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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. 3** of the Journal, is published containing the selected papers contributed by scholars . 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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Editor in Chief

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WHY ARE DEMOCRACIES MALFUNCTIONING IN LESS DEVELOPED COUNTRIES?#

Abhirup Sarkar*

Abstract

The paper is an attempt to explain the low quality of democracy and governance in less developed countries. It argues that less developed countries have large informal sectors where formal laws and norms are absent and where citizens need political support for survival. These supports are provided by the political parties at the cost of general development. There is also contagion in voting behavior.

Keywords : Quality of Democracy, Levels of Living ,Inequality ,Less Developed Countries , Contagious Voting,Informal Sector

JEL Classification Codes :D63, P16, Z13

I. Level of Living and Quality of Democracy

It is well accepted that markets alone cannot deliver socially desirable results ¯ in general, they have to be complimented by government action. This is more so in less developed countries where markets are often weaker. Unfortunately governments, which are supposed to correct market failures, are themselves not free from malfunctioning. So, while governments can theoretically take care of market failures, we need institutions to ensure government efficiency. Electoral democracy is one such institution. Through competitive electoral democracy, weak governments are expected to be punished, strong governments rewarded. The inevitability of facing a future election is supposed to have a disciplining effect on the government in power thereby reducing the chance and extent of government failures.

For poor countries there is yet another reason why democracy as an institution has a greater role to play compared with markets. In a free market, the rich commands a lot more power than the poor and this built in inequality is likely to lead to outcomes which favor the rich. In contrast, assuming universal suffrage, in a democracy, each citizen has a single vote. So, at least theoretically, democracy as an institution exhibits perfect equality. Since in a poor country the number of poor far exceeds the number of rich, the political equality provided

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by electoral democracy is expected to induce governments to adopt pro-poor policies which are likely to be more desirable from the point of view of the society.

The actual experiences of developing countries, however, tell a different story. Democracy rankings of countries, as measured by political rights, civil rights, gender gap, freedom of press, perception of corruption, peaceful transfer of political power and other similar indicators, consistently show that the 'quality' of democracy is lower in poorer countries in comparison with their richer counterparts.There are some regular yearly rankings or categorizations of countries by the quality of their democracy, e.g. the *Freedom House Index* or the *Democracy Index*. There are also composite indices like the *Polity Index* or the *Global Democracy Ranking* which combine a number of more basic indices to evaluate the quality of democracy. These rankings are widely used in the media as well as in academic research.

Over the last two decades, the number of countries of the world practicing one kind of democracy or the other has significantly increased. According to information provided by *Freedom House*[1] in 1989, only 41 percent of the 167 countries in the world practiced electoral democracy. By 2012, while the number of countries had increased to 195, the proportion of countries with electoral democracy had increased to 60 percent. Evidently, this spurt in democracy was partly the result of the breakdown of the socialist ideology and the erstwhile Soviet bloc countries. Be that as it may, the more important question is whether the spread of democracy as an institution has actually expanded political rights and civil liberties on the one hand and improved economic freedom of citizens on the other in countries where such democracy is being practiced.

Available ratings of countries with respect to political and civil performances of their democracies are somewhat confusing because of their wide variation. For example, *Democracy Index*, published by the UK based *Economist Intelligence Unit* puts countries every year in one of the four categories: *full democracy*, *flawed democracy*, *hybrid regimes* and *authoritarian regimes*. The classification of a country is based on a number of indicators of civil liberties - on how elections are conducted, on the number of people participating in the election process, on media freedom, on the degree of corruption and the functioning of the government and so on. In 2012, the total number of countries listed by the *Democracy Index* is 214 out of which 116 are electoral democracies[2]. Of these 116 countries, only 25 (about 21.6 percent) are classified as *full democracy*, 75 (about 64.6 percent) as *flawed democracy* and the remaining 16 (about 13.8 percent) as having *hybrid regimes*.

On the contrary, *Freedom House* ranks countries on the basis of political freedom and civil liberties. In 2013, they have listed 194 countries out of which 116 are electoral democracies, as we have mentioned above. The countries are classified as *free*, *partly free* and *not free* according to their scores on political freedom and civil liberties. Out of 116 electoral

democracies, 89 (about 76.7 percent) are classified as *free* and 27 (about 23.3 percent) as *partly free*.

Clearly, this wide variation in perception, 21.6 percent of the countries perceived as *full democracy* by *democracy Index* and 76.7 percent perceived as *free* by *Freedom House* is to a large extent due to differences in subjective standards set by the two studies. Due to these somewhat arbitrary subjective standards, it is difficult to form an idea about the *absolute* standard of democracy in a country. However, one important feature is common to the two studies. On an average it is true that poorer countries obtain lower scores than the richer countries. In other words, both rankings reveal a statistically positive relationship between quality of democracy and standards of living.

This positive relationship is observed not only in the two studies mentioned above but also in other popular as well as scholarly accounts on democracy. Talking about more formal literature, the direct relationship between democracy and economic wellbeing had probably been rigorously hypothesized first by Lipset (1959), who traces its origin to the writings of Aristotle. Later it was empirically established in Barro (1999). Barro basically uses the*Freedom House* data of electoral rights and civil liberties to measure democracy, but substantiates these with other datasets to get a longer panel. While the quality of democracy is measured by indicators of political rights and civil liberties, standard of living is measured by per capita GDP, primary school attainment and (negatively) by the gap between male and female attainment of primary school. Quality of democracy and standard of living are found to be significantly positively correlated.

In the same vein, Acemoglu and Robinson (2006) have demonstrated a clear positive relationship between the quality of democracy of a country and its standard of living. Apart from Freedom House data, Acemoglu-Robinson have used the Polity IV dataset and the*Composite Polity Index* derived from it and come up with the overall picture that both per capita income and average schooling of the citizens of a country are positively correlated with the quality of democracy of the country. Moreover, they have shown that during the period 1960-1995, every year the quality of democracy in OECD countries has consistently remained at the top, followed by the Latin American countries. The quality of democracy in the Asian countries has remained below that of the Latin American countries and that of the African countries has remained at the bottom in all the years under consideration.

In yet another piece of research, Przeworski et al (2000), have made a dichotomous distinction between democracy and non-democracy. According to these authors, a country, in order to qualify as democracy, must have a democratic and peaceful change in the government at least once in the past, apart from satisfying certain usual standards of political and civil rights. They show that the affluent countries not only have a higher tendency to be

democratic, they also have a higher chance of *remaining* democratic compared with their poorer counterparts.

Low quality democracy can be the result of a number of factors of which government failure is one. Indeed, apart from government failure, poor quality of democracy could be the consequence of a complex host of historical, social, economic and political forces many of which are yet to be clearly identified. But it is government failure which lies at the heart of poor quality democracy in less developed countries.

A focused measure of government functioning is provided by the quality of governance. Worldwide governance indicators[3], provided by the world bank, evaluate governments in terms of six parameters, namely, voice and accountability, political stability and no violence, government effectiveness, regulatory quality, rule of law and control of corruption. By giving an equal weight to each of these parameters it is possible to arrive at a composite index of governance for each country for any particular year and then the countries can be ranked by the quality of their governance as represented by the composite index. It is found that for countries with electoral democracy, the instantaneous correlation between per capita income and the composite index of governance is between +0.83 and +0.86 for each year during the period 2002-2014. Therefore, Lower quality of governance, like lower quality of democracy is also strongly associated with lower income.

2. Theories based on Inequality

The empirical research cited above, however, mostly talks in terms of simple correlations between democracy and governance on the one hand and affluence on the other. The direction of causality is neither well-specified nor well understood. Indeed, the Barro (1999) paper concludes with the comment that though there is ample empirical support for the Lipset/ Aristotle hypothesis, a rigorous theory explaining the link between democracy and standard of living is yet to be forthcoming. Presumably the causation flows both ways. Affluence relaxes certain constraints in the economy which allows the polity and the government to function properly. On the other hand, better governance creates an atmosphere for the economic agents to function more efficiently. But theories linking governance or quality of democracy with economic prosperity are not many.

There is one strand of literature which relates inequality with non-performing democracy or governments. Bardhan and Mookherjee (2000)show that a large middle class in the distribution of income and education and hence of political awareness improves the quality of governance as compared with another society which has the same per capita income but is polarized between the rich and the poor. Again, Acemoglu and Robinson (2001, 2002, 2006)look at the conditions under which a country can experience a transition from non-democracy to democracy or remain confined into a dictatorial rule. The authors argue that

the relationship between income inequality and the probability of transition into democracy is inverted U-shaped. For low levels of inequality, chances of such a transition are low (e.g. in Singapore). This is because the relatively underprivileged are quite well off by absolute standards in these countries and do not have the incentive to bear the cost of fighting for democracy. Similarly, for countries with high inequality, the probability of change is also low (e.g. in Paraguay or El Salvadore). For these countries, the privileged class fight with all their might to maintain status quo because they have a lot to lose if there is a change from non-democracy to democracy. It is the middle levels of inequality, like in Europe or in the United States that brings in democracy and sustains it, for in these countries forces exerted by the rich for non-democracy is subdued by those exerted by the poor for democracy. However, in this class of theoretical models no direct relationship is established between the quality of living and the quality of democracy or governance. Since inequality is not necessarily positively and monotonically related to the level of living, as is clear from the recent by Piketty (2014), these papers do not address the research gap pointed out in Barro(1999).

An institutional approach to the problem is found in North, Wallis and Weingast (2008) where societies are divided into different types of social orders. Developing countries are said to be in natural states where access to rights and privileges are limited to and shared by the oligarchy in power as well as that in the opposition. The latter is capable of disrupting the enjoyment of power by the former through violent means and is pacified through the sharing of exclusive privileges with the rulers. The majority, however, are denied of certain basic rights like good education and health or equality before the law. In such societies competition is severely restricted and access to organizations limited only to a privileged few. This in turn leads to low growth and development in the long run. In contrast, developed countries have open access orders where competition is unrestricted and access to organizations free to all citizens. This facilitates erosion of rents and overall prosperity. The authors point out that the transition from a limited access to an open access order is slow and difficult. They also point out that in the absence of an open access order, an institution like democracy is likely to yield perverse results.

III. Political Economy of the Informal Sector

We take a cue from the institutional approach to build up an argument to explain the empirical relationship between quality of democracy and level of living. To do that we first look at the nature of political economy of a less developed country. A large section of the population in such countries does not have access to good education, health or legal protection and hence deprived of a decent and protected livelihood. Most of the deprived survive in the informal sector. We broadly define the informal sector as one where the rule of law is lacking. In this sector, unregistered economic activities are undertaken and formal laws of the land, like labour laws or tax laws, are flouted. Similarly, property rights and other legal rights are not

well defined and often absent for agents working in the informal sector. On the other hand, since the legal system is expensive and often its privileges are restricted to a handful, people working in the informal sector are vulnerable to violence and extortion. In short, informal sector agents neither abide by the law nor protected by it. Vendors illegally selling their merchandise on the pavements of city streets, unregistered production units neither paying taxes nor conforming to the minimum wage legislation, small entrepreneurs unprotected from the local goons, sex workers soliciting customers in busy metropolitan areas are all examples of economic agents working in the informal sector. Their common characteristics are that they are poor and vulnerable.

Another big chunk of the population earns its livelihood in the agricultural sector where productivity is low and uncertain. One needs subsidies of various kinds to survive[4]. The vulnerability of these people stems from the inherently low and uncertain productivity of backward agriculture and their consequent dependence on official subsidies.The majority of the people in less developed countries are, therefore, vulnerable in one way or the other.

