,t+j} < lnz) \quad \ldots(1)$$

Where V_{ht} represents vulnerability of household h at time t, $C_{h,t+j}$ is consumption expenditure of household h, at time t+j, z is the poverty line, and ln is the natural log.

The consumption generating process can be specified as

$$lnC_h = X_h\beta + \epsilon_h \quad \ldots(2)$$

Where C_h is consumption expenditure of household h, X_h is observable household characteristics in terms of non-stochastic household determinants, household's exposure to shocks and coping strategies with respect to health shocks, β is a vector of parameters, and ϵ_h is zero-mean disturbance term. Two assumptions need to be made for using cross section data- (i) the disturbance term ϵ_h is log normally distributed, implying that C_h is also log normally distributed. This assumption is made to enable the estimation of the probability that a household with a given set of characteristics will be vulnerable to shocks. (ii) The economy is assumed to be stable during the period of analysis.

Thus, any household h, with characteristics X_h will be vulnerable to poverty due to health shocks using the estimated coefficients of equation 2.

$$\widehat{V_{ht}} = pr\ (lnC_{h,t+j} < lnz|X_h) \quad \ldots(3)$$

Allowing for heteroscedasticity, we assume the variance of ϵ_h to be related to the household characteristics in some parametric way as:

$$\sigma^2_{\epsilon,h} = X_h\emptyset + \mu_h \quad \ldots(4)$$

To estimate $\emptyset$, a three stage Feasible Generalized Least Squares (FGLS) procedure suggested will be used. At the first stage, equation (2) is estimated using Ordinary Least Squares (OLS) procedure. The estimated residuals will then be used to estimate the equation (5) by OLS

$$\hat{\sigma}^2_{OLS,h} = X_h\widehat{\emptyset} + \hat{\mu}_h \quad \ldots(5)$$

The predicted values from equation (5) are used to transform equation (5) as:

$$\frac{\sigma^2_{OLS,h}}{X_h\widehat{\emptyset}} = \frac{X_h}{X_h\widehat{\emptyset}}\emptyset + \frac{\mu_h}{X_h\widehat{\emptyset}} \quad \ldots(6)$$

Now equation (6) will be estimated by OLS which will give $\widehat{\emptyset}_{FGLS}$. Here, $X_h\widehat{\emptyset}_{FGLS}$ is the efficient estimate of $\sigma^2_{e,h}$ which is the variance of the idiosyncratic component of household consumption. The standard error of $\widehat{\emptyset}_{FGLS}$ is used to transform equation (2):

$$\hat{\sigma}_{\epsilon,h} = \sqrt{X_h \widehat{\emptyset}_{FGLS}} \quad \ldots(7)$$

$$\frac{lnW_h}{\hat{\sigma}_{\epsilon,h}} = \frac{X_h}{\hat{\sigma}_{\epsilon,h}}\beta + \frac{\epsilon_h}{\hat{\sigma}_{\epsilon,h}} \quad \ldots(8)$$

Estimating equation 8 using OLS will give us $\hat{\beta}$. These values of $\widehat{\beta_{FGLS}}$ and $\widehat{\emptyset}_{FGLS}$ will enable the estimation of expected log consumption as denoted by equation (9) and expected variance of log consumption as denoted by equation (10) respectively. Thus,

$$E\left[\left(ln\widehat{C_h}\middle|X_h\right)\right] = X_h\hat{\beta} \quad \ldots(9)$$

$$Var\left[\left(ln\hat{C}_h\middle|X_h\right)\right] = \hat{\sigma}_h^2 = X_h\widehat{\emptyset} \quad \ldots(10)$$

Now at the final stage, vulnerability to poverty can be estimated as

$$\hat{V}_h = \omega\left(\frac{lnz - X_h\widehat{\beta_{FGLS}}}{\sqrt{X_h\widehat{\emptyset}_{FGLS}}}\right) \quad \ldots(11)$$

Thus, estimation of vulnerability due to health shocks depends on the assumption of normal distribution of log transformed consumption values, choice of poverty line, the expected level and variability of log consumption.

Time Horizon and Poverty Line

Regarding time horizon required to be vulnerable to poverty due to shocks, literature shows that time horizon and welfare are quite arbitrary and households can become poor exactly in one period or in any successive periods after illness shocks and as such, the time horizon has been specified as t+j instead of t+1, with j≥ 1 (Atake 2018, Novignon, *et. al.* 2012). The poverty lines for 2017 have been estimated by using the poverty line figures of 2011-2012 and Consumer Price Index for Industrial Workers (CPIIW) and Consumer Price Index for Agricultural Workers (CPIAL) for the year 2017 (Planning Commission 2014, Labour Bureau 2017).

Threshold for Vulnerability to Poverty

The threshold for vulnerability due to health shocks is taken as 0.5 (Novignon, *et. al.* 2012, Chaudhuri 2003). The choice of this threshold can be justified on multiple grounds. First, it makes more sense to say that a household with 50 per cent probability of falling in poverty, in the next period, is vulnerable to poverty. Thus, households with an estimated vulnerability to poverty of 0.5 and more are

vulnerable to poverty (Novignon, *et. al.* 2012). Second, when a household with the current level of consumption equal to poverty line, faces a zero-mean shock, the estimated vulnerability to poverty is 0.5 (Atake 2018). In the limit, when the time horizon approaches zero, being currently poor and currently vulnerable to poverty coincides (Atake 2018). Vulnerability to poverty is measured in terms of percentage of vulnerable households and mean vulnerability. Higher mean vulnerability implies higher probability to be vulnerable to poverty due to health shocks (Atake 2018). All analyses are conducted using statistical software STATA version 14 taking into account sample weights.

IV Results

Descriptive Statistics

Table 1 shows that on average, 33 individuals per 100 households reported illness/injury during the last 15 days preceding the survey, or at least one event of hospitalisation during the last 365 days preceding the survey. Average monthly consumption expenditure of the household is Rs. 8699 (approx.) with an average household size of 4. Regarding insurance coverage of households, it is observed that 18.99 per cent of the sample households have at least one member having insurance coverage and 15.31 per cent of the households have at least one member with government sponsored insurance coverage.

Table 1: Summary of Descriptive Statistics

Variables	No. of sample households (in percentages)	Mean (SD)
Net Household consumption expenditure		8698.62 (7114.08)
Number of members who are suffering from any illness/injury in the respective reference period		0.33 (0.14)
Household size		4.35 (2.09)
Sector		
Rural	76531 (67.24)	
Urban	37285 (32.76)	
Social Group		
ST	10278 (9.03)	
SC	21879 (19.22)	
OBC and others	81658 (71.75)	
Occupation type of household		
Self -employed	51973 (45.66)	
Regular wage and salaried	22001 (19.33)	
Casual labour	30207 (26.54)	
Other occupation	9636 (8.47)	

Contd…

Table 1: Summary of Descriptive Statistics

Variables	No. of sample households (in percentages)	Mean (SD)
Hygiene		
Hygienic sanitation facilities	88102 (77.41)	
Non-Hygienic sanitation facilities	25714 (22.59)	
Availability of safe drinking water	106497 (93.57)	
Non-availability of safe drinking water	7319 (6.43)	
Gender of the household head		
Female Household Head	13867 (12.18)	
Male Household Head	99949 (87.82)	
Education of household head		
No education	32281 (28.36)	
Primary	42540 (37.38)	
Secondary	26566 (23.34)	
Tertiary	12429 (10.92)	
Region		
North-central	40003 (35.15)	
East	24813 (21.80)	
North-east	4188 (3.68)	
West	15878 (13.95)	
South	28934 (25.42)	
Demographic characteristics		
Presence of at least one child (0-12 years)	28368 (24.92)	
Presence of at least one elderly (60 years and above)	25753 (22.63)	
Presence of at least one female in the reproductive age (15-49 years)	104838 (92.11)	
Health insurance coverage		
Having any member with health insurance coverage	21609 (18.99)	
Having no member with health insurance coverage	92207 (81.01)	
Having any member with government sponsored health insurance	17424 (15.31)	
Having any member with employer provided health insurance	1960 (1.72)	
Having any member with household arranged health insurance	1941 (1.71)	
Having any member with other types of insurance	284 (0.25)	
Total (n)	113816 (100)	

Note: Standard deviations (SD) are given in parentheses.

Source: NSS 75th (2017-18) round unit-record data.

Vulnerability to Poverty

The average estimated vulnerability to poverty is 0.74, with 40.97 per cent of households being vulnerable to poverty due to health shocks (Table 2). Comparing

mean vulnerability to poverty across household characteristics reveals that rural households are comparatively more vulnerable than their urban counterparts. It is also evident that ST and SC households have higher mean vulnerability to poverty than households belonging to OBC and general caste groups (0.63 for ST and 0.58 for SC vs 0.46 for OBC/other caste respectively). Further, households with members employed as casual labourers have higher mean vulnerability to poverty (0.61) in comparison to self-employed and regular wage/salaried households (0.46 and 0.34 respectively). It is further evident from the analysis that households with unhygienic sanitation facilities and poor drinking water facilities have high mean vulnerability (0.67 and 0.59 respectively) than their better-off counterparts (0.45 and 0.49 respectively). We also find that male headed households are more vulnerable to poverty than female headed ones (0.84 vs 0.57). Also, households with illiterate heads have higher mean vulnerability (0.59) than household heads educated up to primary, secondary and tertiary levels (0.54, 0.44, 0.24 respectively), with mean vulnerability rising as education level of the household heads falls. Estimating vulnerability to poverty across various demographic characteristics shows that households with no children and no females in the reproductive period are more vulnerable to poverty than their corresponding counterparts. This implies that health status of members other than children and females, might play a vital role in increasing the mean vulnerability which is corroborated by the finding that households with at least one elderly member having higher mean vulnerability as compared to households with no elderly members (0.51 *vs* 0.49). This may be caused primarily because elderly members have high incidence of illness than non-elderly members, which can increase the overall mean vulnerability. Incorporating insurance coverage among household members in vulnerability analysis further shows that households with no insured members, have higher mean vulnerability than households with insured members (0.51 *vs* 0.44). Analysing across type of insurance coverage, we find that households with at least one member covered with government sponsored health insurance have higher mean vulnerability (0.67) than households with members having other types of insurance coverage such as supported by employer, arranged by household and other schemes (0.38, 0.31 and 0.45 respectively) (Table 3).

