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Publication of *Artha Beekshan*, the quarterly referred journal of Bangiya Arthaniti Parishad, that is, the Bengal Economic Association, is one of the most important academic activities of the Association. The present volume, **Volume 27, No.1** of the Journal, is published as a special issue containing the selected papers contributed by scholars to 38th Annual Conference of the Parishad. We are thankful to the authors and members who have helped in one way or other in the preparation of this volume.

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I would like to extend my whole-hearted thanks to the Editorial team, the Publisher, and all who have helped in the publication process, and especially the office bearers of Bangiya Arthaniti Parishad for their kind endeavours to make this issue of **Artha Beekshan** viable and **Kolkata Mudran** for bringing out the present issue.

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CONTRADICTIONS AND COMPLEMENTARITIES BETWEEN NEOCLASSICAL AND BEHAVIOURAL ECONOMICS: AN EXPLORATION¹

SIDDHARTHA MITRA*

DEDICATION**

Giribala Karmakar (1928-1993) was a lady engaged in the unadulterated pursuit of learning. Her favourite subject was the study of human behavior, as revealed by the Ramayana, the Mahabharata and the Puranas. These tales, even though they have a mythological component, not only highlight human virtue and deceit but reveal the predicaments that human beings face in their choice of actions from a set in which many of the elements are neither coloured black nor white but various shades of grey. Indeed her life exposed her to various contrasts in human behavior as she was born in Barisal, now in Bangladesh and left home to arrive in West Bengal after the Great Partition. At the age of sixty, she wrote four short stories for a local magazine which reflected her understanding of human behavior. Her interests also had a more practical manifestation: she brought up 5 children and did her best to imbue them with correct human values. This paper, which provides the basis for the IInd Giribala Karmakar Memorial Lecture, is dedicated to the virtues and learning of this great lady whose contributions have not got the deserved recognition. It is fittingly devoted to a discussion of the emerging field of behavioral economics, which brings to bear our knowledge of human psychology on the analysis and prediction of human actions and outcomes, subjects which fascinated Giribala Devi.

Abstract

The objective of this paper is to show that the behavioural mission of modelling a human being as an agent driven by economic as well as psychological impulses can be accommodated to a large extent within the neoclassical framework (which consists of optimising agents arriving at equilibrium). First, it attempts to show that the non-homoeconomicus is as capable

¹The author is grateful to Devashish Mitra for drawing his attention in 2016 to the fascinating book written by Richard Thaler on behavioural economics. While writing this paper the author benefitted from discussions with Bhaswar Moitra, Jaideep Roy, Rajat Deb, Partha Sen and Sanmitra Ghosh. However, the author is solely to blame for all errors that might remain in this paper.

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of 'rationality' as a homoeconomicus (self-centred human); in fact being self-centred has no major implications for the ability to be rational. Second, it shows that the systematic biases associated with neoclassical predictions of human behaviour can be resolved in many cases by re-specifying the utility function to accommodate psychological factors. Thus, the contribution of the behavioural school would probably lie in altering the way in which neoclassical models are specified but not in rejecting the neoclassical methodology altogether. At the same time, it is pointed out in this paper that bounded rationality (satisficing behaviour) of human beings in real life can often generate group behaviour that is systematically different from predictions emerging from the neo classical assumption of perfect rationality (optimising agents).

I. Introduction: Rationality and the Non Homoeconomicus

1.1 Prologue: Neoclassical versus Behavioral Economics – Thesis and Antithesis

It is said that human civilization as well as the evolution of thought follow the path of thesis-antithesis-synthesis¹. This seems like the logically correct path to follow as any statement or theory which is untrue, extreme or biased would be gradually eliminated by the continuous propagation of this cycle. But in reality, this propagation is characterised by friction and often met by resistance. When a thesis is put forward and gains acceptance it results in the formation of a school of thought consisting of leaders and followers. Needless to say, the leaders have a vested interest in ensuring that the antithesis to their school never emerges.

Such power exercised by vested interests is the biggest threat to the evolution of human thought and civilization. It must be conceded though that vested interests arise from collusive impulses that come naturally to human beings and can only be reined in through cultivation of intellect. The idea behind any science is to constantly re-examine its theories in the light of new emerging evidence, to retain what is useful and to usher in new theories which fit the evidence better. It is therefore necessary for the true followers of a science to constantly and actively look out for new data that throws light on hitherto explored and unexplored facets of a theory, to embrace new theories which are improvements on old ones (even if such new theories contradict old ones) while retaining the useful essence of what is old.

Sadly, human adherence to scientific methodology, especially in the practice of the 'dismal science' (economics), has been far from perfect. Richard Thaler (2015) is quite right in saying that Adam Smith's earlier writings dealt mainly with behavioural economics. In the 20th century the psychological, moral and ethical aspects of human activity, emphasised by Smith in his book, *The Theory of Moral Sentiments* (Smith, 1759) which preceded the publication of his more widely read work, *The Wealth of Nations* (Smith, 1776), found inadequate space in neoclassical models dominating economics. There were, however, some remarkable though somewhat rare deviations from this neglect. One example which easily comes to mind is

Gary Becker's *The Economic Approach to Human Behaviour* (1976). In this book he managed to successfully incorporate psychological and emotional concepts such as love and prejudice into models of neo classical economics which relied on optimisation of suitably constructed utility and other objective functions. One such work was Becker's paper on markets for marriage (Becker, 1975)² in which the author introduces a household production function associated with outputs such as love and companionship, among others. Thus, Becker showed that the neoclassical framework need not be associated only with tangible goods or marketed services but also with human emotions and relationships.

This paper is motivated by Thaler's normative cum predictive statement about the future of economics: economics should/ "eventually would" focus on the behaviour of quasi-rational agents driven also by emotions and psychological factors rather than just 'economic motives' i.e. that the *homoeconomicus* in economic models would evolve into the *homo sapien* (Thaler, 2000). The objective of this paper is to show that the behavioural mission of modelling a human being as an agent driven by economic as well as psychological impulses can be accommodated to a large extent within the neoclassical framework (which consists of optimising agents arriving at equilibrium). This section and the next section of this paper attempts to show that the *non-homoeconomicus* is as capable of 'rationality' as a *homoeconomicus* (self-centred human); in fact being self-centred has no major implications for the ability to be rational. Section III shows that the systematic biases associated with neoclassical predictions of human behaviour can be resolved in many cases by re-specifying the utility function to accommodate psychological factors. Thus, the contribution of the behavioural school would probably lie in altering the way in which neoclassical models are specified but not in rejecting this methodology altogether. At the same time, it is pointed out in this paper that bounded rationality (satisficing behaviour) among human beings in real life can often generate group behaviour that is systematically different from predictions emerging from the neo classical assumption of perfect rationality (optimising agents). Thus, incorporation of the assumption of bounded rationality in future models of human behaviour deserves the attention of economists.

1.2 The Distinction between Homoeconomicus and Non-Homoeconomicus

Note that one of the main assumptions of neoclassical economics is that a human consumer is 'rational'. But the literal translation of 'rational' is 'logical'. But how far can logic take man in choosing his own actions? Given his incomplete knowledge of science, the vast realm of the unknown and his own prejudices, it would be logical only to maximise one's satisfaction. However, the satisfaction that man draws from a vector of goods, services and actions would depend on his genetic endowment plus the human surroundings nurturing him which determine his biases and impulses; social norms; culture; and his own time variant knowledge of the consequences of his actions and choices. Given that our knowledge about the wide world is

incomplete and would in all probability always be incomplete, it would be vacuous to consider preferences consistent with scientific ‘truth’ as ‘rational’ as that truth has not been fully determined. Nor is the common man aware of all existing scientific findings that pertain to the goods and services available for consumption³. Therefore, a useful definition of rationality in regard to human behaviour would only imply the maximisation of satisfaction which would not only be determined by the intrinsic qualities of consumed goods and services but also by the mentioned factors (cultural background and the psychological makeup of the individual). Such a definition does not require any consistency with ‘scientific truth’ or ethical standards. A follower of religion A who does not buy from a nearby shop belonging to a follower of religion B but walks two miles to buy from the follower of his own religion is being ‘rational’ if buying from the first shopkeeper is distasteful because of his own communal bent of mind.

Given the above definition of rationality, the *homoeconomicus* or economic man is but one variety of the neoclassical agent. While it is possible to define the *homoeconomics* in various ways, existing literature points to the *homoeconomicus* as a human who maximises his satisfactions but obtains no satisfaction exclusively from the satisfaction of others. In other words, the knowledge that another human being has benefitted from her own or any other person’s actions, or by nature brings no satisfaction on its own to the *homoeconomicus*. However, the assumption that a human being optimises his satisfaction or satisfices (enhances her utility as much as possible, given the limitations of time available for choice and cognitive limitations in regard to processing of choices) does in no way rule out that she can gain satisfaction in making others happy through certain actions which might, therefore, be undertaken. These rational or boundedly rational human beings, who can derive satisfaction from the satisfaction of others, are referred to in the rest of the paper as *non-homoeconomicuses*. In other words, the *non-homoeconomicus* is ‘sympathetic’, with the interpretation of ‘sympathy’ almost identical to that discussed in Sen (1977). The concept of ‘sympathy’ is not identical to Andreoni’s concept of ‘warm glow’ where people enhance their satisfaction from an increase in the welfare of others, only if such increase is brought about by their own actions (see Andreoni, 1990 and other papers by the same author).

Examples of satisfaction maximising or neoclassical agents who are not *homoeconomicuses* are a) the man who looks after his parents because an increase in their wellbeing has a positive impact on his own utility even after taking into account the costs that such “looking after” might involve; and b) the young woman who drags a chair in a mall so that an old man, whom she will never meet again, can occupy it (his comfort enhances her wellbeing). In the case of action a) only the man looking after his parents knows his own motives for doing so and thus can correctly classify himself as a *homoeconomicus* or a *non-homoeconomicus*. It is quite possible that this man is looking after his parents because such “looking after” might enhance his reputation among his parents and relatives with possible important material consequences

such as those relating to ‘inheritance’ (see Andreoni, 1990 for a discussion of pure and impure altruism). Action b), it seems, can be judged almost without doubt as an act of pure altruism and the woman classified as a *non-homoeconomicus* by others: it is unlikely that such small acts would result in any significant reputation effects; therefore, there has to be some satisfaction gained from helping the old man (in its absence, the cost incurred from pushing the chair would not be worth bearing).

There is one glitch though: is it the case that a reason for the woman pushing the chair for the old man is the need to generate a warm glow for herself i.e. to assure herself that she is a nice human and generate additional utility in the process? Is it the case that her satisfaction would not have increased if somebody else had performed the act of dragging the chair for the old man? Strictly speaking, the young woman in this case is a *non-homoeconomicus* only if the answer to the final question is ‘no’, irrespective of whether her answer to the first question is ‘yes’ or ‘no’. However, mere actions do not inform us, in most cases, about the answers to questions such as the final one. It seems that assumptions are required. However, if we do not want to split hairs we can classify all those humans, whose actions are sometimes either motivated by (i) the need for a warm glow (the satisfaction that emanates from being a nice person who has helped others rather than an increase in the satisfaction of others per se) or (ii) a genuine sympathy for others (in this case an increase in the wellbeing of others brings about an increase in utility, irrespective of whether the action originates from the concerned person), as *non-homoeconomicuses*⁴.

The discussion in the previous paragraph hints that a *homoeconomicus* often acts in a manner which results in benefits to others. This is well known but is still worth illustrating through an example. As mentioned, ‘reputation effects’ might be generated out of acts of charity. In this case ‘reputation’ and not the satisfaction of those benefitting from charity is an argument in the direct utility function of the donating individual. The court jester who is generously rewarded in gold coins whenever he enhances the king’s happiness through use of humour will almost surely employ such humour in enhancing the happiness of the king even if what enters as an argument into the jester’s utility function is just money and not the king’s happiness i.e. if somebody else makes the king happier the jester is not made any happier. The jester in this case could be a *homoeconomicus* unlike the mother who tells her daughter bedtime stories so that she sleeps happily and on time, and gains satisfaction from the wellbeing of her daughter. Thus, *homoeconomicuses* can help others and do help others on the basis of the calculation that reciprocal actions will in turn confer benefits on them in excess of the incurred costs. Such calculations often result in mutually beneficial trades between two *homoeconomicuses*, for example between the jester in the mentioned example and a *homoeconomicus* king who rewards the jester whenever he is humoured but with an amount which is less than the value of the happiness generated through humour. As mentioned, the

discussion in this paragraph is not pointing to anything new: much of economics till date deals with the possibility of mutually beneficial trade between *homoeconomicuses*.

To repeat, the practice of neoclassical economics or that which recognises human maximisation or near maximisation of utility functions, is perfectly capable of taking care of both the satisfaction maximising *homoeconomicus* as well as the satisfaction maximising non *homoeconomicus*. Note that in case of the *non homoeconomicus*, we always also include as arguments in the utility function consumables which bring satisfaction or happiness to other human beings. This is not true of the utility function of the *homoeconomicus*. For example, a person located in Kolkata might donate Rs. 50 to flood victims in Karnataka as their material welfare enters her utility function as an argument. This person, a very common specimen, is clearly a *non homoeconomicus*. But she is quite capable of maximising or nearly maximising her satisfaction, even though that depends of a) goods and services consumed by her as well as b) satisfaction of others even if increases in such satisfaction has no implications for a).

Thus, any behavioural critique of neoclassical economics which says that the latter can only be a depiction of the *homoeconomicus* would be quite overstated. It might be accurate to say that the practice of neoclassical economics has been predominantly engaged in the study of the behaviour of the *homoeconomicus* whereas neoclassical tools and practice (the utility function and its optimisation) do lend themselves to the study of another type of economic agent, the rational *non-homoeconomicus*. To that extent, the potential of neoclassical tools has not been fully exploited. Moreover, the ability to 'sympathise' with other human beings is but one of the major differences between the economic agent usually seen in neoclassical models and the *homosapien*. Other differences can be seen in the inability of the latter to let bygones be bygones (ignore sunk costs), her felt need for compartmentalisation of the total budget, her lack of self-control etc.

The purpose of this paper is to offer directions for synergising the unexploited potential of the neoclassical methodology with the lessons emerging from behavioural economics, thus helping to further advance the discipline of economics. In other words, the 'thesis' of neoclassical economics, as mostly practised, has in due course of time been met by its so called 'antithesis', behavioural economics. But this paper contends that a meaningful and progressive synthesis of these two schools of thought can be attained.

1.3 The End of the Dominance of Neoclassical Economics: A Brief Historical Sketch

Let us look at the evolution of the critique of neoclassical economics⁵. Till the 1980s neoclassical economists reigned supreme though certain alternative schools of thought such as Marxist and institutional economics had emerged. These, however, remained fringe disciplines in various Western universities in terms of the volume of publications generated

and courses taught. Things began suddenly changing in the early 1980s with the attack on the neoclassical school coming from economists who were troubled by the inadequacies of what they had learnt in neoclassical classrooms for understanding and predicting real world phenomena. The attack came from three sides. A major challenge was pioneered by the 2017 Nobel Laureate, Richard Thaler who began by cataloguing economic phenomena that seemingly conflicted with the predictions of neoclassical economics. At the same time, psychologists such as Daniel Kahneman and Amos Tversky were applying psychological concepts to examine economic behaviour and determine its consistency with certain psychological laws. And finally there were experimental economists such as Charlie Plott and Vernon Smith who were actually testing the predictions of existing neoclassical models by trying to simulate real world conditions in the laboratory. Experimental economists gradually split into two categories, those who performed experiments in the lab and those who performed experiments in the field, often with the environments so chosen for different versions of the same experiment that the human response to a stimulus of interest could be easily gauged.

It was inevitable that experimental economics and behavioural economics would become ‘blood brothers’: experimental economists would look towards behavioural economists when neoclassical predictions were contradicted by experimental findings for explanations based on psychology or even social norms; and behavioural economists would look towards experimental economists to see whether their critique of the neoclassical school — based on intuition, common sense, hunches and casual empiricism and above all a more than passing interest in psychology — was backed by hard data generated through experiments.

There was a great deal of exchange between the psychologists and economists that contributed to the behavioural school (in Thaler’s own words, Kahneman and Tversky taught him psychology while he taught them economics) and gradually the body of literature in behavioural economics became strong. This literature pointed out that human behaviour exhibited systematic deviations from the predictions of the neoclassical model. These claims were in turn supported by robust experiments and surveys. Earlier in the middle of the 1950s, Herbert Simon (1955) had contended that optimisation was not a real world phenomenon: in the real world, people were faced with so many choices that limitations in cognitive power and processing time only allowed the consumer to satisfice i.e. choose a bundle of goods or services which provided a satisfactory amount of satisfaction. While Simon’s critique of neoclassical economics was significant, proponents of the school argued that the genuineness of Simon’s criticism did not in any way diminish the predictive power of neoclassical economics in regard to group behaviour as the random non-systematic deviations from the optimum at the level of the individual would cancel out when individual behaviours were aggregated to determine group behaviour. However, the discovery of systematic deviations at the individual level by later behavioural economists such as Thaler did pose a strong challenge to the

neoclassical school as such deviations implied that predictions of group behaviour by neoclassical models, such as that exhibited by a group of buyers constituting the demand side of a market, would also be characterised by systematic deviations from actual behaviour. In other words, these findings implied that the neoclassical school not only failed to predict individual behaviour with acceptable levels of accuracy (the failure was due to systematic deviations of actual behaviour from predicted behaviour) but also group behaviour. This particular criticism is very significant as the highlighted inaccuracy leads to inaccuracies in the predictions of equilibrium outcomes, whether general or partial.

While the neoclassical school came under a lot of justified criticism no alternative general way of predicting the behaviour of an economic system was offered. Though one can justifiably criticise the neoclassical school there is no doubt that it offers a very elegant and rigorous methodology which enables us to start from the utility function of a representative consumer and the production functions of representative firms in different sectors of the economy and arrive at conclusions about outcomes in the entire economic system. It would indeed be unfortunate if this entire methodology has to be discarded without a suitable replacement because of criticisms from the behavioural school.

Through this paper I try to provide some pointers to how a meaningful synthesis between neoclassical and behavioural economics can be achieved. These thoughts are preliminary in nature and clearly have to be worked on by both theorists and empiricists if anything of great relevance to the future of the discipline is to emerge. But to the best of my ability I am trying to give some impetus to rescuing the 'baby of neoclassical economics' from its alleged and much criticised 'bathwater'. This is a daunting project but nevertheless, I feel, one that ought to be taken: a synthesis is in most cases better than a thesis or an anti-thesis as it draws on the strengths of both while doing away with, at least to a significant extent, their weaknesses.

In the next section (Section II) I will try to isolate the kernel of neoclassical economics as neoclassical models are of various types with assumptions such as perfect foresight and rational expectations often characterising these. I argue that isolation of the kernel involves identifying the assumptions that are common to all neoclassical models (for example, the rational expectations school came into being only in the 80s after neoclassical economics was way past its infancy; similarly, many of the neoclassical contributions are static one period models which are not based on any sort of foresight; thus, neither 'rational expectations' nor 'perfect foresight' are assumptions which belong to the kernel of neoclassical economics).

In Section III I shall talk about some of the systematic deviations of actual from neoclassical behaviour pointed out by the behavioural school and argue that suitable modifications of the utility function might ensure that neoclassical methodology can in fact ensure that neoclassical predictions are not characterised by such deviations from actual behaviour. Section III

constitutes the heart of the paper. Section IV concludes and offers directions for further research.

II. The Kernel of Neoclassical Economics

2.1 *Completeness, Transitivity and Rationality*

All models of neoclassical/ traditional economics are characterised by optimising agents as well as the concept of equilibrium. At the level of the individual consumer or producer, optimisation itself is equivalent to the attainment of equilibrium. Consider a consumer who is faced with a menu of 3 choices: states A, B, and C. If (i) A is preferred to B and (ii) B is preferred to C but (iii) C is preferred to A, then the consumer's preferences are intransitive. This is because (i) and (ii) imply by transitivity that A is preferred to C which in turn contradicts (iii). The conclusion of intransitivity of preferences follows. This implies that each state is revealed to be inferior to one other state. Thus, there exists no unambiguous optimum and the concept of optimisation therefore does not make sense.

Neo classical models also often assume completeness of preferences. Completeness implies that an individual consumer, when faced with a given choice set of states, is always able to compare any two states by choosing one out of the following expressions: (i) a is preferred to b; (ii) b is preferred to a; and (iii) she is indifferent between a and b. Note that completeness is required in order to obtain a ranking of all the states in the choice set. As discussed next, completeness and transitivity are sufficient for generating at least one optimum when the choice set consists of a finite number of elements or is a bounded and closed set consisting of infinitely many choices⁶.

This proposition for the case of a choice set consisting of a finite number of elements can be proved using the principle of mathematical induction. Consider any choice from a given choice set of N states where $N > 2$. Let us call this choice set C . Without loss of generality we can label this choice as 1. If a choice subset is constructed consisting of just this choice then it is tautologically true that this choice is as good as any other element in this choice subset as there are no other choices i.e. 1 is the optimum in the given choice subset. Now pick out any element from C other than 1. Call this element 2. It is easy to see that $\{1, 2\}$ has an optimum as 'completeness' implies that either (i) one of them is preferred to the other (in which case the former is the optimum) or (ii) the consumer is indifferent between the two states (in which case both 1 and 2 are optima). We can proceed in this manner to construct a choice set of n choices where n is any number such that $n < N$. Now we know that (a) the choice subset of n elements has an optimum. Further we can also show that (b) if a choice subset of $n < N$ elements has an optimum then any choice subset of $n + 1$ elements also has an optimum. Let an optimum of the first choice subset (say B) be given by x^* . We can construct the second choice subset by adding an element, say x , from C (not included in B) to

B. Given completeness, x is at least as good as x^* (Case I) or inferior to x^* (Case II). In the first case, transitivity implies that x is at least as good as all of the elements in the newly constructed subset of $n+1$ elements. Thus, in the first case (Case I) either (i) both x and x^* are optima or (ii) only x is the optimum of the newly constructed subset of $n+1$ elements. In the second case (Case II), x^* is an optimum while x is not an optimum. Thus, proposition (b) is proved. Together a) and b) imply that a choice set of N elements will have an optimum where N is any natural number⁷.

If one or more goods are characterised by perfect divisibility then the choice set, say a budget set, will be characterised by infinitely many elements. However, such a set is, more often than not, closed and bounded (a budget set definitely is). A utility function in this context can be defined as any function which assigns a unique and finite number (utility or satisfaction) to each and every element of the choice set. The construction of such a utility function ensures that the properties of completeness and transitivity are satisfied as real numbers obey the properties of transitivity in regard to strong and weak inequalities and completeness in regard to weak inequalities. The properties of closedness and boundedness result in optimisation being made possible: just imagine a three dimensional object with a base given by the budget set and the height giving the utility corresponding to each point (choice) in the base (budget set). It is clear that the choices (points in the budget set or base) which correspond to the maximum height can be identified. These are the optimal choices (in many cases, we might have a single optimal choice). But if one excludes the boundary from the choice set one can have a situation in which one moves towards greater and greater heights as one moves closer to the boundary. In this case there is no optimum.⁸

Note that there is nothing that prevents the preferences of the *non-homoeconomicus* from being complete and transitive. Just consider one short interaction (no possibility of reputation effects or reciprocity) in which a person divides a cake into two parts, x and y , the first to be eaten by herself and the second by another person. It is quite clear that there could be an infinitely many utility functions which satisfy the conditions for the person being classified as a *non-homoeconomicus* (examples being $\min(x,y)$ in which case the cake is split into two halves, $x+y$ which results in the person being indifferent across all distributions of the cake, and $\sqrt{x} + 2\sqrt{y}$ in which case the individual allocates one fifth of the cake to herself and the rest to the other person). Note that if we assume positive marginal utility of cake consumption for the first person for consumption levels less than or equal to the size of the cake, the *homoeconomicus* will always choose to consume the entire cake herself. As we have shown through examples, this is in most cases not true for the *non-homoeconomicus*. Also because any choice of x and y by the *non-homoeconomicus*, described by one of the mentioned utility functions, generates a unique number which is a measure of utility or preference, the

mentioned properties of real numbers guarantee completeness and transitivity in preferences. In other words, it is perfectly possible to have rational *non-homoeconomicuses*.

2.2. *Bounded Rationality: A Critical Discussion*

We end this section by pointing to the work done by Herbert Simon who in the 1950s gave the initial but often forgotten thrust to behavioural economics. I shall illustrate Simon's apprehensions about the neoclassical school with an example. Consider the setting where there are N commodities and the amount of income available with a consumer is M . To be more specific, consider the special case of 3 commodities which have the same price equal to $1/10^{\text{th}}$ the magnitude of the consumer's income. Moreover, only positive integer amounts of these commodities can be bought. The reader can easily verify that even in this very simple case there are as many as 121 states which exhaust the budget completely and need to be ranked by the consumer through her preferences as the straight forward application of 'more is better' cannot be used to compare any 2 of the mentioned states. But a consumer ranking of all these 121 states is virtually impossible, given limitations in cognitive power and processing time. In the real world the number of commodities might exceed 100. The number of axiomatically incomparable commodity bundles can run into millions. Ranking of bundles which is necessary for optimisation is therefore not possible, given the processing capabilities of the human brain as well as time constraints faced by humans. One can of course say that given a utility function in this large number of commodities one can with the help of a computer locate the optimum. But we know that such utility functions do not exist in our brains and furthermore we do not use computers to make our monthly consumption choices in real life. In other words, while the optimisation underlying neoclassical economics is elegant it is also unrealistic. It can often be argued that we can think about rationality being exercised in regard to what is going to be bought or consumed immediately. But even here the existence of multi-characteristic or hedonic goods (the level of each characteristic affects utility) implies that the choice of one good (say a 'saree' or a 'food item' from a restaurant menu) can encounter time constraints and be limited by cognitive power.

Simon therefore introduces the concept of satisficing. An appreciation of satisficing is best obtained through an example. Imagine a consumer who walks into a Chinese restaurant for a meal and is confronted by a long menu with a description of each dish. If the consumer is extremely hungry he or she will ask the waiter whether a certain popular dish is available and if the answer is affirmative (which it should be because it is 'popular') will instantly order it. In this case the choice of the consumer may be quite distant from the optimum in terms of the offered utility but is satisfactory. The distance will not be that large if the consumer has around 10 minutes to spare but even in this case it is unlikely that the consumer will be able to comprehend the various descriptions in the menu, rank the various items and then choose the optimum. Thumb rules, such as elimination of costly dishes, might be used and the

consumer might spend a certain significant proportion of the 10 minutes in wading through the list till he arrives at a choice which he can deem as 'satisfactory'.

Now if the consumer is purchasing one-dimensional items such as potatoes or milk, where one variety is available and the only dimension is quantity, one can contend that a satisficing consumer will undertake a choice which will differ from the optimal choice by a non-systematic random term. These random terms will cancel out when added across consumers in a large enough group. Thus, the assumption of the optimising consumer, while not corresponding exactly to reality, will not result in inaccurate predictions for a group of consumers. But the crucial assumption is that the items are one-dimensional. If we relax the assumption, then the sequence in which the candidates for choice are placed in the menu matters. If the optimal choice is located far into the interior of the menu of a restaurant, then we can easily comprehend that tens of identical consumers walking into the restaurant will depart after making sub-optimal choices. Thus, the neoclassical model of optimisation will result in an inaccurate prediction of group behaviour. In certain cases, the extent of this inaccuracy can be quite large. Clearly, Simon's critique of neoclassical economics is not as harmless as certain proponents of that school make it out to be if we consider hedonic (multidimensional because of quality characteristics) goods.

III. Systematic Predictive Biases Resulting from the Neoclassical Methodology

3.1 The Endowment Effect

The endowment effect is a term coined by behavioural economists, in particular Thaler, to capture the phenomenon that an individual's valuation of a good increases when she gets to own it herself. Thus, imagine my valuing a bottle of wine (costing \$140) in a shop window at \$145. Therefore, I buy it. According to the endowment effect, my valuation of the good rises as soon as I start owning it. Thus, it is possible that my valuation of the wine bottle rises to \$161 as soon as it comes into my possession. Thus, any price in the range \$145-160 (which should have, in the absence of the endowment effect, incentivised me to part with my bottle of wine) is inadequate to make me do so in real life. The positive impact that ownership has on valuation of a good is not explained by economic theory as it has been traditionally practiced and can only be attributed to psychological factors.

Evidence for the endowment effect has been unearthed through an experiment involving tokens, coffee mugs and candy bars conducted by Kahneman, Knetsch and Thaler (1991)⁹. Consider the part of the experiment involving tokens. Each person is assigned an induced value so that if at the end of this part she possesses a token she gets the induced value on selling it to the experimenter. Now each of the N (even number) subjects in this part of the experiment is assigned a different induced value. Subsequently tokens (one each) are handed out to N/2 subjects are random. One would expect that if multiple rounds of this part of the

experiment were played it would be the case that on an average 50 percent of the tokens would go to those belonging to the upper half of the distribution of induced values and the rest would go to those belonging to the lower half. Each of $N/4$ people in the lower half with tokens would pair up with one of $N/4$ people without tokens in the upper half as this would enable the former to get a price higher than her induced value (the price she will get at the end of this part of the experiment if she retained the token) and the latter would also gain by buying the token at a price lying between the former's induced value and her own induced value. Thus, over multiple rounds we would expect the average number of transactions per round to be $N/4$ as a token has no intrinsic value. This was exactly what happened.

The same procedure was now repeated for coffee mugs (also ball point pens) except that consumers were now told to value objects on their own with the promise that at the end, each consumer would be able to sell her mug (pen) if she possessed one. It was found that in this case the average number of transactions per round was significantly less than $N/4$. This could only be the case if there was a systematic tendency for the consumer to raise her valuation once she came to possess the mug (pen) i.e. the endowment effect is present. Thus, the utility from 1 unit of an object should probably be expressed as $U(1, d)$ where $d=1$ if the person already owns the object and $d=0$ if the person does not own the object. Thus, a person would buy 1 unit of an object at price p if $p < U(1, 0)$ but if offered a price P such that $U(1, 1) > P > U(1, 0)$ would refuse to sell it. Note the underlying assumption that our expectations about the usefulness of the good are not diminished greatly once we come to possess the good. This might not be true of cars and many other durable goods. In this case it might be true that $<$ i.e. while possession does tend to raise the valuation of the good the information acquired due to possession might diminish it. The net effect is that a person who pays a price p for a car may want to sell it off at a price $P < p$. However, this does not mean that the endowment effect is non-existent. Rather, there is an 'information effect' resulting from possession which might supplement the 'endowment effect' in some cases but in many other cases counter it. In the case of small items such as mugs and ballpoint pens, the change in valuation due to new information acquired on possession is small and therefore it is only the 'pure endowment effect' which comes into play.

3.2 Sunk Costs

One of the basic features of all neoclassical models is that these compare the marginal benefit of an incremental amount of an action (say production or consumption) to its marginal cost to determine the equilibrium magnitude of that action. Costs whose incurrence constitutes a precondition for initiation of an action and therefore precedes such initiation (sunk costs) are not considered to have any influence on the equilibrium magnitude of an action. The basic

assumption is that the human being considers bygones to be bygones. Therefore, costs incurred in the past are not assumed to have a lingering impact on the human being.

If a human being was identical to a robot this would indeed have been the appropriate way to model her behaviour. However we now know that humans are as much driven by the goals in front of them as they are by their emotions, even if these are retrospective. While neoclassical models till date have assumed the irrelevance of sunk costs for human decisions, empirical data and experiments reveal that they do matter. Let us consider the following examples:

1) Casual Empirical Observation 1 (from Thaler, 2015c): Suppose you buy a pair of shoes. On wearing these you realise that your feet are extremely uncomfortable even after wearing the shoes once or twice i.e. it is not a case of shoe bite. It has been observed that that people often do not immediately discard such shoes but if the pain is bearable continue to wear these for some time. The number of times an uncomfortable pair of shoes is worn would depend on the price that has been paid as well as the extent of the discomfort. Consider the prediction of a standard neoclassical model in this context: when a person starts wearing a pair of shoes the expenditure incurred on it is considered an event in the past and therefore is not supposed to have any bearing on the extent of its use. Yet in real life we find that it does.