It is well-known that poorer countries have higher proportions of their national economies belonging to the informal sector. The strategy of the paper is to theoretically establish a causal connection between the extent of malfunctioning of democracy and the size of the informal sector and thereby establish a link between the level of economic development and the quality of democracy. But before going into that we might do some casual empiricism to motivate our theoretical argument. We look at the democracy scores of countries according to the quality of their democracies on the one hand, and the size of the informal sector in these countries relative to their GDP on the other and establish a statistical link between the two.

For democracy ranking, we use *Global Democracy Ranking, 2012*. It gives weights to a number of variables to arrive at a composite score for the quality of democracy in a country.The weighting scheme used by *Global Democracy Ranking* are as follows: 25 percent on Political Rights , 25 percent on Civil Liberties, 25 percent on Gender Gap, 10 percent on Press Freedom, 10 percent on Perception of Corruption and 2.5 percent each on peaceful change in head of government and peaceful change in the political party in power. The data used for Political Freedom, Civil Liberties and Press Freedom are taken from *Freedom House* while the data for Gender Gap and Perception of Corruption are taken from *Global Gender Gap Report* and *Transparency International* respectively. Estimates of the share of informal sector in GDP are obtained from a World Bank Development Study Group Working Paper[5].

The table in the Appendix shows democracy score for each country against its share of informal sector in GDP. Figure 1 records the scatter of the democracy scores of these 82 electoral democracies on the horizontal axis and the shares of their informal sectors in their

GDP on the vertical axis. The plot is between democracy scores of countries in 2008-09 and the average shares of their informal sectors during 1999-2007. It is evident from the scatter that there is a strong negative correlation between the quality of democracy and the relative size of the informal sector. Indeed, from the data given in the figure, the correlation coefficient between these two variables can be calculated. This correlation coefficient turns out to be -0.67. This vindicates our supposition that large informal sectors are associated with weaker democracies.

As already pointed out, the contribution of the present paper is to theoretically establish a link between the relative size of the informal sector and the quality of democracy. We have also pointed out that the most striking feature of informal sectors all over the world is their *semi legal existence*. This semi-legality ¯ lack of property rights, non-payment of taxes, flouting of labour laws - is necessary for the survival of the informal sector units. But at the same time it makes them extremely vulnerable. Consider, for example, a street vendor selling his merchandise on the pavement of a busy part of a city street. On pen and paper, this is an illegal activity because the vendor does not have the property right on the strip of the pavement where he typically displays his merchandise for sale and is carrying on his business. His vulnerability arises from the fact that there is always a chance of a police raid and confiscation of his goods[6].

To protect themselves from their vulnerability, the informal agents need some kind of political support. Most would go to the ruling political party for protection, but some would also go to the opposition, provided the opposition is strong and united. Indeed, without one form of political support or the other these agents cannot survive. Similarly, subsidies given to the agricultural sector are often personal and excludable, and the agents need political patronage to ensure that they get an uninterrupted flow of subsidies. In return of giving political support to the vulnerable population, both to the informal sector agents in the cities and to the farmers and agricultural labourers in the rural areas, the political parties demand their allegiance.The allegiance demanded consists not only of casting one's vote in favour of the patron, but also participation in meetings and demonstrations organized by the party and on some occasion lending muscle power to rig elections. This political exchange, on a *quid pro quo* basis, forms the core of electoral politics for a large number of less developed countries yielding perverse results for their democracies.

A few implications of this give-and-take politics are worth noting. First, a direct subsidy from the ruling party to the vulnerable in the informal sector cannot discriminate between agents who are loyal to the ruler and who are not and hence cannot be used to earn political allegiance. On the other hand, informal activities being semi-legal gives the political parties an opportunity to selectively protect their supporters. Second, agents show allegiance to a party by openly participating in political meetings and demonstrations. Assuming that party

loyalists who openly support the party get some special benefits if the party wins the next election, those who have demonstrated their support for a particular party have no incentive to vote for a different party. Third, a large number of people demonstrating their support for a particular party signals the strength of that party and the probability of its winning the next election. As a result, more voters would like to join in. In other words, the higher is the number of people openly supporting a party, the higher is the probability of more people doing so. There is, therefore, a strong *contagion effect* in voting behaviour.

There is a substantial literature on patron-client relationship between the incumbent party and the voters. Though the term 'clientelism' has been used to mean different things by different authors[7] in general it has been used to describe a situation where the incumbent government doles out political favours to a select group of voters in exchange of their political loyalty. Most of the literature on clientelism is empirical and a flavour of that empirical literature can be had from Kitschelt and Wilkinson (2007). In addition, the studies by Wantchekon (2003) on Benin, by Stokes (2005) on Argentina and by Khemani (2004), Sarkar (2006), and Bardhan, Mitra, and Sarkar (2009) on India are some of the contributions to the empirical literature on clientelism.

In comparison, the theoretical literature on clientelism is scanty. There is a theory of 'machine politics' where ruling parties make more transfers to better affinity groups [Dixit and Londregan(1995), Grossman and Helpman (1996)]. In another class of models, parties pre-commit through patrons (often local leaders) to clients (voters) [Keefer (2003), Keefer and Vlaicu (2008)]. The present paper develops an argument based on a third kind of patron-client relationship between political parties and voters where implicitly parties protect the semi-legal economic existence of voters belonging to the informal sector and where voters do not have any ideological stance so that they can freely shift their allegiance on the basis of their perceived benefits.

IV. Clientelism, Contagious Voting and the Quality of Democracy

How does clientelism explain poor functioning of democracy in general and low quality of governance in particular? For the sake of clarity let us suppose that there are two types of voters in the country: clientelistic voters and non-clientelistic voters. Clientelistic voters vote on a *quid pro quo* basis, that is, they exchange their votes and political allegiance for excludable personal benefits. The non-clientelistic voters, on the other hand, vote on the basis of past performance of the party in power. Let us treat the proportion of clientelistic and non-clientelistic voters as a parameter. Suppose further that the government, run by the party in power, can allocate its budget between two alternatives, spending on a non-excludable development good and spending on an excludable clientelistic good. The non-clientelistic voters vote for the incumbent if provision of the non-excludable development good is at a

satisfactory level. The clientelistic voters, on the other hand, only look at their personal gains from voting and hence take into consideration only clientelistic goods. It follows from the above structure that higher is the proportion of clientelistic voters, the lesser is the allocation of government budget to the development good. This, in turn, makes democracy non-functional, reduces the quality of governance and thwarts the process of development.

We can put the argument somewhat differently.Suppose voters are divided into informal sector voters and formal sector voters. A patron-client relationship between the incumbent party and informal sector voters leads to *contagious voting*. Each informal sector voter would like to vote for that party for whom most others are voting and hence has a higher probability of winning. For these voters, private benefits obtained from the ruling party are more important than the general performance of the government and the consequent state of the economy. This leads to the result that clientelism in general and an increase in the relative size of informal sector voters in particular, increases the tolerance level of the voters with respect to government inefficiency. This, in turn, induces the government to put in less effort which deteriorates the quality of democracy and the performance of the economy. A corollary of the result is that because of contagious voting, the probability of political change is lower in economies with a higher proportion of informal sector voters. A formal model using this argument is developed in Sarkar (2018).

The argument can also be used in a dynamic set-up to demonstrate perpetuation of underdevelopment. Suppose an economy starts with a high proportion of informality. Through the political process this leads to low quality governance which in turn compels the economy to start with yet higher proportion of informality in the next period. Only a miracle can save the economy from this trap.

V. Concluding Remarks

Our analysis attempted to capture certain key features of political reality in less developed economies. The key element of our analysis stems from the observation that in a less developed region for a significantly large number of people politics constitutes an integral part of their strategies for economic survival. As a result they cannot or do not vote freely according to their preferences. Chatterjee (2004) has called this a political society. People belonging to this society earn their bread in the informal sector where property rights are not well defined. They do not live by formal laws and norms. Some live illegally on government land, others encroach upon city streets to sell their ware. A third group, owning shops or small business, is exposed to the local thugs because it is too costly to get protection from the formal legal system. A fourth, earning its livelihood from the agricultural sector, crucially depends upon political favours to get seeds, water, fertilizers, credit and other inputs from the local bodies. All these people need political protection which is provided by political parties and especially

the one which is in power. If they were securely employed in the formal sector they could vote according to their free choices. But in the absence of a secured formal sector job, they are compelled to sell their votes, the other endowment they have apart from labour, for economic survival. They also provide political services like attending meetings and demonstrations organized by their patron political party. The present paper argued that this crucial aspect of political economy of a less developed region reduces the incentive of the government to put in resources and effort for development.

Notes :

[1]Freedom in the World, 2013

[2]The list of electoral democracies is taken from the list provided by Freedom House for 2012.

[3]produced by Daniel Kaufman and AartKraay and available at info.worldbank.org/governance/wgi/index.aspx#home

[4]All over the less developed world farmers get subsidies on fertilizers, seeds, credit, irrigation water and other inputs. The landless in the rural areas gets work from employment schemes and the homeless gets money to build houses.

[5]Shadow Economies All over the Worldby Schneider, Buehn and Montenegro, July, 2010.

[6]See *Kolkata Hawkers: A Chronicle of Deprivation, Discontent and Struggle* by Siuli Sarkar (2009) for an account of vulnerability of the street vendors of Kolkata.

[7]See *Clientelism as Political Monopoly* by Medina and Stokes (2002) for an account of the different senses in which the term has been used.

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Appendix

Country	Quality of Democracy (Score) 2008 - 2009	Relative Size of Informal Sector (Average 1999 - 2007)
Norway	87.4	18.7
Sweden	86.9	18.8
Finland	86.0	17.7
Switzerland	84.9	8.5
Denmark	83.9	17.7
Netherlands	82.9	13.2
Germany	81.1	16.0
New Zealand	81.8	12.4
Austria	79.7	9.7
Belgium	79.1	21.9
Ireland	81.4	15.8
Australia	79.8	14.0
Canada	79.8	15.7
United Kingdom	80.1	12.5
United States	78.7	8.6
France	77.2	15.0
Spain	77.9	22.5
Portugal	75.3	23.0
Slovenia	75.2	26.2
Japan	74.6	11.0
Israel	73.6	22.0
Estonia	73.3	31.2
Uruguay	72.1	50.6
Chile	71.3	19.3
Czech Republic	72.1	18.4
Korea, Rep.	70.7	26.8
Cyprus	72.0	28.0
Lithuania	71.1	32.0
Italy	71.8	27.0
Poland	70.3	27.2
Costa Rica	70.0	25.8
Argentina	69.1	25.3
Latvia	69.8	29.2
Slovak Republic	68.8	18.1

Hungary	70.0	24.4
Croatia	67.5	32.1
Greece	69.9	27.5
Mauritius	65.4	22.7
Jamaica	65.2	34.8
Panama	64.7	63.5
Bulgaria	65.1	35.3
Romania	63.7	32.6
Brazil	61.1	39.0
Peru	61.7	58.0
El Salvador	59.1	45.1
Trinidad and Tobago	61.1	33.4
Mongolia	58.0	17.6
Dominican Republic	59.4	31.9
Ecuador	58.2	32.4
Moldova	54.4	44.5
Mexico	57.6	30.0
Colombia	55.8	37.3
Philippines	54.0	41.6
Georgia	52.7	65.8
Bolivia	53.8	66.1
Albania	56.0	34.3
Ghana	54.0	40.6
South Africa	55.2	27.3
Turkey	53.8	31.3
Macedonia, FYR	53.3	37.6
Ukraine	57.3	49.7
Namibia	53.1	30.3
Thailand	51.2	50.6
Indonesia	52.4	18.9
India	52.3	22.2
Paraguay	54.1	38.8
Lesotho	50.9	30.5
Botswana	52.3	33.0
Tunisia	38.7	37.2
Papua New Guinea	51.3	36.7
Liberia	49.3	44.2
Guatemala	50.2	50.5
Senegal	48.5	43.8
Bosnia and Herzegovina	49.6	33.6
Bangladesh	47.0	35.3