Table 2: Estimated Mean Vulnerability to Poverty

Vulnerability index (VI)	Total vulnerable households (in percentages)	Mean Vulnerability (SD)
VI ≥ 0.5	46633 (40.97)	0.74 (0.14)
VI < 0.5	67183 (59.03)	0.23 (0.15)
Total	113816 (100)	0.44 (0.29)

Note: Standard deviations (SD) are given in parentheses.

Source: Estimated from NSS 75th (2017-18) round unit-record data.

Table 3: Mean Vulnerability Across Social and Contextual Household Characteristics

Variables	Mean Vulnerability (SD)
Sector	
Rural	0.58 (0.26)
Urban	0.34 (0.27)
Social Group	
ST	0.63 (0.26)
SC	0.58 (0.27)
OBC and others	0.46 (0.29)
Occupation type of household	
Self -employed	0.46 (0.27)
Regular wage and salaried	0.34 (0.26)
Casual labour	0.61 (0.21)
Other occupation	0.75 (0.24)
Hygiene	
Hygienic sanitation facilities	0.45 (0.28)
Unhygienic sanitation facilities	0.67 (0.24)
Availability of safe drinking water	0.49 (0.29)
Non-availability of safe drinking water	0.59 (0.27)
Gender of household head	
Female household head	0.57 (0.28)
Male household head	0.84 (0.18)
Education of household head	
No education	0.59 (0.28)
Primary	0.54 (0.27)
Secondary	0.44 (0.26)
Tertiary	0.24 (0.24)
Region	
North-central	0.49 (0.29)
East	0.57 (0.27)
North-east	0.48 (0.25)
West	0.45 (0.29)
South	0.48 (0.29)
Demographic Characteristics	
Presence of at least one child	0.42 (0.28)
No children	0.53 (0.29)
Presence of at least one elderly	0.51 (0.32)
No elderly	0.49 (0.28)
Presence of at least one female in the reproductive age	0.47 (0.28)
No females in the reproductive age	0.84 (0.18)

Contd…

Table 3: Mean Vulnerability Across Social and Contextual Household Characteristics

Variables	Mean Vulnerability (SD)
Health insurance coverage	
Having any member with health insurance coverage	0.44 (0.30)
No members having health insurance coverage	0.51 (0.28)
At least one member covered with government sponsored health insurance schemes	0.67 (0.31)
At least one member covered with employer supported health insurance schemes	0.38 (0.20)
At least one member covered with household arranged health insurance schemes	0.31 (0.29)
At least one member covered with health insurance from other sources	0.45 (0.31)

Note: Standard deviations (SD) are given in parentheses.
Source: Estimated from NSS 75th (2017-18) round unit-record data.

Determinants of Vulnerability to Poverty

The determinants of vulnerability to poverty due to household illness status has been exhibited in Table 4. We find that there is a negative relationship between vulnerability to poverty and household health status which implies that vulnerability to poverty is higher for households with more ailing members. Also, vulnerability to poverty is higher when the household size is high. Relative to urban areas, households in rural areas are estimated to be more vulnerable to poverty. Even compared to OBC/other caste groups, ST and SC households have higher vulnerability to poverty. Furthermore, households with members engaged as casual labourers are more likely to be vulnerable to poverty due to health shocks relative to households with self-employed members. It is also important to note that households with access to hygienic sanitation facilities are less likely to be vulnerable to poverty. The results also suggest that higher education level of household head relates to lower expected mean of consumption, implying lesser vulnerability to poverty. In addition, it has been observed that higher number of children and elderly in the household increase vulnerability to poverty by lowering expected consumption. A crucial finding of the study is that for households having any member with insurance coverage reduces vulnerability to poverty due to health shocks relative to households with no insured members.

Table 4: Determinants of Vulnerability to Poverty Due to Health Shocks

Variables	Ex-ante mean Consumption (SE)	Ex-ante variance Consumption (SE)
Health Status	-1.29* (0.018)	0.69*(0.007)
Household size	0.16* (0.003)	-0.06*(0.002)
Sector (Ref: Urban)		
Rural	-0.46* (0.008)	0.17* (0.004)
Caste (ref: OBC/Other caste)		
ST	-0.14* (0.012)	0.07* (0.005)
SC	-0.06* (0.009)	0.03* (0.004)
Household Occupational Category (Ref: Self-employed)		
Regular wage/salaried	0.06* (0.010)	0.03 (0.005)
Casual labour	-0.07* (0.008)	0.04 (0.004)
Other occupation	-0.12* (0.014)	0.03* (0.006)
Hygiene		
Hygienic sanitation facilities *(Ref: Unhygienic sanitation facilities)*	0.20* (0.009)	-0.07* (0.004)
Safe drinking water *(Ref: Unsafe drinking water facilities)*	-0.01 (0.014)	0.03* (0.006)
Gender of household head (Ref: Male)		
Female	0.13* (0.011)	-0.11* (0.005)
Education of Household head (Ref: Illiterate)		
Primary	0.05* (0.009)	-0.05* (0.004)
Secondary	0.15* (0.010)	-0.07* (0.005)
Tertiary	0.41* (0.014)	-0.14* (0.007)
Demographic characteristics		
Presence of at least one child *(Ref: No child)*	-0.04* (0.006)	0.05 (0.003)
Presence of at least one elderly (*Ref: No elderly)*	-0.04* (0.006)	0.02 (0.003)
Presence of at least one female in reproductive age *(Ref: No females)*	0.01 (0.004)	-0.01* (0.002)
Presence of at least one member with insurance coverage *(Ref: No insured members)*	0.13* (0.009)	-0.07* (0.004)
Region (Ref: South)		
East	-0.22* (0.010)	0.07* (0.005)
North-east	-0.12* (0.019)	0.07* (0.009)
West	0.02 (0.011)	0.01 (0.005)
North-central	-0.16* (0.009)	0.07* (0.004)
Constant	8.12* (0.028)	1.01* (0.001)

Note: Dependent variable for first estimation is ex-ante mean of consumption; Dependent variable for second estimation is ex-ante variance of consumption; Standard errors (SE) are given in parentheses; * Indicates 5 per cent level of significance.

Source: Estimated from NSS 75th (2017-18) round unit-record data.

V Discussion

The results of our study indicate that current health status of households play a critical role in determining vulnerability to poverty. As general health status of a household declines or share of ill members in the household rises, future expected consumption expenditure gets reduced, making the households more vulnerable to poverty (Atake 2018, Novignon, *et. al.* 2012). The study finds that rural households have higher mean vulnerability than urban ones, implying that the former are unable to shield earned income and consumption expenditures in the face of illness shocks (Mitra, *et. al.* 2016). Our analysis also suggests that SC and ST households and households with members employed as casual labourers are more vulnerable to poverty than their corresponding counterparts. Evidence from ex-post analysis also supports that ST and SC households have uniformly higher poverty levels than OBC and general caste households while households with members employed as casual labourers have highest levels of poverty of all types of employment groups (Sundaram and Tendulkar 2003).

An interesting finding of the study is that households with hygienic sanitation facilities are found to be less vulnerable than their counterparts, thereby confirming that households with good hygiene are more likely to have good health and consequently lower health expenditure resulting in improved welfare. Thus, health is both a consumption and investment commodity, as good health status enables individuals to be more productive and get positive returns from consumption and investment activities (Atake 2018, Novignon, *et. al.* 2012).

We also find that male headed households are more prone to be vulnerable to poverty than female headed households (Novignon, *et. al.* 2012). It is also further revealed that as education of the household head goes higher, the households become lesser vulnerable to poverty (Atake 2018, Novignon, *et. al.* 2012). This implies that educated household heads are more likely to have well-paying income sources than can attenuate the impact of health shocks on vulnerability to poverty (Glewwe and Hall 1998). The study also finds that having more children and elderly in the household makes them more vulnerable to poverty. Both elderly and children are more prone to be ailing and seek healthcare resulting in increased OOP payments in the current period, which might reduce their net consumption expenditure in future (Kumara and Samaratunge 2017).

Also, households having any member covered with insurance coverage are less vulnerable to poverty. Evidence from related studies also asserts that health insurance tends to reduce current OOP health expenditure, thereby reducing vulnerability and poverty (Sepehri, Simpson and Sarma 2006). Quite interestingly, we further find that households with at least one member having government sponsored health insurance are more vulnerable to poverty than households having members with other types of insurance coverage. This suggests that government sponsored health insurance coverage increases the risk of reduction in net consumption expenditure in future. Empirical evidence shows that hospitalization expenditure has increased after introduction of government sponsored health

insurance schemes in India (Selvaraj and Karan 2012). Also, government sponsored health insurance schemes have limited cap amounts and households enrolled in schemes such as Rashtriya Swasthya Bima Yojana (RSBY) are found to incur additional OOP spending on drugs and diagnostics which can make them more vulnerable to poverty (Karan, Yip and Mahal 2017).