2) Empirical Study (Gourville and Soman, 1998): Consider the use of gyms. A standard neoclassical model would project that after the payment for a given period has been incurred the extent of use would depend only on the satisfaction that the person draws from use. In other words, the expenditure incurred is a sunk cost which should not influence the extent of gym use. However, the authors of the study find that people who have registered for gym memberships use gyms much more intensively in the period that immediately follows the payment. Thus, for a prepaid membership which is renewed every 6 months, the intensity of use in the first month following the payment is much greater than in the next 5 months. It is quite obvious that the guilt from not using the gym when one has paid for that use is the highest immediately after payment but diminishes with use.

3) Casual Empirical Observation 2: People tend to eat more at buffets which are highly priced than at those which serve free food or are nominally priced. Again standard neoclassical models would predict that the amount of food eaten by a person should not be determined by the fixed cost that he has paid for the right to eat unlimited food. In other words, the person should keep on eating as long as the marginal utility from an additional morsel (usually assumed to be diminishing in the amount of food already eaten) exceeds zero.

The contention being made in this paper is that the utility framework need not be discarded while modelling human behaviour which attributes significant importance to sunk costs. Thus, utility from the use of a good or service (linked to price at which the good is purchased) can be expressed as

$$\text{Total Utility} = \text{Functional Utility from use} + \text{Psychological Disutility from Non Use} \\ - \text{Opportunity Cost of Use}$$

In the traditional neoclassical framework it is only the first term or the first and third terms which are accounted for. Consider an American student who has spent a significant amount of money to enter a programme but finds the classes useless. If we use the traditional neoclassical framework, the functional utility (or the utility derived directly from listening to the lectures) would be 0 and the opportunity cost of use would be non-negative. The traditional framework would therefore predict that the student will not attend the class in the presence of positive opportunity cost. But reality is often not consistent with this prediction. This can be explained through the above equation i.e. if the second term is also significant and opportunity cost reasonably low, the formula for total utility predicts that the student would attend the class. Of course, such opportunity cost might vary on a day to day basis. For example, if the student's girlfriend is flying into town for the day, the opportunity cost of attending the class would be high enough to overwhelm the psychological disutility from non-attendance. Thus, the student would not attend the class on that day.

Example 1) above can be modelled in the following manner to predict an outcome which corresponds to the actual one. Let $F(x,n)$ denote the functional utility from the n th use of a pair of shoes where x is a vector of characteristics. Further, let $P(n,p)$ correspond to the psychological disutility from not undertaking the n th use where p denotes the price of the pair. It can be assumed that this psychological disutility is decreasing in n and increasing in p . Finally let O depict the opportunity cost of the n th use of the mentioned pair. We can assume that it is independent of n for the sake of simplicity. If the shoes make the user's feet uncomfortable then the difference between first and third terms might be negative (this is likely to be the case if the first term is either (i) negative or (ii) small and positive). However, for initial uses of the pair (low values of n) $P(n,p)$ can be quite large, especially when p is large. Therefore, it is quite possible that it might be preferable to wear the mentioned pair a certain number of times before discarding it in spite of the discomfort caused. With gradual wear, $P(n,p)$ becomes progressively smaller in magnitude with the implication that the pair of shoes would be discarded after a certain number of uses. Ceteris Paribus, the equilibrium number of uses, n^* , would be increasing in p .

Note that whether the disutility, $P(n,p)$, is incurred or not when non-use occurs, is not a matter of choice. It is a function of the psychological makeup of the person which may be assumed to be given at a point of time. This psychological makeup is determined by both invariant nature (genes) and variant nurture. An appropriately nurtured person might come to have a value of P which is so small that the pair of shoes in this example might be discarded after one or two uses. The behaviour of such a person would then be almost consistent

with traditional neo classical predictions. But in real life, nurture by parents who are not economists might pull the individual in a different direction, imposing guilt on her if she does not use a bought good.

2.3 Self Control Issues

In his book, Thaler (2015 d) criticizes neoclassical economics for assuming that individuals exhibit perfect self-control when in fact they do not. He recounts an incident in which removing cashews from the reach of guests at a party, after a certain amount of time had elapsed, had actually made them happier. The argument being made is the following: a) If individuals exhibit perfect self-control then they would not eat an amount of cashews which is significantly different from the quantity that is good for them; and b) the observation runs counter to neoclassical prediction: a bigger choice set always dominates a smaller one in regard to the maximum attainable utility.

Argument b) loses its edge when Simon's notion of bounded rationality is incorporated: a large choice set is associated with greater processing time than its subset and given time constraints, the individual might actually attain a lower level of utility in the case of choice from the superset. This follows from the fact that preferences are often formed after viewing the choice set and not before.

Thaler's empirical observation that the individual in real life does not exhibit perfect self-control is true. However, the assumption of perfect self-control does not have anything to do with the discussed kernel of neoclassical economics. In fact Becker, a staunch neoclassical economist, proposed the theory of rational addiction: a cigarette or heroin addict may prefer a shorter life characterized by great ecstasy than a longer one bereft of it.

In Becker's model addiction is a rational/calculated decision, not a sign of weakness where an individual succumbs to his impulses. Thaler's explanation of the occurrence of addiction/binge consumption or the ability to refrain from such behaviour is based on the interaction between a person's impulsiveness and her capacity for planning without being influenced by the emotion generated on exposure to an environment. Thus, inside the brain of each individual there resides a doer who just responds to the environment around her (for example, succumbing to the temptation of eating cashews or drinking alcohol when these items are placed close to her) and a planner (in this case one, who arranges beforehand for these things to be removed after a suitably small length of time).

In cases where the planner is capable, addiction or overconsumption is avoided; otherwise impulsiveness takes over. Two anecdotes appropriately illustrate the ability of the planner to discipline the doer. The first relates to a personal experience and the second relates to Greek mythology as recounted by Thaler (2015, d).

The personal experience is as follows. I have acquired a fascination for a particular brand of lozenges. If these lozenges are stored in a box at home I find myself approaching the box for a lozenge not long after consuming the previous one. On a given day I can consume 6 to 7 of these. The other day I bought a fresh supply of lozenges and put them in a pocket in my car. As I got off the car I reached out to take the packet home when the planner in me took charge: I reasoned that leaving them in the car would greatly limit the time for which the doer in me would have access to the lozenges, thus regulating my sugar intake.

The story from Greek mythology is better. A group of female singers called the Sirens resided close to the sea near some rocks. Sailors who heard them singing would try to get closer to the music and find themselves shipwrecked. Odysseus wanted to both hear the music and live to tell the tale. He got his sailors to plug their ears with wax while he got himself bound to the mast. This way the impulse to get closer would not be generated in the case of the sailors; in his own case it would be generated by the music reaching his ears but not get manifested in suicidal actions. Odysseus managed to hear the music and remain alive after hearing it. This was a clear case of Odysseus, the planner regulating the impulses of Odysseus the doer.

In a very mathematical paper, Thaler and Shefrin (1988) discuss the interaction between the planner and the doer and the implications of such interaction for human behaviour, especially self-control. In what follows I illustrate a very simple way of looking at the planner-doe interaction using the utility function approach.

When an individual is faced with an environment she gives vent to her impulses (gluttony, aggression etc.). However, different environments do not provide the same scope for these impulses. Let x represent the action taken by the individual where α is a vector representing the environment in which the individual finds herself. Now the simplest form of α could be the choice set facing the individual (for example, when Thaler takes the bowl of cashews away, each commodity bundle in the choice set facing an individual is associated with zero quantity of cashews; in the absence of Thaler's action this would not have been the case) but not necessarily so (I can alter the environment in my office by playing soothing music so that I do not get angry with visiting students and shout at them but the option of shouting is still available to me). The environment specific utility function is given by $U(x, \alpha)$; when an individual maximizes this utility function by choosing an optimal level of x , given the environment α he is in fact being a slave to his impulses. But in many cases, the planner in the individual can act beforehand and choose the environment which results in the individual taking the action that either maximises her own wellbeing or minimises the difference between the maximum and attained wellbeing. There is a distinction being made here between 'wellbeing' captured by $G(x)$ and satisfaction from giving vent to one's impulses in an environment.

Mathematically the problem that the planner solves is:

$$\max_{\alpha} G(x(\alpha))$$

where $x(\alpha)$ solves the problem:

$$\max_x U(x, \alpha)$$

Note that for well being to be maximised, there has to exist a vector in the choice set of the individual so that, the value of x which maximises G . This need not necessarily be the case. But one can get closer to by planning. The gain in wellbeing from planning can be significantly when (a) G is sensitive to x and x is sensitive to variation of environment within the choice set; and (b) one of the mentioned variations is significant.

There are obvious limitations in regard to planning: it only applies to situations in which the environment can be controlled. Further, the choice set for, the environment under which the choice of x is made, might vary across individuals. Good planners would expend both time and effort to contemplate and be adequately informed and one would expect her choice set for to include the value of which induces a choice of x that maximizes or comes close to maximizing $G(x)$.

Clearly, the above is a Stackelberg game: the planner knows the reaction function of the doer (the reaction function provides a unique choice of for each environment,) and uses that knowledge to choose such that G is maximised subject to constraints in regard to environmental choice. Planning can be critical when is significantly sensitive to and/or G is significantly sensitive to, with non-zero sensitivity in the case of both relationships. Effective planning of life would correspond to intervention only in those cases in which planning is critical, given that time is limited and there are other things to do in life besides planning.

3.4 Of Buckets and Budgets

In traditional neoclassical models it is assumed that one's money income is fungible: if on allocating one's money income among expenditures in a certain way, an individual finds that she can increase her total satisfaction by shifting some amount of money from one use to the other she would do so. In other words, it is assumed that there are no restrictions on reallocating one's income across different uses and people undertake such allocation so as to enhance their utility or satisfaction.

Thaler (2015 e)¹⁰ points out that in reality people impose certain restrictions on themselves in regard to the expenditure of income i.e. they allocate their income to certain broad but compartmentalised uses and avoid transfer across compartments. This is akin to putting cash

income in different amounts in various jars, each carrying the label of a different broad use. What is encouraging for neoclassical economists is that each compartment corresponds to a certain broad use of income. Therefore, each broad use consists of a large number of narrowly defined uses among which substitution can take place in the event of a change in relative prices or influences emanating from the surrounding environment. Therein lies the potential to combine Thaler's findings regarding human behaviour concerned with allocation of individual income across broad uses with the neoclassical utility framework.

In neoclassical economics, the Cobb Douglas function has been used to good effect to characterize spending which corresponds to fixed proportions of income spent on various goods. The same function can be used to characterize compartmentalized spending. Thus, individual decision making in regard to spending can be seen to consist of 2 different stages:

In the first stage, the individual allocates his income to broad uses. The proportion of income spent on a given broad use can vary with income. For example, if a broad use carries the label of 'entertainment, including eating out' one would expect the proportion of income devoted to it to increase as one moved from a low income class to the middle income classes. To come back to the central theme of this paragraph, the mentioned allocation can thus be seen as the maximization of the following Cobb Douglas function:

$$\max_{x_i} \prod_{i=1}^{n(M,P)} x_i^{\alpha_i(M,P)} \text{ s.t. } \sum_{i=1}^{n(M,P)} x_i = M$$

where x_i is the money expenditure on broad use i , P is a price vector with components reflecting the unit costs of acquiring various goods and services, and $n(M,P)$ is the number of uses at a given M and P . In the second stage, the individual may be seen as undertaking the following utility maximization problem for each compartment i .

$$\max_{x_{ij}} U_i(x_{i1}, x_{i2}, \dots, x_{ij}, \dots, x_{ik_i}) \text{ s.t. } \sum_{j=1}^{k_i} p_{ij} x_{ij} = x_i$$

where x_{ij} is the quantity consumed of each good or service bought using the i th class of expenditure and k_i is the number of products corresponding to compartment i .

IV. Conclusions

The objective of this paper is to show that the behavioural success in drawing attention to the psychological motives underlying human economic behaviour, though laudable, does not imply that the neoclassical methodology of optimisation should be discarded. Psychological

impulses or actions such as sympathy for others, not letting bygones (read ‘sunk costs’) be bygones, compartmentalisation of expenditures, and the human allowing the atmosphere or surroundings to get the better of her can possibly be successfully incorporated in a neoclassical model (which assumes ‘optimising agents’) so that many of the systematic biases hitherto attributed to such models can be eliminated. Yet it is emphasized that bounded rationality does have implications for group behaviour which cannot be captured by the neoclassical assumption of perfect rationality. Future research may deal with constructing models in which agents are motivated by ‘bounded rationality’ based on both economic and psychological motives.

Finally, it should be emphasised that we are not falling prey to the temptation of constructing a utility function, which when maximised would lead to the observed individual behaviour. Such an approach has no predictive value as it can be implemented only after an action has been undertaken. Rather our approach is to construct a utility function for a representative individual which is able to capture both economic and psychological impulses governing her behaviour. The idea is to ensure that the utility function of an actual individual differs from that representative function by an idiosyncratic term which is random and non-systematic. The representative utility function can then be used to endeavour to correctly predict group behaviour. However, the elimination of systematic biases in the specification of the representative utility function is itself an onerous task.

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Footnotes

¹See Schnitker and Emmons (2013) for an elaboration of Hegel’s Thesis-Antithesis-Synthesis Model.

²Originally published in 1975 but later published in Becker(1976)

³An innocent school boy might draw great satisfaction from eating a greasy hamburger while a Professor with the same taste buds would only get a fraction of that level of satisfaction as he would be deeply aware of the adverse health effects of greasy food. Faced by a choice between a greasy hamburger and a salad their choices might be different. But even the Professor's knowledge about nutrition is necessarily incomplete (every day in the newspapers we see new research findings that contradict earlier ones, causing us to be confused about what to eat and avoid; confused people may under such circumstances choose to work out a compromise between inclinations to pleasure their taste buds and cautiousness resulting from their knowledge of nutrition).

⁴In the case of (i) the utility function of the individual can be characterized as $U(x, g)$ where x is private consumption and g is charity undertaken by her. In the case of (ii) the utility function may be written as $U(x, G)$ where G denotes the level of a good which is of no direct use to the concerned individual but is of use to another individual or a community of individuals not including the concerned individual.

⁵This account of the evolution has been pieced together from various passages in Thaler (2015a).

⁶Note that neither completeness nor transitivity is a necessary condition for an optimum to exist. Consider a choice set in which a subset (the inferior set) and its complement (consider the choice set to be the universal set) are such that each choice in the former is revealed to be inferior to each choice in the latter. We do not need any sort of information about dyadic preferences in regard to any pair of choices in the former set to obtain a meaningful optimum which will necessarily belong to the second choice set if it exists. Thus, completeness and transitivity in the entire choice set are not necessary. However, consider the dyadic preferences involving the choices in the second subset. Completeness and transitivity in regard to these preferences help to generate at least one optimum. For example, consider a choice set with 10 elements in which the inferior set consists of 8 choices and its complement consists of 2 choices. It can be easily seen that only 17 binary comparisons would be enough for optimization in this case (16 for delineating the inferior set and 1 more in regard to the complement) which are vastly less than the 45 needed for completeness of preferences in the entire choice set.

⁷Note that the choice set of $n=1$ or $n=2$ elements has an optimum. Thus, any choice set consisting of not more than 2 elements has an optimum. Now for $N>2$ construct a choice subset of $n=2$ elements. Use of proposition (b) repeatedly implies that any choice set consisting of n elements, where $2 < n < N$, constructed out of C has an optimum. Thus, the choice set of N elements has an optimum.

⁸Consider the case of 2 continuous goods. The budget set in this case will be a triangular region. This constitutes the domain of the utility function. Each point into the budget set will map into a given unique number, the utility giving rise to a 3 dimensional object with a triangular base with the object attaining the maximum height at one or more points, all of which can be termed as 'optima'.

⁹Also see Thaler (2015,b) for a friendly exposition of the endowment effect and related experiments.

¹⁰Also see papers by Heath and Soll (1996) and Hastings and Shapiro (2013)

FALLACIES OF RURAL CREDIT IN INDIA*

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Abstract

Although rural credit made its debut in British India through a simple and brilliant piece of legislation, facilitating formation of village cooperative credit societies as early as in 1904, its intent seems to have got lost over the years in spite of the fact that it has passed through impressive pieces of landmark interventions under successive governments of Independent India and recorded apparently impressive growth in recent years. This paper attributes the pathetic and progressive plight of the Indian farmer to persistent misunderstanding of the canvass of agriculture and developmental credit, powerful campaigning to pamper the virtues of commercial bank credit without pointing out and correcting its long-standing ills, deliberate undermining of direct credit to the vast segment of small and marginal farmers, high transaction as well as transformation cost of institutional credit, especially from commercial banks and RRBs, failure to learn from the resilience of rural moneylenders, failure to appreciate the distinctive characteristics of a credit transaction and implied credit plus approach, progressive policy failure including disproportionately high importance being attached to MNREGA as the main plank of rural safety net to stop erosion of the farmer's margin between ever-increasing costs of production and ever falling farmer's value realization from the market. Although several new generation credit cooperatives and micro-credit organizations, which are sketchily covered in this paper, hold some rays of hope, they too aren't without serious limitations. Though a series of recommendations are made from the author's earlier works, the paper concludes by expressing the fear that unless the issues raised in this paper are judiciously resolved, the country is heading towards a disastrous situation of farming without farmers.

Key Words : Rural Credit, RRBs, Non-Institutional Finance

JEL CLASSIFICATION CODES : O17, Q14,R51

I. INTRODUCTION

Rural credit made its debut in British India through a simple and brilliant piece of legislation, which facilitated formation of village cooperative credit societies as early as in 1904. Its

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intent was loud and clear: to save the rural borrowers from the extreme ‘exploitation’ of rural moneylenders through their own initiative, in which the government was merely a facilitator. The legislation was short and simple, so that even the common villagers could understand and take advantage of its provisions. It was a brilliant piece of legislation, where the British Government wanted to help the poor villagers in every aspect except on one that lest the cooperative movement gets derailed into a freedom movement against the British, an ICS Registrar of Cooperative Societies was installed at the helm of affairs to oversee and restrict cooperative actions, if found necessary. Most unfortunately, in Independent India, though a vast network of cooperatives is built up cutting through the length and breadth of the country, the successive amendments and new pieces of legislation by both Central and State Governments are made so complex and cumbersome that the original intent seems to have got lost, while cooperatives – whether for credit or otherwise - are no longer looked upon as ‘favorites’ by politicians, bureaucrats, policy makers, experts and even the common people for whom the Cooperative Movement was initiated by the Imperial Power. Only some outstanding cooperatives including rural credit cooperatives, which we have termed ‘new generation cooperatives’ are somehow maintaining their existence in localized pockets to provide a sharp contrast to the resilience of the cooperative (including credit cooperatives) structure in most developed country agriculture (see, Datta, 2004 for further details)¹.

However, over time, increasing reliance is being placed on commercial banks and RRBs as the main vehicles of rural institutional credit together with huge expansion in size of credit disbursement, while a long series of innovative schemes and interventions are introduced to make institutional credit easily available to agriculture, and especially to small and marginal farmers, at favorable rates. Though these landmark developments with remarkable growth in quantity and quality of agricultural credit as an apparent consequence makes a comfortable reading, often pampered by misleading interpretations of the impact of formal credit, non-availability of formal credit to small and marginal farmers, their distress and plight continued unabated. The result is serious failure of expectations from rapid expansion of formal credit, which this paper has picked up for critical analysis. While the paper has also raised some rays of hope from the functioning of several new generation credit institutions, besides bringing out a series of recommendations based on the author’s own researches over the past 3-4 decades, it couldn’t avoid raising an alarm over an inevitable disaster in Indian agriculture – how to continue farming, if the farmers are eliminated under pressure from dubious policies.

The paper is organized as follows. Section II summarizes the impressive story of growth of rural credit under landmark innovations and policy interventions by successive governments in India, while the next section brings out the issues of concern. Section III attempts to dig out the various reasons behind observed fallacies in Indian rural credit, while section IV highlights a few illuminating examples among new generation institutions. The next section

briefly talks of a handful of new generation credit organizations, which provides some ray of hope for the poor and suffering farmers in spite of their certain limitations. The final section brings out a set of recommendations, besides concluding the paper.

II. IMPRESSIVE RECORD OF LANDMARK INTERVENTIONS AND QUANTITATIVE GROWTH IN AGRICULTURAL CREDIT

The important landmark developments in Independent India in the sphere of rural credit are the following, to name a few among a large lot:

- Acceptance of the Rural Credit Survey Committee Report (1954) to improve access to rural farm credit;
- Nationalization of the large commercial banks(1969and1980) to facilitate larger flow of credit to the poor;
- Establishment of Regional Rural Banks(1975);
- Establishment of the National Bank for Agriculture and Rural Development (NABARD) (1982);
- Farmers' Club Program (1982) with renewed focus since 2007-08 onwards;
- Financial sector reforms (1991);
- Special Agricultural Credit Plan (1994–1995);
- Kisan Credit Cards (1998–1999);
- Doubling Agricultural Credit program(2004);
- Agricultural Debt Waiver and Debt Relief Scheme (2008);
- Interest Subvention Scheme (2010–2011);
- Bringing Green Revolution in Eastern India (BGREI) to provide concessional re-finance to agricultural investments in the Eastern Region (2011-12);
- Interest Subvention for loan restructured in drought affected states (2012);and
- Pradhan Mantri Jan Dhan Yojana (2014).

Besides, a number of related innovative schemes are introduced like SHG-Bank Linkage Program, which is later extended to Joint Liability Groups, Institutional Reform Packages for Cooperative Banks and RRBs, Rural Infrastructure Development Fund (RIDF); Inventory Financing & Warehouse Receipts Financing, Supply/Value Chain Financing, and credit support for Contract Farming and Farmer Producer Companies (FPCs)².

The existing literature is replete with claims that as a result of these measures, there has been a spectacular growth in agricultural credit, as it can be seen from the following data tables and pictures, reproduced from the available literature, which are self-explanatory. We shall turn to a critique of the prevailing approach only in the following section.

III. LOOPHOLES IN THE ROSY PICTURE PRESENTED IN THE PRECEDING SECTION

Successive tables and figures, which are gathered from secondary sources, bring out the following disturbing features about Indian rural credit:

1. In spite of the rosy picture provided earlier, India's credit-GDP ratio is consistently lower than that of China, Korea and average low-and-medium income countries (Figure 9).
2. % of rural branch expansion exceeded 50 only during 1982-2000 (Table 9).
3. % of rural credit never exceeded 16 in a year since 1980 (Table 9).
4. % of rural deposits hardly exceeded 15 in a year since 1980 (Table 9).
5. Rural credit-deposit ratio is almost consistently below the same for its urban counterpart, and has never exceeded 66% since 1980 (Table 9).
6. Indirect finance, which may be looked upon as alternative to direct finance to the farmer, has been varying between 11-25% of total agricultural credit since 1985 (Table 10).
7. Credit to urban and metro areas out of total agricultural credit and direct agricultural credit has in some years been as high as 37.6% and 25.6%, respectively, since 1990 (Table 11).
8. There has been a steep rise in the share of indirect agricultural credit from a meagre 4% to nearly 30% between 1990-91 and 2010-11 (Figure 10).
9. Share of cooperative in total to agriculture and allied activities is consistently declining since 1975-76, while there is steep rise in the shares of commercial banks and RRBs (though the latter is still around 10-11%) (Table 12).
10. % NPA for all components of cooperative credit, though declining over time, continues to far exceed the same for commercial banks, though it must be pointed out that this comparison makes no sense in view of the fact NPA for commercial banks needs to be seen as % of only agricultural loans from commercial banks, which are generally averse to agricultural loans (Tables 13-14).

11. Though loans against simple rates constitute the dominant category in both rural and urban contexts, there is an increasing tendency towards loans against compound interest rates (and more in the rural context) (Table 15).
12. Long term loans aren't fully converted into private capital formation, thus raising the issue of unproductive use of investment loans (Figure 11).
13. Commercial bank loans have a clear bias in favor of large vis-à-vis medium and small holdings (Figure 12).

IV. EXPLAINING FALLACIES OF RURAL CREDIT IN INDIA

This section is devoted to looking for explanations for why the apparently glorious credit story couldn't be translated into a comprehensive rural and agricultural development which could rule out acute farmer distress and their sorry plight. Several explanations are in order, which are briefly covered below:

(a) Use of incompatible definitions of agriculture for purpose of credit

In National Income Accounting system, agricultural and allied activities are all grouped together to put under a common Primary Sector for all future reference. As a result, when secondary and tertiary agricultural activities are undertaken in an organized manner, they are clubbed under industry, thus understating agriculture's contribution to GDP. But if indirect agricultural loans are to be counted under agriculture priority sector lending, agriculture's indirect contribution to GDP must be counted to avoid overstating what government is doing for agriculture in the form of credit. A more serious problem is that although animal husbandry, forestry, fishery are as much based on Nature as is agriculture, special lower rates applicable to crop cultivation are not applied for loans for these allied agricultural activities; such allied activities are charged higher industrial rates. However, the fact is very often farmers, and especially poor farmers, are required to undertake diversified activities for natural reasons, and especially when traditional agriculture is no longer a profitable proposition. This anomaly disturbs credit flow, affecting the fortunes of poor farmers. Most unfortunately, neither the policy makers, nor our academicians are vocal about this anomalous treatment – may be because these allied activities don't have strong lobbying groups to fight for their cause.

(b) Failure to appreciate the nature of credit transaction

As Yotopoulos and Floro (1992)³ has pointed out, credit involves a multi-period transaction, rather than a spot market transaction, as in apples, it can't stand alone in the absence of another transaction to raise the trust between the borrower and the lender. So, another transaction – whether in the form of a collateral or a reliable credit-worthy project – must be

there. Moreover, there are informational problems both prior to and after a credit transaction is made. Datta and Sriram (2006)⁴ has detailed both pre-contractual and post-contractual problems associated with credit, which both the lender and borrower must be aware of, which is far from the reality especially in the Indian case of poor borrowers. The lenders of government commercial banks, due to agency problem, also tend to shirk in their responsibilities, resulting in credit failure – often resulting from willful default. Unlike what the bankers did to promote ‘New Generation Cooperatives’ in the US, Indian lenders even though they are part of a development banking system hardly undertake developmental precautions to avoid ‘locking-in’ problem of poor borrowers (i.e., non-willful default).

(c) Failure to learn from traditional rural moneylenders

Although rural moneylending continues unabated (though not in open and not with the maximum venom), as various data reveals, our development bankers seem still unwilling to learn from their virtues to make credit paternalistic and credit plus in nature. Credit being a package of services, which goes beyond credit in the form of various supporting services, interlinked credit is a reality, which many traditional moneylenders used to practice. While in an earlier unpublished research for NABARD, the present author has attempted to develop an understanding of rural moneylenders⁵, a former student of his wrote an FPM dissertation on how rural institutional credit can learn from interlinked credit transactions⁶.

(d) High transformation and transaction cost of formal credit

Although the formal banking sector, especially the refinance organizations get a cheap line of credit at 3-5%, they incur huge expenses to convert that line of credit into credit products for common borrowers (transformation cost), besides huge transaction cost in the process of exchange down the line to deliver to the ultimate borrower⁷. In the process, formal credit becomes very costly to deliver. Unless the institutional creditors find cheaper ways to deliver credit and cut down their monopoly rent, formal credit will ever remain beyond the reach of poor farmers. Then comes the transaction cost of the borrower in accessing credit – spending time and money to impress upon the lender to release credit, which is also quite substantial. Although estimation of lender’s transformation cum transaction cost is next to impossible in the absence of any meaningful cooperation, the author has attempted estimation of borrower transaction cost with limited data across various lending agencies⁸. This same point is also very rightly made by Lahiri and Mookherjee (2015)⁹.

(e) Farmer often sandwiched between high cost of inputs and low price realization on his output, while subjected to all kinds of risks

Due to general failure of farmer owned organizations, apart from government apathy towards farmer cooperatives, to ensure economic supply of inputs including services, on the one

hand, and to achieve appropriate forward linkages for value-added sale of his output, farming is rapidly becoming a matter of the past – especially for small farmers. Most governments have failed to appreciate this dilemma of poor farmers – he has no control over backward or forward linkages, where strong market powers are allowed to dominate. Although some new generation organizations are continuing to fight back, they are too small and scattered. Even the newly formed Farmer Producer Organizations are in their infancy to make much of a mark, though they seem to have held some promises.

(f) Indiscriminate use of MNREGA as social safety net for the country side hurting the farmers

Since UPA-I the government is indiscriminately using MNREGA as social safety net with progressively increased budgetary provisions in every successive year, knowing fully well that there are meagre employment opportunities in the country as a whole and more so in the country side. Most unfortunately, it is pampering wage labor not only by pushing up wages, but also encouraging indiscipline and shirking behavior on the part of labor – sometimes a genuine farmer can't find effectively employable wage labor in peak seasons to supplement his family labor, even if he offers a very high wage rate. So, the farming community is worse off not only because of high wage cost, but also because of demoralized labor. In spite of early cautions given to the government, it is turning a deaf ear to the earnest suggestions probably because MNREGA is looked upon as an easy option, and moreover, the future of farming in this country doesn't matter much to successive governments¹⁰.

Scientifically incorrect papers, sometimes at the behest of well-known international organizations are busy showering praise for the mostly failed formal credit organizations, thus making realization of past mistakes and their correction a far cry.

V. Some Illuminating Examples from New Generation Organizations

In this section we shall summarily describe the functioning of a few illuminating organizations from an earlier study by Datta and Sriram (2006), which is reproduced below. The major thrust of these case studies is to bring out the distinctive features and internal processes of a handful of relatively well-functioning traditional and new generation financial institutions.

(a) Mulukanoor Cooperative Bank (MRCB):

In the co-operative sector, Mulukanoor co-operative stands out as a unique example of working under the formal credit structure and weathering the external policy interference and still maintaining a very healthy portfolio. The main features of Mulukanoor are its focus on the members – ensuring homogeneity by insisting that all members have to be farmers. Having got its focus right, all actions of the co-operative have been towards enhancing its salience in the lives of its members. Mulukanoor shows the importance of internal systems

and the role of the member stakes in ensuring that the systems do not collapse. It has over a period of time built in sufficient internal resources and today can very well function as a stand-alone co-operative without seeking any refinance from any institution.

MCRB also demonstrates that the limited size and the co-variance risks of operating in a single agro-climatic zone has not affected the institution in the long run. It also demonstrates that a financial institution can function by largely focussing on small and marginal farmers – that the size of the transactions of the members are not significant to affect its own economies of scale.

The most important demonstration of MCRB is the positive aspects of having interlinked transactions – from input supply to output marketing. It demonstrates that if administered well with appropriate checks and balances, this could turn out to be the best risk mitigation strategy ever thought of by the co-operatives.

(b) Amalsad Cooperative Society:

The Amalsad Vibhag Vividh Karyakari Sahakari Khedut Mandali Limited, located about 60 kms from the city of Surat in South Gujarat, is an offshoot of the ‘Dandi March’ by Gandhi, which had inspired a number of social workers of Ganadevi *taluka* to fight against the local traders through formation of cooperative societies during 1941–42. Amalsad is an ideal case to examine the utility of the conceptual framework of this study, as nearly 66 per cent of the households are landless, whereas the incidence of small (less than 2 ha) and large (2 ha. & above) landholding households is 31 and 3 per cent, respectively.

The society was originally started with the following activities: running a consumer store (presently at 17 places), sale of fertilizer, and banking business. During the 50s, it started flourmill (at present at eight places) and marketing of *chikku* (sapota), mango, banana, *suran* (elephant fruit), and paddy. Although the society continues to be a pooling agency for marketing paddy, in which it enjoys economies of scale only through sale by the Gandevi *Taluka* Union, it has over time started direct and independent marketing of *chikku* and mango. During the 60s, it started providing tractor and truck services, besides selling pesticides, paddy seeds, and implements. In 1975, it started selling building materials while in 1985 a medical store was added to its activity list. The position the society has reached today is the result of a continuous and gradual improvement over a period spanning more than 50 years. During this period, sound business principles relevant for the specific situation have been evolved and applied in a systematic manner so as to acquire competitive edge in each business activity from the viewpoint of members vis-à-vis non-members and also as compared to rival business organizations.

The list below summarizes how Amalsad has been handling the common problems associated with credit.