Benin	47.0	49.8
Sierra Leone	44.5	45.6
Malawi	44.2	41.8
Tanzania	43.0	56.4
Zambia	39.8	47.1
Niger	39.1	40.4
Libya	25.9	33.7

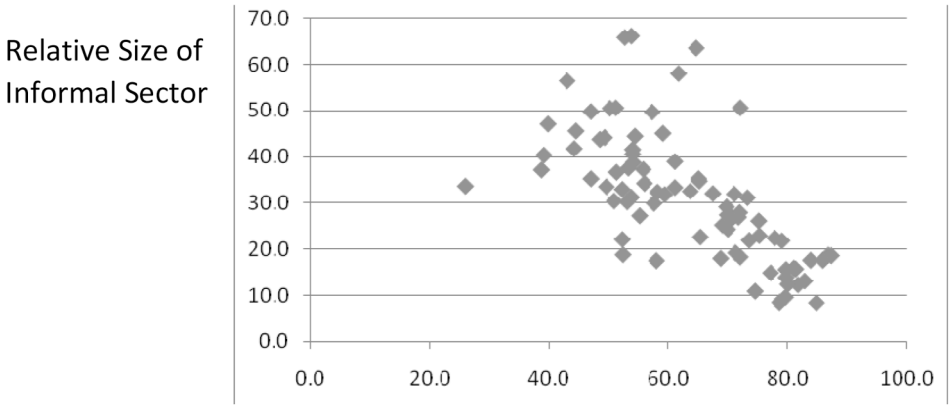

Figure 1

Artha Beekshan, Volume 27, No. 3, December 2018

INFLATION EXPECTATION SURVEY OF HOUSEHOLDS (IESH) IN INDIA: A CRITICAL ANALYSIS

Shreya Some*

Abstract

The focal area of enquiry for this research project is to analyze the predictive power of qualitative and quantitative inflation expectation of households in India. Besides various factors that affects inflation in India , in this paper an attempt has been made to find out whether the perception about inflation three months and one year ahead existing among various households have any impact on the realized rate of inflation in future. The probability approach has been used to derive quantitative estimates of inflation expectations from the qualitative survey data of Reserve Bank of India and different econometric tools like co-integration and regression have been used as per requirement. The paper subsequently analyses the Granger causality to check the direction of causality and recommended few changes in the survey procedure.

Key words: Consumer Price Index (CPI), Inflation Expectations Survey of Households, India.

JEL Classification: D12, D84, E31

I. Introduction

Inflation is considered to be a major economic problem in transition economies and thus fighting inflation and maintaining stable prices is the main objective of monetary authorities. Inflation needs to be kept under check for sustained growth and to prevent deterioration in the already low living stand-ards of India's poor. The negative consequences of inflation are well known. Inflation can result in a decrease in the purchasing power of the national currency leading to the aggravation of social conditions and living standards. High prices can also lead to uncertainty making domestic and foreign investors reluctant to invest in the economy. Moreover, inflated prices worsen the country's terms of trade by making domestic goods expensive on regional and world markets. To develop an effective monetary policy, central banks should possess information on the economic situation in the country, the behaviour and inter relationships of major macroeconomic indicators. Such information would enable the central bank to predict future macroeconomic developments and to react in a proper way to shocks the economy is subjected to.

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Thus, studying inflationary processes is an important issue for monetary economists all around the world. However, it is not an easy task, especially in developing countries, where economic processes are highly unstable and volatile. Since public inflationary expectations can provide valuable information about the outlook for inflation the evolution of these expectations receives special emphasis in any forward looking policy approach. Well anchored inflation expectations facilitate the monetary policy response to adverse supply shocks there by enabling central banks to stabilize economic fluctuations more effectively.

Given this background, the focal area of enquiry is to analyze the predictive power of qualitative and quantitative inflation expectation of households in India. Besides various factors that affects inflation in India , in this paper an attempt has been made to find out whether the perception about inflation three months and one year ahead existing among various households have any impact on the realized rate of inflation in future. The results of the econometric estimation are quite interesting to note and give us conclusions which can help the central bank to control inflation effectively in the future.

Given this background, the research question in this study is: Does qualitative information on inflation expectation helps in predicting actual inflation better than the quantitative information?. If so then the survey questionnaire should be redesigned.

To quantify the qualitative information the famous Carlson Parkin mechanism (see Section 2) has been used and between the two measures of quantitative expectation data reported in IESH (Inflation Expectations Survey of Households) mean has been used in this paper. Different econometric tools like cointegration, regression and Granger causality test have been used for analysis.

This paper can be divided into the following sections: Section II talks about various measures of inflation and inflation expectation in India. Section III presents a detailed discussion about the methodology used, data sources along with the findings. In section IV concludes with some recommendations.

II. Brief discussion on measures of inflation and inflation expectation in India

Three different price indices are published in India by RBI: the wholesale price index (WPI); the consumer price index (CPI), which is calculated for three different types of workers (those in the industrial, urban non-manual, and agricultural/rural sectors); and the GDP deflator. The WPI is available weekly, with a lag of two weeks for the provisional index and ten week lag for the final index. The CPI is available monthly, with a lag of about a month, and the GDP deflator is available only annually.

In most countries, the main focus is placed on the CPI for assessing inflationary trends, both because it is usually the index where most statistical resources are placed and because

it most closely represents the cost of living (and is therefore most appropriate in terms of the welfare of the individuals in the economy). In India, previously, the main focus was placed on WPI because it has a broader coverage and is published on a more frequent and timely basis (Some, 2017). This study uses CPI because it is more relevant in measuring the inflation as it impacts on households. The CPI for industrial workers, the most commonly quoted of the three CPI measures, covers 260 commodities, and is more heavily weighted toward food items which account for nearly 60 percent of the index. Also, the Urjit Patel committee has recommended the usage of CPI for assessing inflationary trend.

Measures of expected inflation are also of interest by themselves, as forecasting inflation is a major task of any central bank. Measures of expected inflation will play an important role in any such exercise, given that what firms and households expect inflation to be over various horizons influences their wage and price decisions, thereby feeding into the measured inflation rate. Figuret1 will help to have a more clear view of the theory. The perception on current inflation rate and expectations for three-month ahead and one-year ahead inflation from round 12 (September 2008) to round 34 (March 2014) are presented in Figure 1.

It represents the average of inflation rate reported by 4,000 households. Though these inflation expectations provide useful inputs on directional movements of future inflation, these are not to be treated as forecast of any official measure of inflation.

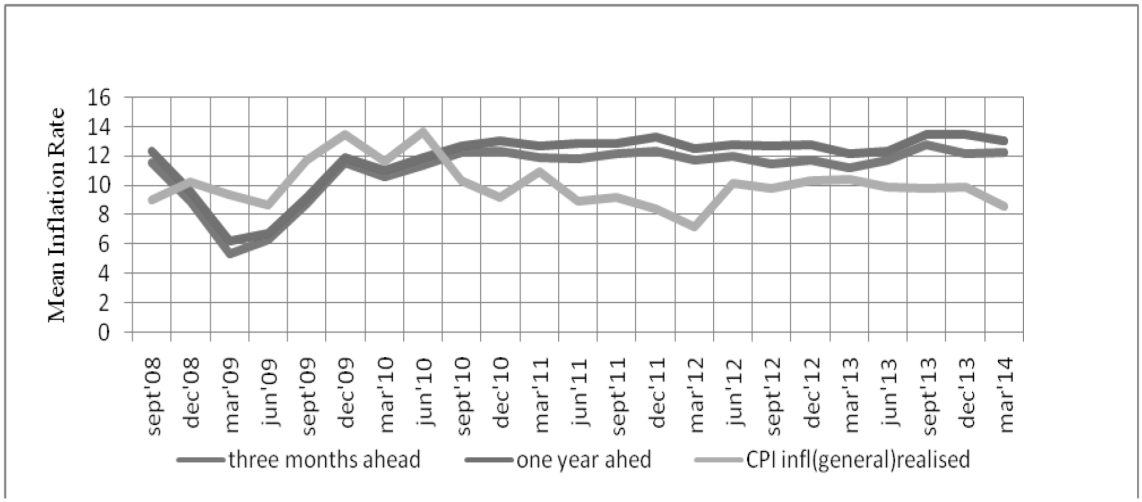

Figure 1 : Mean Inflation Rates, India

III. *Methodology:*

A. Quantifying inflationary expectations:

Three methods to quantify inflationary expectations have been used extensively in the literature: the method of balance statistics, the probability method and the regression method. This paper uses probability method.

Probability methods used in the empirical literature refer to the seminal Carlson-Parkin (1975) approach. It was originally tailored to survey questions with three response categories (i.e. 'prices will increase', 'prices will stay the same', 'prices will fall'). To suit survey questions with five response categories the method was modified with the aim to use all information embodied in the survey data (e.g. Batchelor and Orr 1988). This modified method does not impose unbiasedness of inflation expectations. There are however some assumptions to be made. The first one: the expected rate of price change is usually assumed to be normally distributed in the population. Two kinds of proxies are used in the literature to the measure the perceived price change used in probability methods to scale survey responses: the most recent official inflation figure available to respondents when the survey is carried out (e.g. Forsells and Kenny 2004) , described as 'objectified' or the measure derived on the basis of an additional survey question concerning price past developments (e.g. Duarte and Rua 2007) described as 'subjectified'.

Another feature of the probability approach is thinking in terms of 'sensitivity intervals' or 'indifference intervals'. It is assumed that among respondents reporting that prices will be stable there are not only individuals expecting that future inflation will be equal exactly to zero, but also agents, whose expectations fall within a sensitivity interval centered on zero: ("l, l). In the case of polychotomous survey question there is another sensitivity interval surrounding the perceived rate of price change, ðp . It is assumed that the response that 'prices will increase at the same rate' will be chosen by respondents expecting that future inflation will fall within an interval centered on the perceived rate of inflation: (ðp"s ,ðp+s). As a result, respondents are supposed to declare that 'prices will increase more rapidly' if their expectations exceed the upper limit of the sensitivity interval centered on the perceived inflation. The response 'prices will increase at slower rate' is chosen by respondents whose expectations are between the upper limit of the sensitivity interval surrounding zero and the lower limit of the sensitivity interval centered on the perceived inflation, while the response that 'prices will fall' by individuals whose expectations are below the lower limit of the sensitivity interval centered on zero.

The logic of probability methods may be expressed in the set of following equations, in which individual percentages of respondents are expressed in terms of the probabilities of future inflation being in certain intervals:

$$a_{1t}^{e} = \Pr(\pi_t^{e} \geq \pi_t^{p} + s_t) = \int f_t(\pi_t^{e})\, d\pi_t^{e}$$

$$a_{2t}^{e} = \Pr(\pi_t^{p} - s_t \leq \pi_t^{e} \leq \pi_t^{p} + s_t) = \int f_t(\pi_t^{e})\, d\pi_t^{e}$$

$$a_{3t}^{e} = \Pr(l_t \leq \pi_t^{e} \leq \pi_t^{p} - s_t) = \int f_t(\pi_t^{e})\, d\pi_t^{e}$$

$$b_t^{e} = \Pr(-l_t \leq \pi_t^{e} \leq l_t) = \int f_t(\pi_t^{e})\, d\pi_t^{e}$$

$$c_t^{e} = \Pr(\pi_t^{e} \leq -l_t) = \int f_t(\pi_t^{e})\, d\pi_t^{e}$$

where $f_t(\eth_t^{e})$ denotes density function of the expected inflation. This system of equations illustrates a general idea of probability methods, independently of the type of the distribution of expected inflation assumed. It should be noted that in the equations above individual fractions of respondents are subject to a transformation in order to account for the existence of a fraction de of individuals selecting 'do not know' response category.