Lastly, the study identifies key determinants of vulnerability to poverty, apart from household health status. The salient characteristics that make households more vulnerable to poverty are the household's location in rural areas, belonging to ST and SC groups, having members employed as casual labourers, male household heads, low education of household heads, presence of elderly and children in household and absence of insured members in the household. An additional finding is that large households have lower mean vulnerability than small households. This might be attributed to 'economies of household size' as big household size represents good labour force resulting in increased income. Also, members in big households can get more out of their household income in the form of shared rent, housing bills and bulk purchases of food commodities which can thereby reduce vulnerability to poverty in future (Muleta and Deressa 2014).

The study is not free from limitations. The first limitation is lack of panel data to estimate vulnerability that would have otherwise helped in the analysis of inter-temporal consumption expenditure. The second limitation is that the study is based on data that uses self-reported measures of consumption and health expenditure and self-reported morbidity status. In spite of the aforementioned limitations, it must also be noted that the study highlights the importance of future poverty and confirms its link with household health status, given the scarcity of empirical evidence on these issues in developing economies and particularly in India.

VI Conclusion

With an absence of adequate empirical evidence on the relationship between health status and vulnerability to poverty, our study attempts to examine vulnerability to poverty due to health shocks among Indian households using a 3-step FGLS approach. Using NSS 75th health round (2017-2018), this study develops first of its evidence that in India, presence of ill members in the household reduces household future consumption and makes them vulnerable to poverty. Other causal factors of vulnerability are location of the household in rural areas, belonging to disadvantaged caste groups, having members employed as casual labourers, having elderly and children in the household, male household head, low education levels of household head and presence of uninsured members in the household.

The findings of the study imply that deprivations due to health status need to be viewed from a broader perspective that goes beyond the poverty status at a specific period of time. It also implies that reduction of vulnerability to poverty, or stabilizing consumption in the event of a health shock in the household, can be achieved by expansion of health insurance programs that aim at lessening OOP health expenditure of households as well as focusing on education and access to

hygienic sanitation facilities. These findings will play an instrumental role in developing integrated programmes that improve health status and human capital along with stabilizing consumption in future, especially in the context of COVID-19 pandemic.

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Taxonomic Evaluation of Health Infrastructure and COVID-19 Situation in India with Special Reference to Haryana State

Devender and Kirti

The main objective of this study was to examine the performance of health infrastructure and COVID-19 situation in India with special reference to Haryana state. The Composite indices of health infrastructure and COVID-19 situation had been carried out with the use of 'Wroclow Taxonomic method'. The findings of the paper confirmed that Karnataka state had better health facilities, whereas Bihar state had very poor. In COVID-19 situation Index, Rajasthan, Gujarat and Haryana had performed better, whereas, Assam, Karnataka and Tamil Nadu fared poorly. According to district-level analysis in Haryana, Gurugram shows better health infrastructure, whereas Sirsa was the worst. In COVID-19 situation index, Sonipat, Gurugram, Faridabad, and Mahendragarh had performed better whereas Kaithal, Bhiwani, and Jind fared poorly.

Keywords: COVID-19, Health expenditure, Health infrastructure, Taxonomic method.

I Introduction

The vicious COVID-19 virus, also known as the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), rapidly spread all over the world and has created a situation of devastation for over one and a half years now (Shukla, Pradhan and Malik 2021). It has unanticipated effects on the global health system and created a difficult situation for the world economy (Arif and Sengupta 2021). It has also raised questions regarding health facilities in forward as well as backward countries. The virus was originally reported in Wuhan city (China) from an unidentified reservoir (suspected bats) in December, 2019 (Gauttam, Patel, Singh, Kaur, Chattu and Jakovljevic 2021, Riza, Erdogan, Agaoglu, Dineri, Cakirci, Senel, Okyay and Tasdogan 2020, Shukla, Pradhan and Malik 2021, Velavan and Meyer 2020). In March 2020, the World Health Organization (WHO) declared it a global pandemic due to its rapid transmission from person to person and causing

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many deaths globally (Kannan, Ali, Sheeza and Hemalatha 2020, Wang, Horby, Hayden and Gao 2020).

In India, the first case of COVID-19 was found in the Thrissur district of Kerala on January 30, 2020 (Sarkar, Khajanchi and Nieto 2020). The Government of India (GOI), as well as state governments had formulated a blueprint to tackle this pandemic; therefore various precautions were taken to overcome this difficult situation, which included nationwide lockdown and formation of containment zones. The Government of India (GOI) launched a smartphone based application namely *Aarogya Setu* which helped in tracking down infected persons, and also organised many awareness programs (Malani, Soman, Asher, Novosad, Imbet, Tandel, Agarwal, Alomar, Sarker, Shah, Shen, Gruber, Sachdeva, Kaiser and Bettencourt 2020, Banerjee, Alsan, Breza, Chandrasekhar, Chowdhury, Duflo, Goldsmith-Pinkham and Olken 2020, Gohel, Patel, Shah, Patel, Pandit and Raut 2021, Pandey, Prakash, Agur and Maruvada 2021), etc. Despite these precautions, confirmed cases steadily increased over time. Better health services are necessary to tackle the situation of COVID-19 and to improve overall quality of life, which is influenced by various factors such as demographic, environmental, hereditary, social and economic determinants, i.e., level of income, education, availability of basic amenities and health facilities (Varkey, Joy and Panda 2020). According to Kumar and Gupta (2012), the availability of health infrastructure (skilled workforce, public health organizations, information system, and research and development) in a region, is the most crucial factor that helps in improving the living standard of people.

However, the fact remained that the limited health infrastructure in the pandemic faced a stressful situation (Singh, Deedwania, K, Chowdhury and Khanna 2020). According to the World Health Organization (WHO), 2021 weekly operational updates on COVID-19, as of 16th June 2021, a total number of 17,63,11,647 confirmed cases had been found, and 38,20,207 people died due to this pandemic. On the other hand, in India, the total number of confirmed cases was 2,96,99,589 (16.84 per cent of global cases) and reported 3,31,911 deaths (8.69 per cent of total global deaths) as of 16th June 2021. Herein, it is difficult to predict how much population is currently affected by this virus and how more people will be affected in the future (Petropoulos and Makridakis 2020). The Indian economy where a large proportion of the population lives in rural areas with widespread poverty, needs accessible and low-cost health facilities; therefore, the GOI consistently focused on providing more reliable and affordable health facilities for all. The GOI formulated its first National Health Policy (NHP) in 1983 to provide accessible healthcare services (Maulik, Patil, Khanna, Neogi, Sharma, Paul and Zodpey 2016), the second NHP in 2002 was also based on the previous policy to provide healthcare services through decentralisation as well as through the private sector (Singh 2008); furthermore, in 2017, the GOI introduced restructured NHP for universalisation of healthcare facilities with an approach *Health in All* (Gauttam, *et. al.* 2021). Therefore, the GOI increased its expenditure on health services; however, in 2017-2018, health expenditure as a percentage of

GDP was only 1.25 per cent and the per capita public expenditure on health was ₹1,657 (National Health Profile 2020). In 2020, there were 12,34,205 registered doctors (1 doctor per 1085 people) in State Medical Councils/Medical Councils and 15,54,022 beds (1 bed per 862 people) in government hospitals in India. As mentioned above, a large portion of the population in India lives in rural areas; therefore, the government provided a three-tier health facilities system for them (Rekha 2020), i.e., Community Health Centers (5,685), Primary Health Centers (20,069), and Sub Centers (1,52,794). Despite these steps, health facilities in India are not up to the mark, and the government is still facing a challenge to provide better health care (Dev and Sengupta 2020). Furthermore, due to the low availability of public health services, poor people cannot afford expensive healthcare facilities provided by private providers, as a result, they fall into the vicious circle of poverty (Varkey, *et. al.* 2020).

As a contrast to the above, Haryana is a state that has impressive growth rate and higher per capita income than its neighboring states (Devender and Kumar 2021). In 2020, its government hospitals had 14,517 doctors (1:1991), which was higher than national average; and 41,744 beds in hospitals as well as COVID-19 dedicated health centres (1:692), which was less than the national average. Moreover, health expenditure of the state government on health services was less than the national average, which is 0.68 percent of GDP and the per capita public expenditure on health was merely ₹1,168 in 2017-2018. As per media bulletin (issued by Press Information Bureau [2021], Government of India) on 16th June 2021 there were 2,652 confirmed positive cases per lakh of population, 1.19 per cent of fatality rate, and the weekly positivity rate had fallen to one per cent and 23.34 per cent population was covered through vaccination. Rapid testing/screening, identifying, quarantine and speedy vaccination are the optimum steps for prevention from this pandemic. The role of health infrastructure facilities is indispensable to control any pandemic; therefore, the main objective of this paper is to critically examine the performance of health infrastructure and COVID-19 situation in India with special reference to Haryana state.

II Research Methodology

Choice of Indicators

The present study mainly deals with the availability of health infrastructure and the situation of the COVID-19 pandemic among 21 major Indian States/UTs (affected by the pandemic) and district level in Haryana.

Indicators Related to Health Infrastructure

In terms of health infrastructure, six indicators commonly available for all regions have been collected, i.e., number of hospitals per lakh of population (HI_1), number

of beds per lakh of population (HI_2), number of ICU beds per lakh of population (HI_3), number of ventilators per lakh of population (HI_4), number of testing laboratories (HI_5), number of doctors per lakh of population (HI_6). The data has been collected for the year 2020-2021 from various media bulletin and reports issued by the Ministry of Health and Family Welfare, Indian Council of Medical Research (ICMR), GOI; National Health Profile, 2020; Health Department of Haryana; and Statistical Abstract of Haryana issued by Department of Economic and Statistical Analysis, Haryana (Various issues).