1. Established procedures and processes fully handle the underlying potential adverse selection of borrower.
2. Democratic and transparent functioning of the Society, and the alternatives available to the borrower resolve this borrower's potential adverse selection of lender.
3. Gradual and careful development of a diversified set of activities with scope for refinements during the process of implementation ensures commercial viability of projects.
4. Scope for cross-subsidization of socially worthwhile projects (e.g., the fruit-fly project) boosts up private net return on private business activities.
5. Intimate peer monitoring, interlinked credit transactions (mainly through input and output transactions with the borrower), and supply of suitable credit-complementary services ensure effective use of credit.
6. Transparent and democratic functioning of the society ensures borrower safety (i.e., post-contractual opportunism of the lender).
7. Amalsad's systems and processes have already imparted enough flexibility in the timings and modalities of credit repayment, in cases of unforeseen contingencies, so that there are enough avenues for handling hold-up problem of the borrower and/or the lender due to non-wilful default.

Thus, the factors, which seem to have contributed to this success story, go beyond credit and lie in the organizational structure and its design and contractual arrangements across the various direct and indirect stakeholders to the organization.. However, there are three fundamental reasons why Amalsad-type success stories cannot be easily replicated elsewhere. The first reason is that most of the success factors are internal rather than external. Very often government programs try target-oriented approach to produce success stories overnight and on a mass scale. This is not possible. Even when external resources are made available, they cannot sustain the record of success. On the other hand, even if meagre amount of resources are applied in concentrated doses in potentially good societies, the chances of success are higher. So, a pilot approach makes more sense than the populist approach of spreading the resources thinly in all possible directions. The second fundamental reason for Amalsad success is the working of both supply and demand side factors on credit with strong overlap between the suppliers and users of credit, which seems to have reinforced each other in a healthy interactive process. In most cases, credit is made, but without ensuring or promoting the effective demand for credit and its proper utilization. In Amalsad, the local stakeholders to this organization have integrated both supply and demand considerations behind credit and they have done it at a very low cost. The third fundamental reason behind this success story is the competitive economic environment in which Amalsad operates -

there are ample number of cooperative structures both within and across various agricultural crops and fields of economic activities, which are functioning alongside private business enterprises (the latter are again functioning within the framework of as many as eight Agricultural Produce Marketing Committees in this region). While quite a few of them owe their birth to the inspiration provided by Gandhi especially during the 'Dandi March', but most of them came into existence much later probably due to a unique and complex system of social, economic and political factors, as described by Baviskar and Attwood (1992) in their famous work¹¹. This competitive environment not only ensured a steady supply of competent leaders to produce and run economic organizations, but also exerted continuous and consistent competitive pressure on them to perform and build on the competitive strengths of their organizations and activities. Unless conscious policy efforts are made to promote competition and grass-root leadership, not merely through legislations and outside support, but also and more importantly through creation of internal awareness and capabilities within organizations, any attempt to replicate Amalsad type success stories will remain a far cry.

(c) *BASIX, SHARE & Sanghamitra:*

These three case studies bring out the following stylized features:

Building linkages: BASIX builds up from the leanings of various models, including that of Mulukanoor. Like many microfinance institutions BASIX came up in response to the failure of the formal institutions to cater to the needs of the poor. BASIX demonstrates the importance of backward and forward linkages and the use of existing structures in carrying out credit-complimentary activities. Very much like BASIX Sanghamithra also believes in using the existing infrastructure to reach out credit. Unlike several other microfinance institutions Sanghamithra does not believe in creating additional channels, but believes in building bridges to the existing channels but having processes that are exclusive to it. SHARE on the other hand is an institution that has a stand-alone system and is not dependent on any formal institutions for its delivery.

Focus of activities: Both Sanghamithra and SHARE distinguish themselves in focussing on the poor. Both the institutions have clearly identified their client groups, and packaged their products in simple terms. They are easily understood and simple to implement. Both represent high level of thinking at the systems level, but aid rapid multiplication in the field. BASIX however tries to cater to a wide variety of purposes and channels. Inherently BASIX is more overhead intensive – but provides immense opportunity for staff to innovate at the field level. BASIX is a learning organization and does not hesitate to experiment and replicate its results. In orientation it is diverse from Sanghamithra and SHARE, but still addresses a population similar to the other two.

Internal systems: All the three institutions have built in very good internal systems – that insulate themselves against opportunistic behavior. While BASIX creates an atmosphere of excellence by having good information systems and incentive structures, SHARE is a strict disciplinarian in its attitude. Sanghamithra has created strong systems that are low on overheads. BASIX projects itself as a no-nonsense private sector organization. Offers products that are market savvy and has great delivery mechanisms. SHARE has a limited range of products and believes that discipline is the key to set the anarchic repayment ethic right. Sanghamithra looks at its role as a soother providing a balm to the injured credit system, while being strict in its systems, but rubbing off the learning and demonstrating to the mainstream some alternatives to deal with rural credit.

Transaction costs: All the institutions have adopted the strategy of aggressive reduction in transaction costs for the borrowers. This is done through the strategy of resorting to group collaterals – relying more on inter-personal and intra-group trust as a surrogate for documentation. Where documentation is absolutely necessary for the purposes of appraisals – the strategy adopted it to seek one time information at the time of registration and update the existing information constantly. This reduces unnecessary paper work, while being effective in recovery of loans. The hallmark of all the three institutions is that they are extremely borrower friendly. They give their clients a sense of confidence in dealing with the institution. All the organizations have shifted the focus of transactions from the counter to either the village or even further to the doorstep of the borrower. While the traditional institutions knock on the doors of the borrowers only for recovery of loans, there is great legitimacy and non-formal information gathered if the disbursements are also done at the doorstep of the borrower.

Dealing with default: All the microfinance institutions have rightly identified the importance of prompt repayment of loans to keep the credit machine going. While each has their own systems, they also represent the overall attitude towards rural credit. BASIX sees itself as performing a developmental role – therefore its orientation is to look at the reasons why the default occur and build in a positive role for itself to address the problem. Sanghamithra has a much more systems orientation – it collects post-dated cheques for repayment and ensures that there is pressure built on the group. SHARE has a strict disciplinarian approach – using the stick of peer pressure more than anything else. Obviously all the three approaches seem to have worked – the SHARE and the Sanghamithra approach much more effectively represented by their 100% collections. However, the downside of the SHARE approach lies in the little leeway given in case of genuine failures.

Strategy for growth: Sanghamithra does not see itself as a huge conglomerate growing into a monolith of a credit machine. Therefore, its strategy is more of interventionist in nature. Both BASIX and SHARE have ambitious growth plans. While BASIX has been growing

geographically, it might have spread itself too thin. SHARE is expanding in getting more clients under its fold and therefore has grown deeper in a limited region. The strategy of BASIX's growth adds to the high cost of overheads, whereas both SHARE and Sanghamithra have been able to keep administrative overheads under control. While BASIX believes in leveraging existing structures for extension services and saves costs – SHARE seems to want to do the market development itself. The costs saved on administrative overheads by working in a focused area are off set by very high market development and extension and training costs.

Human resources: BASIX deals with a combination of professional as well as local human resources. This could be a good model for the mainstream banking to follow. Both SHARE and Sanghamithra deal exclusively with local human resources – available at moderate salaries. If the mainstream has to have a constraint in replicating the lessons learnt, they would grumble at the SHARE-Sanghamithra model. However all the three institutions have significant lessons to offer for design of performance incentive systems for the workforce. SHARE and BASIX use a combination of fixed pay and a variable allowance based on the performance – defined differently by each of them.

Form of incorporation: These institutions prove that it is possible to undertake the activities of microfinance under different forms of organization. Between the three institutions, they have experimented with almost all forms of incorporation – for profit companies, non-profit companies, co-operatives and bank. Of the lot, the co-operative form if registered under a liberal legislation as the one in Andhra Pradesh seems to hold out promise – because of the variety of products it can offer and the inherent flexibility. BASIX experimentation with the bank is at an early stage, but the experiment is to be closely watched.

(d) Rastriya Seva Samithi(RASS):

This case study has analyzed the performance of 30 women self-help groups under Rastriya Seva Samithi at Tirupati in South India in terms of intermediate and ultimate measures of success. The self-help groups are able to provide various credit services such as business loan, consumption loan, loan for settlement of old debt and loan for other contingency purposes to their members (Rs.3856, 1997, 2536, 1847, respectively, per annum). They are able to record higher repayment performance (8.3% as on March, 2000) in spite of the fact that they are characterized by heterogeneity in terms of social and economic indicators. Homogeneity of members in terms of caste composition and occupations is not found necessary for success of these self-help groups. The self-help groups tackle the problems of moral hazard in the following manner: (a) regular and frequent visits for monitoring and advice during their visit by the project personnel, ensuring full participation and social cohesion of members; (b) inter-group monitoring in each cluster; (c) inter-cluster meetings for experience sharing among

members; and (d) pro-active role and responsibility of loan and advisory committee members in monitoring of all self-help group activities. The main lessons which arise from this case are:

1. The average size of group at present is small. Group size must be increased keeping intact heterogeneity of occupations for optimal degree of risk pooling. Size of the self-help groups should not be less than 15 members so that viability of the group is ensured.
2. Members of self-help groups should be continuously upgraded for increased business operations and increasing member's income levels.
3. Time frame should be fixed for each self-help group to mature into bigger business operations with strong performance to deal directly with the banks for larger loan facilities.
4. Freedom to charge cost-covering interest rates for each self-help group is essential. At the same time, it should be transparent.
5. Regulatory framework should be in place to prevent unhealthy competition among non-governmental organization in the same area of operations.
6. Heavy emphasis needs not be placed on distance as an important factor for formation of the groups or for the sake of homogeneity of the groups. Risk pooling will be high among members when they are drawn from relatively distant places.
7. Strong group pressure seem to act as disincentive on the members' performance in the group beyond certain level. Group solidarity in terms of helping each other would produce positive results.
8. Long time associations of members seem to produce positive results on the performance of members.
9. Self-help groups should try to harness peoples' stronger social ties rather than relying on the strength of group pressure.
10. Increased credit flow to small women entrepreneurs has to be augmented for improving their economic and social status.
11. Increased emphasis should be put on members' training for their overall development. Their present training and managerial skill are inadequate to handle huge businesses in spite of long association of members with self-help groups. Specific and task-oriented management development programs targeted at women entrepreneurial business activities should be provided.

VI. RECOMMENDATIONS & CONCLUSIONS

In this section we reiterate the issue-based recommendations, which Datta and Sriram (2012)¹² had made earlier.

Issues	Action Points
<i>(1) Defects in credit schemes/projects</i>	
1 Lack of integration of credit schemes meant for target groups resulting in inadequate flow of credit to small and marginal farmers	(i) The schemes should be formulated in a manner such that they integrate different activities (ii) Co-ops should extend consumption loans and loans for meeting social functions. This will help them avoid other costly sources.
2 Inadequate provision for marketing finance to small and marginal farmers, leading to distress sale of production soon after harvesting of crops.	Bank should develop schemes in favor of small and marginal farmers to prevent distress sale. This would establish effective linkage of crop loan with marketing. This will also improve the repaying capacity of borrowers
3 Inadequacy of scale of finance to meet prevailing price of inputs.	The scale of finance is needed to increase by 20% to enable farmers to adopt new techniques in crop production.
4 Non-availability of credit for non-farm sectors like dairy, poultry, fisheries to small borrower because of lack of security.	Credit schemes for dairy, poultry fisheries should be initiated in a big way by formal institutions for landless households and small and marginal farmers.
5 Non-availability of consumption credit from formal institutions	The credit institutions should make available additional amounts of credit for contingent consumption (illness, marriage etc.)
6 Credit support for only traditional cropping pattern	Introduction of loans for cash crops, floriculture, bee-Keeping, dairy etc.

7 Absence of special credit schemes to tackle seasonal unemployment	Introduction of cottage industries in the villages assisted through formal credit institutions
(2) Defects in the credit delivery system	
1 Lack of well-versed staff in the co-op sector at branch level; hence time taken in processing and approving of loans is more.	(iii) Regular training to be imparted to branch staff to improve work efficiency; and (iv) Fixing a time schedule for processing and disbursal of loans.
2 Lack of regular interaction between staff and borrowers .	Efforts should be made to establish rapport between staff of formal financial institutions and borrowers to enable them to get loan without fear.
3 Inadequate and untimely availability of crop loan from co-op banks are causes for unbalanced use of inputs in crops of small and marginal farmers	(i) Coordination with Agriculture Dept for timely availability of finance and inputs to reduce gap in crop loan. (ii) Application and other pre-borrowing procedures may be finished beforehand so that loan can be issued to the farmers at an early date.
(3) High borrower transaction costs in accessing credit	
1 Inflexibility in terms of loaning design in formal institutions is a constraint to approach the banks.	(ii) Kisan Credit Card system attempting to take care of some of the concerns. The issuance of the KCCs must to be speeded up.
2 Demand for security and collateral for small loans from formal institutions. Documentation is elaborate and troublesome	(i) Relaxation in collateral for small and farmers. Security oriented documentation should be minimized. (ii) It would be desirable to examine, to do away with the need for collateral for small/marginal farmers.
3 High total transaction	The decision should be made in

cost per loan in formal institutions	one/two visits of borrowers. Relaxation in documentation and improving the work ethic of bank staff could be helpful in reducing costs.
<i>(4) Insufficient credit-complementary services</i>	
1 Credit complementary services mostly lacking	Credit complementary services like counseling, advising, insurance, extension etc. should be supplied to the farmers
2 Absence of provision for rescheduling of loan in formal institutions puts borrowers in hardship	Make provision for rescheduling loan in case of genuine difficulties and non-willful defaults.
3 Due to lack of infrastructure facilities and conducive atmosphere, NGOs and micro-finance institutions are unable to spread their financial activities in rural areas.	NGOs and micro-finance institutions may be extended full support by state governments and Lead Banks for spreading their financial network in rural areas.
4 Ensuring better recovery of money and recycling of funds.	(i) Promote mutual insurances including crop insurance and health insurance using the successful example of mutual health insurance of Annapurna Parivar at Pune and using the SHG-JLG structure, and also implement the program of farm mechanization in the spirit of cooperation, rather than depending exclusively on government-subsidized and government-managed schemes. (ii) Have an incentive system for good recovery of loan.
5 Interference of State Govt. creating hurdles for bankers in their efficient functioning.	Formulate clear-cut credit policy in favor of small and marginal farmers so as to avoid ad hoc state interventions, especially in coops.

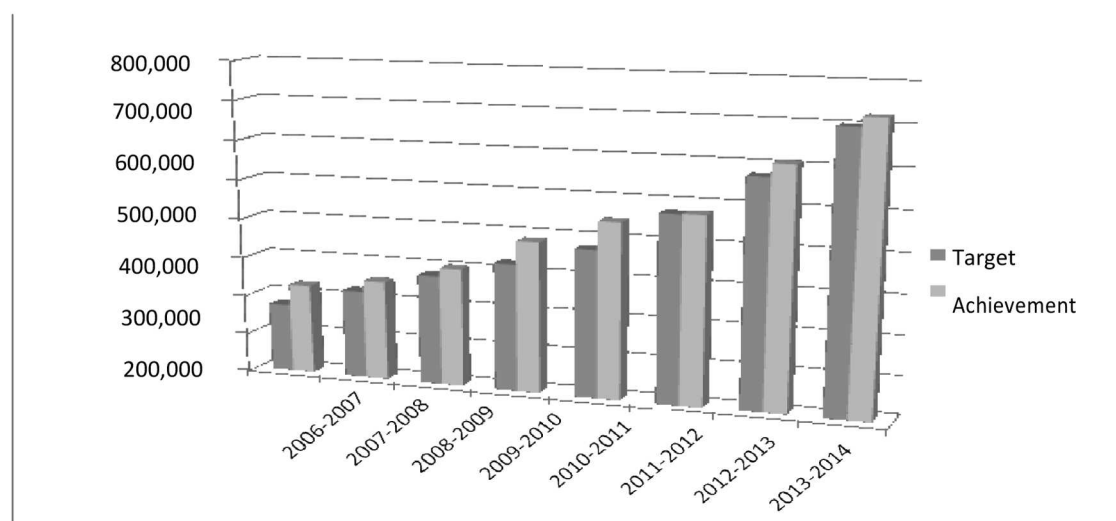
(5) Inadequate monitoring of credit

1 Lapse on proper maintenance of loan record and extensionservices on the part of financial institutions to make borrowers fearless to divert the loans to other purposes

Monitoring of loans should be strictly made to check the diversion of loan. Wide coverage of farmers under Kisan Credit Card Scheme. Access to reach the borrowers through promoting and linkage of SHGs and popularization of "Farmers Club"

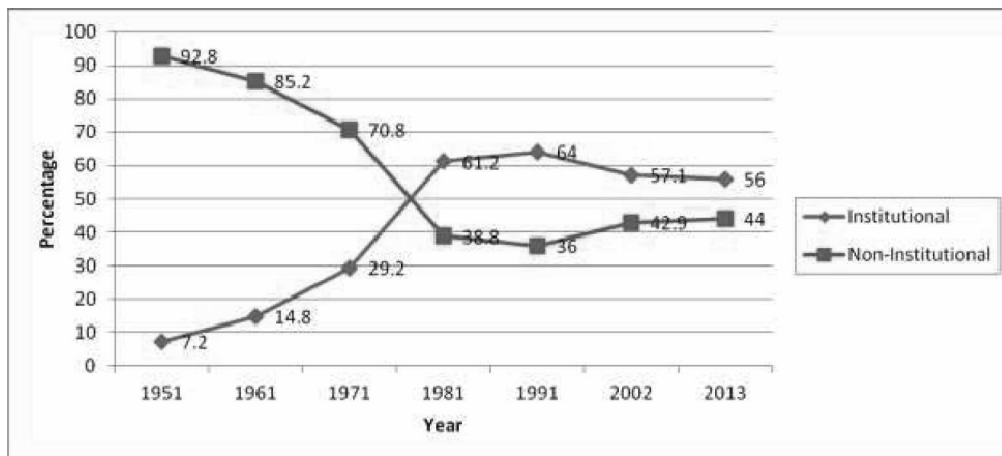
Since some of this old set of recommendations have been tried in the past with no meaningful result – apparently because of poor implementation by private or government agencies, it is high time to revert back to revert back to the people-centric approach using cooperatives and cooperative-like organizations (e.g., SHG/JLG structure, FPCs, and NGOs) if poor farmers are to be saved. Some of the NBFC MFI's like Bandhan, SKS etc. are doing well in terms of private profitability, but hardly in terms of sustainable development of their resource-poor customers. Unless the poor farmers are saved through judicious efforts and policy support, India may have to pursue farming without her poor farmers!

Figure 1: Flow of Agricultural Credit outstripping Targets since 2006-07



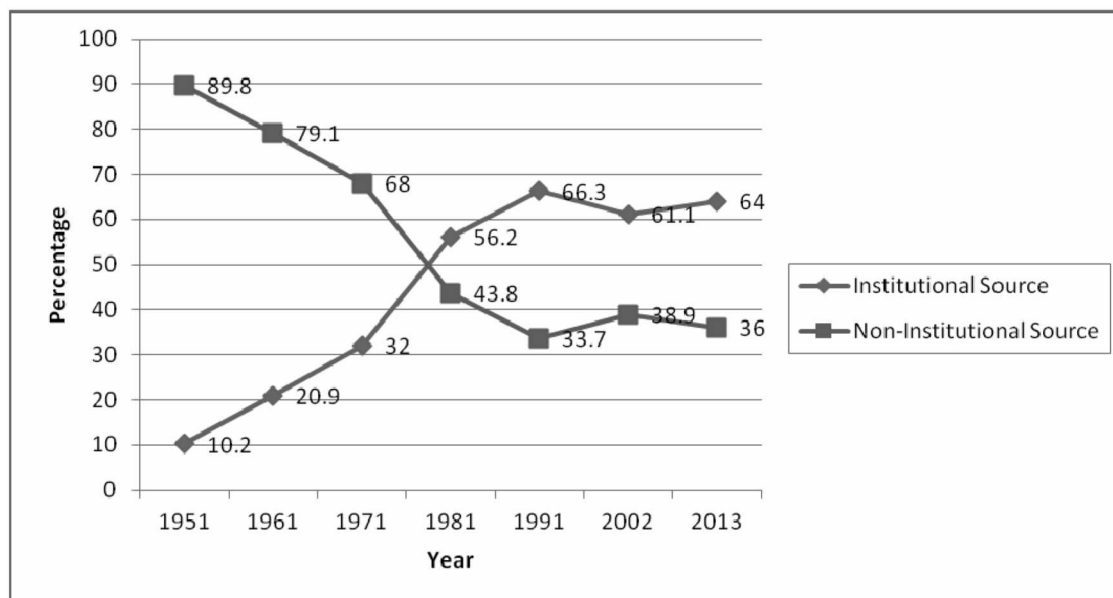
Source: Reproduced from Seena (2015)¹, p. 384

Figure 2: Rising Share of Institutional Source & Declining Share of Non-institutional Source in Outstanding Debt of Rural Households



Source: All India Debt & Investment Surveys, Various Issues, NSSO; Reproduced from Hoda & Terway (2015)¹, p.4.

Figure 3: Rising Share of Institutional Source in Outstanding Debt of Cultivator Households, but the same for Non-institutional Source Falling



Source: All India Debt & Investment Surveys, Various Issues, NSSO; Reproduced from Hoda & Terway (2015), p.5.

Table 1: Break-up of Institutional & Non-institutional Sources of Rural Credit showing Decline of the Moneylenders

Sources of Credit	1951	1961	1971	1981	1991	2002	2013
Institutional	7.2	14.8	29.2	61.2	64	57.1	56
Government	3.3	5.3	6.7	4	5.7	2.3	1.2
Co-	3.1	9.1	20.1	28.6	18.6	27.3	24.8
Commercial Banks	0.8	0.4	2.2	28	29	24.5	25.1
Insurance, Provident	-	-	0.2	0.6	1.4	0.6	0.3
Other Agencies*	-	-	-	-	9.3	2.4	4.6
Non-Institutional	92.8	85.2	70.8	38.8	36	42.9	44
Moneylenders	69.7	60.8	36.9	16.9	15.7	29.6	33.2
Relatives, Friends, et	14.2	6.9	13.8	9	6.7	7.1	8.5
Traders &	5.5	7.7	8.7	3.4	7.1	2.6	0.1
Landlords	1.5	0.9	8.6	4	4	1	0.7
Others	1.9	8.9	2.8	4.9	2.5	2.6	1.4
Total	100	100	100	100	100	100	100

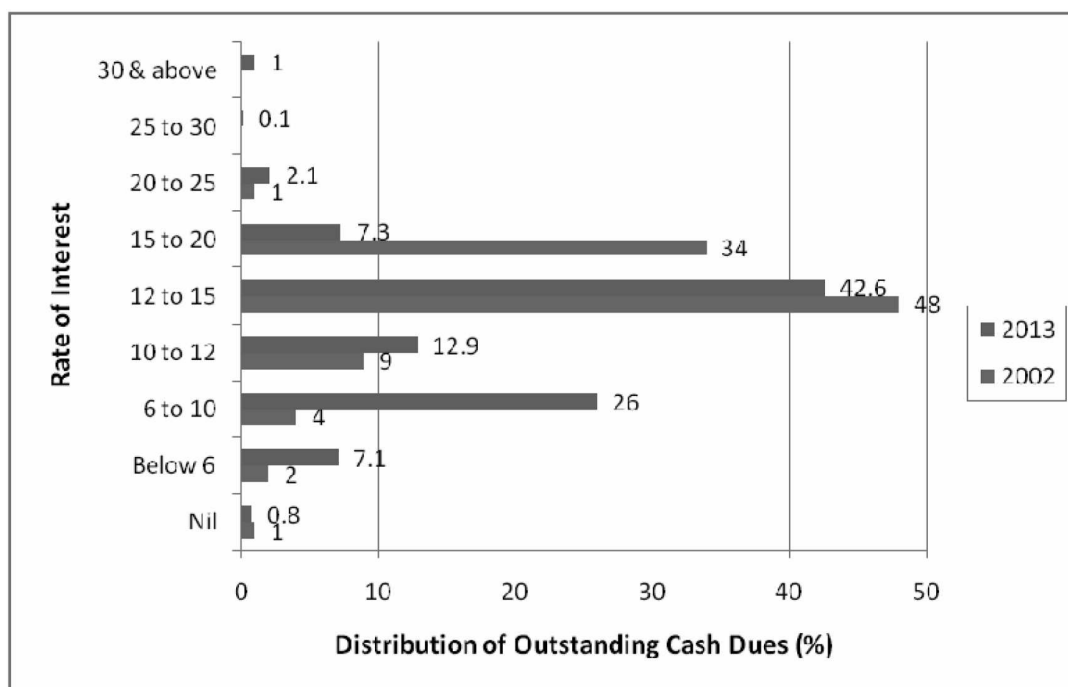
Source: All India Debt & Investment Surveys, Various Issues, NSSO; Reproduced from Hoda & Terway (2015), p.6.

Table 2: Break-up of Institutional & Non-institutional Sources of Agricultural Credit showing Decline of the Moneylenders & Rise of the Commercial Banks

Sources of credit	1951	1961	1971	1981	1991	2002	2013
Institutional	10.2	20.9	32	56.2	66.3	61.1	64
Government	-	6.2		4	5.7	1.7	1.3
Cooperative Societies/Ba	6.2	12.5		27.6	23.6	30.2	28.9
Commercial Banks	4	2.2		23.8	35.2	26.3	30.7
Insurance, Provident Fund	-	-		0.8	0.7	0.5	0.1
Other Agencies*	-	-		-	1.1	2.4	3
Non-Institutional	89.8	79.1	68	43.8	33.7	38.9	36
Moneylenders	39.8	25.3		17.2	17.5	26.8	29.6
Relatives, Friends, etc.	-	-		11.5	4.6	6.2	4.3
Traders &	-	-		5.8	2.2	2.6	
Landlords	21.4	15		3.6	3.7	0.9	0.4
Others	28.6	38.8		5.7	5.7	2.4	1.7
Total	100	100	100	100	100	100	100

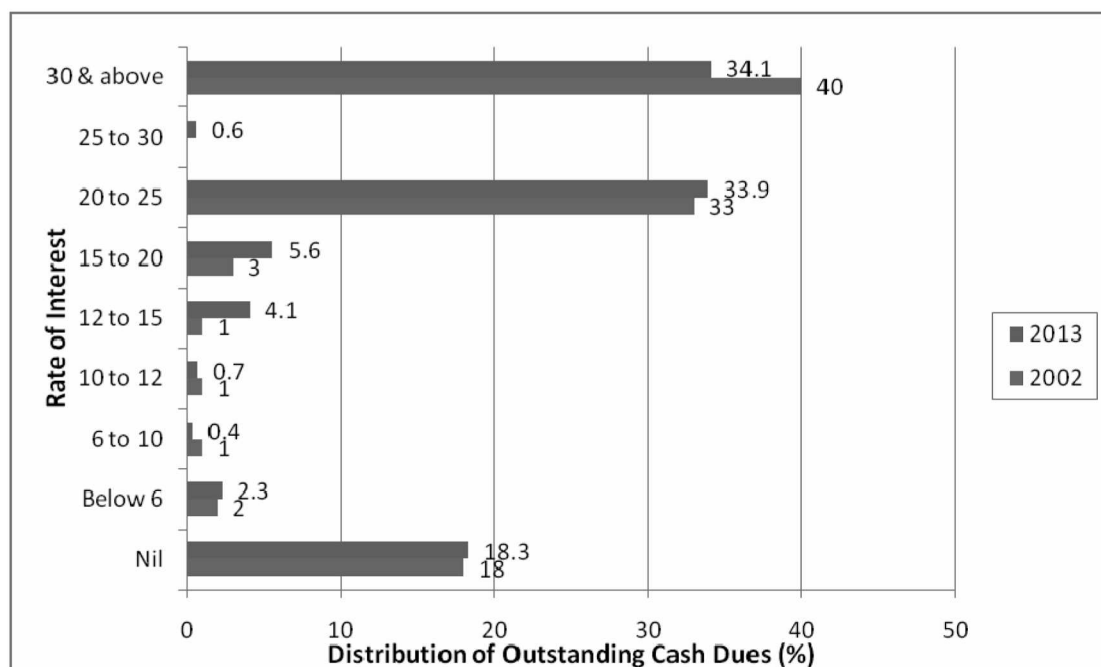
Source: All India Debt & Investment Surveys, Various Issues, NSSO; Reproduced from Hoda & Terway (2015), p.6.

Figure 4: Improved Bell-shaped Distribution of Cash Dues of Rural India to Institutional Sources against Interest Rates



Source: All India Debt & Investment Survey, NSSO; Reproduced from Hoda & Terway (2015), p.7.

Figure 5: Slightly Improved J-shaped Distribution of Cash Dues of Rural India to Non-institutional Sources against Interest Rates



Source: All India Debt & Investment Survey, NSSO; Reproduced from Hoda & Terway (2015), p.8.

Table 3: Progressive Rise in Rural Bank Branches together with Rise in Intensity of Population Coverage

Year	Rural Branches	Populationpe
1975	5598	87442
1981	8471	64650
1991	11344	57992
2001	14597	52319
2011	23097	36335

Source: Handbook of Statistics on the Indian Economy, Reserve Bank of India & United Nation Population Division; Reproduced from Hoda & Terway (2015), p.11.

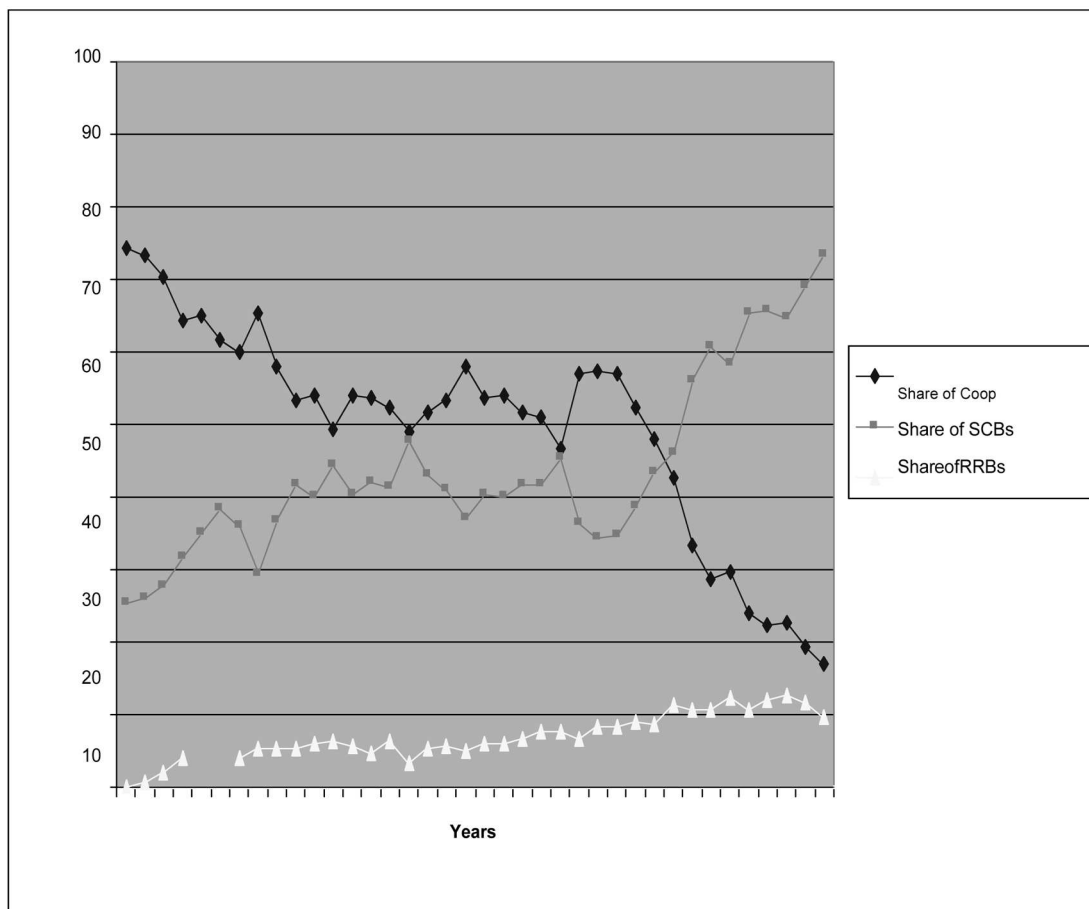
Table 4: Low Interest share (as %) on working capital to of total cost of cultivation for Various crops

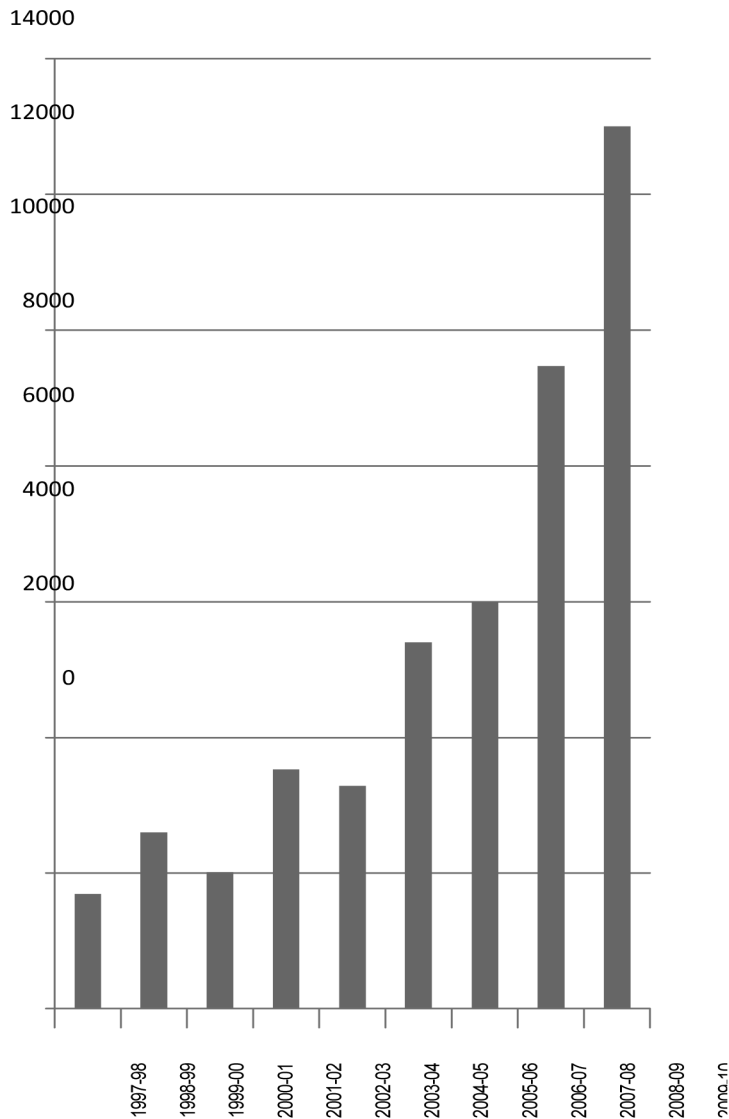
Years	Paddy	Wheat	Maize	Sugarcane	Potato	Onion	Cotton	Jute	Sunflower
2006-07	1.59	1.54	1.46	3.15	1.96	1.52	1.56	1.38	1.78
2007-08	1.53	1.50	1.48	3.19	2.12	1.9	1.51	1.43	1.77
2008-09	1.52	1.46	1.52	3.01	1.84	1.74	1.50	1.49	1.79
2009-10	1.54	1.48	1.52	2.66	2.03	1.61	1.48	1.46	1.78
2010-11	1.60	1.43	1.49	2.94	1.77	1.69	1.41	1.36	1.90
2011-12	1.58	1.46	1.52	3.23	1.80	1.84	1.48	1.35	1.72

Source: Directorate of Economics & Statistics, Department of Agriculture & Cooperation, Ministry of Agriculture;

Reproduced from Hoda & Terway (2015), p.24.