Assuming the normal distribution (see figure 2)of the expected inflation and solving the above equations leads to the following results for its mean, standard deviation and both sensitivity intervals:

$$Đ_t^{e} = \frac{\pi p(G+H)}{G+H-(E+F)} \quad \text{..... (1A)}$$

$$\sigma_t = \frac{2.\pi p}{G+H-(E+F)} \quad \text{..... (2A)}$$

$$s_t = \frac{\pi p(F-E)}{G+H-(E+F)} \quad \text{..... (3A)}$$

$$l_t = \frac{\pi p(H-G)}{G+H-(E+F)} \quad \text{..... (4A)}$$

where $E = N z^{-1}(1 - a_{1t}^{e})$,

$F = N z^{-1}(1 - a_{1t}^{e} - a_{2t}^{e})$,

$G = N z^{-1}(1 - a_{1t}^{e} - a_{2t}^{e} - a_{3t}^{e})$,

$H = N z^{-1}(c_t^{e})$

and $N z^{-1}$denotes the inverse standard-normal cumulative distribution function.

In line with the construction of the survey question, a quantitative measure of inflation expectations and its standard deviation depends upon two factors, that is on responses to the survey question and on the perceived rate of inflation

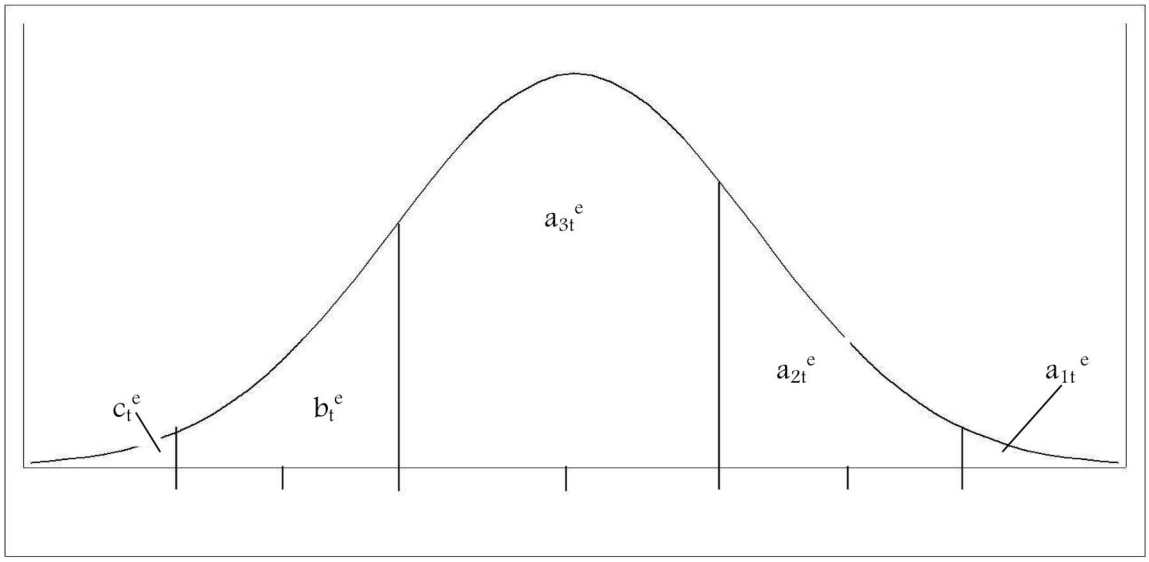

Figure2: Graphical presentation of adjusted Carlson-Parkin approach

There are different probability methods to quantify perceived rate of inflation on the basis of qualitative survey data. One of them, employed in some studies on European consumer inflation expectations (e.g. Forsells and Kenny 2004), uses the condition of unbiasedness of the perceived inflation. However, due to some limitations of that approach – caused mainly by the need to aggregate fractions of respondents claiming that 'prices are much higher', 'moderately higher' and 'a little higher' – the approach suggested by Duarte and Rua (2007), seems more adequate.

The logic behind it is the same as in the case of quantification of the expected inflation on the basis of five-response survey questions. Response categories are reinterpreted by assuming that answering the survey question respondents compare price dynamics perceived by them with a 'natural' rate of inflation or a 'moderate' rate of inflation, which reflects the permanent or trend rate of price change and can be approximated by smoothing the actual inflation (with HP filter, moving averages etc.). Respondents declaring that 'prices have risen a lot' are assumed to think that current inflation is higher than trend inflation plus a sensitivity parameter. Inflation perceived by respondents claiming that 'prices have risen moderately' is assumed to fall within sensitivity interval surrounding trend inflation. Implied price changes perceived by the remaining fractions of respondents are determined in analogous way.

The expected rates of inflation are calculated by using equation (1A) given in the analysis described in detail above. For the general prices the formula used the percentage of respondents each category available from the survey data and also the last year's realized rate of inflation is taken as the proxy for the perceived inflation rate (πp).

Table 1: Data Sources

Variables	Source	Link	Frequency
Inflation expectation Survey of Households	RBI publication	http://www.rbi.org.in/	Quarterly
CPI-General inflation	Database on Indian Economy & Current statistics	http://dbie.rbi.org.in/	Annually
Food inflation	Ministry Of Statistics And Program Implementation, Central Statistics Office	http://mospi.nic.in/	Monthly, quarterly, annually
Non food inflation	Database on Indian Economy	http://dbie.rbi.org.in/	Quarterly
Housing inflation	Database on Indian Economy	http://dbie.rbi.org.in/	Quarterly

B. Engel- Granger Cointegration

To analyze whether the quantitative and the qualitative expected series have any predictive power on the actual rate of inflation individually, initially cointegration has been carried out. Note that the analysis has been done in four parts:

i) General inflation

ii)Food inflation

iii) Non food inflation

iv) Housing inflation.

To carry out the analysis each of the variables are checked for stationarity by the Augmented Dickey Fuller (ADF) tests (refer table 4a, 4b, 4c, 4d and 4e in Annex) since there exists no issue of heteroskedasticity . Moreover the sample size is not enough to allow for other asymptotic tests like KPSS.

The qualitative data series that has been quantified using Carlson Parkin method for econometric analysis has shown interesting results. There exists cointegrating relationship between the series AFI and QF12 and the series DAHI and QH3. Hence for two groups (food and housing) out of four, qualitative inflation expectation, has the power to predict realized inflation.

On the other hand for general and nonfood inflation, the realized inflation series are stationary so no cointegrating relationship is possible. Hence some sort of structural modeling in subpart

C has been performed for general and non food inflation, just to examine whether there exists any predictive power of household expectation on realized inflation.

C: Regression Analysis

The functional form of the regression equation for General inflation:

AI = f {DQI3(-1),DQI12(-4),EI3(-1),EI12(-4)},

Note that to carry out a multivariate ordinary least square regression between the variables it is imperative to first convert the variables into stationary series. The non stationary series were converted into stationary ones by the method of first order of differencing which makes it stationary by removing the trend component from it. The quantitative inflation expectation series, both for three months ahead (EI3) and one year ahead (EI12), are absolutely stationary.

The stochastic regression equation is:

$AI = á + â_1 DQI3(-1) + â_2 DQI12(-4) + â_3 EI3(-1) + â_4 EI12(-4) + μ,$

where DQI3(-1) is one period lag of the first difference of QI3

DQI12(-4) is four period lag of the first difference of QI12,

EI3(-1) is one period lag of EI3,

EI12(-4) is one period lag of EI12,

AI is the realized rate of general inflation that are officially published.

μ is the error term

á is the constant

â is the slope coefficient.

Various models have been tried out to examine whether there exists any effect of household expectation on realized inflation and the above model has proved to be the best fit (table 3.1 a in annex) as the model nearly explains 75% of the variation in realized rate of general inflation. Note that one period lag refers to three months ahead and four period lag is for one year ahead since data are quarterly.

The regression equation that came out considering AI as the dependent variable:

AI = 26.089 + 0.096 DQI3(-1) -0.056DQI12(-4) -1.129EI3(-1) -0.247EI12(-4)

(0.0000) (0.0446) (0.4673) (0.0011) (0.0647)

The result shows that not only the qualitative information but also the quantitative information about expectation affects realized general inflation as DQI3(-1) and EI3(-1) are significant at 5% level. Moreover DQI3(-1) and AI are positively related implying that if household expectation rises then realized general inflation rises by .096 units but interestingly if EI3(-1) rises then realized general inflation falls by 1.129 units, p-values are given in the parenthesis.

For nonfood inflation, only the coefficient of EI3(-1) is significant at 10% level(table 3.2b in annex) when bivariate OLS is performed but the model is not a good fit. Hence much cannot be predicted from this.

D: Granger Causality Test

A time series X is said to Granger-cause Y if it can be shown, usually through a series of t-tests and F-tests on lagged values of X (and with lagged values of Y also included), that those X values provide statistically significant information about future values of Y.

If a time series is a stationary process, the test is performed using the level values of two (or more) variables. If the variables are non-stationary, then the test is done using first (or higher) differences. In fact Granger and Newbold (1974) noted that the results of the Granger Causality tests using non-stationary variables will lead to spurious regression. The number of lags to be included is usually chosen using an information criterion, such as the Akaike information criterion or the Schwarz information criterion. Any particular lagged value of one of the variables is retained in the regression if (1) it is significant according to a t-test, and (2) it and the other lagged values of the variable jointly add explanatory power to the model according to an F-test .Then the null hypothesis of no Granger causality is not rejected if and only if no lagged values of an explanatory variable have been retained in the regression.

Based on the probability values reported in the table 3.1a, b, the hypothesis that DAFI does not Granger Cause DQF12 cannot be rejected, but the hypothesis that DQF12 does not Granger cause DAFI can be rejected. Therefore, it appears that Granger causality runs one way, from DQF12 to DAFI, but not the other way. This finding suffices to the former finding that for food inflation the qualitative data for one year ahead has a good predictive power. This is quite natural as maximum portion of consumers' budget is spend on food so if their expectations about future food prices always feed into their consumption decision now and in future ,causing a in demand leading to food inflation. The same perception of future price hike incentivizes producers to hoard food items now creating shortage of supply and hence reinforcing food inflation.

Similarly, DQH3 Granger causes D^2AHI but not the other way round (table 3.2). One real life example of this finding can be the housing bubble that created the crisis termed as "Global Meltdown". Though India was initially not hit very hard by this global crisis but such cases

can occur (further studies are necessary for final conclusion). If speculators who are interested in real estate business have some expectation of price hike in future say three months ahead then they will be incentivized to invest now in search of speculative gains in future. This can hamper growth as this is a very risky area to venture into for India.

IV. Summary with Recommendations:

Surveys are useful because they provide independent (or relatively non-model dependent) measures of inflation expectations, a key variable that a central bank can use in its design of an optimal monetary policy geared toward the achievement of price stability. Using the approach set out in Carlson Parkin (1975) and then modified by Batchelor and Orr 1988 to incorporate all information included in the survey, the probability approach is used to derive quantitative estimates of inflation expectations from the qualitative data of the Inflation Expectations Survey of Households (IESH) conducted by Reserve Bank of India.