Indicators Related to COVID-19 Situation

The COVID-19 situation has been measured by five common indicators available among major Indian states as well as in districts of Haryana, i.e., number of confirmed cases per lakh of population (CI_1), recovery rate (CI_2), fatality rate (CI_3), weekly positivity rate (CI_4), and per cent population covered through vaccination (CI_5). The data was collected with a cutoff date of 16th June 2021 from various media bulletins and reports issues by the Ministry of Health and Family Welfare, Indian Council of Medical Research (ICMR), GOI; and Health Department of Haryana. For measuring indicators per lakh of population (some districts have population below one million, therefore, per lakh population has been used), the projected population of 2020 was estimated with the help of exponential growth from 2001 to 2011.

Choice of Methodology

There are several statistical methods available in the literature to construct a composite index but most of methods have their own limitations. Therefore, the present study used the 'Wroclaw Taxonomic method' developed by Florek, Lukaszewicz, Perkal, Steinhaus and Zubrzycki (1952) and further used by Ewusi (1976), Khan and Islam (1990), Narain, Rai and Shanti (1991), and Ohlan (2013). Steps of the method:

Let assume $[X_{ij}]$ had a data matrix for *i*th district and *j*th indicators. Here the selected indicators were expressed in different units of measurement; therefore, there was a need to transform $[X_{ij}]$ into the standardized score $[Z_{ij}]$ as follows :

$$[Z_{ij}] = \frac{x_{ij} - \bar{x}_j}{s_j}$$

in which, $\overline{x_j}$ = mean and s_j = standard deviation.

$$P_{ij} = (z_{ij} - z_{oj})^2$$

where Z_{oj} is the optimal value of each indicator from [Z_{ij}]. The optimum value of the indicator would be the maximum value for all stimulant and the minimum value for all destimulant. The pattern of development has been given as:

$$C_i = \sqrt{\sum_{J=1}^{n} P_i \,/\, (CV_j)}$$

where (CV_j) = Coefficient of variation.

The composite index of health development is given by $D_i = C_i / C$

where $C = \bar{C} + 3\sigma C_i$, $\bar{C}$= mean and σ = standard deviation.

where $0 < D_i < 1$ (If the value of Di is close to zero (0), then the particular district has relatively better health infrastructure). This methodology was also used for the measurement of the situation of COVID-19 in Haryana, in which a low value of D_i showed the particular region performed well and situated in a better situation in COVID-19.

Classification of Various Stages

A more meaningful classification of the districts based on their stages was carried out with the help of mean and standard deviation value as follows:

Better (IV) = $D_i \leq (\bar{X} - \sigma)$; Average (III) = $\bar{X} > D_i > (\bar{X} - \sigma)$; Poor (II) = $\bar{X} < D_i < (\bar{X} + \sigma)$; Very Poor (I) = $D_i \geq (\bar{X} + \sigma)$.

III State Level Analysis of Health Infrastructure and COVID-19 in India

The role of public expenditure is an important factor in providing affordable health services, especially in developing countries such as the Indian economy. In developed economies, the government spends much more on health services than in developing or less developed countries. According to the World Health Statistics Report (2018), expenditure on health services in the USA, Norway, and India's neighbouring country Sri Lanka was 17.1, 10.5, and 3.9 per cent of GDP, respectively; whereas, in India, it was merely 3.6 per cent of GDP. However, the GOI has increased its expenditure on health serviced due to dire condition created by COVID-19 pandemic; according to budget estimates, the total health expenditure of GOI was 6501.2 billion ₹ in the financial year 2020-2021 (Kirti and Langyan 2020).

In India, the average number of hospitals per lakh population was five; nine states had a higher number of hospitals than the national average. Uttar Pradesh

was on top (17,103) whereas Jammu and Kashmir (157) had the lowest number of hospitals in India. However, among the number of hospitals per lakh population of a state, Karnataka had highest 17 hospitals, followed by Himachal Pradesh and Uttarakhand. In terms of the number of hospital beds and ICU beds per lakh population, India's average was 116 and 5 beds, respectively. Maharashtra had the highest 270 hospital beds per lakh population and Tamil Nadu had the highest 12 ICU beds per lakh population. Himachal Pradesh had the lowest number of hospital beds and Bihar had the lowest number of hospital beds per lakh population. In aggregate, six states had higher value than national average in case of hospital beds per lakh of population and nine states were above national average in case of ICU beds per lakh population. In availability of ventilators for serious patients, national average was four per lakh population whereas Delhi had the highest number of ventilators followed by Maharashtra, Punjab, Uttarakhand, and Himachal Pradesh. The number of COVID-19 testing laboratories in India was 2,655 with wide regional variation among states. Tamil Nadu had the highest number of laboratories for testing COVID-19, followed by Uttar Pradesh, Maharashtra, and Karnataka whereas Himachal Pradesh had the lowest number of laboratories, followed by Jammu and Kashmir, Jharkhand, Assam, and Chhattisgarh. The number of doctors in India was 92 per lakh population and nine states had higher value than the national average. Maharashtra had the highest doctors, followed by Tamil Nadu, Karnataka, Andhra Pradesh, and Uttar Pradesh. Moreover, Himachal Pradesh had the lowest number of doctors, followed by Jharkhand, Uttarakhand, Chhattisgarh, and Haryana.

To overview the level of health infrastructure and to understand the impact of COVID-19 pandemic in India, a composite index of health infrastructure (HII) and COVID-19 situation (CSI) have been carried out, as given in Table 1.

It was clearly observed that Karnataka (0.217) obtained first place in health infrastructure followed by Kerala, Tamil Nadu, and Uttarakhand with index value of 0.315, 0.341, and 0.363, respectively. On the other hand, Bihar (0.769) had very poor health infrastructure, after that Jharkhand with index value of 0.721. Bihar had the lowest number of hospital beds, ICU beds, ventilators, and labs for COVID-19 sample testing. In addition, Jharkhand also had a deficient number of ICU beds and doctors per lakh population.

On the other hand, from the values of the composite index of the COVID-19 situation, it may be observed easily that Rajasthan (0.110) obtained the first rank in this index, which means this state did well in the pandemic, followed by Gujarat and Haryana with index values of 0.137, and 0.153, respectively. Rajasthan performed better as it had a low fatality rate from the pandemic and vaccinated around 25 per cent of the population. Gujarat had a low positivity rate and vaccinated 31 per cent of the population; moreover, Haryana had observed a high recovery rate and vaccinated 23 per cent of the population. On the contrary, Assam (0.970) was the state most afflicted by the pandemic, followed by Karnataka and Tamil Nadu, with values of 0.661 and 0.626, respectively. Assam had the lowest recovery rate, and only 14 per cent of the population had been vaccinated.

Table 1 Composite index of Health Infrastructure (HII) and COVID-19 Situation (CSI) in India

Sr. no.	States/UTs	HII			CSI		
		Value	Rank	Stage	Value	Rank	Stage
1	Karnataka	0.217	1	IV	0.661	20	I
2	Kerala	0.315	2	IV	0.416	13	II
3	Tamil Nadu	0.341	3	IV	0.626	19	I
4	Uttarakhand	0.363	4	IV	0.438	15	II
5	Maharashtra	0.450	5	III	0.409	12	II
6	Punjab	0.463	6	III	0.457	16	II
7	Delhi	0.486	7	III	0.23	7	III
8	Haryana	0.516	8	III	0.153	3	IV
9	Himachal Pradesh	0.519	9	III	0.303	11	III
10	Jammu and Kashmir	0.583	10	II	0.468	17	II
11	Gujarat	0.596	11	II	0.137	2	IV
12	Andhra Pradesh	0.612	12	II	0.438	14	II
13	Rajasthan	0.643	13	II	0.11	1	IV
14	Assam	0.651	14	II	0.97	21	I
15	West Bengal	0.654	15	II	0.227	6	III
16	Uttar Pradesh	0.656	16	II	0.256	10	III
17	Madhya Pradesh	0.679	17	II	0.184	4	III
18	Odisha	0.68	18	II	0.539	18	II
19	Chhattisgarh	0.685	19	II	0.196	5	III
20	Jharkhand	0.721	20	I	0.243	8	III
21	Bihar	0.769	21	I	0.252	9	III

Source: Author's own calculation.

From the above findings, it was found that all the four states with better health infrastructure failed to tackle the pandemic as expected. Similarly, two states with average infrastructure, Maharashtra, and Punjab, have also failed. With its average infrastructure, Haryana was the only state that did well. On the other hand, barring four states namely Jammu and Kashmir, Gujarat, Assam, and Odisha, all poor as well as very poor health infrastructure having states have fared better.

IV District Level Analysis of Health Infrastructure and COVID-19 in Haryana

The primary objective of this section was to study the level of health infrastructure and situation of COVID-19 in Haryana. It was at 8th rank with average health infrastructure (III) among major states; whereas, a better situation (IV) with 3rd rank has been observed in the case of the COVID-19 situation among major states (*see* Table 1).