Figure 6: Progressive Rise in Shares of Commercial Banks & RRBs & Decline in the Same for Cooperatives in Direct Institutional Credit to Agriculture & Allied Activities (during 1975-76 to 2011) [Source: Reproduced from Hoda & Terway (2015), p.15]





Source: Statement 5 of Expenditure budget, Volume 1, Government of India; Reproduced from Hoda & Terway (2015), p.23.

Note: Vertical axis in Crores of Rs.

Figure 8: Short-term Credit Over Time almost Over stripping Farmers' Cost of Inputs & Employee Compensation During 1975-76 to 2011-12

[Source: Handbook of Statistics on the Indian Economy, RBI & National Accounts Statistics, CSO; Reproduced from Hoda & Terway (2015), p.18].

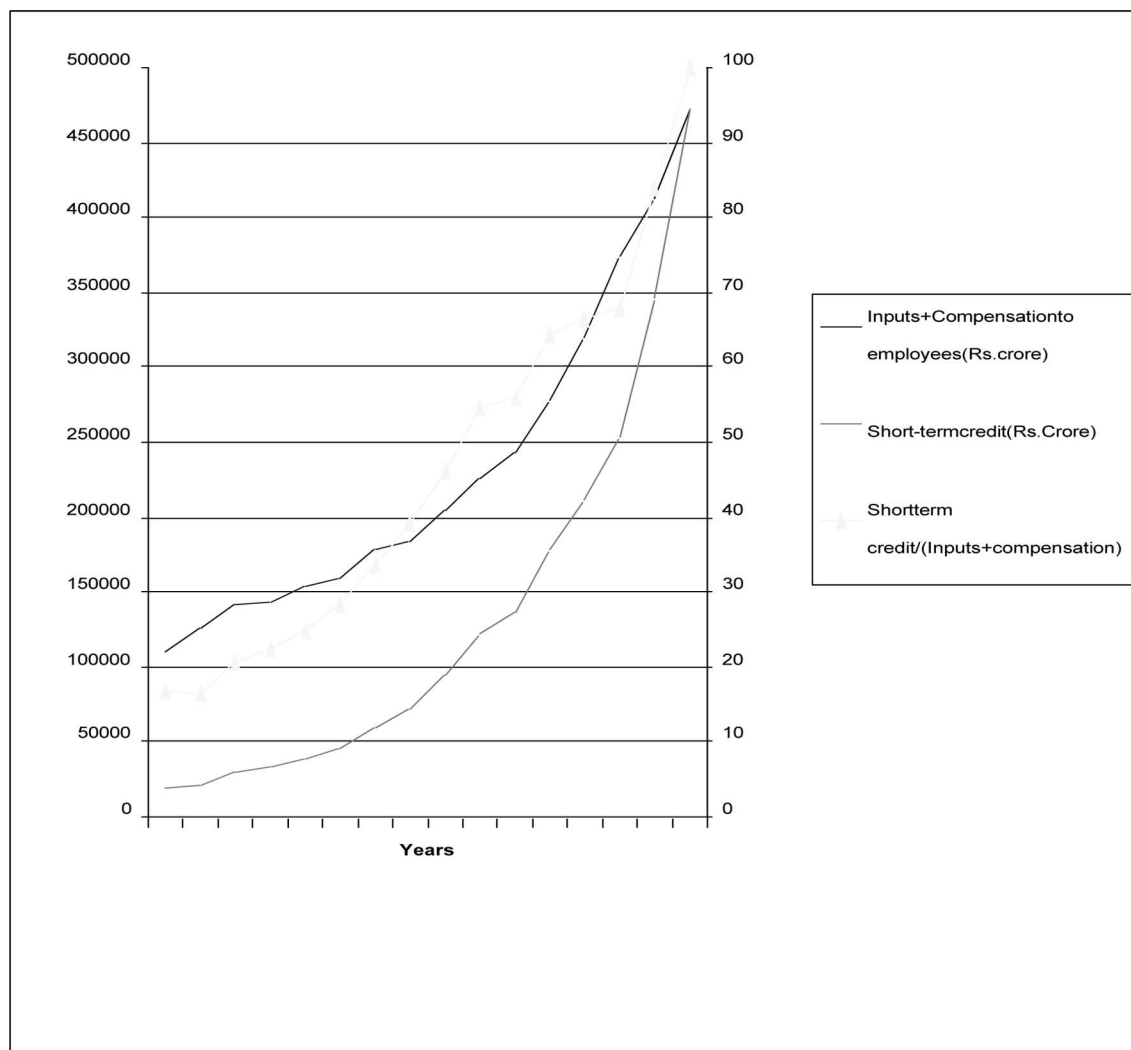


Table 5: Amount distributed on Agricultural Debt Waiver & Debt Relief Scheme (ADWDRS)

Year	Amount(Rs.Crore)
2008-09	25,000
2009-10	15,000
2010-11	11,340.41
2011-12	1,176.39
Total	52,516.86

Source: Statement 4 of Expenditure budget, Volume 1, Government of India; Reproduced from Hoda & Terway (2015), p.24

Table 6. Agency-wise and Year-wise Issue of Kisan Credit Cards : 1998-99 to 2011-12 (figures in millions)

Year	Cooperative banks	Regional Rural Banks	Scheduled Commercial Banks	Total
1998-99	0.16	0.01	0.62	0.79
1999-00	3.75	0.18	1.99	5.92
2000-01	9.36	0.83	5.38	15.57
2001-02	14.8	1.66	8.45	24.91
2002-03	19.38	2.62	11.15	33.15
2003-04	24.26	3.89	14.24	42.39
2004-05	27.82	5.62	18.64	52.08
2005-06	30.42	6.87	22.8	60.09
2006-07	32.72	8.28	27.61	68.61
2007-08	34.81	10.05	32.21	77.07
2008-09	35.87	11.26	33.67	80.8
2009-10	37.03	12.87	36.42	86.32
2010-11	39.84	14.65	39.09	93.58
2011-12	42.8	16.64	44.21	103.65
Total	353.02	95.43	296.48	744.93
Share in Total (%)	47.39	12.81	39.8	100
CAGR (%)	30.51***	52.52***	30.93***	31.1***

Note:***Significant at 1 percent probability level; Source: Anjani et al.(2010)and NABARD Databases (various years); Reproduced from Thejeswini (2014), p.80.

Table 6(a): Progress under SHG-Bank Linkage Program

Year	No. of SHGs Linked #	Bank loan (in billion Rs)	Refinance assistance (in billion Rs)
1995-96	2635	0.04	0.04
1996-97	3841	0.06	0.05
1997-98	5719	0.12	0.11
1998-99	18678	0.33	0.31
1999-00	81780	1.36	0.98
2000-01	14905	2.88	2.51
2001-02	19765	5.45	3.96
2002-03	25588	10.22	6.22
2003-04	36171	18.56	7.05
2004-05	53966	29.94	9.68
2005-06	62010	44.99	10.68
2006-07	110574	65.70	12.93
2007-08	122777	88.49	16.16
2008-09	160958	122.54	26.20
2009-10	158682	144.53	31.74
2010-11	119613	145.48	31.74
2011-12	114787	165.35	30.73
CAGR %	49.74*	73.45***	52.83***

*Notes:****Significant at 1 percent probability level.

#Data relate to SHGs linked with Commercial Banks, RRBs and Co-operative Banks.

Source: Handbook of Statistics of Indian Economy, 2012-13 (Published by RBI); Reproduced from Thejeswini (2014), p.81.

Table 6(b): Progress under SHG-Bank Linkage Program

Year	NGOs	Cooperative Bank	Regional Rural Banks
2007-08	3278	704	656
2008-09	6205	1335	1242
2009-10	8939	2507	2521
2010-11	13599	2922	2215
2011-12	15870	4359	2103
2012-13	17559	3365	1824

Table 7: Progress in Formation of Farmers' Clubs

Year	NGOs	Cooperative Bank	Regional Rural Banks	Scheduled Commercial Banks	SAUs/ KVKs	Others	Total (During the year)	Cumulative
2007-08	3278	704	656	534	61	43	5276	20276
2008-09	6205	1335	1242	1010	115	82	9989	30265
2009-10	8939	2507	2521	2276	185	347	16775	47040
2010-11	13599	2922	2215	2733	255	179	21903	68943
2011-12	15870	4359	2103	2104	807	-	25243	94186
2012-13	17559	3365	1824	1453	601	-	24802	118988
2013-14	11192	1742	1433	1056	856	-	16279	135267

Source: NABARD Annual Reports (various years); Reproduced from Thejeswini (2014), p.82.

Table 8: Financing of JLGs over the Years

Year	No. of JLGs	Bank finance (crore `)	Grant assistance (crore `)
2010-11	125000	660	25
2011-12	194000	947	37
2012-13	196000	1170	54
2013-14	399000	1393	77

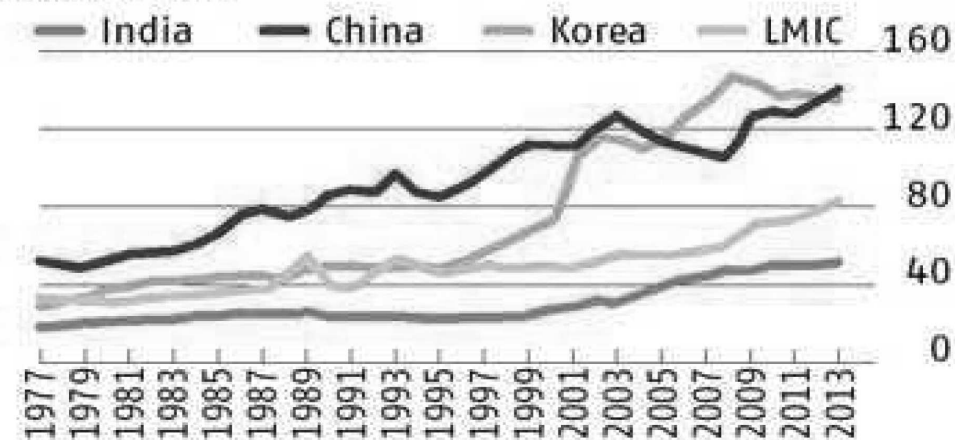
Source: NABARD Annual Reports (various years); Reproduced from Thejeswini (2014), p.82.

Figure 9: India much below China, Korea & Average LMIC in terms of Credit-GDP Ratio Over the Years

(Reproduced Figure 1 from <http://www.rediff.com/business/column/column-5-vital-questions-on-indias-credit/20150410.htm>)

Figure 1: Domestic credit to GDP ratio over time, selected countries and groups

Credit/GDP (%)



Note: LMIC stands for low- and middle-income countries

Table 9: Year-wise Progress in Rural Bank Branches, Rural Credit Outstanding, Rural Deposits & Rural Credit-Deposit Ratio

Year	Number of Bank Offices		Credit Outstanding		Deposits		Credit-Deposit ratio	
	Rural	Percent of total	Rural	Percent of total	Rural	Percent of total	Rural	All Areas
1980	15105	46.59	2165.34	9.67	3975.27	11.93	54.47	67.17
1981	17656	49.44	3061.7	11.4	5261.58	13.03	58.19	66.46
1982	20401	52.07	3749.02	12.13	6313.43	13.78	59.38	67.44
1983	22686	53.91	4551.96	12.35	7671.98	14.09	59.33	67.7
1984	25380	55.98	6740.95	14.83	9243.16	14.37	72.93	70.7
1985	30185	58.74	7277.94	13.77	10411.47	13.39	69.9	67.94
1986	29703	55.74	8403.77	14.66	12808.81	13.89	65.61	62.15
1987	30209	56.08	9745.17	15.11	15521.63	14.33	62.78	59.51
1988	31114	56.15	11356.8	15.84	19215.26	15.06	59.1	56.19
1989	33014	57.21	14552.5	16.29	22046.49	14.99	66.01	60.78
1990	34791	58.22	16067.85	15.4	26233.64	15.26	61.25	60.68
1991	35206	58.46	18598.97	14.97	31009.8	15.46	59.98	61.93
1992	35269	58.22	20692.26	15.14	35749.71	15.08	57.88	57.66
1993	35389	57.85	22906.4	14.1	41409.73	15.01	55.32	58.9
1994	35329	57.16	24670.35	14.03	49331.14	15.23	50.01	54.29
1995	33004	52.91	25174.31	11.93	51819.62	13.67	48.58	55.63
1996	32995	52.35	29012.37	11.39	61313.17	14.39	47.32	59.77
1997	32915	51.79	32525.22	11.44	73769.7	14.74	44.09	56.81
1998	32878	51.19	37598.08	11.4	86706.41	14.54	43.36	55.32
1999	32857	50.59	42090.81	11.01	102697.07	14.71	40.99	54.78
2000	32734	50.04	48753.39	10.6	120539.19	14.67	40.45	56.01
2001	32562	49.39	54431.25	10.11	139431.36	14.69	39.04	56.71
2002	32380	48.91	66681.9	10.17	159423.46	14.19	41.83	58.39
2003	32303	48.55	77153.35	10.21	176502.39	13.83	43.71	59.24
2004	32121	47.8	85020.95	9.66	195081.71	12.91	43.58	58.25
2005	32082	46.93	109975.62	9.54	213104.11	12.2	51.61	65.98
2006	30579	44.01	126078.34	8.33	226061.18	10.81	55.77	72.39
2007	30551	42.52	154897.97	7.96	253013.69	9.74	61.22	74.97
2008	31076	39.8	183106.81	7.58	303423.04	9.34	60.35	74.37
2009	31667	38.6	207926.13	7.3	363910.19	9.28	57.14	72.61
2010	32624	37.2	249276.96	7.5	420337.72	9.2	59.30	73.3
2011	33683	36.2	2958145.4	7.3	493265.52	9.2	599.71	75.6
2012	36356	35	380517.65	7.9	573185.85	9.4	66.39	79
2013	39233	35.9	456190.81	8.3	669888.68	9.6	68.10	78.8
CAGR	2.93		17.60		16.81		0.68	

Source: Source: Basic Statistical Returns of Scheduled Commercial Banks, RBI; Reproduced from Venkatachalam (2017).

Table 10: Composition of Direct and Indirect Finance within Total Agricultural Credit over the Years

[Reproduced Table II of Venkatachalam, C.H. (2017): “Public Sector Banking and the Unmet Expectations of Rural India”, The Hindu Center Politics & Public Policy, Dec.22, 2017]

Year	Table II. Share in total agricultural credit (%)		
	Direct Finance	Indirect Finance	Total
1985	83.2	16.8	100
1990	86.8	13.2	100
2000	84.5	15.5	100
2005	76.1	23.9	100
2006	72.1	27.9	100
2007	74.5	25.5	100
2008	77.5	22.5	100
2009	77.1	22.9	100
2010	76.1	23.9	100
2011	82.0	18.0	100
2012	83.4	16.6	100
2013	85.9	14.1	100
2014	84.3	15.7	100
2015	87.7	12.3	100
2016	89.8	11.2	100

(Source: Basic Statistical Returns)

Table 11: Leakage of Total Agricultural Credit & Direct Agricultural Credit towards Urban & Metropolitan Areas since 1990

[Reproduced Table III of Venkatachalam (2017)]

Year	Table III. Total Agricultural Credit		
	Rural & Semi-urban	Urban & Metro	Total
1990	85.1	14.9	100
1994	83.4	16.6	100
1995	83.7	16.3	100
2005	69.3	30.7	100
2006	62.4	37.6	100
2011	66.9	33.1	100
2015	95.5	4.5	100
	Direct Agricultural Credit		
1990	88.8	11.2	100
1994	89.0	11.0	100
1995	88.6	11.4	100
2005	84.3	15.7	100
2006	80.0	20.0	100
2011	74.4	25.6	100
2015	89.8	10.2	100

(Source: Basic Statistical Returns)

Figure 10: Steep Rise in Share of Indirect Credit in Total Commercial Bank Agricultural Credit



Source: Hand book of Statistics on the Indian Economy, Reserve Bank of India; Reproduced from Hoda & Terway (2015), p.10.

Table 12: Progressive Decline in Share of Cooperatives & Progressive Rise in Shares of Commercial Banks & RRBs towards Loans for Agriculture & Allied Activities

YEAR	Share of Cooperative Banks (Percent)	Share of Commercial Banks (Percent)	Share of RRBs (Percent)
1975-76 to 1990-91	59.84	36.47	4.21
1991-92 to 2002-03	53.63	39.48	6.89
2003-04 to 2012-13	28.72	60.23	11.05

Source: Handbook of Statistics on the Indian Economy, Reserve Bank of India ; Reproduced from Hoda & Terway (2015), p.14.

Table 13: NPA as % of Loan Outstanding of Cooperative Credit Segments

Year	StCB	DCCB	SCARDBS	PCARDBs
2005-06	16.84	19.65	32.69	35.64
2006-07	14.16	18.53	30.27	35.44
2007-08	12.33	18.48	34.99	43.47
2008-09	11.91	18.02	30.39	42.22
2009-10	9.08	13	33.34	42.78
2010-11	8.58	11.19	32.22	40.53
2011-12	6.98	10.25	33.2	36.71
2012-13	6.16	9.83	35.97	37.09

Source: Annual Reports, NABARD; Reproduced from Hoda & Terway (2015), p.16.

Table 14: NPA as % of Loan Outstanding of Cooperative Credit Segments

Years	NPA of SCBs in Agriculture (Rs.crore)	NPA as a share(% of outstanding loans by SCBs
2005-06	6716	3.48
2006-07	7367	2.93
2007-08	9735	3.29
2008-09	7149	1.95
2009-10	10353	2.25
2010-11	16700	3.31
2011-12	24800	4.23
2012-13	30200	4.77

Source: Report of Trends & Progress of Banking in India, RBI; Reproduced from Hoda & Terway (2015), p.27.

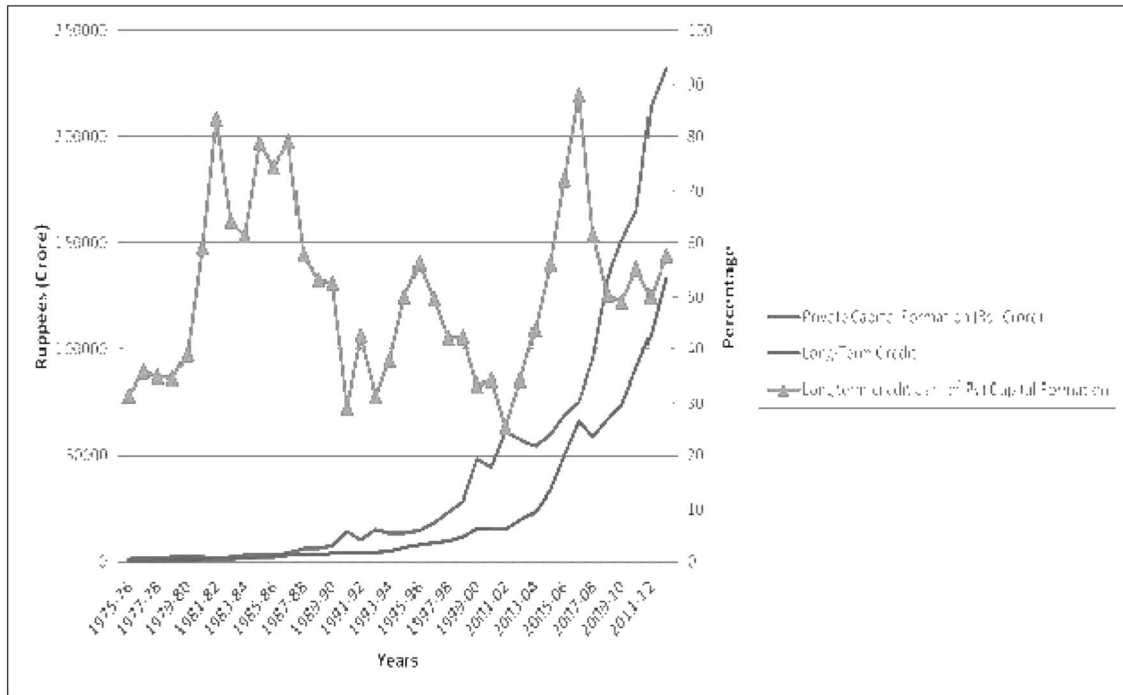
Table 15: % Distribution of Cash Dues on Rural & Urban Loans against Interest Types, showing Steep Rise of Loan Shares under Compound Interest in both Rural & Urban Areas, while Dominant Loan Shares continue under Simple (often above 25%) Rate

[Reproduced from Venkatachalam (2017), p.7]

Terms of interest	% distribution of cash dues in							
	Rural				Urban			
	1981	1991	2002	2012	1981	1991	2002	2012
Interest Free	12	9	8	5	19	17	10	8
Simple	69	66	69	52	68	60	69	61
Compound	11	22	21	43	6	17	17	28
Concessional	2	4	2	1	3	5	3	3

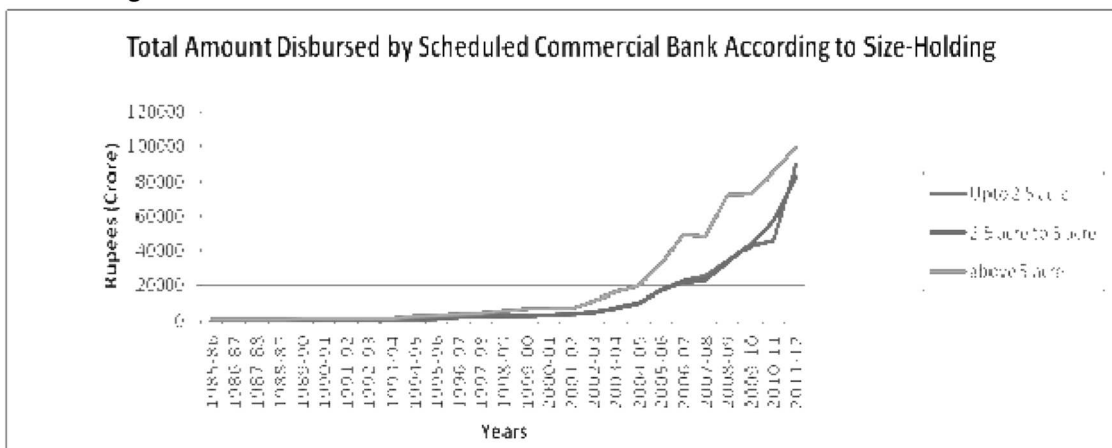
(Source: NSSO data)

Figure 11: Graph showing that Long Term Credit Always Falling Behind Private Capital formation in Agriculture



Source: Handbook of Statistics on the Indian Economy, RBI & National Accounts Statistics, CSO; Reproduced from Hoda & Terway (2015), p.19.

Figure 12: Graph Showing Bias in Disbursement of Commercial Bank Loans in favor of Large Landholdings



Source: Handbook of Statistics on the Indian Economy, Reserve Bank of India; Reproduced from Hoda & Terway (2015), p.20.

MACROECONOMICS OF DEVELOPMENT AND BANKING SECTOR REFORMS IN INDIA*

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Abstract

Following the adoption of the New Economic Policy (NEP) by India in July 1991, Government of India (GoI) has started viewing banks as commercially organized profit driven financial institutions whose viability depends upon their ability to make profit. Like all capitalist economies, India is also subject to trade cycles and onset of a recession leads to a drop in banks' profit levels and an increase in their stock non-performing assets. This prompts the government to ask banks to tighten lending norms. This paper develops a simple baseline model to examine the implications of this kind of a policy. It shows that the policy noted above deepens recession, increases inequality and exacerbates the problem of non-performing assets and low profit. It also shows that, instead of taking the banks and the defaulting firms to task for a factor that is completely beyond their control, the best way of tackling this problem is to adopt appropriate stabilization programmes to counter the recession.

Key Words: Recession, Non-performing assets, Bank Regulation

JEL Classification: E32, E58, G21

I. INTRODUCTION

Since 2011-12 non-performing assets of public sector banks have begun to rise. Both Government of India and RBI have taken alarm and have adopted a number of measures to arrest the growth of non-performing assets. The government is planning to infuse new capital into the banks to maintain capital adequacy ratio. Some of the public sector banks have been put under the category that requires "Prompt Corrective Action" (PCA). All the banks in general and the public sector banks in particular have been put on high alert. Most alarmingly, the GOI has proposed to introduce the Financial regulation and deposit insurance (FRDI) bill, which empowers the government to forfeit the deposits of the depositors to rescue banks that have become insolvent.

Clearly, this measure will destroy people's faith in banks. They will be disinclined to hold their savings with the banks bringing about a collapse of the banking system and, thereby,

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that of the economy as a whole. We shall examine the implications of all these measures here. However, to adopt appropriate measures, one has to identify the reasons for the increase in the stock of non-performing assets. From the data of growth rate and non-performing assets, it is clear that the non-performing assets as a percentage of total advances started rising since the onset of recession in 2011-12 (see Tables 1 and 2). The period from 2003-04 to 2010-11 was one of unprecedented boom during which GDP grew at an average annual rate of around 8.5 percent. The growth rate dropped to 6.5 percent in 2011-12 and further to 4.5 percent and 4.8 percent respectively in 2012-13 and 2013-14. Even going by the new data derived using new methodology and a new base year 2011-12, which has substantially raised the growth rates of 2012-13 and 2013-14, the average annual growth rate during 2012-13 – 2015-16 is around 6.5 percent. If we had applied the same methodology and the base year to estimate the growth rates of the boom period (2003-04 to 2010-11), the average annual growth rate of the boom period would have been much higher than what we have shown in Table 1. During the boom period spanning eight years, investors' morale was high. Driven by their enthusiasm to invest, advances grew at a high rate. However, the expectation of a high growth of demand that drove investment during the boom period turned awry since 2011-12. Large expensive capacities created during the boom period turned idle saddling the investors' with large losses. Investors' morale went for a toss. This led to two changes: default rate rose sharply raising the growth rate of non-performing assets, while growth rate of advances fell. These two factors together brought about an increase in the stock of non-performing assets as a fraction of total advances. Obviously, neither the investors nor the banks are at a fault as capitalist economies are subject to trade cycles and both upswings and downturns are unpredictable. The best way of tackling recessions and the attendant problem of non-performing assets is to undertake appropriate expansionary fiscal policy to put the economy on an upswing, provide debt relief to ailing firms until the economy revives and provide adequate capital to the banks to fully compensate for their losses until the economy begins to boom again and the firms begin to make profit and start paying back the loans along with the interest. (In fact, some of these policies were adopted by the US government and Fed to rescue the banks and the economy following the financial meltdown since 2007 (see Mishkin (2011) and Blinder and Zandi (2010^a, 2010^b).) If instead of adopting intelligent, well-informed anti-recessionary policies, the government takes the banks to task, it will have the confidence of banks', savers' and investors' badly shaken, credit disbursement will dip sharply and the economy will slip into a deep recession. In what follows, we shall illustrate these points.

II. A BASELINE MODEL FOR EXAMINING BANKING SECTOR REFORMS

We first develop a simple baseline model to examine the implications of the recent banking sector reforms in India. We consider a small open economy divided into two sectors: a real

sector and a financial sector. We focus on the real sector first.

Real Sector

In the real sector, aggregate output or GDP is demand determined. The equilibrium condition of the real sector is given by

$$Y = cY + I(r) + G + X\left(\frac{P^*e}{P}; Y^*\right) - \frac{P^*e}{P}M\left(\frac{P^*e}{P}, Y\right) \quad (1)$$

We assume that government expenditure is financed by borrowing from the central bank so that

$$G = \frac{dH}{P} \quad (2)$$

In (2), dH denotes increase in the stock of high-powered money. For the time being, we ignore cross-border capital flows and consider the flexible exchange rate regime. The BOP equilibrium condition is, therefore, given by

$$X\left(\frac{P^*e}{P}, Y^*\right) - \frac{P^*e}{P}M\left(\frac{P^*e}{P}, Y\right) = 0 \quad (3)$$

Financial Sector

We assume for simplicity that the only kind of financial institutions that exist in the financial sector are banks. Banks raise their funds by inviting deposits and also by selling equities. We ignore here the secondary market in equities. Banks sell new equities in the market at a fixed price. At the fixed price, either they are able to sell as many equities as they want or they face demand constraint. We consider both the cases here. We postulate for simplicity that only banks issue equities.

We assume that savers hold their saving in the form of equity, bank deposits and currency. They hold q and q_1 fractions of their saving in the form of equity and currency respectively and the rest in the form of bank deposits. We also assume here that banks do not hold any excess reserve and they sell equities only to meet the capital adequacy requirement. Given these assumptions, the amount of new equities the banks want to sell is given by

$$E^s = \frac{1}{\theta}L^s = \frac{1}{\theta}(1 - \rho)dD \quad (4)$$

In (4), $E^s \equiv$ planned supply of new equity by the banks, $L^s \equiv$ planned supply of new bank loans, $\frac{1}{\theta} \equiv$ capital adequacy ratio, $\rho \equiv$ CRR, and $dD \equiv$ new deposit received by the banks.