The results suggest two important things.Firstly, there exists long term relationship between qualitative inflation expectation and realized inflation. In other words, consumers' expectations are shown to provide a reasonably accurate predictor of housing inflation three months ahead and food inflation now, hence information on these qualitative expectations are indeed very useful for predictive purposes. Therefore RBI may continue this qualitative portion of the survey schedule. On the other hand, no relationship exists between quantitative information and realized information so RBI may drop such questions regarding food and household inflation from the survey schedule and thereafter use the Carlson Parkin Methodology to estimate the mean and the standard deviation from the qualitative information. Secondly, there exists no such relationship between quantitative inflation expectation and realized inflation but the structural model predict some sort of a immediate relationship between both qualitative and quantitative responses of households with the realized rate of inflation regarding general and nonfood inflation. Overall, the evidence from the Granger causality test when combined with the results from cointegration provides various crucial linkages, for example qualitative information about food and household expectation causes the necessary changes in food and housing inflation respectively though not immediately but after some lags. The inference from multivariate regression also tells the same story i.e qualitative responses reinforces inflation further but quantitative responses always over predict inflation. These results suffice to intuitive arguments and may help the monetary authority to take necessary monetary policies to stabilize prices, one of the major issues these days.

Moreover there are various problems related to the method of sampling used. One such problem is of randomization where the investigators are provided with various pin codes to carry out their surveys that is basically they are free to choose any household existing in those pin codes.

Problem of representativeness also exists. This type of sampling is a mixture of both purposive and scientific sampling. Hence a good sampling framework is the pre-requisite for any further investigation like testing of bias, error correction mechanism etc

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Annexure:

Table 2a[α]: Unit root tests (general inflation)

ADF	AI	D AI	D ^{2}AI	QI3	D QI3	QI12	D QI12
	-3.97**	-5.57*	-6.09*	-2.85	-4.38**	-2.74	-4.23**

Table 2b[β]: Unit root tests (food inflation)

ADF	AFI	D AFI	QF3	D QF3	QF12	D QF12
	-2.20	-4.79**	-2.69	-6.04**	-2.68	-5.73**

Table 2c[©]: Unit root tests(housing inflation)

ADF	AHI	D AHI	D ^{2}AHI	QH3	D QH3	QI12
	-3.05	-1.61	-9.80**	-2.91	-4.37**	-3.66**

.Table 2d[#]: Unit root test(nonfood inflation)

ADF	ANI	QN3	D QN3	QN12	D QN12
	-4.31**	-1.918	-5.06*	-2.16	-5.05*

Table 2e[μ]: Unit root test for the estimated errors in each of the four cases.

ADF	UFI(3)	UFI(12)	UHI(3)
	-0.36	-2.81**	-1.70*

[á] Notes: AI is actual inflation(realized), QI3 is expected inflation (3 months before) QI12 is expected inflation (12 months before).This is for general inflation.

[â] Notes: AFI is actual inflation(realized), QF3 is expected inflation (3 months before) QF12 is expected inflation (12 months before).This is for food inflation.

[©] Notes: AHI is actual inflation(realized), QH3 is expected inflation (3 months before) QH12 is expected inflation (12 months before).This is for housing inflation.

[#] Notes: ANI is actual inflation(realized), QN3 is expected inflation (3 months before) QN12 is expected inflation (12 months before).This is for nonfood inflation.

[μ]Notes: UI is estimated error for general inflation .UFI is estimated error for food inflation. UHI is estimated error for housing inflation. The number in the parenthesis denotes numbers of months.

ADF presents the augmented Dickey-Fuller test-statistic for the null hypothesis of a unit root in the indicated series against the alternative hypothesis of stationarity. D denotes the first difference of the series D^2 denotes the second difference of the series. D^3 denotes the third difference of the series. ** indicates that it is possible to reject the null of a unit root at the 5% level of significance and * indicates that it is possible to reject the null of a unit root at the 1% level of significance

Tables 3.1a: Ordinary Least Square

Dependent Variable: AI

Method: Least Squares

Date: 06/19/14 Time: 14:34

Sample (adjusted): 2009Q4 2014Q1

Included observations: 18 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	26.08968	2.640152	9.881886	0.0000
DQI3(-1)	0.096457	0.043408	2.222092	0.0446
DQI12(-4)	-0.056156	0.075000	-0.748749	0.4673
EI3(-1)	-1.129601	0.272403	-4.146795	0.0011
EI12(-4)	-0.247211	0.122491	-2.018187	0.0647*

R-squared	0.807936	Mean dependent var	10.09333
Adjusted R-squared	0.748839	S.D. dependent var	1.624645
S.E. of regression	0.814206	Akaike info criterion	2.656927
Sum squared residual	8.618110	Schwarz criterion	2.904252
Log likelihood	-18.91234	Hannan-Quinn criterion .	2.691029
F-statistic	13.67143	Durbin-Watson stat	1.943392
Prob(F-statistic)	0.000138		

Table 3.1 b

Dependent Variable: ANI

Method: Least Squares

Date: 06/19/14 Time: 14:39

Sample (adjusted): 2008Q4 2014Q1

Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.311702	1.801098	3.504364	0.0022
EI3(-1)	0.293694	0.161164	1.822331	0.0834*

R-squared	0.142400	Mean dependent var	9.545000
Adjusted R-squared	0.099520	S.D. dependent var	1.530959
S.E. of regression	1.452783	Akaike info criterion	3.671347
Sum squared resid	42.21155	Schwarz criterion	3.770532
Log likelihood	-38.38481	Hannan-Quinn criter.	3.694712
F-statistic	3.320890	Durbin-Watson stat	1.390042
Prob(F-statistic)	0.083393		

indicates that it is possible to reject the null of a unit root at the 5% level of significance

*indicates that it is possible to reject the null of a unit root at the 10% level of significance

Tables 3.2: Pairwise Granger Causality Test

1)Pairwise Granger Causality Tests

Date: 06/16/14 Time: 10:44

Sample: 9/01/2008 3/01/2014

Lags: 2***

Null Hypothesis:	Obs	F-Statistic	Prob.
DQF12 does not Granger Cause D AFI	20	4.56943	0.0282*
D AFI does not Granger Cause DQF12	0.05871	0.9435	

2)Pairwise Granger Causality Tests

Date: 06/11/14 Time: 15:07

Sample: 9/01/2008 3/01/2014

Lags: 2***

Null Hypothesis:	Obs	F-Statistic	Prob.
D QH3 does not Granger Cause D ^{2}AHI	19	2.75537	0.0979**
D^{2}AHI does not Granger Cause DQH3		0.86701	0.4416

*significant at 5%

** significant at 10%

*** In general, it is better to use more rather than fewer lags, since the theory is couched in terms of the relevance of all past information. One should pick a lag length that corresponds to reasonable beliefs about the longest time over which one of the variables could help predict the other.

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KEYNES, DASGUPTA AND BEYOND: TOWARDS A TRANSITION TO STRUCTURALIST MARCROECONOMICS.*

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Abstract

This paper looks at the roots of transition process in economic theory linking the economics of Keynes, A.k.Dasgupta , and the modern structuralist approach to macroeconomics for developing economies.It is argued that Dasgupta's vision about the applicability of Keynesian macroeconomics for the developing economies constitutes the basis of what modern day macroeconomic theory characterize as Structualist Macroeconomics , displaying demand as well as supply constraints in such economies and the underlying adjustment mechanisms and policy implications.

Keywords : Keynes and effective demand, Dasgupta , Underdeveloped Economies, Structuralist Macromodels.

JEL Classification Codes :B21, E12,E 65.

Among the Indian economists who reflected on economic theory and development process of the Indian economy during the early days, Professor Amiya Kumar Dasgupta was definitely the leading pioneer, and it is my privilege to deliver this Annual lecture in the memory of this great mind that India had produced. I am thankful to the Bangiya Arthaniti Parishad, and particularly to Dr. Alaknanda Patel for giving this honour to me. I am aware of the challenges that I inherit from my illustrious predecessors who had given this prestigious lecture in the past. Amiya Kumar Dasgupta is considered the doyen of theoretical economics in India during that time , and many of his writings are considered as "Vintage" writings by stalwarts like V.R.Panchamukhi and others. Among what he wrote and authored, was the classic 1954 Economic Weekly paper entitled *Keynesian Economics and Underdeveloped Countries,* followed by another classic monograph entitled *Epochs in Economic Theory*, written in his late years. In these materials, Dasgupta's reflections on the stages of evolution of economics discipline in general, and the process of economic development in less developed economies in particular , are noteworthy and important, and I shall develop my lecture from the ideas that he left at that stage. It may be noted that Dasgupta's Economic Weekly paper was

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slightly prior to Arthur Lewis's classic Manchester School article on Unlimited Labour Supplies or Surplus Labour in underdeveloped nations in Asia, Africa and Latin America, and together these two pieces are considered as the foundations of modern day development economics.

In my lecture , I shall speak on Keynes, Dasgupta and Beyond taking cues from some of his writings to focus on the evolution of contemporary sub-discipline in the domain of economics science, namely *structuralist macroeconomics* , which has influenced contemporary discussions on economic processes and policy designs, particularly in the so-called less developed economies. This is my humble tribute to this great scholar and thinker. I shall argue that apart from suggesting a theoretical framework to study economic development of an agrarian economy, in which he used a Ricardian framework, Dasgupta also suggested the operation of multiple constraints simultaneously in LDCs, which was developed later as Structuralist Macroecomoics since the 1980s.

I.KEYNES

The debate in macroeconomics since the days of Classical economists like Marshall and Pigou essentially revolves around two issues: Automatic transition to full employment equilibrium from non-equilibria situations, and Neutrality of money , making equilibrium solutions in the real sectors of the economy totally independent of the changes in the monetary stock or its demand in the economy. Keynes, in his General Theory, had shown that if the economy is stuck with an equilibrium with involuntary unemployment, there is no automatic mechanism that makes its transition to full employment equilibrium possible. Full employment may be attained only by accident, and unemployment in general prevails, constrained by demand constraint operating in the economy. Money is non-neutral in the Keynesian system, as the changes in its supply or demand affects the equilibrium rate of interest, which affects investment decisions and thereby affect real aggregate output and employment in the economy. The followers of the Classical macroeconomic thought have argued that Keynes obtained unemployment as a *special case* of the classical theory because of his assumption of special rigidities in the free operation of the price system in the form of the downward rigidity of money wages , liquidity trap and interest-inelasticity of saving and investment decisions . These rigidities stand in the way of obtaining full employment equilibrium in a capitalist economy. The debate turned into the question of generality or otherwise of the two approaches to macroeconomics –*Keynes vs the Classics*, to which John Hicks had attempted a synthesis in terms of his *SILL* diagram, later popularized as the *IS-LM* framework. Lawrence Klein's *Keynesian Revolution* is also an attempt at such integration, with variable price level , but the problem remains.

The Keynes vs Classics debate turned into a Keynesian counter - revolution in the 1970s.This followed as a sequel to the neoclassical synthesis led by the seminal work by Don

Patinkin in 1965. The basic problem noted in the context of Keynes's construction of the General Theory was the integration between value theory and monetary theory. Neoclassical synthesis posits the value theory as equivalent to the theory of general equilibrium of the Walrasian variety with tatonnement mechanism to set the correct set of market clearing prices, where all markets, including money and labour markets are simultaneously in balance. The fact that such simultaneous equilibria in all markets do not hold in practice due to informational and structural asymmetries and frictions , has resulted in the consideration of multi-market non-Walrasian equilibria with rationing to explain unemployment and inflation . Following Patinkin and Clower, neo-Keynesian disequilibrium models with quantity rationing have been developed by Barro and Grossman, Malinvaud , Hahn and Benassy , among others , mainly towards the end of 1970s and the whole of 1980s . They distinguished between Classical unemployment with excess supply in labour market and excess demand in commodity market , and Keynesian unemployment with excess supply in both labour and commodity markets. The short-side rule determines which constraint is binding and hence the consequential disequilibrium.