In terms of health infrastructure, Haryana had 601 hospitals, 41,744 hospitals beds and 69 testing laboratories dedicated to COVID-19. , Haryana had 2 hospitals per lakh population, 144 hospitals beds, seven ICU beds, four ventilators and merely 48 doctors. In terms of hospitals and doctors, the state was far below the

national average. However, Haryana was better in terms of hospital beds, ICU beds per lakh population, while the number of ventilators was almost equal to the national average. At the district level, Gurugram had the highest number of hospitals in terms of absolute as well as per lakh of population, whereas Sirsa had the least number of hospitals. Ambala had the highest number of hospital beds, whereas Yamunanagar had the least number of hospital beds. Moreover, Gurugram had the highest number of ICU beds and ventilators, whereas Nuh had the lowest number of ICU beds and Jind had the lowest number of ventilators. On the aggregate level, eight districts were above than the states' average in case of number of hospitals per lakh population, and nine districts were above the states' average in hospital beds. In terms of ventilator availability, Gurugram had the highest number of ventilators (22), per lakh population, and seven districts had higher values than the state average. Haryana had a total of 69 laboratories for testing COVID-19, in which Gurugram had the highest number of laboratories, followed by Faridabad, Ambala and Rohtak. In two districts, i.e. Kaithal and Mahendragarh, there was not even a single laboratory for COVID-19 sample testing. In terms of doctors per lakh population, about 48 doctors were available in Haryana, while Panchkula had the highest number of doctors (128), and Palwal had the least number of doctors (4).

Moreover, in Haryana, the first case of COVID-19 was confirmed in the Gurugram district on 17th March 2020. However, earlier on March 11, 2020, the World Health Organization had declared COVID-19 as a pandemic and on the same day the Haryana Government issued the 'Haryana Epidemic Diseases, COVID-19 Regulations, 2020. After that, in the year 2020, two rounds of *Sero Survey* (first in August and second in October 2020) were conducted by Health Department of Haryana to evaluate the spread of COVID-19 in different districts. In the first round, Faridabad was found the most affected district in the state where the positivity rate was found to be eight per cent. Moreover, in the second round of the *Sero survey*, Faridabad was again found the most affected district; however, this time the positivity rate had increased to 14.8 per cent. To measure the impact of COVID-19 pandemic in the districts of Haryana, a composite index of the 'COVID-19 situation' was calculated based on selected five indicators, as given in Table 2. In Haryana, the number of confirmed cases per lakh population was 2,652 as of 16th June 2021. In which, Gurugram (10,457) district had the highest number of confirmed cases, followed by Faridabad (4,828), Panchkula (4,766), and Sonipat (2844); whereas, Nuh (401) district had the lowest number of confirmed cases followed by Palwal (890), Kaithal (905), and Bhiwani (1,382). Hisar, Sonipat, Panchkula, Faridabad and Gurugram had higher value than the state average in confirmed cases. The fatality rate from COVID-19 was 1.19 per cent in Haryana, where only six districts had a lower fatality rate than the state average. Kaithal had the highest fatality rate, followed by Fatehabad, Bhiwani and Jind; whereas, Gurugram had the lowest fatality rate, followed by Sonipat, Mahendragarh and Faridabad. The recovery rate in Haryana was 98.34 per cent as of 16th June 2021, where merely four districts had a higher recovery rate than the

state average. Sonipat (99.45 per cent) had the highest recovery rate, followed by Gurugram (99.34 per cent), Mahendragarh (99.05 per cent) and Faridabad (99.04 per cent). On the other hand, Kaithal (96.14 per cent) had the lowest recovery rate, followed by Bhiwani (96.69 per cent), Jind (96.98 per cent) and Mahendragarh (97.39 per cent). As on June 16, 2021, 23.34 per cent of the total population in Haryana had been covered through vaccination (commutative coverage). Six districts of Haryana have vaccinated a larger population than the state average. Gurugram covered the highest 51.71 per cent population by vaccination, followed by Ambala, Panchkula, and Faridabad. The lowest vaccination was observed in Haryana in Nuh (6.88 per cent), followed by Jind, Hisar and Kaithal with 13.58, 14.29 and 15.95 per cent, respectively. The weekly positivity rate from 9th to 15th June 2021 was only one per cent in Haryana. As of 16th June 2021, only five districts were found a lower positivity rate than the state average. Highest positivity rate was observed in Sirsa (20.23 per cent), followed by Fatehabad, Rohtak and Panchkula at 6.09, 5.38, and 4.43 per cent, respectively. The lowest positivity rate was observed in Nuh (0.19 per cent) district, followed by Jhajjar, Mahendragarh and Gurugram at 0.33, 0.53 and 0.70 per cent, respectively.

To overview the level of health infrastructure and to understand the impact of COVID-19 pandemic in Haryana, a composite index of health infrastructure (HII) and COVID-19 situation (CSI) have been carried out, as given in Table 2.

Table 2 Composite index of Health Infrastructure (HII) and COVID-19 Situation (CSI) in Haryana

Sr. no.	District	HII			CSI		
		Value	Rank	Stage	Value	Rank	Stage
1	Gurugram	0.416	1	IV	0.104	2	IV
2	Ambala	0.485	2	IV	0.447	10	II
3	Jhajjar	0.557	3	IV	0.336	7	III
4	Panchkula	0.567	4	IV	0.309	6	III
5	Hisar	0.602	5	III	0.493	13	II
6	Rohtak	0.652	6	III	0.492	12	II
7	Faridabad	0.664	7	III	0.126	3	IV
8	Fatehabad	0.673	8	III	0.527	18	II
9	Mahendragarh	0.692	9	II	0.132	4	IV
10	Bhiwani	0.71	10	II	0.692	20	I
11	Karnal	0.719	11	II	0.354	8	III
12	Kurukshetra	0.72	12	II	0.497	14	II
13	Yamunanagar	0.729	13	II	0.449	11	II
14	Nuh	0.743	14	II	0.498	15	II
15	Palwal	0.746	15	II	0.44	9	II
16	Sonipat	0.757	16	II	0.085	1	IV
17	Jind	0.759	17	II	0.625	19	I
18	Kaithal	0.785	18	II	0.829	21	I
19	Panipat	0.787	19	II	0.507	16	II
20	Rewari	0.797	20	I	0.292	5	III
21	Sirsa	0.806	21	I	0.512	17	II

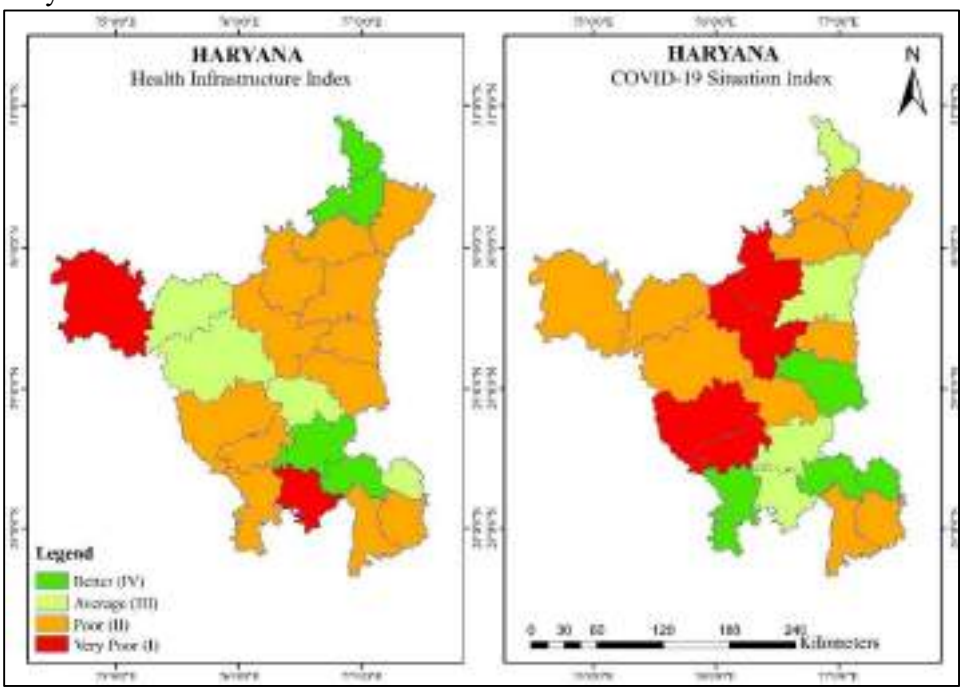
Source: Author's own calculation.

It was observed that Gurugram (0.416) district occupied the first rank in health infrastructure, followed by Ambala, Jhajjar and Panchkula with an index value of 0.485, 0.557, and 0.567, respectively. Whereas, Sirsa (0.806) district has the worst health facilities, followed by Rewari with an index value of 0.797. Whereas Sirsa (0.806) district has the worst health facilities, followed by Rewari with an index value of 0.797. It has found that more than half of the districts did not have available adequate infrastructure to deal with pandemic situation.

On the other hand, from the values of the composite index of the COVID-19 situation, it may be observed that Sonipat (0.085) district obtained the first rank in this index, which means this state did well in the pandemic, followed by Gurugram, Faridabad and Mahendragarh with an index value of 0.104, 0.126 and 0.132, respectively. All four districts have obtained better stage (IV) in COVID-19 situation index as it had higher recovery rates, lower fatality and positivity rates, and higher percentage of the total population vaccinated than the state average. Whereas, Kaithal (0.829) district was the district most affected by the pandemic, followed by Bhiwani and Jind with an index value of 0.692 and 0.625, respectively. Kaithal had a lower recovery rate, higher fatality and positivity rate, and lower percentage of the total population vaccinated than the state average. From the above findings, it was found that except Gurugram and Faridabad districts, all the districts with better as well as average health infrastructure, had failed to tackle the pandemic situation as expected. On the other hand, five districts, namely Mahendragarh, Karnal, Sonipat, Rewari and Sirsa fared better, despite having poor or very poor health infrastructure.