Demand for new equities comes from the savers who hold q fraction of their saving in the form of new equities. Thus,

$$E^d = q(1-c)Y \quad (5)$$

New deposits received by the banks are given by

$$dD = (1-q-q_1)(1-c)Y \quad (6)$$

Substituting (6) into (4), we get

$$E^s = \frac{1}{\theta}(1-\rho)(1-q-q_1)(1-c)Y \quad (7)$$

There are clearly two possibilities, $E^s > E^d$, $E^s \leq E^d$. In the first case, banks are rationed in the equity market. Hence, their planned supply of new loan will be given by

$$L^s = \theta E^d = \theta q(1-c)Y \quad (8)$$

In the second case, banks are able to sell as much new equity as they plan to. Hence, their supply of new loans is given by

$$L^s = \theta E^s = (1-\rho)(1-q-q_1)(1-c)Y \quad (9)$$

We also assume that the banking sector is oligopolistic and the interest rate charged by banks on loans is rigid and depends only upon the repo rate. Denoting the lending rate of banks and the repo rate by r and r_p respectively, we have

$$r = r \left(\begin{matrix} r_p \\ + \end{matrix} \right) \quad (10)$$

Demand for loans comes from the investors, who finance their entire investment with bank loans. In this connection, we divide aggregate investment into two parts. One part of investment is undertaken by the quality borrowers whom banks never ration, and the other part is undertaken by those investors whom banks ration. We denote the former by I_0 and the latter

by I_1 and write the investment function as

$$I = I_0(r(r_p), \varepsilon_0) + I_1(r(r_p), \varepsilon_1) \quad (11)$$

In (11), ε_0 and ε_1 denote expectations of the two types of borrowers. We assume here that at the given interest rate, non-quality investors are rationed in the credit market and investment of the non-quality borrowers is determined by the supply of loans. Banks, however, ration credit. They give loans only to those whom they consider creditworthy. Normally, they cannot disburse as much credit as they want to. Taking this into account, we modify the loan supply equations (8) and (9) as follows:

Eq.(8), which gives the loan supply equation in the first case, is given by

$$L^s = I_0(r(r_p), \varepsilon_0) + \beta(N, R) [\theta q(1-c)Y - I_0(r(r_p), \varepsilon_0)] \quad 0 < \beta \leq 1 \quad (12)$$

In the second case, eq.(9) is written as

$$L^s = I_0(r(r_p), \varepsilon_0) + \beta(N, R) [(1-\rho)(1-q-q_1)(1-c)Y - I_0(r(r_p), \varepsilon_0)] \quad 0 < \beta \leq 1 \quad (13)$$

In (12) and (13), β denotes the fraction of the banks' potential supply of loans that banks are able to disburse to their non-quality borrowers. β is made a decreasing function of both N , which denote the stock of non-performing assets of the banks, and R , which denotes bank regulations that make banks more cautious regarding their lending behavior. Since, by assumption, banks ration credit, aggregate investment is determined by supply of bank credit. Hence investments in case 1 and case 2 are given by (14) and (15) respectively.

$$I = I_0(r(r_p), \varepsilon_0) + \beta(N, R) [\theta q(1-c)Y - I_0(r(r_p), \varepsilon_0)] \quad (14)$$

$$I = I_0(r(r_p), \varepsilon_0) + \beta(N, R) [(1-\rho)(1-q-q_1)(1-c)Y - I_0(r(r_p), \varepsilon_0)] \quad (15)$$

We first focus on the second case where capital adequacy norm does not act as a constraint.

The Case where Capital Adequacy Ratio Does Not Act as a Constraint on Loan Supply

Substituting (2), (3) and (15) into (1), we rewrite it as

$$Y = c.Y + I_0(r(r_p), \varepsilon_0) + \beta(N, R) [(1-\rho)(1-q-q_1)(1-c)Y - I_0(r(r_p), \varepsilon_0)] + \frac{dH}{P} \quad (16)$$

The model is now given by two key equations (3) and (16) in two endogenous variables: y and e . We can solve (16) for the equilibrium value of y . Putting this equilibrium value of y into (3), we can solve it for the equilibrium value of e .

We now carry out a comparative static exercise to explain the working of the model. Suppose the government raises its expenditure by dG and finances it by borrowing from

the central bank so that $dG = d\left(\frac{dH}{P}\right)$. Taking total differential of (16) and solving for dY , we get

$$dY = \frac{d\left(\frac{dH}{P}\right)}{1 - [c + \beta(1 - \rho)(1 - q - q_1)(1 - c)]} \quad (17)$$

Again, taking total differential of (3), using the fact that $X = pM$, where $p \equiv \frac{P^*e}{P}$, holds in the initial equilibrium, we get

$$de = \frac{pM_y}{\frac{P^*}{P}M(\eta_x + \eta_m - 1)} dY = \left(\frac{pM_y}{\frac{P^*}{P}M(\eta_x + \eta_m - 1)} \right) \left(\frac{d\left(\frac{dH}{P}\right)}{1 - [c + \beta(1 - \rho)(1 - q - q_1)(1 - c)]} \right) \quad (18)$$

In (18), $\eta_x \equiv \frac{p}{X} \frac{\partial X}{\partial p} \equiv$ price elasticity of export and $\eta_m \equiv -\frac{p}{M} \frac{\partial M}{\partial p} \equiv$ price elasticity of import.

Again, from (6) we get

$$d(dD) = (1 - q - q_1)(1 - c) \frac{Pd\left(\frac{dH}{P}\right)}{1 - [c + \beta(1 - \rho)(1 - q - q_1)(1 - c)]} \quad (19)$$

Note that if $q = q_1 = \beta = 0$, we get our standard money supply formula:

$$d(dD) = \frac{1}{\rho} Pd\left(\frac{dH}{P}\right) \quad (20)$$

(20) gives us the usual money supply formula. Again, when $q_1 > 0$, but $q = \beta = 0$, we get

$$d(dD) + dCU = dM^s = \frac{1}{\frac{1-q_1}{q_1} + \rho} Pd\left(\frac{dH}{P}\right) = \frac{1+\lambda}{\rho+\lambda} Pd\left(\frac{dH}{P}\right) \quad (21)$$

In (21), $CU \equiv$ currency in circulation, $M^s \equiv$ money supply and $\lambda \equiv$ the ratio in which people hold their saving in currency and deposit. Thus, (21) also gives the standard money supply formula.

Let us now explain the adjustment process. Following an increase in G by dG financed by

borrowing from the central bank, the multiplier process operates and Y increases by $\frac{dG}{1-c}$.

During the multiplier process, transactions may be carried out with currency or bank deposits or both. Let us explain the multiplier process a little. Per unit increase in Y , demand for domestic goods rises by $c - pM_y$. However, the increase in import demand raises the exchange

rate by $\frac{pM_y}{b}$, where $b \equiv \frac{P^*}{P} M(\eta_x + \eta_m - 1)$ so that net export goes up by pM_y , restoring

BOP equilibrium. Therefore, in the net, demand for domestic goods rises by c per unit increase in Y . This explains the multiplier. Out of this additional income, people will save

$(1-c) \cdot \frac{dG}{1-c} = dG$, which they will allocate over bank deposit, equities and currency. Out of

this additional saving, banks will receive new deposits of $(1-q-q_1)dG \cdot P$ and people will hold additional currency of $q_1 \cdot P \cdot dG$. Out of this new deposits, banks will be able to extend new loans in real terms of $\beta \cdot (1-q-q_1)dG$, which will raise planned investment by the same amount. At this point, the first round of transactions is complete. The first round increases in Y, e, dD, CU, L and I are denoted by $dY_1, de_1, dS_1, d(dD)_1, dCU_1, dL_1$ and dI_1 respectively and they are given by

$$dY_1 = \frac{dG}{1-c}, de_1 = \frac{pM_y}{b} dY_1, dS_1 = dG, d(dD)_1 = (1-q-q_1).P.dG, dCU_1 = q_1.P.dG, \\ dL_1 = \beta.(1-\rho).(1-q-q_1).P.dG \text{ and } dI_1 = \beta.(1-\rho).(1-q-q_1).dG$$

The increase in investment demand in the first round will set off the multiplier process and

raise y in the second round by $dY_2 = \frac{\beta.(1-\rho).(1-q-q_1).dG}{1-c}$, e in the second round will

go up by $de_2 = \frac{pM_y}{b} dY_2$. Similarly,

$$dS_2 = (1-c)dY_2, d(dD)_2 = (1-q-q_1)(1-c)PdY_2, dCU_2 = q_1(1-c)PdY_2, \\ dL_2 = \beta.(1-\rho).(1-q-q_1)(1-c)PdY_2 \text{ and } dI_2 = \beta.(1-\rho).(1-q-q_1)(1-c)dY_2$$

In the same way, third round changes are given by

$$dY_3 = \frac{[\beta.(1-\rho).(1-q-q_1)]^2}{1-c}.dG, de_3 = \frac{pM_y}{b} dY_3, \\ dS_3 = (1-c)dY_3, d(dD)_3 = (1-q-q_1)(1-c)PdY_3, dCU_3 = q_1(1-c)PdY_3, \\ dL_3 = \beta.(1-\rho).(1-q-q_1)(1-c)PdY_3 \text{ and } dI_3 = \beta.(1-\rho).(1-q-q_1)(1-c)dY_3$$

This process of expansion will continue until the increase in y that takes place in each successive round eventually falls to zero. Total changes in Y, e, dD and CU are given respectively by

$$dY = \frac{1}{1-c}.dG + \frac{[\beta.(1-\rho).(1-q-q_1)]}{1-c}.dG + \frac{[\beta.(1-\rho).(1-q-q_1)]^2}{1-c}.dG + \dots = \\ = \frac{1}{(1-c)[1-\beta.(1-\rho).(1-q-q_1)]}.dG = \frac{1}{(1-c)[1-\beta.(1-\rho).(1-q-q_1)]}.d\left(\frac{dH}{P}\right) \quad (22)$$

$$de = \frac{pM_y}{b} dY \quad (23)$$

$$d(dD) = (1-q-q_1)(1-c)PdY, dCU = q_1(1-c)PdY, \\ dM^s = dM^d = d(dD) + dCU = (1-q-q_1)(1-c)PdY \quad (24)$$

In (24), M^d denotes money demand. One can easily check that (22), (23) and (24) tally with (17), (18) and (19) respectively.

III. RECESSION, BANKS AND BANK REGULATION

We shall now use the model developed above to examine how recessions affect banks and what the government's policy intervention should be in such a scenario. This is of considerable importance as, following the onset of recession in India since 2011-12, banks got into trouble as its stock of non-performing assets increased and became subject to close official scrutiny and concern (see Tables 1 and 2). To accomplish this task, we have to incorporate in our model the fact that N depends upon the state of the economy indicated by Y and on such factors as degree of supervision and monitoring, norms specified by the central bank for identifying non-performing assets etc. We denote these latter factors, which are exogenously given here, by ϕ . An increase in ϕ indicates an increase in the degree of strictness in supervision, monitoring etc. We, therefore, make N a decreasing function of Y and an increasing function of ϕ . Incorporating this in (16), we rewrite it as

$$Y = c.Y + I_0(r_p, \varepsilon_0) + \beta \left(N(Y, \phi) - \frac{d\bar{H}}{P} \right) [(1-\rho)(1-q-q_1)(1-c)Y - I_0(r_p, \varepsilon_0)] + \frac{dH}{P} \quad (25)$$

In (25), $\frac{d\bar{H}}{P}$ denotes the stock of real balance created by the central bank to buy up the non-performing assets.

Using (25), we shall now examine how the effect of an adverse exogenous shock to the economy gets magnified manifold on account of the government's obsession with the non-performing assets of the banks. We assume here that on account of exogenous reasons, there takes place a fall in ε_0 , which indicates a deterioration in the expectations regarding the future of the quality investors. We derive its impact here by taking total differential of (25) treating all exogenous variables other than ε_0 as fixed and, then solving for dY . This yields the following:

$$dY = c.dY + I_{0\varepsilon_0} d\varepsilon_0 + \beta_N N_Y \cdot (1-\rho)(1-q-q_1)(1-c)Y dY + \beta(1-\rho)(1-q-q_1)(1-c)Y - \beta I_{0\varepsilon_0} d\varepsilon_0 \Rightarrow$$

$$dY = \frac{(1-\beta)I_{0\varepsilon_0} d\varepsilon_0}{1 - [c + \beta_N N_Y \cdot (1-\rho)(1-q-q_1)(1-c)Y + \beta(1-\rho)(1-q-q_1)(1-c)]} < 0, \text{ when } d\varepsilon_0 < 0 \quad (26)$$

Their non-performing assets on account of government regulations makes the multiplier much larger than $\frac{1}{1 - [c + \beta(1 - \rho)(1 - q - q_1)(1 - c)]}$, the value that it otherwise would have assumed. This will be clear, if we explain the expression on the RHS of (26). The numerator gives that fall in aggregate investment at the initial equilibrium Y following the deterioration in the investors' sentiments. Thus, there emerges an excess supply given by the absolute value of the numerator at the initial equilibrium Y . To remove this, producers reduce Y . Per unit fall in Y , excess supply falls by unity. However, the unit fall in Y also reduces demand raising excess supply thereby. A unit fall in Y reduces consumption demand by c . It reduces saving and, thereby, potential supply of bank loan by $(1 - c)$ and $(1 - \rho)(1 - q - q_1)(1 - c)$ respectively. The unit fall in Y also raises N and lowers β . Hence aggregate loan disbursement of banks and aggregate investment go down by $\beta(1 - \rho)(1 - q - q_1)(1 - c)$. Hence, in the net, per unit decline in Y , excess supply falls by $1 - [c + \beta(1 - \rho)(1 - q - q_1)(1 - c)]$. However, governments' efforts at arresting the growth of non-performing assets forces banks to be extra cautious and reduces loan disbursement and investment further by $\beta_N N_y (1 - \rho)(1 - q - q_1)(1 - c)Y$. Therefore, per unit decline in Y , excess supply instead of falling by falls by a smaller quantity given by . Hence, the multiplier becomes much larger. This explains (26). This yields the following proposition:

Proposition 1: *On account of the kind of regulations and pressures banks are subject to in the post-reform period in India, the effect of an exogenous decline in aggregate demand gets magnified manifold bringing about a deep recession.*

Appropriate Counter – Recessionary Policy of the Government

The government can tackle the situation by raising G by a suitable amount and financing it by creating money. We can show the impact of this policy by taking total differential of (25), and setting From the above it follows that if the government raises G by the amount of the autonomous decline in investment demand and finances it by money creation, Y will be restored to its initial level and the economy, banks and investors will again become healthy. Otherwise, the economy will slip into a deep recession and the banks and the investors will plunge into deep trouble. This gives us the following proposition:

Proposition 2:

If there takes place an autonomous decline in aggregate demand for exogenous reasons plunging the economy into a recession, the best way of tackling it is to raise government expenditure by the same amount as the autonomous fall in aggregate demand and finance it by money creation. It will restore the economy, banks and the firms back to health.

From the above it follows that a recession should be tackled by an appropriate stabilization policy at the macro level. If instead, firms and banks are taken to task for the losses they make on account of factors, which are completely beyond their control and which stem from the very nature of a capitalist economy, the recession and plight of the forms and banks will deepen instead of the other way round.

Illustration in a Dynamic Set-Up

To illustrate the impact that the government's regulations produce on banks as their stock of non-performing assets increases with the onset of recession, we dynamize the model presented above. We make the stock of non-performing assets of period t a decreasing function of Y_{t-1}

and $\frac{d\bar{H}}{P}$ and an increasing function of ϕ . Thus,

$$N_t = n(\bar{Y} - Y_{t-1}) + \phi - \frac{d\bar{H}}{P} \quad n > 0, \phi > 0 \quad (27)$$

In (27), $\bar{Y}$ is a constant and it denotes the full employment level of output. Using (27), we rewrite (14) (making some simplifications for algebraic convenience) as

$$Y_t = cY_t + \bar{I} + \beta \cdot [(1-\rho)(1-q-q_1)(1-c)Y_t - \bar{I}] - \phi \cdot \left[n(\bar{Y} - Y_{t-1}) + \phi - \frac{d\bar{H}}{P} \right] + \frac{dH}{P} \quad (28)$$

$n > 0, \phi > 0$

In (28), we have assumed that the quality investors' investment is exogenously given and denoted it by $\bar{I}$, regarded β as fixed and captured the deleterious impact of an increase in the stock of non-performing assets on credit supply and investment due to government

regulations by means of the term $\phi \cdot \left[n(\bar{Y} - Y_{t-1}) + \phi - \frac{d\bar{H}}{P} \right]$. All this has been done for simplicity.

We rewrite (28) as

$$Y_t = \frac{(1-\beta)\bar{I} + \frac{dH}{P} - \phi \left(n\bar{Y} + \phi - \frac{d\bar{H}}{P} \right)}{1 - [c + \beta(1-\rho)(1-q-q_1)]} + \frac{\phi n}{1 - [c + \beta(1-\rho)(1-q-q_1)]} Y_{t-1} \quad (29)$$

We assume that the first term on the RHS of (29) is positive. We also assume for the sake of existence and stability of the steady state that the coefficient of Y_{t-1} lies between 0 and 1. The line YY in Figure 1 represents (29). The steady state value of Y corresponds to the point of intersection of YY and the 45° line. Suppose there takes place a deterioration in the quality investors' morale for exogenous reasons and this brings about a fall in $\bar{I}$ by $d\bar{I}$. Following this, the YY shifts downward bringing about a cumulative decline in Y and, therefore, a cumulative increase in the stock of non-performing assets. These cumulative changes have been indicated by arrows. The process may be briefly explained as follows.

Effect of an Autonomous Fall in Investment Demand

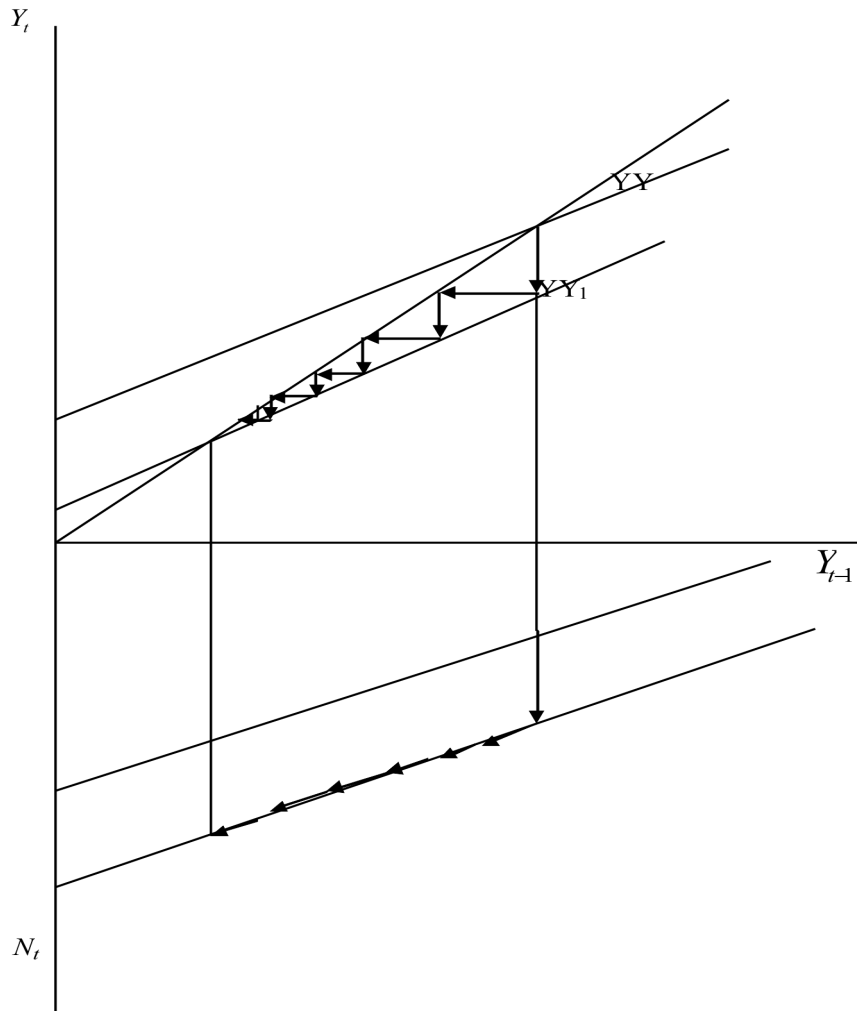


Figure 1

Following an exogenous decline in quality investors' investment in period 0 by $d\bar{I}$, the multiplier process operates and in period 0, Y goes down by $\frac{(1-\beta)d\bar{I}}{1-c+\beta(1-\rho)(1-q-q_1)(1-c)}$.

Let us explain this expression. Following the fall in output by $(1-\beta)d\bar{I}$, aggregate consumption falls by $c(1-\beta)d\bar{I}$. On the other hand, aggregate saving and bank deposits decline by $(1-c)(1-\beta)d\bar{I}$ and $(1-q-q_1)(1-c)(1-\beta)d\bar{I}$ respectively. Hence, disbursement of bank loans and, therefore, investment fall by $\beta(1-q-q_1)(1-c)(1-\beta)d\bar{I}$. Accordingly, aggregate demand and, therefore, aggregate output go down by $[c+(1-q-q_1)(1-c)](1-\beta)d\bar{I}$. This multiplier process of contraction will continue and at the end of the process, aggregate output will fall

by $\frac{(1-\beta)d\bar{I}}{1-[c+\beta(1-\rho)(1-q-q_1)(1-c)]}$. In the absence of government's obsessive concern with non-performing assets of banks and the efforts it makes to arrest the growth of non-performing assets by forcing banks to follow stricter norms of bank lending, the contraction in GDP would have stopped here. But the latter factors lead to further rounds of contraction in GDP. In the next period, period 1, because of the contraction in GDP in period 0, banks' stock of

non-performing assets rises by $n \cdot \frac{(1-\beta)d\bar{I}}{1-[c+\beta(1-\rho)(1-q-q_1)(1-c)]}$. It forces banks to adhere to stricter lending norms stipulated by the central bank and, as a result, bank lending falls

further by $\varphi^n \frac{(1-\beta)d\bar{I}}{1-[c+\beta(1-\rho)(1-q-q_1)(1-c)]}$, which, through the multiplier process

described above, reduces GDP in period 1 by $\varphi^n \frac{(1-\beta)d\bar{I}}{\{1-[c+\beta(1-\rho)(1-q-q_1)(1-c)]\}^2}$. This

leads to further increase in the stock of non-performing assets by

$\varphi^{n^2} \frac{(1-\beta)d\bar{I}}{\{1-[c+\beta(1-\rho)(1-q-q_1)(1-c)]\}^2}$ in period 2 and reduces GDP by

$(\varphi^n)^2 \frac{(1-\beta)d\bar{I}}{\{1-[c+\beta(1-\rho)(1-q-q_1)(1-c)]\}^3}$. This process of contraction will continue until

the new steady state is reached. The contraction in Y that takes place from period 1 is quite

substantial and is entirely due to government's policies towards banks' non-performing assets. Since non-quality borrowers comprising the small and medium borrowers are rationed, when lending norms are tightened, concentration and inequality increase along with the deepening of recession. The above analysis yields the following proposition:

Proposition 3: Stricter lending norms imposed on banks following an onset of recession and the consequent increase in the stock of non-performing assets of banks to arrest the growth of their non-performing assets substantially deepen recession and exacerbate the problem of non-performing assets. They also significantly increase degree of concentration and inequality.

Clearly, the situation calls for suitable policy intervention on the part of the central bank to

avert the crisis. It is quite clear from (29) that, if the government raises $\frac{dH}{P}$ by the same amount as the fall in $(1 - \beta)\bar{I}$, the YY schedule in Figure 1 will remain unaffected and the fall in Y and the increase in non-performing assets can be averted. Thus, instead of taking to task the victims of recession, the government should adopt appropriate, well-informed anti-recessionary policies to keep banks and other economic agents healthy. Otherwise, recession and inequality and along with them economic woes of banks and other economic agents will deepen.

IV. CONCLUSION

Banks perform very important social functions. They mobilize savings of the savers and transfer them to the borrowers. Banks cannot perform these functions effectively if they are commercial organizations, whose objective is to make profit and whose viability depends upon whether they are able to make profit. As enshrined in Indian Constitution and, as should be the responsibility of every civilized society, to provide equal opportunity to everyone, every individual should have access to a safe avenue for holding their savings. Banks cannot achieve this, if they are commercial organizations. If they are commercial organizations, they may not consider it profitable to make themselves accessible to every saver. Moreover, they will be subject to vagaries of capitalist market forces. Hence, their liabilities will not be fully safe. They will, therefore, not be able to fully mobilize all the savings of the savers. In fact, the kind of instabilities that a capitalist economy is usually subject to and given the performance of banks in advanced capitalist economies, banks are unlikely to have any access to the major part of savings of the savers. Thus, for banks to be able to effectively mobilize savings generated in the economy, they have to be social institutions owned by the government and protected by the government fully from the vagaries of market forces. Again, an economy, to perform efficiently and equitably, should meet all the genuine credit needs of people and

firms - credit needs that arise out of the necessity of producing and/or consuming essential goods. Again, when banks are commercially organized, they will disburse credit on the basis of profit criteria. Hence, they will ration small and medium producers, even when they are engaged in the production of essential goods, while credit needs of quality borrowers, even when they use the credit to produce luxury goods, are fully met (see in this connection Bernanke, Gertler and Gilchrist(1996)). This may lead to severe macroeconomic instability giving rise to shortages of food and other mass consumption goods and large imports of components required for luxury production. These large non-essential imports may lead to steep increase in exchange rate raising domestic price level and, thereby, worsening trade balance further. Shortages of mass consumption goods coupled with steep increase in the exchange rate generate strong inflationary and recessionary forces. Thus, when banks are commercially organized in a poor and dependent country like India, they fail to meet genuine credit needs of the economy and profit driven bank credit allocation may generate strong destabilizing inflationary and recessionary forces. Banks should be treated as social institutions owned and protected by the government from the vagaries of market forces. They should mobilize saving to the fullest possible extent by providing every individual with a fully safe avenue of saving and utilize the savings to meet all genuine essential credit needs of the economy. Private profit driven banks perpetrate the kind of disasters that we witnessed in 1991 in Japan, in 2007 in the US and in 2008 in Europe.

Commercially organized banks, as pointed out above and as amply evidenced by the disastrous experiences of the advanced capitalist countries, give rise to severe macroeconomic instability through gross misallocation of bank credit (see in this connection (Blinder and Zandi (2010^a, 2010^b), Mishkin (2011), Koo (2008) et al.)

Commercially organized banks, public or private, are subject to vagaries of market forces and, as argued in the present paper, government's effort at arresting the growth of their non-performing assets following an onset of recession may deepen the recession significantly.

Government, therefore, should regard banks as social institutions that work not for profit, but for maximizing the welfare of the masses. Such banks will provide stability to the economy and help it realize its full development potential. Commercially organized banks driven by profit motive are a source of instability, inequality and economic disaster.

Commercially organized profit driven financial institutions create an island of immense opulence in the midst of country-wide unemployment and poverty and regularly cause crises, which gravely exacerbate economic woes of the masses.

In this paper, we have not explored the case where capital adequacy norm is binding. We shall do that in our future research.

Table 1: Non-Performing Asset in Absolute Terms and as Percentage of Total Advance in Four Bank-Groups

Year	GNPA (in billion rupees)				GNPA(as % of total advances)			
	Scheduled	Public	Private	Foreign	Scheduled	Public	Private	Foreign
2015	6119.47	5399.56	561.86	158.05	7.5	9.3	2.8	4.2
2014	3233.35	2784.68	341.06	107.61	4.3	5.0	2.1	3.2
2013	2633.72	2272.64	245.42	115.65	3.8	4.4	1.8	3.9
2012	1935.09	1644.61	210.71	79.77	3.2	3.6	1.8	3.1
2011	1423.26	1172.62	187.68	62.97	3.1	3.3	2.2	2.8
2010	979.00	746.00	145.00	50.00	2.5	2.4	2.7	2.5
2009	846.98	599.26	140.17	71.33	2.4	2.2	2.9	4.3
2008	683.28	449.57	138.54	64.44	2.3	2.0	3.1	3.8
2007	563.09	404.52	104.40	28.59	2.3	2.2	2.5	1.8
2006	504.86	389.68	62.87	22.63	2.5	2.7	1.9	1.8
2005	510.97	413.58	40.52	19.28	3.3	3.6	1.7	1.9
2004	593.73	483.99	45.82	21.92	5.2	5.5	3.6	2.8
2003	648.12	515.37	59.83	28.94	7.2	7.8	5.0	4.6
2002	687.17	540.90	72.32	28.45	8.8	9.4	7.6	5.3
2001	708.61	564.73	68.11	27.26	10.4	11.1	8.9	5.4
2000	637.41	546.72	16.17	31.06	11.4	12.4	5.1	6.8
1999	604.08	530.33	9.46	26.14	12.7	14.0	4.1	7.0
1998	587.22	517.10	8.71	23.57	14.7	15.9	6.2	7.6
1997	508.15	456.53	3.92	19.76	14.4	16.0	3.5	6.4
1996	473.00	435.77	2.17	11.81	15.7	17.8	2.6	4.3

Source: Database on Indian Economy, India

Table 2: Annual Growth Rate of GDP at Constant Prices

Year	Growth Rate Of GDP At Factor Prices (Base Year 2004-05)	GVA at Basic Prices Base Year 2011-12 New Series		
1990-91	5.3			
1991-92	1.4			
1992-93	5.4			
1993-94	5.7			
1994-95	6.4			
1995-96	7.3			
1996-97	8.0			
1997-98	4.3			
1998-99	6.7			
1999-00	8.0			
2000-01	4.1			
2001-02	5.4			
2002-03	3.9			
2003-04	8.0			
2004-05	7.1			
2005-06	9.5			
2006-07	9.6			
2007-08	9.3			
2008-09	6.7			
2009-10	8.6			
2010-11	8.9			
2011-12	6.7			
2012-13	4.5	5.4		
2013-14	4.8	6.1		
2014-15		7.2		
2015-16		7.9		
2016-17		6.6		

Source: RBI

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TRADE AND THE ENVIRONMENT*

RAJAT ACHARYYA¹

I. Introduction

Since 1980s globalization and trade as development strategies of countries have been championed by the global agencies like the World Bank and the IMF. At the same time, growing awareness for preservations of the environment has made the countries realize that trade according to comparative advantage may have far reaching adverse effects on the environment and thus the gains from trade may be far more less than the Doctrine of Comparative Cost Advantage implies. This has led many countries, particularly the developed countries, to condition, and often restrict, trade flows by requiring certain minimum environmental qualities of the goods being traded. There has also been a growing concern for implementing uniform environmental standards across countries as asymmetries in implementation of such standards may by itself give rise to perverse comparative advantage and unfair trade. The bilateral and regional trading arrangements are thus increasingly used to implement uniform environmental standards, particularly in the context of pollutions that are trans-boundary in nature. In this keynote address I shall touch upon these different dimensions of the link between international trade and the environment.

II. Three basic issues

There are three basic issues in the trade-environment relationship. First, a two-way causation exists between international trade and the environment: On the one hand, the national environmental policies — taxes and standards — influence comparative advantage and the consequent pattern of trade; and on the other hand, international trade and its larger flows affect the environment in the trading nations.

Second, economic activities causing environmental damages are essentially cases of negative externalities, and accordingly optimal policy interventions involve corrections of such externalities. However, pollution and environmental damages can be caused by either the production of a good, or by its consumption. A distinction thus needs to be made between production pollution of international trade and consumption pollution of it as the optimal policy interventions would not be the same in both cases. Distinction also needs to be made between national and trans-boundary or global pollution. The latter being the case of global externality, national environmental policies cannot take care of environmental degradation caused by international trade. Hence, policy coordination among the trading nations is needed.

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Third is the concern arising from the argument that environmental standard is an important determinant of capital flows across countries. There are the twin hypotheses of capital flight and pollution heaven hypotheses that characterize this dimension. A related issue is race-to-the-bottom, i.e., competition amongst the developing countries through lowering of their environmental standards to attract FDI.

III. Environmental Standards, the Comparative advantage and Ecological dumping

Asymmetries in National environmental policies often influence the comparative advantage and this has been the major bone of contention between the developed and developing countries. The developing countries are alleged to be engaged in unfair trade and ecological dumping by loosely implementing environmental standards. Ecological dumping is a phenomenon whereby a pollution-intensive good is priced below its social marginal cost.