It has been argued by Malinvaud (1977) and following him, Benassy (1986) that when unemployment (excess supply in the labour market) coexists with excess supply in the commodity market, it is Keynesian unemployment, whereas when unemployment coexists with excess demand in the commodity market, it is considered as classical unemployment. In the absence of a real balance effect, a low real wage aggravates the problem of effective demand via income distribution towards the thriftier class and thus creates excess supply in the commodity market. On the other hand, too high a real wage rate diminishes the profitability of investment and output, and as a result creates excess demand in the commodity market. The basic clue to the above distinction between two types of unemployment rests upon two opposing effects on the level of aggregate employment and output following variations in real wage rate. John Hicks (1974) distinguished between a 'savings effect' and a 'substitution effect' of a change in real wage rate to focus on how these contradictory forces operate on the level of employment and output. A higher real wage rate stimulates effective demand by reducing savings through the redistribution of income from profits to wages (on the assumption that $s_p > s_w$), whereas a higher real wage rate also tends to depress the profitability of producers and induce substitution against labour – intensive methods of production thereby reducing the demand for labour. Bhaduri and Marglin (1990) have shown that the old wage–cut controversy between Pigou and Keynes could be resolved if we acknowledge the twin effects of a wage cut (for a given price level). Wage cut encourages under -consumption by reducing wage bill via redistribution towards profits, and it accelerates investment by enhancing profitability via unit cost reduction .The net effect on aggregate output and employment depends on which effect dominates. If the first effect dominates then a Keynesian unemployment would ensue with a low real wage rate and vice versa. On the other hand, if

the second effect dominates then a classical unemployment would ensue even with a low real wage rate and conversely. Thus a policy of wage reduction would not necessarily stimulate employment as argued by the proponents of classical macroeconomics or the fixed price non-Walrasian macro-economists like Malinvaud and Benassy. In fact , the failure of the non-Walrasian models to explain realisation of profits in the investment goods sector arises from the fact that demand is endogenous for the consumption goods sector, whereas it is exogenous for the investment goods sector.

According to Paul Davidson (2007), Keynes's revolution in macroeconomic theory essentially revolves around his rejection of the three axioms of the Classical economic theory of aggregate output and employment, enunciated by Pigou, namely "neutrality of money", "gross substitutability", and "ergodicity" axioms. Keynes provided a more general framework with fewer axioms to drive home the essentiality of effective demand as the principal determinant of aggregate output and employment in a free enterprise capitalist monetary economy. Keynes argued that the potential of insufficient aggregate demand standing as a constraint to automatic transition to full employment in a capitalist economy arises from the possibility that saving prevents current production from being automatically consumed, and the leakage or gap cannot automatically filled in because of uncertainty of investment, due to the animal spirit of businessman or what may be described as the consequence of *expectation not being right.* The neutrality of money proposition states that "changes in the quantity of money in the economy have absolutely no effect on the aggregate level of employment and production in the system". The mainstream interpretation of Keynes's emphasis on effective demand hinges on the rejection of the above neutrality proposition based on nominal rigidity of wages and prices. This argument is flawed, argues Davidson, because in a barter economy , the only way to save is to accumulate durable goods, such that savings automatically creates investment, and Says' Law holds by definition in such an economy as a matter of definition. This necessarily breaks down in a monetary economy, wherein money income may be saved by holding one's holding of liquid monetary asset, and this liquidity preference function is a result of choice between alternative assets under capital uncertainty , faced by the agents. To quote from the General Theory, "An *act of individual saving means—so to speak- a decision not to have dinner today. But it does not necessitate a decision to have a dinner or to buy a pair of books a week hence, or to consume any specific things at any specified date. …there is always an alternative to the ownership of real capital assets, namely the ownership of money and debts.*"Say's Law of markets necessarily breaks down in a monetary economy and with it break down the tenets of automaticity of full employment and monetary neutrality, and this is true independent of rigidity of nominal wages and prices. This means that even when all prices including the nominal wage rate are flexible, and may even adjust instantaneously, attainment of full employment equilibrium in the short run may be eluded in principle because of the paucity of aggregate effective demand. And such a paucity of effective

demand may nullify the Gross substitutability axiom of the Classical economic theory which presumes that prices would automatically fall to clear the market in the face of inadequate demand, because demand curves are necessarily downward sloping .This presumption of micro-theory that demand curves slope downward(which rests on the axiom of gross substitutability) is theoretically fragile at the macro-level—if price level of every good declines because of excess supply, where is the scope for substitution? And if the price level of everything falls, including labour, there is no change in the purchasing power of income in the aggregate because nominal incomes have fallen along with output prices, barring the real balance effect on consumption expenditure and interest rate effect on investment, deflation cannot boost aggregate demand and involuntary unemployment emerges in equilibrium – thus excess supply of labour coexists with excess supply in the commodity market. The wealth effect or the real balance effect- a la Pigou-Patinkin-Metzlar, even if it is present, is likely to be quantitatively tiny, and only relevant assets are outside monetary assets, which are relatively small proportion of total wealth. The interest rate effect is potentially more robust, but empirically weak. In line with Keynes' own enunciation in chapter 19 of the *General Theory* on long-run expectation, it is clear that deflation could be destabilizing, i.e. downward price and wage adjustment in the face of insufficient aggregate demand and unemployment makes things worse because of the following reasons—(a) redistribution of wealth from borrowers to lenders when debt contracts have fixed nominal terms;(b) reduced spending by indebted consumers who tighten their belts in an attempt to maintain individual budget constraints; (c) disruption to financial intermediation as deflation increases the incidence of default; and (4) the expectation that falling prices in the current period signal future declines, raising anticipated real rate of interest rates , incentivizing agents to defer- or curtail current expenditure. All these suggest that in the static framework, aggregate demand curve might be *upward sloping,* such that lower wages and prices induced by unemployment and deficient demand conditions could worsen the problem.

In fact, Keynes' treatment of uncertainty and long term expectations in chapter 19 of his *General Theory* indicates his rejection of the *ergodicity* axiom of Classical Economic theory: people do not know that they do not know, and only can form expectations which may not prove to be right. If your vision of the process of economic behavior is hundred years, you almost know what is there beyond that time, but if your adjustment process of economic behavior and decision making is one or two years, you really do not know what lies ahead, and are likely to err in your judgment regarding future investment prospects, and therefore planned investment may not be adequate to absorb planned savings in the short run, leading to the onset of demand deficiency and associated contraction that multiplier process may initiate (Leijonhufvud, 1968).Suppose the world is ergodic, but we have monetary exchange and there is no automatic mechanism to ensure that investment is adequate to absorb full employment savings. In such a case, the system will not automatically converge to Classical

full employment, even if investment and consumption decisions are based on expectation of an ergodic stochastic process. As a result, the failure of monetary neutrality and gross substitution together would work to give the centrality of effective demand principle –James Tobin called it "Keynes Mark I (Tobin, 1975).They also explain why insufficient aggregate demand prevents the free enterprise capitalist economy from fully employing its resources including labour and producing its potential output—neither interest rate nor wage-price adjustment provide an adequate answer to the problem. Davidson (2007) calls Keynes' rejection of ergodic uncertainty as "Keynes, Mark II". One may look to Keynes' *Treatise on Probability* as the source of his perception about uncertainty, and significant post-Keynesian contributions to the decisions under uncertainty around his line of argument include G.L.S.Shackle or Hyman Mynsky, the latter developing the theory of financial crisis in the post War capitalist economies.

II.DASGUPTA

Amiya Kumar Dasgupta traversed a wide field in the domain of economic analysis like theory of value and distribution, growth and development , money, international trade and public finance , and contributed significantly on economic planning ,wage policy, austerity, black markets, inflation, Gandhian economics, Marshallian theories, Keynesian economics and Marxian political economy and so on. Influenced by his contemporaries like Joan Robinson and Nicholas Kaldor, Dasgupta excelled in framing the temporal behaviour in economics within the framework of classical political economy, where the capitalist form of production, in its essential form, had evolved through crises and fluctuations, and in less developed nations like India the question of employment of surplus labour through the process of economic development became the focal point of his analysis. He considered General Theory as a *classic*, making a distinct epoch in economic theory, something on which historians of economic thought might find continuous interest. But the essential thrust of his argument was a *theoretical* one, which is related to the behavior of wage rate with employment, and its evolution through time—i.e. in the short run and the long run as was analysed by Marshall. He writes, "*The period of reference is a 'short period' over which, among other things, capital equipment and technique are given and constant, these being the result of past investment. Labour is employed upon a given capital equipment, and is pushed up to the margin of profitableness. A short period equilibrium is thus envisaged for the economy as a whole. However, although Keynes' analysis runs in terms of a short period, it does not preclude longer run inferences. For, a long period is a succession of short periods, each endowed with different capital equipment and carrying the legacy of the past.*"(Dasgupta, 1954).Thus it is clear that Keynes was inverting the Marshallian sequence of the behavior of the supply curve for a single industry between very short run , short run and the long run to depict the aggregate supply curve for the economy. In the domain of Marshallian analysis,

the very short run supply curve of a single firm or industry is a vertical one, as most of the factors of production are fixed, upward sloping in consonance with the profit maximizing behavior of producers when some factors become flexible and factor substitution is allowed, but becomes a horizontal one in the long run when all factors become flexible for use by the producer and profit maximization continues as an objective of the individual producer. For Keynes, who was interested in depicting the behavior of the aggregate supply curve in the very short run, short run and long run, the exact opposite sequence would be valid: in the very short run for the economy as a whole, if each individual producer faces only limited use of factors of production, in the aggregate resources and capacities remain idle, such that if demand for output is forthcoming, then supply would increase without any increase in the price level- a horizontal aggregate supply curve gives credence to Keynes's idea of effective demand led expansion of output in the very short run via what he called the *multiplier process*. The short run supply curve in Keynes for the economy as a whole is exactly the same as the Marshallian one for one industry within the ambit of profit maximization under perfect competition- thus micro transcends to macro exactly in the short run. In the long run, when every individual producers faces perfect flexibility in the use of the inputs – all factors are treated as variable for individual producer, no resources in the economy as a whole or no capacities installed could remain idle, such that the effective demand elasticity of output becomes zero – the aggregate supply curve becomes vertical, and we enter into the regime of demand determined prices in the long run for the economy as a whole. According to Keynes, this is the Classical full employment, which he argued that a capitalist economy could attain only by accident, and not as a general tendency. The general tendency is a characterization of very short or short run equilibrium for the economy as a whole with involuntary unemployment- a phenomenon of demand determined equilibrium from which a free enterprise capitalist economy does not automatically gravitate to full employment equilibrium in the long run. Augmentation of effective demand in such an economy is crucial in relaxing the demand-constraint, which requires outside government policy stimulus. While monetary stimulus may not suffice to initiate the process of demand expansion because of the peculiarities of expectation about future asset prices vis a- vis the current market rate of interest in the short run -a phenomenon that Keynes dubbed as 'liquidity trap'- a policy of direct fiscal expansion would relax the demand constraint and initiate the process of recovery from recession towards full employment equilibrium, no matter what the mode of financing the additional fiscal spending might be. This essentially is the Keynesian theory and Dasgupta concurs with Keynes' diagnosis and explanation. What Dasgupta questioned was the applicability of the Keynesian theoretical apparatus to explain the process of development in less developed nations, and he maintained that the applicability of the Keynesian theory in the context of underdeveloped economies could *at best be limited*. That was the basis of his famous 1954 classic paper

which slightly predates Arthur Lewis's much-quoted celebrated Manchester School paper on Surplus labour.