The district level stages of the health infrastructure index and COVID-19 situation index has been represented in Figure 1. In terms of health infrastructure, only 38.33 per cent of the population resides in the eight districts which had better or average infrastructure facilities . On the other hand, in terms of the COVID-19 situation index, only eight districts performed better or average in which 38 per cent of the population resides. It was clearly observed that a high proportion of the population of Haryana resides in the poor or very poor condition in both indices. Only one district, Gurugram, performed better in both indices. However, five districts namely, Kurukshetra, Yamunanagar, Nuh, Palwal and Panipat did poorly in both indices. The findings showed that a high variation exists in health infrastructure and the COVID-19 situation index at the district level in Haryana.

Figure 1: Distribution of Health Infrastructure and COVID-19 Situation in Haryana

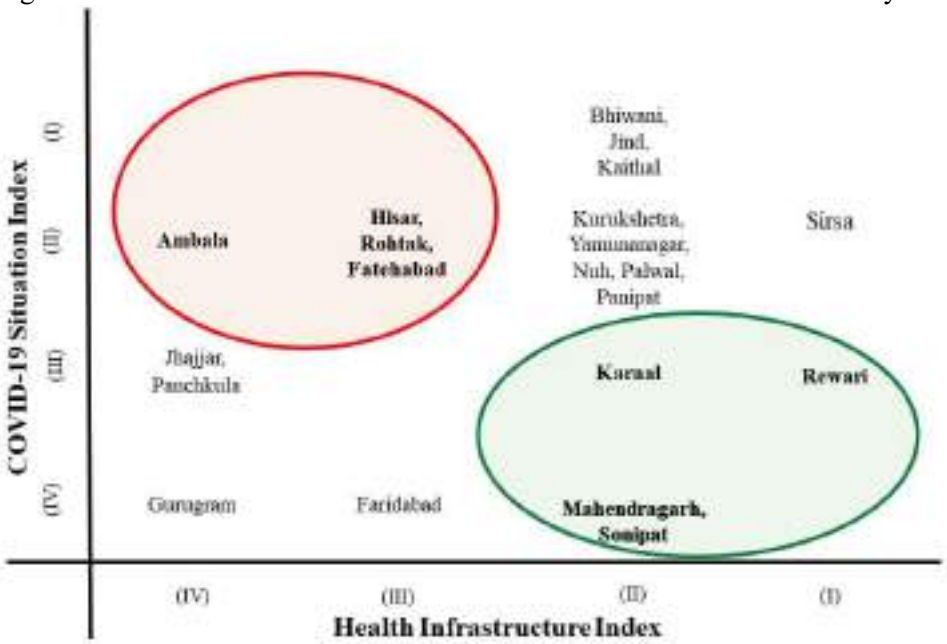


Source: Author's own calculation and map created through AcrGIS 10.3.

The interrelationship between health infrastructure index and COVID-19 situation index in districts of Haryana had been explained in Figure 2. In Haryana, out of 21 districts, eight districts had better (IV) or average (III) health infrastructure and the remaining 13 districts had poor (II) or very poor (I) health infrastructure. Moreover, in COVID-19 situation index, eight districts were situated in a better or average condition and the remaining 13 districts in poor or very poor situation. It can be clearly observed from Figure 2 that out of four districts having better health infrastructure, namely Ambala, Jhajjar, Panchkula and Gurugram, only Gurugram performed as expected with sufficient infrastructure. Moreover, Gurugram had the highest concentration of COVID-19 infection, followed by Faridabad, Panchkula, Sonipat and Hisar. However, Ambala was found in the poor circumstances in COVID-19. Jhajjar and Panchkula had an average situation according to the index value. Interestingly, Mahendragarh and Sonipat had poor in health infrastructure, although they performed better in COVID-19 pandemic. Karnal was also in poor infrastructure still occupied Stage III in health infrastructure index. Despite health infrastructure in Rewari district was very poor, it performed average (Stage III) in COVID-19 situation Index. Similarly, in COVID-19 situation index, four districts, namely Gurugram, Faridabad, Mahendragarh and Sonipat, were in better condition. Bhiwani, Jind and Kaithal were in very poor COVID-19 situation. Jhajjar, Panchkula, Karnal and

Rewari were in the average stage. Kurukshetra, Yamunanagar, Nuh, Palwal and Panipat were poor in health infrastructure as well as in COVID-19 situation index. Nuh had the lowest concentration of COVID-19 infection, followed by Palwal, Kaithal, Bhiwani and Jind.

Figure 2: Health Infrastructure index and COVID-19 Situation index in Haryana



Source: Author's own calculation.

V Conclusion and Policy Implications

The present study had focused on investigating the performance of health infrastructure and COVID-19 situation in India with special reference to Haryana. In this study, 21 major states/UTs of India were considered, in which Karnataka was found better in terms of health facilities and Bihar was very poor. However, despite having so many facilities, Karnataka performed very poorly in handling COVID-19 situation. On the other hand, five states, namely Assam, Bihar, Jharkhand, Madhya Pradesh and West Bengal, did not have a single indicator above the national average. In COVID-19 situation index, Rajasthan, Gujarat, and Haryana performed better and Assam, Karnataka, and Tamil Nadu performed very poorly. In Haryana, Gurugram district occupied the first position in health infrastructure and Sirsa last. In health infrastructure, Hisar (5th rank) was the only district in which the values of all the indicators were higher than the state average. Moreover, three districts, i.e., Sirsa, Panipat, and Rewari, did not have a single indicator above the state average. In COVID-19 situation index, Sonipat, Gurugram, Faridabad, and Mahendragarh performed better and Kaithal, Bhiwani,

and Jind performed very poorly. Moreover, the relationship between the availability of health infrastructure in an area and their performance in COVID-19 situation was not clearly found. As a result, some areas with better infrastructure are struggling to cope with this pandemic situation, and some areas performed well despite having fewer health facilities. Therefore, it may be concluded that areas with better health infrastructure did not guarantee ability to tackle the pandemic situation. The government should focus on increasing testing capacity, rapid screening in rural areas, efficient management of containment zones at the micro-level, higher priority to the speedy vaccination, and more awareness programmes. COVID-19 pandemic exposed our infrastructural reality, and this is the time for the government to look at our policies and develop a more sustainable and affordable health mechanism for society.

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Human Capital, Institutional Quality and Economic Growth - The Mediating Effect of Digital Adoptions, Creative Outputs, and Total Factor Productivity

Seema Joshi

Taking a sample of 18 Asian economies and using the path analysis technique and maximum likelihood method of estimation, the present paper contributes to the literature on the interaction between human capital (HC), institutional quality (IQ), and economic growth (EG) in the context of selected Asian economies. The study marks a clear-cut departure from the previous studies by introducing the mediating effect of Digital Adoptions (DA), Creative Outputs (CO), and Total Factor Productivity (TFP) on IQ and helps in obtaining more reliable results of IQ on EG. The path analysis technique allowed us to parse the direct and indirect effects of key variables on each other as well as on IQ. The study demonstrates that HC impacts digital adoptions and creative outputs directly, positively, and significantly and exercises an indirect but positive influence on IQ by mediating variables such as DA, CO, and TFP. TFP growth improves the quality of institutions, which in turn spurs economic growth. The major policy implication of this study is that it very clearly shows that institutional quality is tied to TFP directly and to human capital (via creative outputs and TFP) indirectly. Such a study deserves special attention of policymakers in Asian countries for promoting strategies regarding human capital and digital development along with leveraging the creative industries and services sectors for productivity enhancement, which can significantly improve institutional quality and facilitate broad-based growth.

Keywords: Human Capital (HC), Digital Adoption Index (DA), Creative Outputs (CO), Total Factor Productivity (TFP), Institutional Quality (IQ), and Economic Growth (EG).

I Introduction

The paper aims to examine the interaction between human capital (HC), quality of institutions (IQ) and economic performance. Beginning in the 18th century (Smith 1776) and followed by the influential writings of several economists belonging to