This particular issue can be illustrated and explained in terms of the following example. Suppose there are two goods – a clean good (Y), which has no impact whatsoever on the environment, and a dirty good (X), the production of which degrades the environment. The environmental degradation caused by this dirty good inflicts upon the society a direct utility loss, which is, however, not internalized by the producers. Thus, good X generates a negative (production) externality making the social cost higher than the private cost. That is, private costs of producing good X underestimate the true (or social) costs. For the clean good Y , on the other hand, private

costs correctly reflect the social costs, and there is thus no divergence between the two. In Figure 1, the downward sloping curve dd reflects the relative demand for good X , whereas upward sloping curves PMC and SMC represent the ratios of private and social marginal cost respectively of good X to those of good Y . Note that for reasons spelled out above, the SMC curve (reflecting relative social cost of production of X) lies wholly above PMC curve but the vertical distance rises with the (relative) output level, which captures congestion effects.

In an unregulated (closed) economy, PMC will give us the relative supply curve for good X , and thus the equilibrium price will be the one for which relative demand curve intersects the PMC curve. The socially optimum situation would have been, however, the one where relative demand curve intersects the SMC curve. Thus, an unregulated (closed) economy produces more of good X (relative to good Y) than the socially optimum one, and thus degrades the environment more. The social optimum can be achieved through an environmental tax per unit of output of good X , at the rate equal to the vertical distance between the PMC and SMC curves.

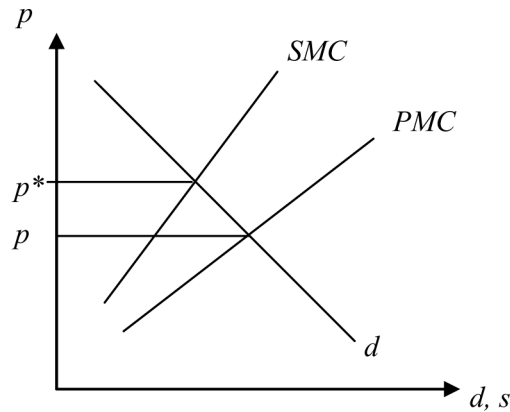


Figure 1: Environmental Standards and Perverse Comparative Advantage Export of Dirty Good

Now suppose two countries, a North and a South, share the same technology for producing these two goods and have identical and homothetic preferences, but differ in terms of implementation of environmental taxes and regulations. In the North, stringent regulations force producers to set price at the level of social costs while such regulations are absent in the South. This may be a reflection of differences in the level of social awareness regarding the value of environment. Autarky prices in the two regions will thus be different: the relative price of good X , p , in the South, being equal to the private rather than the social cost, will be lower than p^* , the relative price of good X in the North. The South thus enjoys a comparative advantage in the dirty good X although the advantage is at the expense of the environment. As trade opens up, the South exports the dirty good X to the North, not because of its genuine comparative advantage located in the fundamentals (such as, tastes, technology or factor endowment) but because of lax or absence of environmental regulations. This is the bone of contention for the North: Trade is unfair and involves ecological dumping because the South undervalues the environment and as a result gains an undue, or perverse¹, cost advantage. While the argument certainly has its merit, the flip side of it is that the North produces less of the dirty good at home but consumes more of it which is met by imports from the South. Thus trade induces the South to expand production of the dirty good, and cause environmental damage, to meet the Northern consumption, and the North can consume the good without having to damage its own environment. Thus, non-tariff barriers by the North against this kind of unfair trade and ecological dumping do not seem to make sense economically, at least in this case of production pollution and externality.

¹ See Sanyal and Acharyya (2001) for further elaboration on this perverse comparative advantage.

Alternative Framework: Environmental-Quality Differentiated Good Approach

Following Acharyya (2000, 2005), Bansal & Gangopadhyay (2003), Sen (2007), and Sen and Acharyya (2012), environmental standard determining comparative advantage of nations and consequent unfair trade can alternatively be illustrated in terms of environmental-quality differentiated good approach. Consider a good which can be of different varieties or qualities indexed by $A \in [0, 1]$. A low quality of the good degrades the environment more than a higher quality. Thus, the index A captures the environmental-quality of the good. These qualities are *observable to all* agents in the market including potential buyers.²

If consumers care for the environmental degradation, they should be willing to pay more for the good of higher environmental quality. This is captured by the utility function of a consumer $u(A, x)$ with increasing marginal willingness-to-pay for quality, $u_A > 0$. Suppose each consumer buys only one unit of the good. Net utility derived is assumed to be additively separable:

$$v = u(A) - p$$

A consumer buys the good of environmental quality A if $v \geq 0$. In Figure 2, upward sloping concave curves reflect iso-net-utility curves (or indifference curves between environmental-quality A and the unit price p) for different levels of net utility. By the additively separable property of net utility function, these iso-net-utility curves are *vertically parallel*.

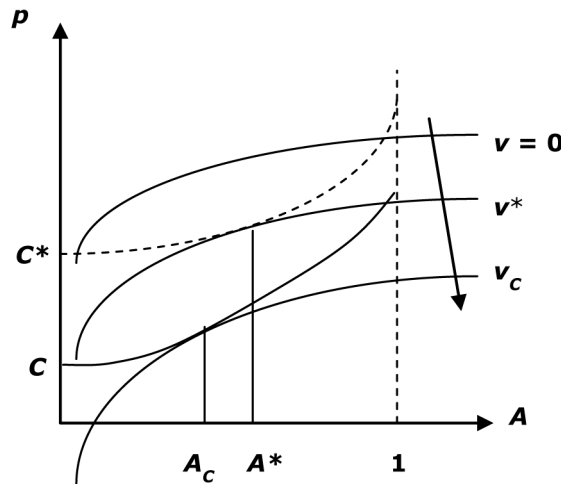


Figure 2: Competitive and Socially Optimum Environmental Quality

² An example of observable quality may be eco-labeling of goods.

The total production cost of the good depends on both the units produced and the quality of the good:

$$C = C(x, A)$$

We assume that the marginal cost of production for any given quality is constant but increasing in the quality, $CAA > 0$. The total cost curve is thus upward sloping and strictly convex. The social cost of production is, however, larger than the private cost of production, and lower is the environmental quality of the good, larger is the divergence between social and private costs. The broken upward sloping convex curve C^* represents such social cost of production.

Unregulated competitive quality A_c is given by the tangency of the private cost of quality and the iso-net-utility curve labeled vc , which is sub-optimal. The optimal quality would be A^* corresponding to the tangency between the social cost of quality and the iso-net-utility curve labeled v^* . A pollution-content tax, $t = t(A)$, $tA < 0$, can restore optimality by lowering the marginal cost of quality and thus inducing competitive producers to raise their qualities to A^* .

If there are two identical countries, with the North taxing its producers to price the good at SMC and the South leaving producers unregulated, then the South produces a dirtier variety A_c of the good at lower price whereas the North produces a cleaner variety A^* (which is the socially optimum as well) at a higher price. Allowing international trade will then mean dirtier imports from the South will drive all producers in the North out of the market. This is because the net utility from consuming A_c at a lower price is higher than that from consuming A^* at a higher price, as is evident from Figure 2.³

A few comments are warranted at this point. First, as in the earlier framework, as long as it is a case of production pollution, trade sanction by the North does not make sense. Case of Consumption pollution may justify such trade interventions for which we need to distinguish between private and social marginal willingness to pay. Second, a uniform tariff by North on imports will not induce Southern firms to export a higher environmental quality. A uniform tariff vertically shifts up the cost curve, that is, it does not change the marginal cost of quality, and so by the vertically parallel property of the iso-net-utility curves, competitive equilibrium quality remains the same. A pollution-content tariff raises the marginal cost of producing the varieties of lower environmental quality relative to that of higher-environmental quality and thus can achieve the socially optimum environmental quality.

Third, heterogeneous or different types of buyers in this framework can explain co-existence of dirtier and cleaner varieties of the good both across and within countries and intra-industry

³ When confronted with choice between imported dirtier variety and domestically produced cleaner variety, the Northern consumers would self-select the imported dirtier variety since $vc > v^*$.

trade through quality discrimination by a monopolist or quality competition by competitive or oligopolistic firms.

IV. Trade Liberalization and the Environment: Static Effects

Even if comparative advantage of the South in dirty good X is a genuine comparative advantage, globalization and trade liberalization will have far reaching implications for the national pollution levels in trading nations. However, again, such effects would be asymmetric in the North and in the South. To fix ideas, suppose production of each unit of the dirty good X degrades the environment by e , where e is the pollution-emission intensity of dirty good production. Consider the South as a small open economy, and having a comparative advantage in the dirty good X so that the relative price of X there is lower than that in the world market. When this country liberalizes its trade regime, it exports the dirty good and its domestic price rises to the one prevailing in the world market. As Copeland and Taylor (2003) shows, this price change triggers two primary effects: a composition effect and a scale effect. Figure 3 illustrates these two effects.

The downward sloping and strictly concave curve MN represents the production possibility frontier (PPF) in the South – the different combination of the dirty and clean goods that can be produced exhausting all the resources in the South. The autarky production in the South is organized at point A where the pre-trade price line – absolute slope of which reflects the price of the dirty good X relative to that of clean good Y – is tangent to the PPF. The ray connecting the origin and this autarchic production point gives us the pre-trade production ratio Y/X . If the South has a comparative advantage in the dirty good X , then post trade the relative price of good X will rise there as shown by the steeper broken line through pre-trade production point A . The post trade production adjusts to point C with the South specializing in the production of the dirty good X . The composition of production now changes towards the dirty good as the production ratio falls to Y'/X' . The consequent rise in the pollution level in the South from OZ_0 to OZ_2 is shown in the lower panel of Figure 3. This increase in the pollution level can be decomposed into two components. First, increase in the level of pollution from OZ_0 to OZ_1 corresponding to the increase in production of good X from X_0 units to X_1 units. This is the composition effect.

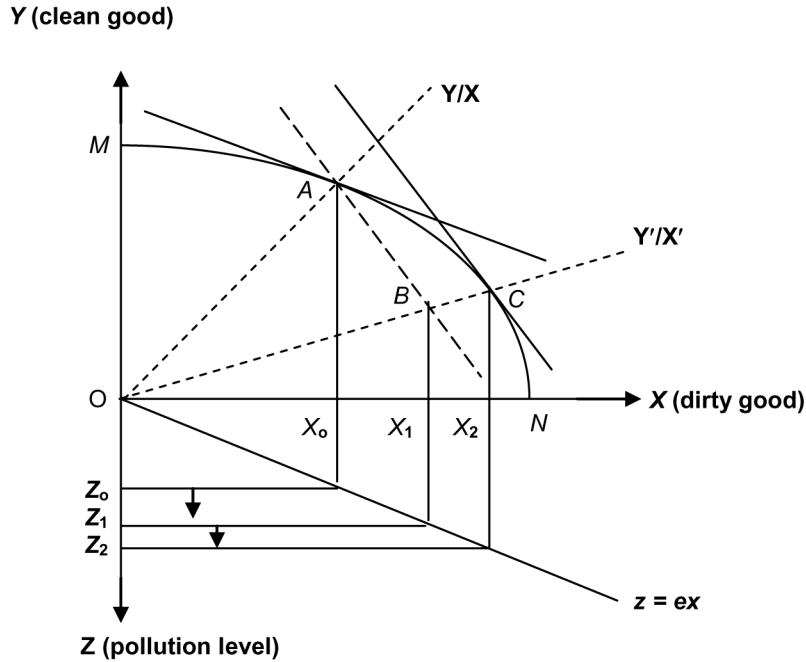


Figure 3: Scale and Composition Effect of Free Trade

Because, this expansion in production of the dirty good X corresponds to the movement from A to B along the same price line and hence captures the change in composition of the *same* aggregate value of production. The increase in pollution emission from OZ_1 to OZ_2 , on the other hand, reflects the scale effect, because the increase in production of the dirty good that causes this part of the increase in total pollution corresponds to the movement from B to C along the same ray reflecting an increase in the scale of production of both goods without any change in composition of output.

On top of these composition and scale effects, a *technique effect* arises if we consider environment as an input to the production process of the dirty good X . If the producers of good X are forced to internalize the social cost of environmental degradation through a pollution tax, then to them such a pollution tax rate appears as the price of environmental-input. Now, if the Southern government responds to the higher aggregate pollution level consequent upon opening up of trade by raising the rate of pollution tax, then it would induce all producers to choose a lower pollution-intensive production technique. Therefore, by the technique effect, the level of pollution should decline.

However, on the whole, we can expect the composition and scale effects to be larger than the technique effect so that trade liberalization raises the overall national pollution level in the country exporting the dirty good, when production process degrades the environment. The flip side of the coin is that overall national pollution should decline in the North importing the dirty good from the South.

But if the pollution level had been generated by consumption of the dirty good rather than production of it, then trade would have increased pollution level in the North through similar composition and scale effects by increasing the consumption of dirty good there. On the other hand, the pollution level in the South would have declined since domestic consumption of the exported dirty good would fall as price of it would rise with the opening up of trade and its export to the North.

V. Capital inflows and Environmental Degradation

It is often contended that capital inflow or FDI is attracted by the developing countries (or the South) by keeping their environmental standards low. This is also politically feasible because, with low per capita income, people have a low preference for better environmental quality. There is thus less political pressure on the local governments to raise the environmental standards. This is known as the pollution haven hypothesis, which constitutes the demand side of capital inflow.

On the supply side, there is the capital-flight hypothesis. Because of the lower standards or lax implementation of these standards, dirty industries offer higher return to capital in the developing countries than in the developed countries. Capital thus moves from the developed to the developing countries to be invested in the dirty industries in the latter. The products produced there are then exported to the developed countries for consumption. This means the consumption need of the developed countries are met not through degrading their own local environment but by relocating production in the developing countries and importing such production.

If these twin hypotheses – pollution haven and capital flight hypotheses – are correct then capital inflows into the developing countries have far reaching adverse impact on the environment leading us to rethink on the process of development itself. One implication is that the developing countries would compete among themselves by lowering their respective environmental standards to attract FDI and thus leads to *race to the bottom* since such universal lowering of environmental standards would degrade the environment all around.

Evidence on FDI in the developing countries flowing primarily into the dirty industries or is attracted by lax environmental standards is, however, mixed. That is, there is no conclusive evidence for migration of dirty industries to the developing countries. But this possibility leaves the question of whether capital inflow is conducive for sustainable development open.

VI. Trans-boundary pollution and policy coordination

Certain types of pollution originating in a specific location transmit or spill over to other cross-border locations through rivers flowing across countries such as Ganges and Niles in cases of water pollution, or through winds in case of air pollution. These are the trans-boundary pollution, which can be unidirectional or regional reciprocal. Water pollution carried by a river flowing through upstream and downstream countries is the case of unidirectional trans-boundary pollution. For example, the Nile and its tributaries flow through nine countries starting from Uganda (the White Nile) and Ethiopia (the Blue Nile). European acid rain, on the other hand, is an example of regional reciprocal trans-boundary pollution. Sulphur oxides are emitted into the atmosphere when fossil fuel is burnt by the European countries, which are transformed into sulphate and are transported long distances from the source by winds. These sulphates are finally deposited on the soil far from the source country through rain. When sulphur oxides are emitted for sufficiently long periods of time, this results in acid rain damaging the soil, surface water and forestry. But, since winds blow in several directions, transportation of sulphate in the atmosphere and subsequent wet deposition or acid rain is not unidirectional.

In both the above cases, however, it is difficult to identify the polluter and polluted. Thus *polluter-pays-principle* is not applicable and policy coordination is needed to achieve globally optimum pollution abatement. In case of water pollution carried through the Nile, Sudan, Egypt, Zaire, Kenya, Tanzanian, Rwanda, and Burundi are downstream countries relative to Uganda and Ethiopia, but upstream countries relative to each other according to their respective geographical location. Sudan, for example, is both polluter as well as victim of trans-boundary water pollution carried through The Nile.

In case of European acid rain, on the other hand, nationally optimum environmental regulations to abate trans-boundary pollution are sub-optimal. This is because such policies do not take into account the environmental costs inflicted upon other countries by economic activities in another country. Again, policy coordination is needed among the European countries in abating sulphur emission in the European atmosphere.

In cases of trans-boundary pollution like the above, while every country realizes the need for such policy cooperation to achieve the globally optimum pollution abatement, cooperation invariably fails without a supra-national authority enforcing such cooperation. A cooperative agreement is simply not sustainable, or, in the parlance of game theory, cooperation is not a Nash Equilibrium. To exemplify, suppose among the European countries an agreement is reached to lower the pollution level to the globally optimum level. Since pollution abatement is costly, if a country defects and instead implements the nationally optimum level of pollution abatement, it can save upon the pollution abatement cost. But it benefits from other countries

abiding by the agreement and abating the higher cooperative level of pollution. Thus, in absence of any supra-national authority punishing the defector and thereby lowering the benefit from others honouring the agreement, each and all countries will have unilateral incentives for defection. *All countries will defect*, each expecting that every other country will implement the cooperative level of pollution abatement. Cooperation cannot, therefore, be sustained

Herein lies the importance of regional trade blocs (RTBs) like NAFTA, EU, ASEAN and the like. These RTBs often act as the supra-national authorities to the resolution of the policy coordination problem *regionally*. Accession of Mexico to the NAFTA was conditioned by resolving trans-boundary pollution problems between the USA and Mexico. Mexico was required to implement stricter regulations and higher level of pollution abatement.

VII. Conclusion

This paper provides an overview of the issues involved in trade and the environment. While the relationship between trade and the environment is two-way, trade causing environmental degradation does not necessarily call for trade restrictions by the importing countries, unless the pollution generated by such production in the exporting country is trans-boundary in nature or imports generate consumption pollution in the importing country. In case of production pollution confined within specific national boundaries, import of dirty good by the North from the South actually lowers pollution level in the North. In any case, however, trade restrictions are second best policies. Pollutions are in general cases of negative externalities, and the theory of externality⁴ tells us that the first-best or optimal policy is a pollution-content production or consumption tax depending on whether the pollution is generated while producing the good or while consuming the good.

In case of trans-boundary pollution, on the other hand, national environmental taxes or regulations will not achieve the global optimum. Policies are to be coordinated, which, in turn, requires existence of a supra-national institution like regional trading bloc.

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⁴ See Johnson (1965) for example.

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THIS IS WHAT HAPPENED TO THE NEXUS BETWEEN INFLATION AND OIL PRICE AMONG SOME DEVELOPING COUNTRIES — A MACROECONOMIC ANALYSIS

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Abstract

The recent rounds of recession have renewed the fears of consumer price inflation. Theoretically, as oil is used as a direct input for many consumer items it will lead to higher prices for some goods and services. Historically, the “pass through” effect of oil price shocks was very evident during the seventies but disappeared somehow in the eighties. Interestingly, empirical research, however, has not always predicted that oil price shocks leads to a general rise in the price level. In this backdrop, the research question is how variations in global oil prices impacts domestic inflation in a panel data set-up of thirty emerging and developing countries including India, Pakistan and China during the period from 2000 to 2016. The results show that a rise in the global oil prices leads to an impact on domestic price inflation. Interestingly, we find some asymmetric impact of oil price shocks for Asian and non-Asian countries. The impact of monetary policy has been significant and as a result the oil price shock has declined over the years in the post-globalization era which is something momentous given the current situation.

Key words : oil price, structural shocks, inflation, monetary policy, fiscal policy

JEL Classification: E58, O11, N15

I. Introduction

OPEC was formed on September 14, 1960 with five founding members : Saudi Arabia, Kuwait, Iran, Iraq and Venezuela. The current membership of 14 nations also includes Qatar, Indonesia, Libya, the UAE, Algeria, Nigeria and Ecuador. Its original purpose was to try and obtain higher prices for oil sold to the “seven sisters”: ESSO, Royal Dutch Shell, Anglo-Persian Oil Company, SoCal, Gulf Oil and Texaco, which were the major oil companies that dominated production, refining, and distribution at that time. By 1970, oil had begun to exert considerable control over production by its members and this in turn, had a significant influence on the market price for crude oil.

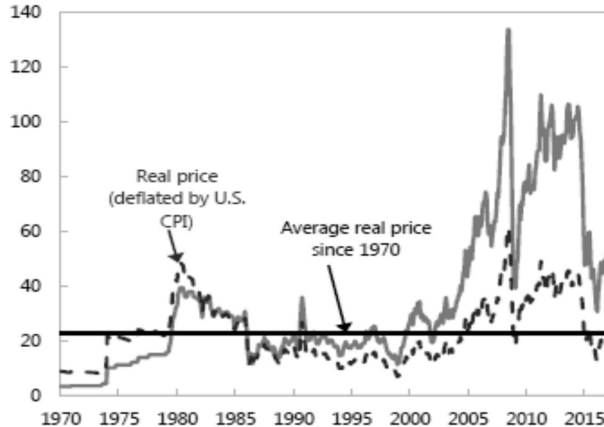
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On October 17, 1973 OPEC announced that it would no longer ship oil to nations that were supporting Israel in the Yom Kippur War. These nations included the USA and its allies in Europe and Japan. The OPEC oil embargo set off a sequence of price increases that were subsequently exacerbated by the Iranian Revolution (1979) and the Iran-Iraq war (1980-88). In January 1981, the nominal price of oil in the USA reached \$38.85 per barrel. In real terms (using the April 2008, adjusted consumer price index) this was equivalent to a price of \$95.08 per barrel; more than seven times the real price of oil in 1973.

The price increases in crude oil between 1973 and 1981 resulted in the greatest “peaceful” transfer of wealth from the industrialized economies of North America, Europe and Asia to OPEC members. By the early 1980s, however a combination of energy conservation, new (non-OPEC) sources of crude oil, and worldwide economic recessions resulted in a reduced demand for oil. Saudi Arabia finally grew tired of what is regarded as greedy undisciplined production and decided that it would produce at its full quota and let the price find a new lower market equilibrium. By July 1986, the nominal price of oil had fallen to \$10.91 per barrel. From August 1986 to August of 1990, the real price of crude oil was relatively stable, fluctuated between \$22 and \$36 per barrel. Real prices increased with Iraq invasion of Kuwait and the start of the first Gulf War (August 1990-1991). In October 1990, the real price spiked to \$52.69 per barrel but by February 1991, the real price has fallen below \$30 per barrel. Real prices rose between \$21 and \$32 per barrel from February 1991 to December 1997. Following September attack US invasion of Iraq in 2003 likely has contributed to the continued increase in the price of crude oil. On April 2008, the real price for crude oil reached a record high of \$112.21 per barrel. On April 23, the spot price finished at \$118.30 per barrel. Since June 1999, the price path for crude oil exhibited an increasing trend but with severe fluctuations (Refer to Figure 1).

Figure 1 : Real



Source : Grigoli et al. (2014).

Table 1 above reports the export trends by OPEC countries. UAE is largest exporter but the level of exports for all the OPEC members have been on the decline if one compares the level of exports between 2014 and 2015. Now the question we are trying to answer is can we make a comment on how this increase in oil prices affects domestic inflation across some developing countries under consideration.

Table 1: Total value of export (\$Billion) trend in OPEC countries

	2011	2012	2013	2014	2015	Diff. over 2014
Algeria	77.7	77.1	69.7	62.9	37.8	-25.1
Angola	67.3	71.1	68.2	59.2	32.6	-26.5
Ecuador	22.3	23.8	24.8	25.7	18.4	-7.4
Indonesia	203.5	190.0	182.6	176.0	150.3	-25.7
IR Iran	144.9	107.4	91.8	85.2	78.0	-7.3
Iraq	83.2	94.4	89.7	84.0	54.7	-29.3
Kuwait	102.1	118.9	115.1	103.9	55.0	-48.9
Libya	19.1	61.0	46.0	13.8	10.9	-2.9
Nigeria	99.9	96.9	97.8	82.6	45.4	-37.2
Qatar	112.9	133.0	136.8	126.7	77.3	-49.4
Saudi Arabia	364.7	388.4	375.9	342.3	205.4	-136.9
United Arab Emirates	302.0	359.7	371.0	367.6	333.4	-34.2
Venezuela	93.7	97.9	88.8	74.7	38.0	-36.7
Total	1693.3	1819.7	1758.2	1604.6	1137.0	-467.6

Source : Compiled by the authors based on data retrieved from *www.opec.org*

The rest of the paper is organized as follows. Section 2 reviews the related literature. Section 3 decodes the Indian story in this context. Section 4 discusses the methodology applied and brings out the empirical evidence of the impact of oil prices on inflation. Section 5 concludes.

II. Review Of Select Literature

There is a very rich body of literature which talks about the oil price shock and inflation nexus. This study does not makes an attempt to give a detailed survey of oil price shocks on inflation across different countries in the world but rather briefly sums up the recent related literature on the impact of oil price shocks on using international data with a particular focus on India. It is important to contextualize this issue in the recent past because results two decades ago are grossly dissimilar to what we get to see in the present context. To begin with, we have a category where theoretical mechanisms via which oil-price increase may

create an impact on inflation, GDP growth and other macro parameters have been discussed (Bruno & Sachs, 1982; Hamilton, 1996; Brown & Yucel, 2002). The second category pertains to the empirical formulation of oil price-inflation model either in linear or non-linear form. This mathematical liaison was verified mostly for developed countries between 1990-2000. These include the likes Cunado and Gracia (2003); Lee et al. (2001); Lee and Ni (2002); Lardic and Mignon (2006).

Recent studies by De Gregorio et al. (2007) provide evidence of a decreased pass-through from oil prices to domestic inflation from estimating augmented Phillips curves using data from both sets of advanced and developing economies. In another study, Habermeier et al. (2009) using panel data for a combination of 50 countries (comprising of some developing and developed countries) estimate the magnitude of pass-through of oil price shocks and derive a conclusion that greater central bank independence will help in exercising inflation targeting monetary policy which will for that reason reduce the size of pass through on domestic inflation. For the Eurozone area, Álvarez et al. (2011) estimates the direct effects of oil price increases on inflation and opines that the effects have increased over time mostly attributed to higher expenditure on refined oil products.

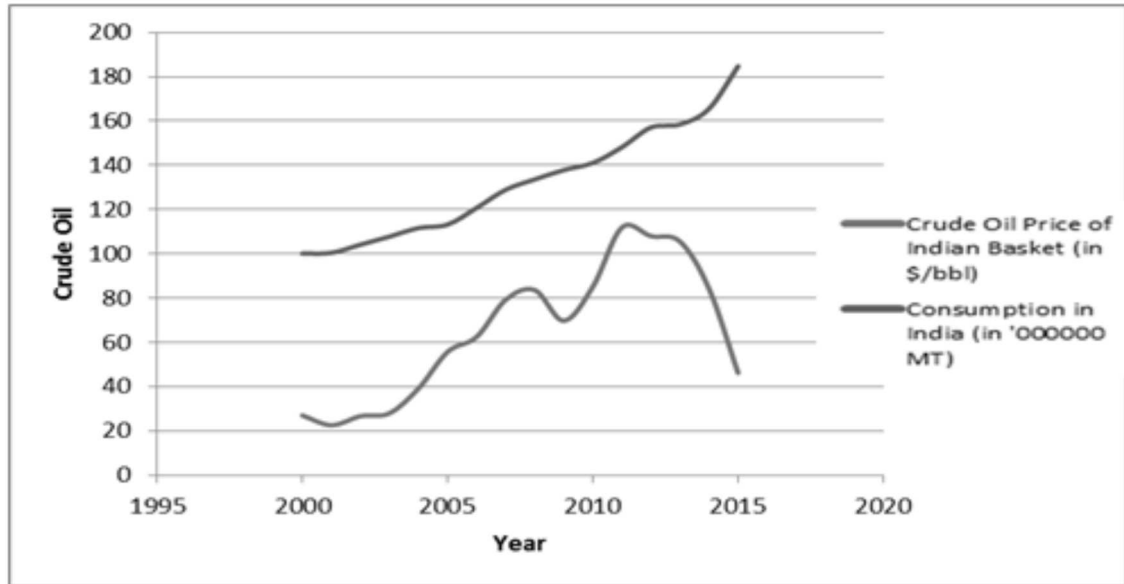
In a time series set-up, Zoli (2009), Caceres et al. (2012) study the impact of commodity price shocks on inflation in Emerging Europe and Central Africa, respectively. One of the earliest studies dates back to using non-linear specifications in a vector autoregression set-up (Lee et al., 2001 and Hamilton, 1996). Recent estimates by Gelos and Ustyugova (2017) using panel data set-up estimate augmented Phillips curves in the time span between 2000-2010. However, they come to a conclusion that inflation targeting monetary policy is not significant in determining the extent of pass of rise in oil price on domestic inflation. Another school of thought prophesizes that there can be different effects of inflation on real GDP depending on whether negative supply shock is the pushing factor or positive demand shock (Kilian, 2009; Peersman & Van Robays, 2012; Baumeister & Peersman, 2013). Here, in this paper, we will not try to comment on what the nature of the monetary policy should be to cope up with any sort of oil price shock but rather look at the dynamic impacts of past year inflation values on current period inflation.

III. Decoding The Recent Movements In Oil Prices In The Indian Context

The recent fall in crude oil prices is plausibly beneficial for oil importing countries like India having 70 per cent to 80 per cent of oil dependence. The benefits can be witnessed from the fact that India's GDP reached \$2000 billion in 2015. Due to falling oil prices the macro-economic indicators such as inflation, current account deficit (CAD), and trade balance improved. On the back of contraction in the trade deficit, the CAD came down to \$22.1 billion or 1.1 per cent of GDP from \$26.8 billion, or 1.3 per cent of GDP, in 2014-15. In this

backdrop, there has been a significant reduction in India's oil import bill and hence the current account deficit. This fall in the recent oil prices has given made the government to lower subsidies on petroleum products (Bundhun, 2013).

Figure 2 : Crude oil price and consumption trend in India from 2000 to 2016



Source : Authors' compilations

Figure 2 validates that indeed crude oil prices (year-on-year) movements is on the down turn which also kind of justifies the increase relationship between consumption and price of crude oil. As already mentioned, in a situation of fall in crude oil prices, the government can cut down on its subsidies in fuel use. Going by the trends, if diesel prices can also be market linked assuming fluctuations in the rupee are taken care of then it will in a way make resources available in the hands of the government. This will thereby pave the way to set in motion growth augmenting reforms cutting across the various sectors of the Indian economy.

IV. METHODOLOGY AND RESULTS

IV.1 Data and Methodology related issues

In trying to find an answer to the inflation-oil price nexus we collated data from the year 2000 onwards for 30 developing economies¹ (with an Asian vs. non-Asian segregation specification). The issue of data availability and credibility is something that had to be taken into account. In such a setting, the problem is that for most of the developing countries CPI inflation data does not extend back in time i.e. over a higher frequency of years and the

quality aspects fail to meet the specifications. In view of this, we stick to the World Bank database and use the data (from the year 2000 just to ensure that there was parity in the availability of annual data for each of the countries) on CPI.

The paper seeks to answer the following questions — i) How has the volatility in global oil price movements affected domestic inflation since 2000; and, ii) Is there any significant variation in the inflation-oil price nexus across the Asian and non-Asian economies. To estimate the impact of global oil prices on domestic inflation, we develop a model following Choi (2017),

$$P_t = (P_t^O)^\mu (P_t^N)^{\mathcal{G}} (P_{t-1}^O)^{1-\mu-\mathcal{G}}$$

where, the first component is the oil price CPI, the second component is the non-oil price CPI and finally we have the oil price CPI for the previous year. First taking logs on both sides and then taking the derivative of the model above with respect to time yields,

$$\pi_t = \mu\pi_t^O + (1 - \mu - \mathcal{G})\pi_{t-1}^O + \mathcal{G}\pi_t^N$$

π has its conventional meaning of rate of growth in prices over time broken up into two parts. The first part is the impact of oil price inflation in the current year on current year CPI whereas the second part is the impact of oil price inflation of the previous year on the current year CPI and finally we have the component of non-oil price inflation in the current year and its influence on current year CPI. Based on this we formulate our empirical model.

Therefore, the empirical model for period i and at time t ,

$$Inf_{it} = \alpha_i + \sum_{j=1}^l \kappa_{ij} Inf_{it-j} + \beta_{it} (\delta_{it-1} Inf_{oil_t}) + \phi_{it} (\{1 - \delta_{it-1}\} Inf_{non-oil_t}) + \varepsilon_{it} \dots \dots (1)$$

where, $i = 1, 2, \dots, 30$ and $t = 2000, 2003, \dots, 2016$ and the variables are as mentioned above. α_i represents the country specific effects. Inf_j represents the lagged values of CPI, Inf_{oil} represents the global oil price inflation (in US\$ per barrel) and $Inf_{non-oil}$ is the global price inflation (excluding oil). δ can be interpreted as the share of oil in the CPI basket proxied by the share of transport (energy) in our case for the countries concerned whereas $(1 - \delta)$ stands for share of all forms of components except transport share. Such data on energy shares have been compiled from *OECD.Stat* database, the concerned countries' statistical database. Assumptions about the error term determine whether we speak of fixed

effects or random effects. In a fixed effects model, ϵ_{it} is assumed to vary non-stochastically over the units of cross section (i) or length of time (t) which is analogous to a dummy variable model in one dimension. While in a random effects model, the error term, ϵ_{it} is assumed to vary stochastically over i or t . Whether a panel data model follows the feature of fixed effect or random effect it can be verified by the Hausman Test.