Dasgupta was engaged in a debate with V.K.R.Rao regarding whether the Indian Economy in the early 20th century was demand constrained or supply constrained, and how the process of its economic development could be explained. Dasgupta, who based his analysis of underdeveloped countries on the Ricardian model of real wage rigidity, to oppose the claim of V.K.R.V.Rao that Keynesian multiplier operates in a country like India. As early as 1942, while commenting on an important book on 'India's Fiscal Policy', Dasgupta raised the following set of questions:

"Is there anything like involuntary unemployment in this country? Is it not pertinent if one asks for a demonstration of its existence before one accepts any judgment of policy which begs so delicate an assumption? Mr. Keynes, I think, had the case of his own country in view when he enunciated his theory of involuntary unemployment. A country which is in an advanced state of economic development, where population is fast coming to a stationary level, and where, further, there exists a strong trade union organisation to resist any reduction of money wages, provides a peculiarly suitable soil for the application of Keynes' theory… Indian economy, on the other hand, is characterised by an entirely different set of conditions. It is not capital saturation, and surely not a refusal of the people to multiply that accounts for a low marginal efficiency of capital. The trade unions are just in their infancy and are not sufficiently organized, so that there is still scope for 'plasticity' of wage rates. General considerations suggest that mass unemployment, in this country, is mostly seasonal, although partly also it is due to inertia and lack of mobility of capital" (Dasgupta, 1942).

Dasgupta argues further,

"The relation of Keynesian economics to the problems of underdeveloped countries is a subject which has received wide attention from our economists recently. In a series of articles in the Indian Economic Review (Vol I, Nos 1, 2 and 3), Dr V K R V Rao called attention to the special features of underdeveloped economies and enquired to what extent the Keynesian propositions apply to these economies. It was a subject of discussion in the 1953 session of the Indian Economic Association, and a good many papers were devoted in the Conference to a consideration of this problem. In general, the authors, despite differences in emphasis on specific points, seem to come to the conclusion that Keynesian economics, insofar as it is formulated in the General Theory of Employment, Interest and Money, has little validity in the context of underdeveloped economies, that Keynesian involuntary unemployment is not the kind of unemployment from which these economies suffer, and that the problem in these economies is one of long-term economic development rather than the attainment of 'full employment' in the Keynesian sense."(Dasgupta, EPW, January 1954).

Dasgupta's characterization of Keynes' very short run equilibrium for an economy as demand constrained , and long run equilibrium as supply constrained , and the simultaneous operation of quantity and price adjustments in the short run macroeconomy, and his emphasis on structural rigidities in the underdeveloped economy, indicate the simultaneous operation of multiple constraints in different sectors of the economy of LDC in the short run , which tend to restrict the operation of Keynesian multiplier. As a result, Dasgupta was skeptical of the applicability of pure Keynesian theory in the context of underdeveloped economies. To quote Dasgupta (1954), "*The test of economic progress is not just maintenance of full employment. A country which is already advanced and has a high average standard of living can afford to take full employment as a unique goal of economic policy, a certain minimum level of growth being implicit in it. But for an under-developed country such as ours where in the past the rate of capital formation has failed to keep pace with the growth of population and where peoples' standard of living has been systematically pressed down, the essential test of economic progress is rising productivity of labour; maintenance of full employment is not enough. This is what makes the task of economic development of an under-developed economy so formidable*." This indeed is a difficult task, requiring lots of organizational efforts, managerial skills and planning involving inter-temporal choices based resource allocation in a mixed economy, and Dasgupta was candid in delineating the importance of such factors in the economic development of a poor backward nation like India.

Debates on the effectiveness of policy options notwithstanding, the assumption of fixed prices as the basis of disequilibrium revokes the question of rationality of such behaviour or their micro-economic foundations. Kalecki's theory of cost-plus mark-up pricing at an imperfectly competitive market structure with demand-determined output in the short-run provides a new escape route for Keynesian macro-theorist to salvage the non-Walrasian result of fixed price constrained disequilibria as explanation of Keynesian unemployment. The Polish economist Michael Kalecki made important theoretical contributions to this effect exploring the relationship between mark-up pricing, capacity utilisation, investment pattern and its financing and effective demand in a capitalist economy, both in the short run and in the long run. In a series of papers written between 1933 and 1942, Kalecki developed his theory of effective demand and income distribution for a capitalist economy, where the markets were imperfectly competitive. He argued that in a capitalist economy, since production is demand determined owing to the existence of under-utilised capacities, the spending behaviour of different income classes are important in determining the level of effective demand, given the distribution of income between wages and profits by the mark-up pricing by industrial capitalists. Kalecki assumes that all wages are consumed and that all profits are spent on capitalist's consumption and investment expenditure. It is the volume of investment expenditure which is crucial in determining the level of profit and the national income in a capitalist

economy, and therefore business upswing or downswing is crucially related to the fluctuations in investment demand and the factors underlying it.

Although there are important methodological and analytical differences between his analysis and those of Marx and Keynes , Kalecki's analysis of degree of monopoly based income distribution precisely fixes the real wage rate and hence does the same trick as the Marxian notion of '*rate of exploitation'*, or the Keynesian construct of wage unit does. His primary focus on consumption of wage goods and spending of wage bills on them constituted the core of modern discussions of macroeconomic adjustments under alternative forms of unemployment. Unlike Keynes, who had emphasised the importance of government spending as the panacea to overcome the deficiency of effective demand in a capitalist economy, Kalecki had argued that industrial capitalists would in general object to the maintenance of full employment through public investment because such large scale government intervention may dampen private confidence and crowd out private investment. Kalecki's emphasis on selective government control and planning for the priority sectors of the less developed economies, and his perception of social and political forces inhibiting the process of economic growth have important insights for the analysis of the dynamics of mixed economies and the political economy of their development. His use of the distinction between cost-determined and demand - determined prices for industrial and agricultural products constitutes the basis of present-day Structuralist macroeconomic modeling for the LDCs, with multiplicity of constraints operating in such economies at the same time. These constraints include : (a) the paucity of tangible capital stock required to expand capacities in the industrial sector, (b)unequal distribution of income and the effective demand constraint,(c) the paucity of foreign exchange and limited availability of foreign credit so that transformation possibilities through foreign trade get limited, (d) the small size of domestic savings , (e) low productivity in agriculture, i.e., slow growth of *'necessities'* like wage goods , and (f) the political constraints which limit the domain of public actions in the mobilisation of savings and investment . While the effective demand problem emanating from unequal income distribution and oligopolistic market structure may restrict industrial output in the short run, Kalecki has laid greater emphasis on the wage goods constraint which may initiate a process of inflation during the course of economic development, with adverse consequences for income distribution and growth. The capital shortage problem of the LDCs may be relaxed through the mechanism of raising the share of investment in national income for capital formation; such a process would however release extra demand for food and other necessities, whose growth being sluggish, would contribute to price increase. This is precisely the danger that Vakil and Bramhananda pointed out in their opposition to the Mahalanobis strategy of planning in India.

III. BEYOND: STRUCTURALIST MACROECONOMICS

The essential point of departure of Structuralist Macroeconomics is to recognize the presence of multitude of structures inherently built in the economic system that reflect the simultaneous existence of constraints in the macro-economy. Some of these constraints are in the nature of demand constraints and some are in the nature of supply constraints .In a less developed economy such constraints operate in different sectors of the economy at the same time at least in the short run. A typical example of supply constraint in such a less developed economy is its agricultural sector, while its industrial sector may face demand constraint due to the insufficiency of demand for output arising due to difference in spending patterns of agents at different levels of income distribution. Lance Taylor (1983) and Mihir Rakshit (1982) have developed short run structuralist macro models for LDCs using the Keynesian principle of effective demand and Kalecki's notion of income distribution and effective demand. Such models can be extended to the open economy analysis to examine the effects of policies on expenditure switching between domestic and foreign goods, and expenditure reducing programmes, and test for the operation of the Keynesian multiplier analysis. Another strand of *Structuralism* could be to provide a heterodox theoretical structure such that we may have a Classical D Ricardian version of capital accumulation in some competitive sector, and a purely Keynesian investment function or a Kalecki D Steindl form of investment function relating the degree of capacity utilization and rate of profit to portray the short-run or long run equilibria in a macro-economy with imperfect competition. Marglin (1984) has suggested such a synthetic heterodox macro-model, and one may integrate the Marglin version with the Taylor- Rakshit variety to explain the adjustment mechanism and the effects of policy shocks on rate of profit and unemployment in a capitalist less developed economy operating under multitude of constraints. Here one may note the important insights of Amiya Dasgupta that these constraints are reflected in the shape of aggregate supply curve and since the long run is a succession of short-period equilibrium(as the waves of the sea) , the process of capitalist development as well as the adjustment mechanisms underlying therein could be effectively characterized as important elements of structures in the LDC macro-economy so as to be able to reflect on possible consequences of policy shocks in these economies.

The *'Structuralist'* macro-models, have explicitly taken into account the economic and structural constraints operative in LDCs in different forms: the interdependence between sectors through the channels of demand for and supply of wage goods , the role of social classes in determining the pattern of income distribution and effective demand in a generalized framework . Both flex-price and fix-price adjustment mechanisms in different sectors determine the nature of growth path of the endogenous variables and define the domains of government intervention to attain the targets. The basic tenets of the structuralist approach to development

economies have been to develop inter-sectoral macro-models for developing economies by integrating the principles of effective demand developed by Keynes and Kalecki with the theory of income distribution among social classes to highlight the importance of specific structural rigidities that are evident in many LDCs. It makes specific assumptions about the working of different sectors of the economy on the basis of inherent structural features and institutions which are obtained from history. In particular, the structuralist approach to macroeconomics for developing economies seeks to provide a macroeconomic framework for a 'dual' economy variety of development models, pioneered by W.A. Lewis (1954), among others.

The contribution of Taylor (1982, 1983) lies in developing the relationship between food prices, inter-sectoral terms of trade and inflation in a less developed economy. The industrial prices are set by some mark-up rules a la Kalecki while agriculture is determined by the level of fixed capital and is flex-price. Workers spend all their income on agricultural good while the demand for non-agricultural good comes from investment requirement of capitalists plus capitalists' consumption. The model explains how in short run agricultural prices and non-agricultural output adjusts to maintain parity between planned savings and reinvestment; in the long-run sectoral rate of profits adjust and move to steady state growth. Taylor has shown that contractionary fiscal and monetary policies can reduce agricultural price and keep inflation under control but it affects employment and output in non-agricultural sector. The overall growth rate of the economy is constrained by the economy's inability to augment agricultural production, and the low level of investment, particularly in the food sector. If the former constraint is relaxed, then buoyant animal spirits of the capitalist class may drive the economy in the long run by depressing the real wage rate and raising their rate of profit. One can allow for differential savings propensities of workers and capitalists in each sector, or even for workers in each sector to enjoy a part of the profit as was suggested by Pasinetti (1962), but the general tenor of arguments in Taylor's model and the qualitative comparative static properties do not change because of such a differences in specifications. If, however, an autonomous investment function of the Keynesian type is replaced by more realistic ones typifying the corporate behaviour over time in an oligopolistic market as in Kelecki-Steindl, then of course, one has to move to a more general framework than was attempted by Taylor. And the strength of the wage goods constraint to determine the actual growth path of the economy and the behaviour of industrial output and inter-sectoral terms of trade shall in general depend on the nature of income distribution that such investment would sustain, and the link between future and the present via the nature of expectation formation function. Thus the structuralist model of Taylor provides clues to address the macro-economic issues of a less developed nation under oligopolistic market structure, where production and investment behaviour of industrial enterprises are linked through the solution of an inter-temporal optimisation programme.