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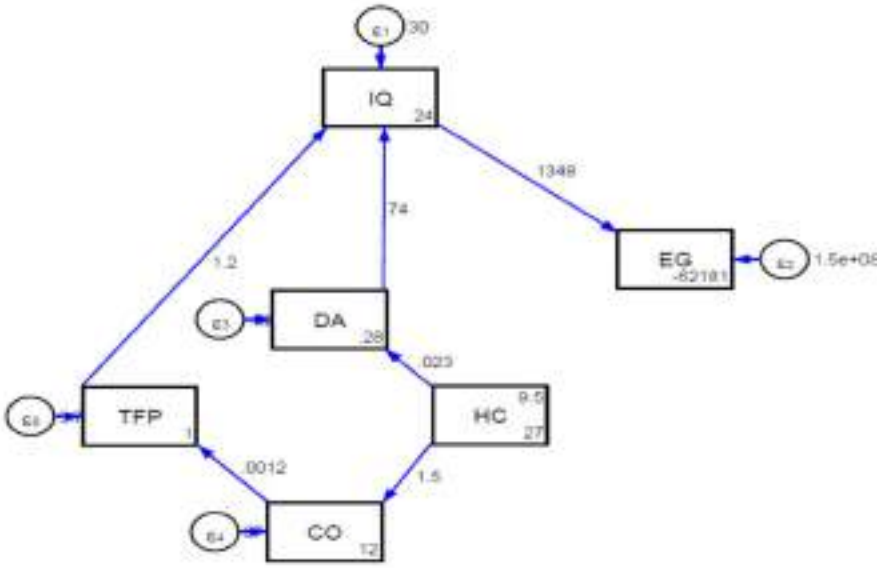
the new school of institutional economics (North 1990, North and Thomas 1973, Hall and Jones 1999, Acemoglu, Johnson, Robinson and Tchaichoroen 2003; Acemoglu, Johnson and Robinson 2005) have subsequently brought this relationship between IQ and economic growth to prominence in the economic literature (Knack and Keefer [1995], Mauro [1995], Hall and Jones [1999], Rodrik, Subramanian and Trebbi [2004] Beirne and Panthi [2022]). There are also a few studies (Lipset 1960, Glaeser, *et. al.* 2004) that investigate the effect of human capital on political institutions and thereby on economic performance. However, to our knowledge, few studies have tried to capture and analyse the impact of human capital (HC) on institutional quality (IQ) by mediating variables such as the digital adoption index (DA), creative outputs (COs), and total factor productivity (TFP), which have emerged as important drivers of economic growth with globalization, the onset of Industry 4.0 (Skare and Soriano 2021, Sainee, Kamat, Prakash and Weldon 2017) and the COVID-19 pandemic. In addition, no other study tries to parse the direct and indirect effects of the key variables on each other as well as on IQ, which in turn fosters economic growth. As a novelty, the present study attempts to address all the aforementioned gaps in the previous research and that too in the context of Asian economies. It contributes to the literature on the interaction between human capital (HC), institutional quality (IQ), and growth (EG) by using the path analysis technique. Although multiple regression models have been widely used in social science research, there are too many contentious issues related to their use. The problem of multicollinearity, non-simultaneous estimation of parameters, absence of overall goodness of fit indices, etc. /might be faced by the researchers while using this method. We preferred to use the path analysis technique in this paper, as many of the above-cited limitations of the multiple regression techniques are addressed by the path analysis method and in an unambiguous manner (see Min and Mishra 2010). The paper sets out the hypothetical model based on the literature review in Section II, which is followed by sources of data, methodology, empirical evidence, conclusions and policy implications later.

II Presentation of a Hypothetical Model Based on a Review of Literature

Figure 1 gives a hypothetical model that provides a visual representation of the relationship between endogenous and exogenous variables. The arrows are used in the path diagrams to indicate the hypothesized structure of relationships among the key variables. When an arrow is directed from an exogenous (independent) variable to the endogenous/dependent variable, then this is called the direct effect. For example, in the path diagram given below, the EG is the dependent variable and is influenced by IQ directly, as indicated by the direction of an arrow.

Figure 1: Path Diagram



Studies referenced earlier show that institutions are a major determinant of economic outcomes. A few studies (Lipset 1960, Glaser, La Porta, Silanes and Shleifer 2012, Bekana 2020) also show that human capital impacts institutional quality. However, our argument in this paper is that it is the level of human capital that will determine the quality of the labor force by encouraging digital adoption (Foster and Rosenzweig 2010) and by facilitating the generation of creative outputs. Both digitization and creative outputs have a productivity-enhancing effect (Chiemeke and Imafidor 2020, Bahrini and Qaffar 2019, Nwankwo 2018, Falk and Biag 2015, Florida, Mellander and Stolarik 2008) and have the potential to positively impact institutional quality and economic growth (Finger 2007). Undeniably, greater access to knowledge and tech adoption will have several positive implications for employment, productivity and accountability in politics, government and businesses. This interaction can help increase economic growth. However, the potential of DA and CO will be untapped if quality HC is not available. HC is indispensable for accelerating DA, the growth of creative industries and improving productivity. Undeniably, it is HC that adds to the absorptive and innovative capacity of the economy (Bye and amp, Faehn 2021). Studies (Nelson and Phelps 1966, Benhabib and Spiegel 1994, Bodman and Le 2013) have established that technology adoption becomes easier when people are educated.

In the hypothesized path model, the variables (such as DA, CO, and TFP) are termed 'mediating variables' (between HC and IQ). The inclusion of variables in the model is justified based on a comprehensive review of the literature. A unique feature of this path model is that it allows for studying direct and indirect effects

simultaneously. It enables us to parse the effects of HC on DA and IQ (HC _DA _ IQ) on the one hand and the effect of HC on CO, TFP, and IQ (HC _CO _TFP IQ) on the other hand. It helps us to identify the factors that act on IQ directly (such as DA and TFP) and indirectly (such as HC affecting IQ through DA and by affecting CO and TFP).

The direct effect of DA on IQ is 73.8/74, as exhibited by the arrow directed from DA to IQ, and that of TFP is 1.2.

However, the indirect effect of HC on IQ works via DA and via CO and TFP. The indirect effects are obtained by multiplying the coefficient for each path, e.g.

HC _DA _IQ is (.023*.74) = 1.633 …(i)

HC _CO _TFP IQ is (1.5*.0012*1.2) = 0.00216 …(ii)

Total indirect effect [sum up (i) and (ii)] = 1.633+0.00216=1.63516
The indirect effect of HC on IQ is 1.63516 and is positive.

III Data Sources and Methodology

The study empirically explores the contributions of HC to IQ and EG in selected Asian countries. We gathered data for 18 countries from various sources. The selection of countries was based on the availability of data for the variables that we chose. The list of the variables used in the study along with the data sources is as follows.

Table 1: Variables and Data Description

Variable	Notation	Variable Description	Year	Source
Institutional Quality	IQ	The innovation input sub-index on institutions has three dimensions: political environment, regulatory environment, and business environment. This measures the quality of institutions. In GII, sub-pillars are calculated using the weighted average of its indicators and are normalized to take the form of scores between 0 and 100.	2020	Cornell University, INSEAD, and the World Intellectual Property Organization, 2020 The World Intellectual Property Organization (WIPO), *Global Innovation Index Report*
Creative Output	CO	The innovation output sub-index on CO comprises intangible assets like trademarks by origin), creative goods and services (like cultural and creative services exports), and services and online creativity (Generic top-level domains, Wikipedia edits, etc.).	2020	Cornell University, INSEAD, and the World Intellectual Property Organization, 2020 The World Intellectual Property Organization (WIPO), *Global Innovation Index Report*
Economic Growth	EG	GDP per capita on purchasing power parity basis ($)	2019	World Bank, *World Development Indicators*
Human Capital	HC	Human Development Index considers three dimensions: long and healthy life, education, and standard of living	2019	United Nations Development Programme, *Human Development Report*

Contd…

Table 1: Variables and Data Description

Variable	Notation	Variable Description	Year	Source
Digital Adoption	DA	DAI measures a country's digital adoption across three dimensions, namely DAI (Business), DAI (people, and DAI(government). It is assumed in this study that DAI will impact EG after a time lag. Therefore, the use of data for the year 2014 is justifiable.	2019	World Bank, *Digital Adoption Index*, 2014
Total Factor Productivity	TFP	TFP implies multifactor productivity which shows the change in output that is not due to change in the observable outputs like labor or capital. The average annual growth of TFP has been used	2017-18	Asian Productivity Organization, *Asian Productivity Databook 2020*, Tokyo

IV Empirical Evidence and Discussion

A path analysis using the statistical software STATA 15 was performed to analyse the impacts on institutional quality and EG. The coefficients have been computed using the maximum likelihood method, and the model fit is justified using several methods explained in Table 3. The empirical exercise yielded five linear relationships among endogenous variables, namely, IQ, EG, DA, CO, and TFP, as shown in Table 2. The interpretations of the results are as follows:

Table 2: SEM and Path Analysis Findings for Key Variables

	Endogenous Variables(outcome variables)				
⇩ Exogeneous Variables	IQ ⟹	EG	DA	CO	TFP
	Eq. 1	Eq. 2	Eq. 3	Eq. 4	Eq. 5
DA	73.817				
	(0.0000)**				
TFP	1.176				
	(0.079)***				
IQ		1347.987			
		(0.0000)**			
HC			0.0232	1.455	
			(0.0000)**	(0.001)**	
CO					0.0015
					(0.975)
Intercept	24.02	62180.74	2830573	11.696	1.003
	(0.0000)**	(0.0000)**	0.0000)**	(0.01)*	-0.335

Notes: (i) The values in parentheses are the p values, (ii) * indicates a 0.01 level of significance, ** indicates a 0.05 level of significance and *** indicates a 0.10 level of significance.

Source: Author's calculations.

The estimated slope coefficient for DA (b_1^{DA}) = 73.817 (see Table 2) for predicting IQ indicates that for every unit increase in DA holding TFP constant, IQ improves by 73.817, and this is found to be significant. The results are in keeping with recent studies (Chiemeke and Imafidor 2020, Bahrini and Qaffar 2019, Falk and Biag 2015).

The estimated slope coefficient for TFP (b_2^{TFP}= 1.176) for predicting IQ indicates that for every one-unit increase in TFP (holding DA constant), IQ improves by 1.176. TFP has a significant impact on IQ. This result is also consistent with several other empirical studies (Hall and Jones,1999; Jankauskas and Seputiene 2007 and Kassa 2016) that found a positive and significant association between labor productivity and IQ.

Coming now to the interpretation of multivariate regression results for Equation 2 on EG.

The Intercept of EG (b_0^{EG}) =-62180.74, the value of EG when all predictors are zero (IQ=0).

The slope coefficient of IQ (b_1^{IQ}) =1347.987, predicting EG, indicated that for every unit improvement in institutional quality, economic growth spurs by 1347.987. This is in keeping with the large literature referenced earlier on IQ and EG (Knack and Keefer [1995]; Mauro [1995]; Hall and Jones [1999]; Rodrik, *et. al*. [2004] Beirne and Panthi [2022]).