Now coming to the interpretation of in the equation above, there are discussions which focus on the fact that whether it should be treated as a random effect or as a parameter that needs to be estimated from the panel equation. The modern econometric theory as pointed out by Woolridge (2010) states that the question is whether the researcher wishes to estimate a model where the unobserved effect is assumed to be correlated with the regressors (i.e. the case of “fixed effects” estimation) or is considered to be random (i.e. “random effects” estimation). The next question which immediately crops up is that then which method seems applicable? To answer this, the authors will make use of the Hausman Specification test (Hausman, 1978). The null hypothesis under the Hausman Specification test states that the individual unobserved effects are modeled by a random effects model whereas the alternative hypothesis states that the model is a fixed effects one. The test statistic used is,

$$m = q'(\text{var } \beta_{FE} - \text{var } \beta_{RE})^{-1} q \approx \chi^2 \text{ where, } q = \beta_{FE} - \beta_{RE}.$$

The β matrix is a 5×1 vector comprising of the five regressors including the constant country specific effect term. The degrees of freedom for the statistic is the rank of the difference in the variance matrices. If the difference is positive definite, this is the number of common coefficients in the models that is being compared with significant differences in the estimated coefficients. Moving away from the normal panel data structure, the authors presents a case where the lagged values of the dependent variable may be correlated with the unobserved effect and the strict exogeneity assumption might not work out. Given the literature on inflation and the impact of the lagged values of inflation i.e. past year CPI values have an influence on the current year levels of inflation, so the model specification used is,

$$\begin{aligned} (Inf_{it} - Inf_{it-1}) = & \sum_{j=1}^2 \psi_{ij} (Inf_{it-j} - Inf_{it-j-1}) + \beta_{it} (\{\delta_{it-1} Inf_oil_t\} - \{\delta_{it-2} Inf_oil_{t-1}\}) \\ & + \phi_{it} (\{[1 - \delta_{it-1}] Inf_non-oil_t\} - \{[1 - \delta_{it-2}] Inf_non-oil_{t-1}\}) + (\epsilon_{it} - \epsilon_{it-1}) \dots (2) \end{aligned}$$

where, $i = 1, 2, \dots, 30$ and $t = 2000, 2003, \dots, 2016$ and x is the matrix of all the 4 regressors and $\hat{a}$ is a vector of the coefficients. It needs to be mentioned at the outset that a central problem in dynamic panel is the problem of “Nickell bias”. This problem occurs when the

fixed effects maximum likelihood (ML) estimator is inconsistent for a fixed number of time periods, as the number of cross-sectional units tends to infinity. But in this model there cannot be a problem of “Nickell bias” as both the cross-sections and time periods do not tend to infinity and are finite (Gaibullov et al., 2014).

Having no unit root in the dependent variable made us to go for Arellano-Bond difference GMM estimator. If $T > 10$ then also the use of a fixed effect model can be good since the Nickell bias is an inverse function of T . Before moving to the definition of Arellano-Bond estimator, a short technical note on the issues that needs to be understood first. Lags of $\mathbf{x}_{it}$ or Δx_{it} can additionally be used as instruments, and for moderate or large T (i.e. $T > 10$), an unrestricted number of lags will introduce a huge number of instruments and result in a loss of efficiency so following Cameron and Trivedi (2005), there can be a maximum of four lags. However, coming to the decision of considering two period lags has been determined by the test of over-identifying restrictions i.e. Hansen’s test of over identifying restrictions. The results of which are reported in the next section and are consistent with the statements made by Cameron and Trivedi (2005). Hansen’s (1982) J test corrects Sargan’s test of over identifying restrictions in the presence of heteroskedasticity. The statistical confirmation of the null hypothesis means the instruments fit the data well but the acceptance of alternative hypothesis rejects the validity of the instruments (Sargan (1958); Hansen (1982)).

The set of assumptions are, $E(\varepsilon_{it}) = 0$ and $E(x_{is}\varepsilon_{it}) = 0 \forall t \neq s$

Coming to the general definition of the Arellano-Bond estimator,

$$\hat{\beta} = \left[\left(\sum_{i=1}^N Z_i' Z_i \right) W_N \left(\sum_{i=1}^N Z_i' Z_i \right) \right]^{-1} \left(\sum_{i=1}^N Z_i' Z_i \right) W_N \left(\sum_{i=1}^N Z_i' y_i \right) \text{ and } W_N = S^{-1}$$

where,

$$S = \frac{1}{N} \sum_{i=1}^N Z_i' \varepsilon_i \varepsilon_i' Z_i, \text{ where, } \varepsilon : NT \times 1$$

i.e. a set of 4 regressors over 16 time periods.

The X matrix is the set of transformed explanatory variables (4 regressors) and y is the set of transformed dependent variable. The authors are also including instruments for the explanatory variables and the general instrumental variable matrix with lagged values looks like,

$$Z = \begin{pmatrix} y_{i1} & x_{i1} & 0 & 0 & 0 \dots 0 & 0 & 0 & 0 & 0 \dots 0 & 0 & 0 & 0 & 0 \dots \\ 0 & 0 & y_{i2} & x_{i2} & 0 \dots 0 & 0 & 0 & 0 & 0 \dots 0 & 0 & 0 & 0 & 0 \dots \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & 0 \dots \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & 0 \dots \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & x_{iT-1} & 0 \dots \end{pmatrix}$$

It needs to be mentioned that while the y_i 's are scalars the x_i 's are 1×4 vectors comprising of the regressor variables and their difference levels as given in equation 2. As the number of columns in Z_i becomes very large, computational considerations may not require the comprehensive use of all possible instruments (see Alvarez & Arellano, 1998). In case of a given cross-sectional sample size (N), the use of too many instruments may result in overfitting biases. Given this consideration and following the result of Hansen (1982) test the authors have stuck to two period lags and have ignored the least informative instruments. Following the model specifications of Chambers and Guo (2009), equation 2 has been developed and the results are reported in the next section.

IV.2 Results

At the outset, before going into the details of the results the stationarity of the panel data needs to be examined. Levin, Lin and Chu (LLC) panel unit root tests have been used in this study (Levin et al., 2002). We carried out this test depending on the conventional specification of the test-statistic performs well when N lies between 10 and 250 and when T lies between 5 and 250 which suits our specification. This is followed by the Hausman specification test (refer to Table 2) of finding out whether random effects or fixed effects suits best in our case. Going by the Hausman specification results, fixed effects model is what we have in this case. The results have been reported in Table 3 below where we have compared the results across the Asian and non-Asian economies.

Table 2. Hausman Specification test results

Test Summary	Chi-Square Statistic	Chi-Square d.f.	Probability value
	21.654	4	0.000*

Source: Results as obtained by the authors in Eviews 7. Note : * denotes significance at 5 per cent level

Going by the Hausman specification results, fixed effects model is what we have in this case. The results have been reported in Table 3 below where we have compared the results across the Asian and non-Asian economies.

Table 3. Fixed Effects Estimation Result

Variable	Coefficient	t-Statistic	Probability value
ASIAN ECONOMIES			
Inf ₁	-0.225	-3.04	0.00*
Inf ₂	-0.051	-0.42	0.35
Inf_oil	0.496	2.48	0.04*
Inf_non-oil	0.425	2.40	0.04*
constant	0.992	6.57	0.00*
NON_ASIAN ECONOMIES			
Inf ₁	-0.165	-1.98	0.07
Inf ₂	-0.041	-0.29	0.39
Inf_oil	0.376	2.56	0.04*
Inf_non-oil	0.310	2.44	0.04*
constant	1.112	7.22	0.00*

Source: Results as obtained by the authors in Eviews 7; Note : * denotes significance at 5 per cent level

But the results of the standard formulation of fixed effects might not always yield consistent results as seen in Table 3. The insignificance of past year inflation values made us to rework the model with Arellano-Bond specification (refer to Table 4) as we believe that there must be some endogeneity issue with past year inflation values. The basic objective of going for this dynamic panel estimation is to examine whether oil price inflation from the past year leaves behind any kind of inertia effect on the current year inflation levels.

Table 4. Results with Arellano-Bond specification

Variable	Coefficient	t-Statistic	Probability value
ASIAN ECONOMIES			
Inf ₁	0.305	3.02	0.00*
Inf ₂	-0.005	-0.32	0.38
Inf _{oil}	0.556	2.66	0.03*
Inf _{non-oil}	0.510	2.55	0.04*
constant	1.243	8.33	0.00*
NON-ASIAN ECONOMIES			
Inf ₁	0.211	2.11	0.05*
Inf ₂	-0.001	-0.15	0.44
Inf _{oil}	0.441	2.47	0.04*
Inf _{non-oil}	0.373	2.45	0.04*
constant	1.023	6.81	0.00*

Note : * denotes significance at 5 per cent level; Source: Results as obtained by the authors in Eviews 7

A country with a higher share of transport in the CPI basket is likely to have a higher inflationary impact from global oil price shocks not only by a direct effect of current year but also due to indirect lagged values representing the second-round effects which are theoretically consistent. As shown in Table 4, the inertia effects are strong for the Asian economies (including India and China) as compared to the non-Asian economies. We find that transport share in the CPI basket is the most robust determinant of the response of inflation across countries. Interestingly, fizzling out of the inertia effect of past period inflation values on current inflation (i.e. the insignificance of the second period lag) can be somewhat attributed to better conduct of monetary policy as argued by Choi (2017). The results also indicate that a country with a high level of energy subsidy is likely to have a lower inflationary impact from the global oil

price shocks. These subsidies, in fact, distort the price signals from oil price shocks and prevent the pass-through of oil price increases on to the CPI of the country concerned.

V. Concluding Remarks

Studies have been made to examine the impact of an increase in oil prices on prices of other commodities and output in India. In this concluding section, we try to pen down our thoughts in the Indian context. A slight increase in the price of petroleum products, mostly administered, sparks up a debate among the public. In general, the postponement of adjustment in administered prices may delay the build up of inflationary pressure in the short run, but eventually translates into an even bigger shock. A sustained rise of US\$ 5 per barrel in the price of oil leads to a 1.2 percentage point increase in inflation after a year which is very consistent with what the IMF predicts. It also reduces the annual GDP growth by 0.2 percentage point as per IMF projections.

In our paper, through panel estimation (both static and dynamic), we have analysed the impact of oil price changes on domestic inflation across 30 Asian and non-Asian developing countries including India from macroeconomic a standpoint with a specific examination of whether our results corroborate with the theoretical underpinning made so far in the literature. We find that a rise in the global oil prices leads to an positive impact on domestic price inflation. Specifically, oil price inflation from the past year leaves behind inertia effect on the current year inflation levels but among other things, what we conclude is that monetary tightening effects can bring down the inflationary effect. Second, the transport share in the CPI basket is the most robust determinant of the response of inflation across countries. Furthermore, for import dependent countries like India, the rise in world oil prices worsens the trade balance position, leading to higher current account deficits and deteriorates the net foreign asset position. At the same time, higher oil prices tend to decrease private disposable income and corporate profitability, reducing domestic demand; along with a depreciation of the exchange rate, this acts to bring the current account back into equilibrium over time.

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ROLE OF MICROFINANCE IN EMPOWERING WOMEN IN INDIA

RAJIB BHATTACHARYYA*

Abstract

Achieving faster, sustainable and inclusive growth has been the buzz word since the initiation of the India's 11th and 12th Five Year Plans. Microfinance is an established part of the financial system in most countries and is increasingly integrated into the financial system to an extent that it is difficult to identify a distinct microfinance sector. The Objective of providing financial services to the "Unreached Poor", and also in strengthening underprivileged and discriminated women in the society and thus significantly contributing to gender equality and women empowerment has been sought to be successfully implemented in India through microfinance, dominated by Self Help Group (SHGs). The study examines the recent growth of micro finance in India with its focus on client's outreach and portfolio operations. It provides a comparative analysis of the SBLP- model and MFI model and their relative performances. Its tries to explore the inter-state variation in microfinance penetration on the basis of Microfinance Geographical Index (MGI) and Microfinance Penetration Index (MPI). The performances of various UNDP created indices for measurement of women empowerment like GDI, GEM and GII has been assessed. Finally, the study tries to assess the impact of micro finance penetration on women empowerment in India in terms of an empirical analysis.

KEYWORDS: Microfinance, Women Empowerment, Self Help Group (SHGs), Microfinance Geographical Index (MGI), Microfinance Penetration Index (MPI), Measures of Women and Gender Empowerment, Cross section Data analysis.

JEL CLASSIFICATION: G21, J16, O22, D63, C21.

I. INTRODUCTION

Achieving faster, sustainable and inclusive growth has been the buzz word since the initiation of the India's 11th and 12th Five Year Plans. Microfinance is an established part of the financial system in most countries and is increasingly integrated into the financial system to an extent that it is difficult to identify a distinct microfinance sector. The Objective of providing financial services to the "Unreached Poor", and also in strengthening underprivileged and discriminated women in the society and thus significantly contributing to gender equality and women

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empowerment has been sought to be successfully implemented in India through microfinance, dominated by Self Help Group (SHGs). The 12th Five Year Plan (2012-2017) focused strongly on sustainable, equitable and inclusive growth, along with women empowerment, taking into account the needs of all section of the society. For the first time the Twelfth Five Year Plan Approach Paper identified financial inclusion as a public policy initiative to achieve rural transformation and development through the process of improving access to organized financial market for ordinary households, especially in excluded and under-served areas. In this context, microfinance emerged as a powerful tool for poverty alleviation and financial inclusion in India. Microfinance refers to small savings, credit and insurance services extended to socially and economically disadvantaged segments of society.

So the aim of the government is to emphasize on a two pronged strategy focusing initially on the need to bring the macro economic imbalances under control and to reverse the slowdown and to spread the benefits of growth to the poor, SCs/STs, other backward castes (OBCs), other disadvantaged groups in our society, minorities and women. The Indian growth story in recent years has been one of high GDP growth but primarily driven by the growth in services sector. But this growth has not been pro-poor or inclusive as is reflected in the relatively low agricultural growth rate, low-quality employment, poor education, inadequate healthcare services, rural-urban divide, social inequalities, and regional disparities. A lack of inclusive growth can result in real or perceived inequities, which has its own social ramifications.

II. LITERATURE SURVEY

Research done by UNDP, UNIFEM and the World Bank among others indicate that gender inequalities in developing societies inhibit economic growth and development. Swain (2007) in his paper concluded that many strides have been made in the right direction and women are in the process of empowering themselves and NGOs that provide support in financial services and specialized training, have a greater ability to make a positive impact on women empowerment. Batliwala (1994) identified three approaches to women's empowerment: the integrated development approach which focused on women's survival and livelihood needs; the economic development approach which aimed to strengthen women's economic position and the consciousness approach which organized women into collectives that address the source of oppression. Mayoux (1998) argues that the impact of microfinance programmes on women is not always positive. Kabeer (2001) defined empowerment as "the expansion in people's ability to make strategic life choices in a context where this ability was previously denied to them." This definition contains two elements, (i) the idea of process, or change from a condition of disempowerment, and (ii) the idea of human agency and choice. This helps in distinguishing empowerment from other closely related concepts like women's autonomy, gender equality, gender discrimination etc. Pokhriyal, Rani and Uniyal (2014)

attempted to study the role of microfinance intervention in promoting women empowerment in rural India through various schemes of the commercial banks and the NABARD. It also focuses on the progress of the MFI-Bank linkage programme.

III.OBJECTIVE OF THE PRESENT STUDY AND METHODOLOGY

The prime objective of the present study is to explore the linkage between initiatives towards growth of micro-finance Institutions (MFI) and women empowerment (in terms of job creation through self-help groups (SHGs) and MFIs).

- i. The study examines the recent growth of micro finance in India with its focus on client's outreach and portfolio operations. It provides a comparative analysis of the SBLP- model and MFI model and their relative performances.
- ii. Its tries to explore the inter-state variation in microfinance penetration on the basis of Microfinance Geographical Index (MGI) and Microfinance Penetration Index (MPI).
- iii. The performances of micro finance with respect to various indices for measurement of women empowerment like GDI, GEM and GII.
- iv. Finally, the study tries to assess the impact of micro finance penetration on women empowerment in India in terms of an empirical analysis

The entire analysis is based on time series data available from the various departments of the Govt. of India (particularly the Reports on Microfinance by NABARD) and also the NSSO Data (various survey rounds). The ideas of various published papers, journals and other reports has also helped in developing this paper. We have used the simple OLS regression technique to measure women empowerment in terms of percentage of self-employment among women (PSELF_EMP) and the independent variables are Per capita State GDP (SGDP), micro finance penetration rate (MPIPR) across states, literacy rate among women (LITRT) across states and state-wise regional rural bank (RRBPR), after checking stationarity by ADF test. There are 28 states and 7 union territories in India which provides a scope of 35 observations in a cross-sectional study. However, in our study we have 31 observations for each variable which include 26 states and 5 union territories. The states of Jammu & Kashmir, Lakshadweep, Daman & Dui, and Dadra & Nagar Haveli have been omitted because of non-availability of data (Telengana is included in the state of Andhra Pradesh).

IV.THE GROWTH OF MICRO FINANCE IN INDIA

The historical development of micro finance in India dates to the establishment of Syndicate Bank in 1921 in private sector. In its initial phase of development, Syndicate Bank concentrated on raising micro deposits in the form of daily/weekly basis and sanctioned micro loans to its

clients for shorter period of time. But microfinance came to limelight only when Dr. Yunus gave it a mass movement in Grameen Bank experiment of group lending. Later in the 1970s a significant microfinance initiative was undertaken by Shri Mahila SEWA (Self Employed Women's Association) Sahakari Bank in 1974 for providing banking services to the poor women employed in the unorganized sector in Ahmadabad in Gujarat. Mysore Rehabilitation and Development Agency (MYRADA) of Karnataka was another NGO to start in 1968 to foster a process of ongoing change in favour of the rural poor. The government of India had also launched various poverty alleviation programs like Small Farmers Development Scheme (SFDS) 1974-75, Twenty Point Programme (TPP) 1975, National Rural Development Programme (NRDP) 1980, Integrated Rural Development Programme (IRDP) 1980, Rural Landless Employment Guarantee Programme (RLEGP) 1983, Jawhar Rozgar Yojna (JRY) 1989, Swarna Jayanti Gram Swarajgar Yojana (SGSY) 1999. But with the establishment of National Bank for Agriculture and Rural Development (NABARD) in 1992 in the field of microcredit, the movement of microfinance got a boost in India. Today we find that the microfinance services are delivered by apex institutions like National Bank for Agriculture and Rural Development (NABARD), Small Industries Development Bank of India (SIDBI) and Rashtriya Mahila Kosh (RMK). At the lower level we have commercial Banks, Regional Rural Banks and cooperatives to provide microfinance services. The private institutions that undertake microfinance services as their main activity are generally referred to as Micro Finance Institutions (MFIs) in Indian context.

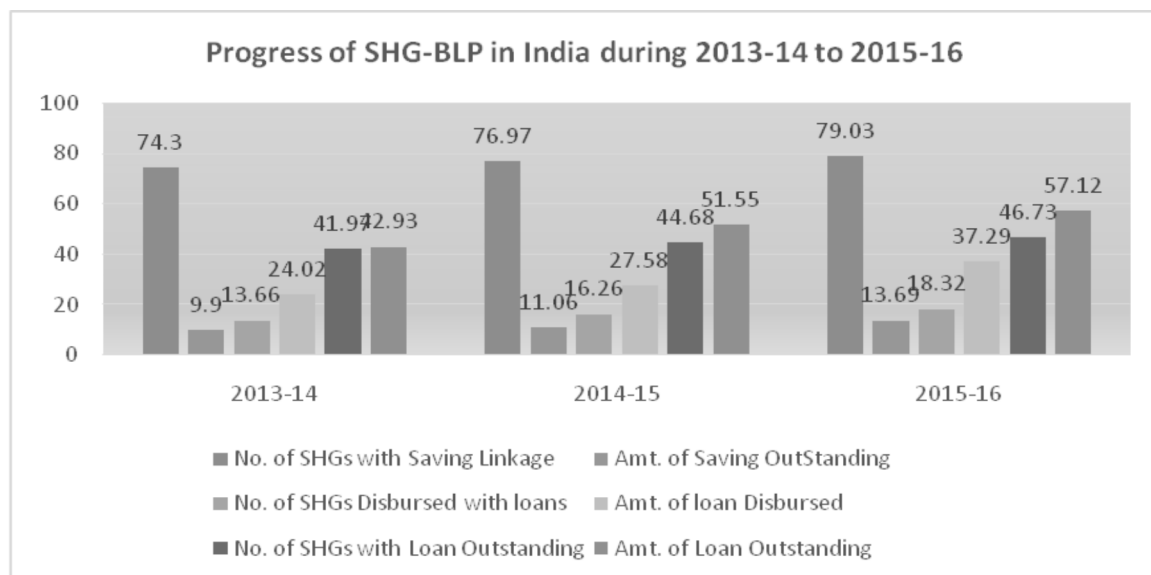
Status of Microfinance in India

In India microfinance operates through two main channels-

- a) banking system through the Self-Help Groups (SHGs) under SHG-Bank Linkage Programme (SHG-BLP) and (Joint Lending Group (JLG) bank lending programme
- b) Micro Finance Institutions (MFIs) lending through individual and group approach.

Figure-1: Progress of SHG-BLP in India during 2013-14 to 2015-16

(No. in Lakh; Amount in Rs. '000 crore)



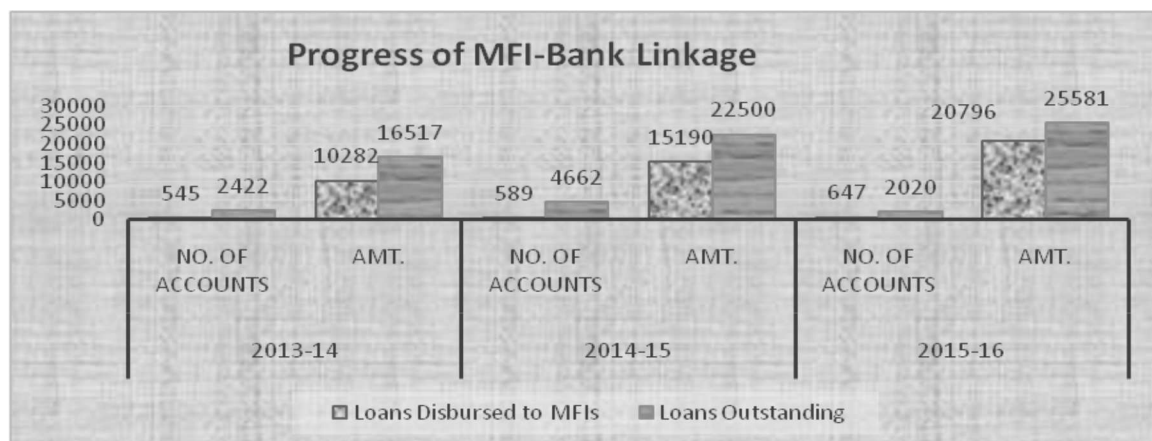
[Source: Author's Construction based on Status of Microfinance in India (2015-16), NABARD]

According to NABARD, the SHG-BLP, which is the largest microfinance programme in the world, today touches 101 million households through 7.9 million SHGs with thrift & deposits of about INR 1,36,914 million, annual loan off-take of INR 3,72,869 million and loan outstanding of nearly INR 5,71,192 million. In the arena of financial inclusion, SHG-BLP is a strong platform for increasing the outreach of banking services amongst the poor. The number of SHGs with savings linkage, credit disbursed during the year and bank loans outstanding as well as the quantum of savings outstanding, loan disbursed during the year and total loan outstanding had shown positive growth during the period 2013-14 to 2015-16 (Figure-1).

MFI-Banks Linkage Programme also played a crucial role for extending financial services to the microfinance sector in the country by raising resources from Banks and other institutions and extending loans to individuals or members of SHGs/ JLGs. The total loans to MFIs by banks and financial institutions increased by over 36.90% during the year 2015-16 as against 47.73% during the previous year (2014-15) (figure-2).

Figure-2: Progress of MFI-Bank Linkage in India during 2013-14 to 2015-16

(Amount in Rs. Crore)



[Source: Author's Construction based on Status of Microfinance in India (2015-16), NABARD]

Figure-3: Region-wise Status of Bank Loan Disbursed to SHGs

[Source: Author's Construction based on Status of Microfinance in India (2015-16), NABARD]

The number of SHGs availing bank loan and total amount of credit disbursed by banks to SHGs in different Regions during past three years are given in Figure-3. There was 35% jump in quantum of credit disbursement in 2015-16 compared to 15% in the previous year.

The states of Andhra Pradesh, Telangana, Karnataka, Tamil Nadu and West Bengal were the major contributors to this quantum growth. Figure-4 demonstrate the overall growth of the microfinance in India in the post global crisis era. Since 2009-10, till 2014-15 loan disbursed has exceeded the outstanding loan portfolio (except for the two years 2011-12 and 2012-13).

Figure-4: Growth of Microfinance Sector in India



[Source: Author's Construction based on Status of Microfinance in India (2015-16), NABARD]

Figure-5: MFIs Client Outreach Expansion Trend in India

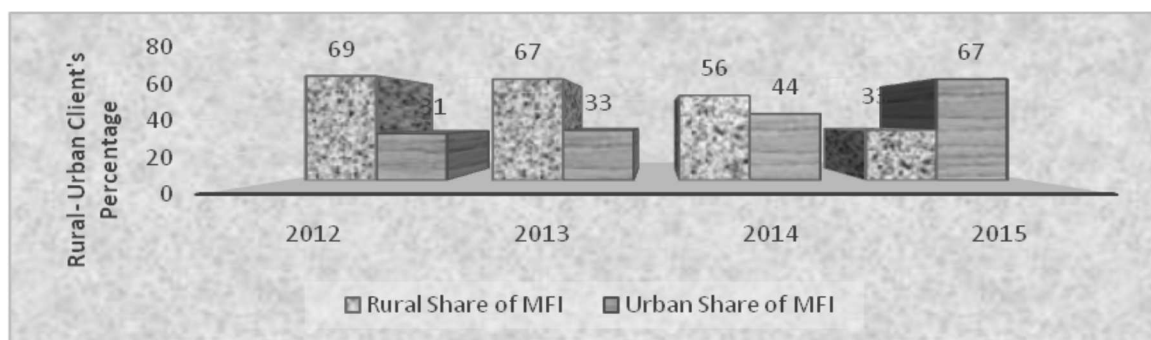


[Source: The Bharat Microfinance Report, 2015 (NABARD)]

The total number of clients served by MFIs stood at 371 lakh as on 31 March, 2015. Client outreach of MFIs had grown substantially from 2005 to 2011, reaching a level of 371 lakh. This trend slowed down during 2012 and 2013 and the number of clients slumped to 275

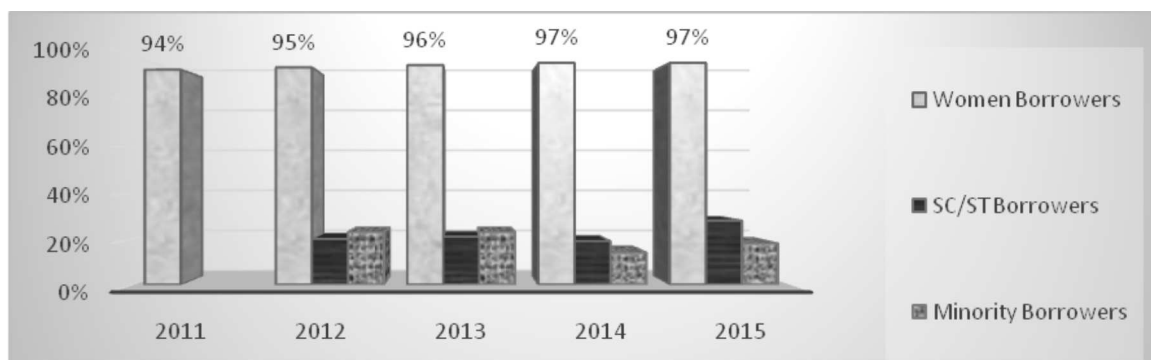
lakh. The trend reversed in 2014 with a growth and reached a level of 330 lakhs. This trend continues in 2015 with an astounding rise in clients/borrowers to an all-time high of 371 lakh (figure-5). Majority of these clients are being served by NBFC-MFIs (85.18%). In terms of client's outreach, all the States and Union Territories have grown, except for combined Andhra Pradesh & Telangana and Andaman & Nicobar. Across the board loan waivers announced by both the state governments led to sticky accounts in MFIs' books, which later had to be cleaned up. This could be one of the reasons for the fall in client outreach. The other reason is a deliberate scaling down of operations in both these states by leading MFIs.

Figure-6: Changes in the Rural-Urban Share of MFI Clients



[Source: Author's Construction based on The Bharat Microfinance Report, 2015 (NABARD)]

Figure- 7: Composition of MFI Clients in India



[Source: Author's Construction based on The Bharat Microfinance Report, 2015 (NABARD)]

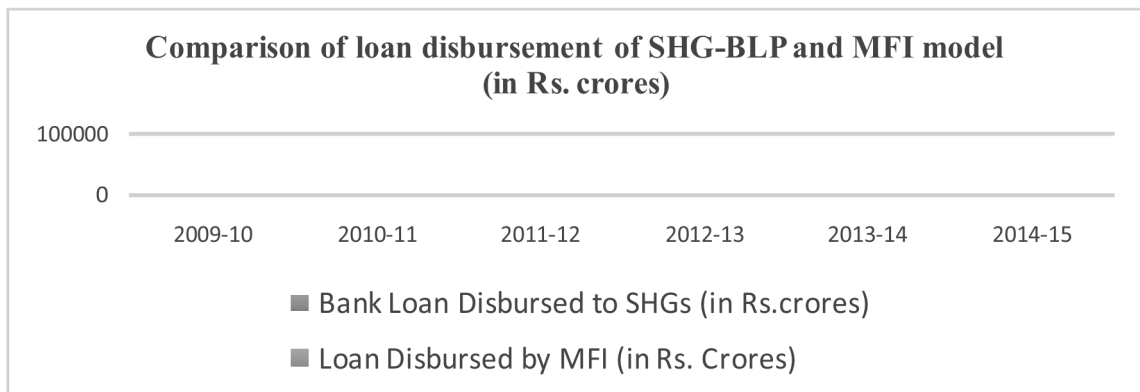
There has been a change of trend in the percentage share of MFI clients in between 2012 and 2015 (figure-6). It has changed from rural-centric to urban-centric. One probable explanation

may be minimization of operational expenses and maximization of their operational efficiency for reasonable profitability. In India, the focus of microfinance has always been on serving women. Women clients constitute 97% of the total clients of MFIs. A trend analysis of women borrowers, SC/ST borrowers and minority borrowers is shown in figure-7.

V.COMPARISON BETWEEN SBLP- MODEL AND MFI MODEL IN INDIAN SCENARIO

In India microfinance operates through two main channels viz. a) banking system through the SHGs under SHG-Bank Linkage Programme (SHG-BLP) and b) through Micro Finance Institutions (MFIs) lending through individual and group approach. In the case of the banking model Self Help Groups (SHGs) are formed and financed by banks. In some cases SHGs are formed by formal agencies/NGOs and financed by banks. In the MFI model, SHGs are formed and financed by the Microfinance Institutions (MFIs) that obtain resource support from various channels. While the MFI model is growing rapidly, the SBLP is by far the more dominant model in terms of outreach. Both these models are very different from each other in methodologies adopted and legal forms of institutions involved in service delivery- SBLP is run by the government while the MFI model is privately managed with some institutions being regulated by the Reserve Bank of India. A comparison between the two is shown in figure-8.