The interpretation of Equation 3 on DA is as follows:

i) The intercept of DA (b_0^{DA}) =--283057, the value of DA when all predictors are zero (HC=0).
ii) The slope coefficient of HC (b_1^{HC}) =.02324, predicting DA, indicated that on average, for every unit improvement in human capital (HC), digital adoption (DA) increases by.02324.

It is important to mention here that human capital (Gorodnichenko and Roland 2010, Yamamura and Shin 2012, Ghulam 2012, Sharpe 2004, Isaksson 2007) and innovation (DA also indicates tech innovations) have been viewed and confirmed to be crucial factors affecting productivity (Bye and Faehn 2021, Crespi and Zuñiga 2010, Peters, Loof and Janz 2003, Hall 2011, Isaksson 2007, Sharpe 2004).

The interpretation of Equation 4 on Creative outputs (CO) is as follows:

i) The intercept of CO (b_0^{CO}) = 11.696, the value of CO when all predictors are zero (HC=0).
ii) The slope coefficient of HC (b_1^{HC}) =1.4553, predicting CO, indicated that for every unit improvement in human capital (HC), CO increases by 1.4553. This is in line with the study done by Florida, *et. al.* [2008], which finds that HC and creative class play a complementary role in regional development. Nwankwo (2018) emphasizes harnessing the untapped potential of the

creative industry through policy interventions that can contribute much more to overall growth through employment and revenue generation.

Now, we come to the interpretation of multivariate regression results for Equation 5 on TFP.

i) The intercept of TFP (b_0^{TFP}) =1.0039, the value of TFP when all predictors are zero (CO=0).

ii) The slope coefficient of TFP (b_1^{CO}) =.00115, predicting TFP, indicated that for every unit improvement in CO, TFP registers an increase of.00115. Our result shows that CO has a positive but not significant association with TFP. Our result lends support to the findings of Florida et al. 2008, who also found relatively high levels of association between artistic and entertainment occupations (i.e., creative class) and regional labor productivity.

After the estimation of the model, we proceeded to assess whether our estimated model is saturated or the best fit model or not, following the insights provided by Hooper, Coughlan and Mullen [2007] in their work. It is important to mention that the goodness of fit/fit indices help a researcher to assess how well the observed data match a probability distribution. There are a variety of fit indices available. However, Table 3 below provides a summary of the estimated values of various indices from the path model and acceptable threshold levels.

Table 3: Finding Saturation of Estimated Model Based on Fit Indices

Name of Fit Index	Acceptable threshold levels	Estimated values as per the path model
Chi-Square Test (χ2 test)	The insignificant result at the 0.05 threshold	18.347 (0.433)
Root Mean Square Error of Approximation (RMSEA)RMSEA	Value < 0.07	0.033
Comparative Fit Index (CFI) and Tucker–Lewis index(TLI)	> Or =0.95	0.996

Note: Acceptable threshold levels are based on Hooper et al. (2007)

Source: Hooper, D., J. Coughlan and M. Mullen (2007), Structural Equation Modelling: Guidelines for Determining Model Fit, The Electronic Journal of Business Research Methods, 6(1): 53-60.

The table given above clearly shows that our estimated model turns out to be the best fit model, as the threshold levels needed by the four fit indices viz. A chi-squared test (χ2 test), RMSEA, CFI, and TLI are present, clearly showing that the specified model is accepted.

The model fit indices are interpreted as follows:

The traditional method used for evaluating overall model fit is the chi-square value (Hu and Bentler 1999) obtained through the chi-square test (χ2 test). It helps us to assess the discrepancy, if any, in the magnitude of covariance matrices between the sample and fitted matrices. A model is said to be fit if the estimate or statistics turns out to be insignificant at the 0.05 threshold (Barrett 2007). Since this happens to be the case in the empirical exercise carried out in the present study (see Table 3), the proposed model is indeed a good fit model.

We have also used another criterion (namely RMSEA), which is said to be 'one of the most informative fit indices'[1] (Diamantopoulos and Siguaw 2000). RMSEA was developed by Steiger and Lind (1980, cited in Steiger 1990). In the case of RMSEA (the said fit index), a stringent upper limit of 0.07 is regarded as an indication of a fairer fit (Steiger 2007). The value of the statistic in our model is 0.033, which is less than 0.07. Therefore, this indicates that our model is a fairer fit.

Utilizing two other fit indices, namely, the comparative fit index (CFI, which is insensitive to sample size[2]) and Tucker–Lewis's index (TLI), it has been found that the proposed model is an excellent fit. In the case of both these indices, a value greater than or equal to 0.95 is indicative of a good fit (Hu and Bentler 1999). In the case of our study, the value of the statistic stands at 0.996, and it indeed represents an excellent fit.

Given the plethora of fit indices, we have chosen the four fit indices (see Table 3) that indicate that our model is the saturated one of the best fit models and reflects different aspects of model fit, as has been emphasized by Crowley and Fan (1997).

V Conclusion and Policy Implications

The path model developed in this paper demonstrates the importance of the interaction between human capital and IQ for exploring the growth process. The literature acknowledges that IQ plays a key role in fostering the EG. However, the pivotal role of human capital in encouraging digital adoption, facilitating the generation of creative outputs, and boosting productivity, institutional quality, and economic growth is largely unresearched, especially in the context of Asian economies. That is how the present study assumes importance. Our study is the first to our knowledge to use path analysis and complex variables such as DA and CO, among others, to evaluate their impact on IQ (via TFP improvements) and EG. The empirical estimates obtained by us, using cross-section data of 18 Asian countries and applying maximum likelihood methods of estimation corroborates some insights from the path model visualized by us.

The present paper reveals that DA and IQ are positively and significantly related. Earlier studies have shown that digital technology penetration and adoption can have a critical effect on innovation and productivity along with other socioeconomic benefits. Digital adoption presupposes the availability of digital infrastructure. However, digital adoption in some Asian countries is still in the stage of infancy, due to various reasons, such as a low level of investments in ICTs (information communication technologies), inaccessibility or low accessibility of digital technologies, and a low level of digital maturity. Digital illiteracy along with the negative perception about the adoption and usage of technologies are other hurdles on the path of digital transformation of these economies. Therefore, the role of policymakers and policy interventions in incurring higher IT spending (for building digital infrastructure), promoting 'digital literacy',' digital skills',

and 'digital inclusion' by plugging the 'digital divide'[3] is crucial. Nurturing 'digital maturity and 'digital mindset' through building a culture of understanding by 'a rotation of mindset' in addition to removal of 'mistrust of technologies' by launching awareness campaigns and tailored programs is a must. This will allow everyone to access and use digital technologies. The respective governments, through policy articulation and implementation, must strive to create an enabling environment for digital transformation via higher IT spending, boosting digital skills sets along with refining practices to be followed by government and nongovernment bodies, including corporations (Accenture 2017), to realize the full impact of digital technologies on economic performance/prosperity (*by* improving the quality of institutions). Extending the benefits of digital information, products, and services equally and equitably through the enabling and regulatory mechanisms can also help attain the goal of 'digital inclusion'.

Our study also highlights the positive association between HC and DA, and HC and CO generation. Therefore, in addition to HC development and digital adoption strategies, there is a need for formal governmental intervention in these countries to map the creative goods and services sector, which is largely an untouched sector in many developing Asian economies. Knowing fully well the positive impact of COs on TFP (through this study), it is imminent that governments in the selected Asian economies must articulate a coherent policy to develop, deepen, support, and promote the creative industries and the services sectors and also check the challenges of intellectual property protection so that the full potential of this sector is optimally used. Obtaining a high level of productivity by improving the effectiveness of HC and creative (industries and services) sectors, should be set as an important mid- and long-term aim of economic policy in these selected countries.

Our research unearthed the positive impact of IQ on economic growth in a very unique way by factoring in the role of HC and DA. Therefore, in addition to checking the 'digital technologies void' (wherever it exists), policymakers will have to design effective policies to plug the 'institutional void' too, wherever it is present. Any policy lacuna in these respects has the potential to make transactions (government and business as well) scarcer and riskier. 'The pervasive power of digital transformation and 'creative outputs 'in boosting productivity and economic growth through IQ might remain unrealized because of a lack of policy responses.

In summary, the major conclusion of this study is that institutional quality is tied to digital adoptions and TFP directly and to HC indirectly. The indirect effect of HC on IQ works via DA directly and via CO indirectly (through TFP). The findings of the study have implications for practitioners and policymakers in public administration. The central lesson for an administration wishing to experience the lasting benefits of human capital and digital strategies is to think and act proactively. Rethinking and reorientation of strategies toward digital transformation and promotion of creative industries can not only bring economic effects but also reduce the administrative burden. Leveraging digital

transformation and the creative industries and services sectors can give a large push to TFP, which can further enhance IQ. It is this strengthening of institutional quality that will boost EG. Our results do not specifically pinpoint the exact mechanism through which institutional strengths can be translated into economic growth. Therefore, more research on this issue is needed.

Endnotes

1. This fit index is called RMSEA and is considered to be sensitive to the number of estimated parameters in the model.
2. Studies (Fan, Thompson and Wang 1999) point out that CFI is least affected by sample size and works well even when the sample size is small (Tabachnick and Fidell 2007).
3. The digital divide implies the divide that exists between those who have access to ICTs and those who are devoid of them (NTIA 1999). It has been pointed out in studies (Choudrie, Grey and Tsitsianis 2005, Helbig, Ramón, Gil-García and Ferro 2009) that the digital divide affects e-governance initiatives negatively.

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