Figure-8: Comparison of SHG-BLP and MFI model on the basis of Loan Disbursed



[Source: Author's Construction based on The Bharat Microfinance Report, 2015 (NABARD)]

Microfinance Institutions in India emerged in the late 1980s in response to the gap in availability of banking services for the unserved and underserved rural population. Their business proliferated in 1990s under the open economy regime. Most of the institutions that entered the field were from the social sector and hence they took the legal form of trusts or

Societies. These institutions were then registered as NBFC-MFIs under the category created by RBI based on Malegam committee recommendations. While the MFI model reaches microcredit quickly and efficiently to the financially excluded, the SHG-BLP programme besides credit and savings provides wholesome social and economic justice to the excluded and deprived section of the society and has proven itself as an invaluable platform for inclusive growth.

State-wise Variation of Microfinance- Microfinance Geographical Index(MGI)

Microfinance Geographical Index is based on quantitative factors that attempt to capture certain dimensions of financial inclusion including the penetration of credit and a proxy of its quality based on a geographical context in order to identify areas based in how served they are and where the microfinance institutions can improve progressively access to financial services to their clients starting with the provision of credit. The MGI measures the geographical spread of microfinance institutions. In this first edition, the Microfinance Geographical Index covers 642 districts and 35 states/UTs at a quarterly interval. The current index scores are calculated based on the data provided by the institutions for the period of December 2014 quarter, March 2015 quarter and June 2015 quarter.

MFIs report district and state level information to MIX on a quarterly basis. These geographical data include indicators such as:

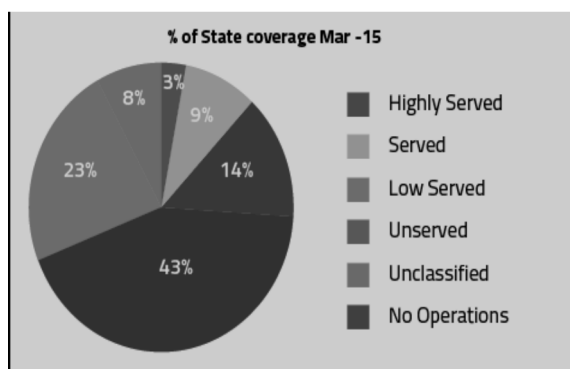
- a. Number of MFI institutions in each district and state³
- b. Number of branches
- c. Value of loans disbursed during the period
- d. Number of outstanding loans
- e. Gross loan portfolio

The following steps are followed:

- i. All metrics considered for the index calculation are converted to a percentile scale that allows comparison across factors which have different levels of distribution.
- ii. A simple average is calculated based on all individual percentiles of each metric to obtain a unique value per area (district and state). The final score value are based on the percentile score.
- iii. Using the final index score per area, the results are then divided into four groups: “highly served”, “served”, “low served”, and “unserved”. In addition, we have identified areas such as “unclassified” where the data is not complete across all

metrics and “no operations” where none of the MFIs are working in these geographies.

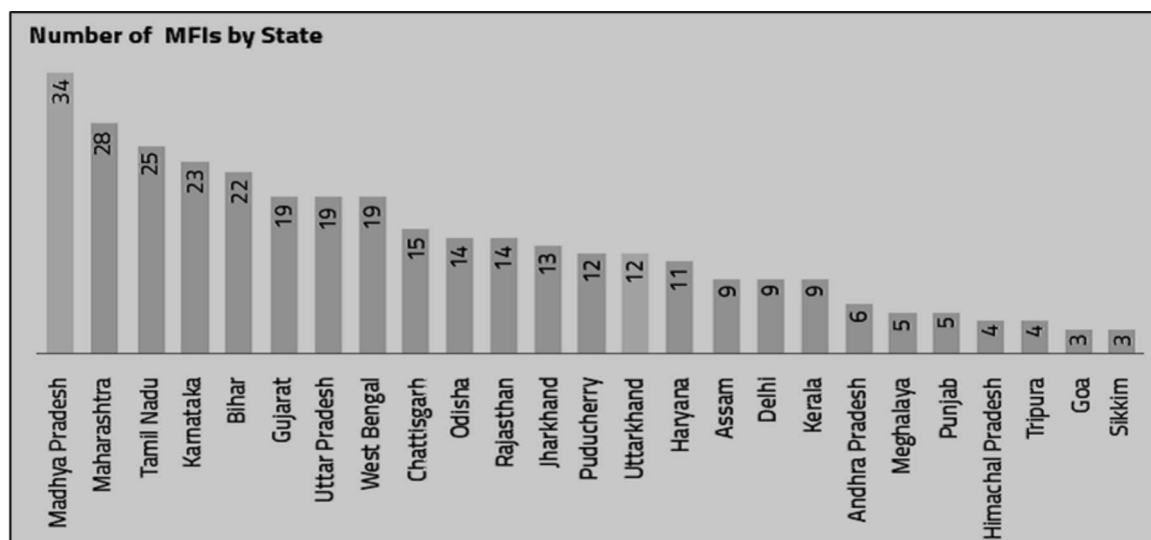
Figure – 9:Composition of States on the basis of MGI



For the quarter ending on March 31, 2015, there are fifteen states that are categorized as “Served” having scores ranging between 50 to 75 percent. Five of the 35 states and union territories in India are categorized as “Highly Served” while eight are classified as “Low Served” (figure-9) (table-1)

[Source: India Microfinance Geographical Index, March 2015]

Figure- 10: Distribution of Numbers of MFI across States



[Source: India Microfinance Geographical Index, March 2015]

There are states that, for one reason or the other, have attracted more MFIs to set up operations. For example, Madhya Pradesh has the broadest MFI presence with 34 different MFIs operating within its borders. Maharashtra follows with 28 institutions, while Tamil Nadu, Karnataka, and Bihar are home to 25, 23, and 22 different MFIs, respectively (figure-

10). These microfinance institutions have around 5,115 branches and a loan size of approximately Rs. 23,019 crore during the first quarter of 2015.

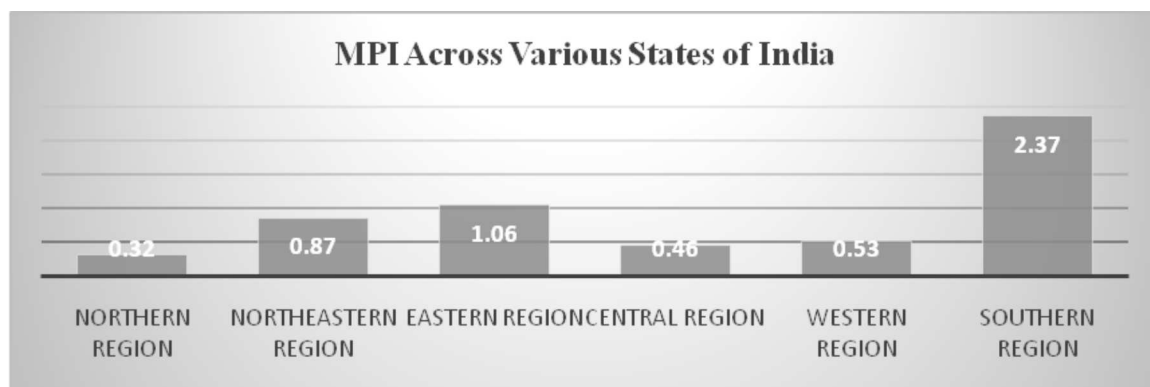
Table- 1: Classification of states and Union Territories (on the basis of Percentile scores)

Categories	Names of States and Union Territories
Highly served States (>75 percent)	Karnataka, Tamil Nadu, Kerala, Delhi, Puducherry.
Served States (50-75 percent)	West Bengal, Maharashtra, Assam, Odisha, Gujarat, Andhra Pradesh, Rajasthan, Haryana, Tripura, Uttarakhand, Meghalaya, Punjab, Sikkim, Goa, Chandigarh.
Low Served States (25-50 percent)	Uttar Pradesh, Bihar, Madhya Pradesh, Jharkhand, Chattishgarh, Himachal Pradesh, Jammu & Kashmir, Arunachal Pradesh
Unserved (< 25 percent)	Mizoram, Manipur, Nagaland
Unclassified (Incomplete data)	Andaman Nicobar
No Operation	Dadra and Nagar Haveli, Daman & Diu, Lakshadweep

[Source: India Microfinance Geographical Index, March 2015]

Microfinance Penetration Index (MPI)

The Southern states have been predominant in microfinance activities since the very beginning although in recent years microfinance network is spreading at a substantial rate in the eastern and central regions of the country (figure-11). This can be reflected in the Microfinance Penetration Index (MPI). This index was calculated for the first time in the year 2008 in the State of the Sector Report, 2008. The MPI provides estimates of the relative share of the states in microfinance clients as compared to their share in the population. It compares the distribution of microfinance clients to the distribution of total households in the country.

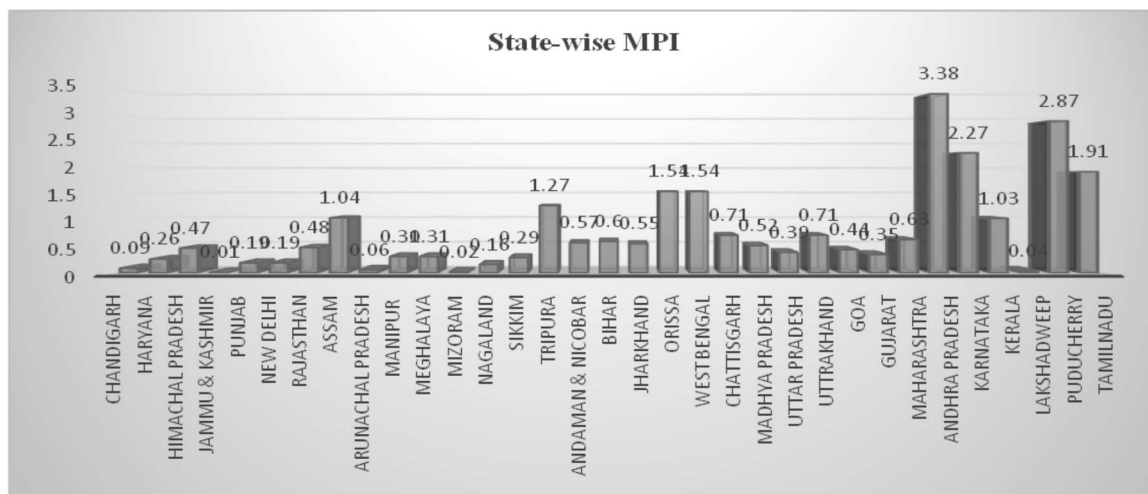
Figure-11: Region-wise MPI variation in India

[Source: Author's Construction on the basis of Inclusive Finance India Report 2014]

A review of the state-wise performance of MPI reveals the following:

Table-2: Top six ranking states Bottom six ranking states

Andhra Pradesh	(3.38)	Jammu & kashmir	0.01
Puducherry	(2.87)	Mizoram	0.02
Karnataka	(2.27)	Lakshadweep	0.04
Tamil Nadu	(1.91)	Arunachal Pradesh	0.06
West Bengal	(1.54)	Chandigarh	0.09
Odisha	(1.54)	Nagaland	0.16

Figure-12: State-wise Performance of MPI

[Source: Author's Construction on the basis of Inclusive Finance India Report 2014]

Andhra Pradesh, Puducherry, Tamil Nadu and West Bengal continue to be states with high levels of MPI, with Karnataka displaying substantial gains over previous years. MPI continues to be low in the Northern region and in the BIMARU states (Bihar, Madhya Pradesh, Rajasthan, and Uttar Pradesh) at a value of less than 0.5 (figure-12).

Relation between Micro Finance and Women Empowerment in Indian Scenario

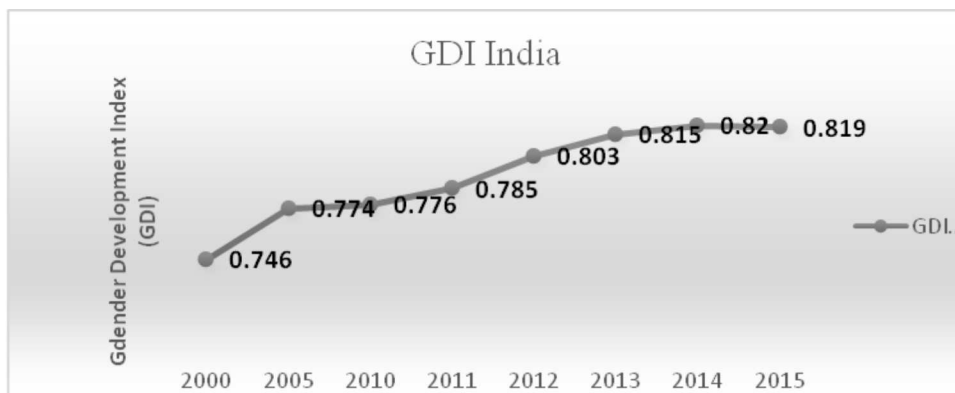
The large proportion of microfinance beneficiaries are the women in the society as they are mostly engaged in unpaid work and they need access to productive resources with financial services being a key resource. Microfinance provides women with the financial backing they need to start business ventures and actively participate in the economy. It gives them confidence, improves their status and makes them more active in decision making, thus promoting gender equality. Microfinance schemes usually lend small short term loans to very poor micro-entrepreneurs (very poor micro-entrepreneurs are women). Experience reveals that women have a small credit risk, repaying their loans and tend more often to benefit the whole family. Loan repayment is always guaranteed by group members collectively and access to future credit or loans is contingent on successful repayment. Giving women access to microcredit loans therefore generates a multiplier effect that increases the impact of a microfinance institution's activities, benefiting multiple generations.

VI. WOMEN EMPOWERMENT: CONCEPT AND MEASUREMENT

The World Bank defines empowerment as “the process of increasing the capacity of individuals or groups to make choices and to transform those choices into desired actions and outcomes. Central to this process are actions which both build individual and collective assets, and improve the efficiency and fairness of the organizational and institutional context which govern the use of these assets.”¹ Thus, as the World Bank (2001) report confirms, societies that discriminate on the basis of gender pay the cost of greater poverty, slower economic growth, weaker governance and a lower living standard of their people. The World Bank also identifies four key elements of empowerment to draft institutional reforms: access to information; inclusion and participation; accountability; and local organizational capacity.² The UNDP report of 1995 introduced two new complementary indices: the Gender-related Development Index (GDI) and the Gender Empowerment Measure (GEM). The GDI indicator measures the inequalities between men and women in terms of access to basic needs. GEM evaluates women’s access to political and economic posts. The present study attempts to analyze the concept of women empowerment and its various indices.

Various indices for measurement of women empowerment

The UNDP report of 1995 introduced two new complementary indices: the Gender-related Development Index (GDI) and the Gender Empowerment Measure (GEM). GDI and GEM developed by UNDP need to be recast to realistically capture the gender gaps in development and empowerment in the Third World. The Gender Development Index (GDI) measures gender inequalities in achievement in three basic dimensions of human development: health, measured by female and male life expectancy at birth; education, measured by female and male expected years of schooling for children and female and male mean years of schooling for adults ages 25 years and older; and command over economic resources, measured by female and male estimated earned income.

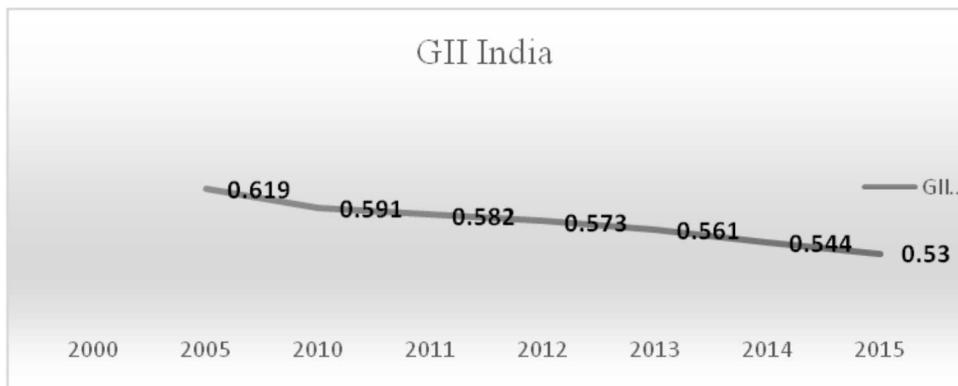


[Source: Author’s compilation based on the HDI Statistics (2000 – 2015)]

The GDI groups are based on the absolute deviation of GDI from gender parity, 100 $\cdot |GDI - 1|$. Countries with absolute deviation from gender parity of 2.5 percent or less are considered countries with high equality in HDI achievements between women and men and are classified as group 1. Countries with absolute deviation from gender parity of 2.5–5 percent are considered countries with medium-high equality in HDI achievements between women and men and are classified as group 2. Countries with absolute deviation from gender parity of 5–7.5 percent are considered countries with medium equality in HDI achievements between women and men and are classified as group 3. Countries with absolute deviation from gender parity of 7.5–10 percent are considered countries with medium-low equality in HDI achievements between women and men and are classified as group 4. Countries with absolute deviation from gender parity of more than 10 percent are considered countries with low equality in HDI achievements between women and men and are classified as group 5. India falls within the medium HDI group but according to GDI score India falls under group 5 (i.e. with low equality in HDI achievements between women and men) (figure-13).

As recommended by Klasen and Schöler (2011) and others, the GDI was dropped and also the GEM has been discontinued. Instead a new Gender Inequality Index (GII) has been created and calculated for 137 countries. The new GI contains three dimensions, reproductive health, empowerment, and labor market. The first averages female adolescent fertility and maternal mortality, the second parliamentary representation and educational attainment, and the third just consist of labor force participation.

Figure-14: Changes in India's GI from 2005 - 2015



[Source: Author's compilation based on the HDI Statistics (2005 – 2015)]

The GI is an index measuring the welfare loss of gender inequality considering a hybrid of well-being and empowerment outcomes rather than gender-sensitive development or gender inequality directly. The changes in the GI values for India are shown in figure-14 and has shown a downward trend. As per the United Nations Development

Programme's Human Development Report 2013: India stood at 132nd position out of 187 countries on the gender inequality index (GII) —performing worse than Pakistan whose position is 123. All nations in South Asia, except Afghanistan, performed better than India, with Sri Lanka (75) topping them all. Nepal ranked 102nd and Bangladesh 111th. Key factors which put India on such a low position in 2013 are: Only 29 per cent of Indian women above the age of 15 in 2011 were apart of the country's labour force, Only 26.6 per cent women above 25 years received a secondary education in 2010, compared to 50.4 per cent of men, about 200 women died every 100,000 child births.

Status of Women Empowerment in India

i) Economic Empowerment through SHG- Bank Model

The SHG-BLP is also the largest coordinated financial inclusion programme and NABARD has always strived to broad base the ownership of the programme amongst different stakeholders like banks, NGOs, Govt. etc. This saving led model of microfinance is a successful empowerment tool which has covered almost 10 crore households in the country. Among these 86 percent are exclusively women groups which are a big push to the women empowerment programme. The number of SHGs having savings linkage increased to 79.03 lakh as on 31 March 2016 from 76.97 lakh a year back. There was a net addition of 2.06 lakh SHGs during the year 2015-16. The domain of SHGs consists of 85.6% women groups which play a crucial role in empowerment of the poor rural women. The number of SHGs with savings linkage, credit disbursed during the year and bank loans outstanding as well as the quantum of savings outstanding, loan disbursed during the year and total loan outstanding had shown positive growth during the past four years (table-3).

Table-3: Progress of SHG- Bank Model during 2012-13 to 2015-16 in India

(No. in Lakhs./ Amt. Rs. Crore)

		2012-13		2013-14		2014-15		2015-16	
		No. of SHGs	Amount	No. of SHGs	Amount	No. of SHGs	Amount	No. of SHGs	Amount
SHG Savings With Banks as on 31st March	Total No. of SHGs	73.18 (- 8.1%)	8217.25 (25.4%)	74.3 (1.53%)	9897.42 (20.45%)	76.97 (3.59%)	11059.84 (11.74%)	79.03 (2.68%)	13691.39 (23.79%)
	All Women SHGs	59.38 (- 5.7%)	6514.86 (27.6%)	62.52 (5.27%)	8012.89 (22.99%)	66.51 (6.38%)	9264.33 (15.61%)	67.63 (1.68%)	12035.78 (29.92%)
	% of Women Groups	81.1	79.3	84.15	80.96	86.41	83.77	85.58	87.91
Loans Disbursed to the SHGs during the year	No. of SHGs Extended Loans	12.20 (6.3%)	20585.36 (24.5%)	13.66 (12.02%)	24017.36 (16.67%)	16.26 (19.03%)	27582.31 (14.84%)	18.32 (12.67%)	37286.90 (35.18%)
	All Women SHGs	10.37 (12.4%)	17854.31 (26.3%)	11.52 (11.02%)	21037.97 (17.83%)	14.48 (25.69%)	24419.75 (16.07%)	16.29 (12.50%)	34411.42 (40.92%)
	% of Women Groups	85.1	86.7	84.3	87.6	89.06	83.53	88.92	92.29
Loans Outstanding against SHGs as on 31st March	Total No. of SHGs Linked	44.51 (2.2%)	39375.30 (8.4%)	41.97 (- 5.71%)	42927.52 (9.02%)	44.68 (6.46%)	51545.46 (20.06%)	46.73 (4.59%)	57119.23 (10.81%)
	All Women SHGs	32.57 (2.9%)	32840.04 (7.8%)	34.06 (- 9.34%)	36151.58 (10.08%)	38.58 (13.27%)	45901.95 (26.97%)	40.36 (4.61%)	51428.91 (12.04%)
	% of Women Groups	84.4	83.3	81.2	84.2	86.35	89.05	86.37	90.04

[Source: Author's Compilation from Status of Micro Finance in India (NABARD), 2014-15 & 2015-16]

ii) Role of MGNREGA in Fostering Women Empowerment

The role of MGNREGA and micro finance in this context is important because it provides an environment of sustainable improvement in the quality of life of rural women folk for equal opportunity in decision making process and to participate in community life by forming SHGs and MFIs.

Table- 4: Role of MGNREGA in Women Empowerment

Person Days (in Crores), [% of Total Person Days]						
	FY 2006-07	FY 2007-08	FY 2008- 09	FY 2009-10	FY 2010-11	FY 2011-12
Total	90.5	143.59	216.32	283.6	257.2	218.6
Women	36.8 (40%)	61.2 (43%)	103.5 (48%)	136.4 (48%)	122.7 (48%)	105.27 (48%)

[Author's Construction based on The MGNREGA Official Website]

Utilization of allocated funds and asset creation has been taken as a measure of success for women empowerment (though table-4 shows that the percentage of women days has remained the same).

iii) Women Entrepreneurship in Small Scale Industries through Microfinance

Women Entrepreneurs are the women or a group of women who initiate, organize and operate a business enterprise. The government of India notes women entrepreneurs as "*An enterprise owned and controlled by women saving a minimum financial interest of 51 per cent of the capital and giving at least 51 per cent of the employment generated in the enterprise to women*". (MSME, Govt. of India) The share of the units managed by women in terms employment was 7.14. The employment generated per Rs. one lakh investment in the units managed by women was 2.49. Among the small scale industrial units owned by women entrepreneurs in India, Kerala tops the list with over 1.39 lakh units, followed by Tamil Nadu with 1.30 lakh units. Principal Characteristics of SSI units managed by women are presented in the following table-5.

Table 5: Principal Characteristics of SSI Units Managed By Women in India

For units managed by women	No. of units	Market Value of fixed assets	Employment	Gross output	Exports
Regd. SSI Sector	114362	33624570500	349342	60316833602	3314822655
Percentage to total of the respective category	8.32	3.66	5.67	2.97	2.69
Unregd. SSI Sector	880780	37763317590	1429962	37324824839	53802469
Percentage to total of the respective category	9.63	6.04	7.62	4.72	0.28
Total SSI Sector	995142	71387888090	1779304	97641658441	3368625124
Percentage to total of the respective category	9.46	4.63	7.14	3.46	2.37

[Source: <http://www.dcmsme.gov.in/ssiindia/census/ch2.htm>]

Empirical Analysis

Our basic objective is to provide some empirical support to the analysis made using various secondary data. The relationship between the independent and dependent variables is determined using ordinary leastsquares (OLS) regressions. The model tries to seek an explanatory relationships between the independentand dependent variables. Here we have tried to measure women empowerment by means of percentage of self-employment among women (PSELF_EMP) and the independent variables are Per capita State GDP (SGDP), micro finance penetration rate (MPIPR) across states, literacy rate among women (LITRT) across states and state-wise regional rural bank (RRBPR). The microfinance penetration index (MPI) provides estimates of the relative share of the states in microfinance clients as compared to their share in the population (calculated by share of microfinance clients divided by population of the respective state). There are 28 states and 7 union territories in India which provides a scope of 35 observations in a cross-sectional study. However, in our study we have 31 observations which include 26 states and 5 union territories. The states of Jammu & Kashmir, Lakshadweep, Daman & Dui, and Dadra& Nagar Haveli have been omitted because of non-availability of data (Telengana is included in the state of Andhra Pradesh).

This study is based on secondary data from the following sources:

- (i) State-wise percentage of self-employed women (taken as a proxy for women empowerment) has been taken from Annual Report, Ministry of Child and Women development, Govt. of India.
- (ii) Micro finance penetration rate across states Inclusive Finance India Report, 2014.
- (iii) Per capita State GDP (SGDP), literacy rate among women (LITRT) across states and state-wise regional rural bank (RRBPR) are taken from RBI's Handbook of Statistics on Indian Economy.

First, we check the stationarity of the data using Augmented Dickey-Fuller (ADF)Test (table-6) and finally we run the OLS regression to have an estimate of the parameters.

Table-6: Results of Unit Root Test (Using Augmented Dickey-Fuller Test)

Variable	t-Statistic	Probability	Critical value (5% level)	Series Type
PSELF_EMP	-4.764167	0.0006	-2.963972	S
SGDP	-4.688575	0.0008	-2.963972	S
MFIPR	-3.850841	0.0064	-2.963972	S
LITRT	-4.878424	0.0005	-2.963972	S
RRBPR	-1.762456	0.3880	-3.004861	NS
D(RRBPR)	-5.181940	0.0005	-3.020686	S

The results of table-6 clearly shows that all the variables are stationary at level except for RRBPR, which is stationary at first difference.

The functional specification of the model is as follows:

$$pself_emp_i = \alpha_1 + \beta_1 sgdpr + \beta_2 mfipr(-1) + \beta_3 mfipr(-2) + \beta_4 litrt + \beta_5 litrt(-1) + \beta_6 d(rrbpr)$$

Regression Results

Dependent Variable: PSELF_EMP

Table-7: Results of Regression

Table-7: Results of Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	60.15535	49.16381	1.223570	0.2388
SGDP	0.000645	0.000199	-3.236914	0.0052
MFIPR(-1)	-15.59103	5.333034	-2.923483	0.0099
MFIPR(-2)	1.978889	5.676740	0.348596	0.7319
LITRT	-0.845715	0.475671	-1.777942	0.0944
LITRT(-1)	1.322357	0.447986	2.951781	0.0094
D(RRBPR)	-0.003047	0.004698	-0.648512	0.5259

R-Squared = 0.680615; Durbin-Watson stat= 2.207394

The coefficients of regression show that SGDP has a positive impact on self-employment of women i.e. on women empowerment. But both MFIPR (-2) and LITRT (-1) are lagged functions which have a positive impact on the self-employment of women. But the change in the no. of rural bank branches across states has a negative impact. The explanatory variables together explain 68 per cent of the variations in the dependent variables. Moreover, the DW statistic value is close to 2, showing non-autocorrelation.

Empirical Analysis and Results

Here we have tried to measure women empowerment by means of percentage of self-employment among women (PSELF_EMP) and the independent variables are Per capita State GDP (SGDP), micro finance penetration rate (MPIPR) across states, literacy rate among women (LITRT) across states and state-wise regional rural bank (RRBPR). The microfinance penetration index (MPI) provides estimates of the relative share of the states in microfinance clients as compared to their share in the population (calculated by share of microfinance clients divided by population of the respective state). There are 28 states and 7 union territories in India which provides a scope of 35 observations in a cross-sectional study. However, in our study we have 31 observations which include 26 states and 5 union territories. The states

of Jammu & Kashmir, Lakshadweep, Daman & Dui, and Dadra & Nagar Haveli have been omitted because of non-availability of data (Telengana is included in the state of Andhra Pradesh).

First, we check the stationarity of the data using Augmented Dickey-Fuller (ADF) Test and finally we run the OLS regression to have an estimate of the parameters. The coefficients of regression shows that SGDP has a positive impact on self-employment of women i.e. on women empowerment. But both MFIPR (-2) and LITRT (-1) are lagged functions which have a positive impact on the self-employment of women. The explanatory variables together explain 68 per cent of the variations in the dependent variables. Moreover, the DW statistic value is close to 2, showing non-autocorrelation.

VII. CONCLUDING REMARKS

The foregoing analysis clearly reflects the fact that in the arena of financial inclusion, SHG-BLP model and the MFI model have both provided a strong platform for increasing the outreach of banking services amongst the poor. In fact, according to NABARD, the SHG-BLP is the largest microfinance programme in the world. The states of Andhra Pradesh, Telangana, Karnataka, Tamil Nadu and West Bengal were the major contributors to this quantum growth (which resulted in a 35% jump in quantum of credit disbursement in 2015-16 compared to 15% in the previous year). The total number of clients served by MFIs has also shown an upward trend. There has been a change of trend in the percentage share of MFI clients in between 2012 and 2015. It has changed from rural-centric to urban-centric. If one compares the SHG-BLP and MFI models, it shows that though the MFI model has registered significant proliferation since 1990s, but still the SHG-BLP model is the dominant one in terms of loans disbursed. Microfinance Geographical Index (MGI) shows significant variations - fifteen states that are categorized as “served” having scores ranging between 50 to 75 percent; five of the 35 states and union territories in India are categorized as “highly served” while eight are classified as “low served”. The Microfinance Penetration Index (MPI) shows that the Southern states have been predominant in microfinance activities since the very beginning although in recent years microfinance network is spreading at a substantial rate in the eastern and central regions of the country. Andhra Pradesh, Puducherry, Tamil Nadu and West Bengal continue to be states with high levels of MPI, with Karnataka displaying substantial gains over previous years.

India falls within the medium HDI group but according to GDI score India falls under group 5 (i.e. with low equality in HDI achievements between women and men). As per the United Nations Development Programme’s Human Development Report 2013: India stood at 132nd position out of 187 countries on the gender inequality index (GII)—performing worse than Pakistan whose position is 123. So, in order to improve these indices economic empowerment

is aimed through microfinance programmes, MGNREGA, entrepreneurship development etc. The empirical analysis reveals that SGDP has a positive impact on self-employment of women i.e. on women empowerment. But both MFIPR (-2) and LITRT (-1) are lagged functions which have a positive impact on the self-employment of women. Micro Finance Institutions (Development and Regulation) Bill 2012 on May 22, 2012 has been introduced by the Govt. of India to establish a regulator under RBI to regulate and supervise the activities of NGOs and MFIs. But the outreach of these programmes must extend further at a rapid pace to the remotest corner to help the poor and unprivileged people, particularly the rural women folk to achieve faster inclusive and sustainable development.

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APPENDIX

Model I: $pself_emp \text{ c } sgdpmfipr(-1) \text{ mfipr}(-2) \text{ litrtlitr}(-1) \text{ d}(\text{rrbpr})$

Dependent Variable: PSELF EMP

Method: Least Squares

Date: 07/30/17 Time: 20:26

Sample (adjusted): 3 27

Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	60.15535	49.16381	1.223570	0.2388
SGDP	0.000645	0.000199	-3.236914	0.0052
MFIPR(-1)	-15.59103	5.333034	-2.923483	0.0099
MFIPR(-2)	1.978889	5.676740	0.348596	0.7319
LITRT	-0.845715	0.475671	-1.777942	0.0944
LITRT(-1)	1.322357	0.447986	2.951781	0.0094
D(RRBPR)	-0.003047	0.004698	-0.648512	0.5259
R-squared	0.680615	Mean dependent var	58.17391	
Adjusted R-squared	0.560845	S.D. dependent var	24.00695	
S.E. of regression	15.90911	Akaike info criterion	8.617451	
Sum squared resid	4049.596	Schwarz criterion	8.963036	
Log likelihood	-92.10069	Hannan-Quinn criter.	8.704365	
F-statistic	5.682705	Durbin-Watson stat	2.207394	
Prob(F-statistic)	0.002503			

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