Mihir Rakshit (1982), however, contends that the relevance of Keynes in the context of less developed nations should be judged from the particular method of analysing macro-economic problems as visualised by Keynes rather than by the set of policy prescriptions he had for the advanced countries that experienced the Great Depression. Extending the Keynes-Kalecki-Kaldor scheme of income distribution and effective demand in a labour surplus economy of the Lewisian (1954) variety , where the real wage rate in the agricultural sector is fixed in terms of corn by the prevalence of 'unlimited labour supply', Rakshit has introduced demand constraint in the production of both wage goods (agriculture) and non-wage goods (industrial). Workers in both sectors are assumed to spend all their incomes on wage goods, while landlords and industrial capitalists spend on non-wage goods. A rise in industrial investment not only expands industrial production, but also creates extra demand for agricultural output, such that agricultural production goes up instead of remaining stationary as in the Lewis model, the value of the multiplier being simply the reciprocal of the share of the landlord's income in the value added in the wage goods sector. The most interesting result of his model is that due to an autonomous shift in the terms of trade in favour of industry , the industrial output actually could contract through the scale and redistribution effects , i.e. , the aggregate surplus of the landlords and industrial capitalists class together dwindles , and further it gets redistributed more in favour of industrial capitalists at the expense of landlords ; the former having higher propensity to save , the total effective demand for the industrial output shrinks . A rise in real wage rate in the agricultural sector, on the other hand, has stimulating impact on the demand for both wage goods and non-wage goods, although the size of industrial profits is reduced. As Rakshit remarked, 'the interests of landlords and workers coincide and stand opposed to capitalists." (Rakshit, 1982, pp. 130). It is an interesting result for the study of political economy in an underdeveloped economy, although arrived at through a different methodology.

It is however unlikely that in both sectors of the LDCs, quantity adjustment mechanism would prevail. While the market for agricultural products is more likely to behave flex-price, in the industrial sector oligopolistic price setting and demand constrained quantity adjustment behaviour are often seen to be existent, at least in the short run. Rakshit draws upon the framework of non-Walrasian macroeconomics under rationing as was suggested by Malinvaud (1977) and Benassy (1986) to formulate a dual adjustment mechanism where the food market exhibits the Marshallian flex-price adjustment whereas the Keynesian quantity adjustment prevails in the market for industrial products. The inter-sectoral terms of trade become endogenous as the assumption of Say's Law of markets in Lewis (1954) is dropped. Rakshit, like Kalecki, has perceived three proximate constraints operative on the industrial sector: (a) wage goods / marketable surplus constraint, (b) profitability constraint, and (c) the effective demand constraint. If the first constraint is binding, rapid industrialization becomes contingent upon the modernisation of the agricultural sector; if the second constraint is however binding,

then only expansion of effective demand, possibly by supplementing private investment by government expenditure or easy money policy may be thought of. However, in a situation of industrial stagnation constrained by paucity of aggregate demand, a rise in industrial investment expands industrial output and employment through a change in terms of trade in favour of agriculture, and the industrial capitalists may be accordingly left impoverished relative to the landlords. If, on the other hand, the marketable surplus of food is augmented via a policy of Green Revolution say, when the industry is demand constrained, then we may encounter a paradox of plenty - a bumper harvest may fail to stimulate or may even reduce production in the industrial sector and further improve the terms of trade in favour of agriculture. A policy of technology-push industrialization will, on the other hand, will increase the demand-constrained level of industrial production and profitability, but the resultant price rise of agricultural goods will depress the real wage of fixed income groups and augment the incidence of poverty. In the opposite case where industrial production is supply constrained and there is no problem of marketing new output of the industrial sector, an expansion of industrial investment, although may attractive to industrial entrepreneurs, may be detrimental to the cause of the capitalist class as a whole. As the terms of trade more against industry, we may encounter a phenomenon of inflationary contraction .

IV. CONCLUSION

Evolution of macroeconomics since the days of Keynes and Dasgupta has taken fascinating paths. Structuralist macroeconomics has focused on the operation of multiple constraints in different sectors of the economies of LDCs. Dasgupta called for classification of epochs in economic theory on the basis of questions asked, and not necessarily on the chronological sequence of the evolution of economic ideas and theories. His characterization of Keynesian macroeconomics as the inverted sequence of Marshallian periodisation and identification of structural constraints in the underdeveloped countries, are important pointers to the development of macroeconomic discipline. Keynes was not concerned with the long run, but if long run is nothing but a succession of short run equilibrium, an important question that remains is what causes transition from one short run to another and the mechanisms underlying the process. The factors that propel a matured capitalist economy may not be appropriate in the context of an underdeveloped economy, and so the questions asked are deemed to differ. The solutions are perhaps to be sought beyond the theoretical discourses of short run macroeconomics, more so for underdeveloped countries.

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FARMERS' SUICIDE IN INDIA: GROUND REALITIES

Kasturi Bhadra Ray

Abstract

A disquieting feature of Indian agriculture on which almost 70% of the population is dependent directly or indirectly, has been developing over the last few decades, namely farmer suicides. The highest number of farmer suicides were recorded in 2004 when 18,241 farmers committed suicide.Though it declined after that, it was not substantially. Over the years, the situation has been most disturbing among the cash crop growers in Maharashtra, Karnataka, Andhra Pradesh, Madhya Pradesh, Kerala and Tamil Nadu, more precisely among the small and marginal farmers. Inadequacy/failure of institutional sources to address the problem of the farmers and continuing importance of informal sources like moneylenders was identifiable as the crucial factor responsible for the dismal plight of the small and marginal cash crop cultivators.

Keywords: Farmer suicide; Cash crop; Small and marginal farmers; Indebtedness; Moneylenders.

JEL Codes: E5, O1, Q1.

I. Introduction

A disquieting feature of Indian agriculture on which almost 70% of the population is dependent directly or indirectly, has been developing over the last few decades, namely farmer suicides. Reporting in popular press about farmers' suicides in India began in mid-1990s, particularly by Palagummi Sainath. In the 2000s, the issue gained international attention and a variety of Indian government initiatives(Waldman 2004, Huggler 2004).National Crime Reports Bureau(NCRB), an office of the Ministry of Home Affairs Government of India, has been collecting and publishing suicide statistics for India since the 1950s, as Annual Accidental Deaths & Suicides in India Reports. It started separately collecting and publishing farmers suicide statistics from 1995 (Hardikar 2011).

The highest number of farmer suicides were recorded in 2004 when 18,241 farmers committed suicide. Though it declined after that, it was not substantially. It stood at 15963 in 2010.In 2014 there was a change in the definition of farmer which previously also included agricultural labourers. With the new parameters, the number of farmer suicides in 2014 falls to 5,650. That is less than half their 2013 figure of 11,772. However if agricultural labourers suicide data is added to this the figures for 2014 stand at 12360 .For 2015 the figures stood at 12602.

Over the years ,the situation has been most disturbing in Maharashtra, Karnataka, Andhra Pradesh, Kerala and even in the agriculturally most progressive state of Punjab. Farmer suicides rates in Bihar and Uttar Pradesh on the other hand, two large states of India by size and population – have been about 10 times lower than Maharashtra, Kerala and or even Pondicherry (Ravi 2007,Nagaraj 2008). The National Crime Reports Bureau of India reported in its 2012 Annual Report, that 135,445 people committed suicide in India, of which 13,755 were farmers; of these, 5 out of 29 states accounted for 10,486 farmers suicides (76%) – Maharashtra, Andhra Pradesh, Karnataka, Madhya Pradesh and Kerala. In 2015,Maharashtra topped the list of farmer suicides with 4,291 suicides, followed by Karnataka with 1,569, Telangana 1,400, Madhya Pradesh 1,290, Chhattisgarh 954, Andhra Pradesh 916 and Tamil Nadu 606. Together, these seven states accounted for 87.5% of total suicides in the farming sector in the country -11,026 of 12,602.In the next section we take a closer look at the situation in these states to identify the factors that resulted in the huge number of farmer suicides.

II: Combination of factors leading up to farmer suicides

A closer look at the situation in these regions of prolific farmer suicides reveals that the crisis is saturated most among the cash crop growers in these regions i.e. farmers cultivating mainly Cotton but also coffee, Chilly, Groundnut, Rubber, etc. The increased use of cash crops (which involve higher cost of inputs and are grown primarily to be exported as opposed to food crops (low in cost and designed to be sold more locally) has been identified as an issue for the farmer suicides concentrated in these areas by several research works (Mishra 2006,Gruere et al 2008,Gruere and Sengupta 2011and Kennedy and King 2014). The farmers in these regions have been induced/persuaded to grow cash crops for high profits, without assessment of risks, costs ,vulnerability and ground reality. Small and marginal farmers failed to identify the risk factors associated with the commercial crops and blindly follow their way to making higher profit, in the end bare their lives to the cost of risk associated with the commercial crops.

To elucidate the problem more clearly we take the case of Vidarbha in Maharashra where the situation was most acute. Vidarbha has the highest acreage under the Monsanto's GMO Bt cotton . At one point of time Vidarbha, in Maharashtra was known for its cotton or "white gold" production, but now the region is mostly known as the suicide belt of India. A number of social activist groups are of the opinion that Monsanto's GM seeds create a suicide economy by transforming seed from a renewable resource to a non-renewable input which must be bought every year at high prices. Cotton seed used to cost Rs 7/kg. Bt-cotton seeds were sold at Rs 17,000/kg. Indigenous cotton varieties can be intercropped with food crops. Bt-cotton can only be grown as a monoculture. Indigenous cotton is rain fed. Bt-cotton needs irrigation. Indigenous varieties are pest resistant. Bt-cotton, even though

promoted as resistant to the boll worm, has created new pests, and to control these new pests, farmers are using 13 times more pesticides then they were using prior to introduction of Bt-cotton. And finally, Monsanto sells its GMO seeds on claims of yields of 1500/kg/year when farmers harvest 300-400 kg/year on an average.

While Monsanto pushes the costs of cultivation up, agribusiness subsidies drive down the price farmers get for their produce. As for example ,cotton producers in the US are given a subsidy of $4 billion annually and this has artificially brought down cotton prices, A study carried out by the Research Foundation for Science, Technology and Ecology (RFSTE) shows that due to falling farm prices, Indian peasants are losing $26 billion annually. This was the outcome of the direct linkage of the agriculture sector to the international market without any safety net.

On the other hand regarding cultivation procedures, many a times the farmers do not know the correct conditions of cultivation due to a lack of information and the crop suffers due to incorrect cropping conditions, over spraying or use of too many pesticides (Shetty 2004, Qaim 2010, Gruere and Sengupta 2011). Bt-cotton is supposed to provide guard against bollworms, which is supposed to help in declining the pesticide requirement. But unfortunately bollworm is only one of the pests. As for example, Mukherjee(2009) in a study of the major destruction in of the cotton crop in another region in Warangal of Andhra Pradesh in 1997-98, identified it to having been caused by Spodopetra, against which Bt varieties were not effective .Also, in the long-run, pests develop resistance against such varieties and leads to the emergence of secondary pests. Desperate farmers have to spray pesticides and hence the cost of cultivation which was already high due to usage of hybrid varieties (cost of seeds are almost four times that of normal seeds), keep on increasing(Gunnell et al 2007, comment in this regard on the predominance of suicide by pesticide poisoning as farmers have easier access to this method of self-poisoning that has a particularly high case fatality rate).

There has also been the development of a rapidly growing secondary market for so called “stealth” or “spurious” seeds (meaning the quality of the seeds could not be verified), very often resulting in doomed crops.

Bt cotton is very much dependent on irrigation. But as Sadanandan (2014) observes, only 35% of land used for agriculture in India is irrigated. In some areas of Vidarbha, one of the worst affected areas of the crisis, Kale (2011) found that around 85% of the area is rain-fed, making farmers particularly susceptible to extreme variations in yields and therefore returns.

Kale et al. (2014) remark that 69% of victims in a sample from Vidarbha had no water source and relied entirely on monsoon rains for their fields. Gedela (2008) in a study in Andhra Pradesh exhibits that non-suicide farmers had a higher proportion of their land area that was irrigated than suicide victims in Andhra Pradesh. Poor irrigation may not only be a

direct cause of increased debt by lowering returns and potentially causing crop failures, but also be partly responsible for the move towards moneylenders and informal sources of credit. Since the early 1990s the amount of public money spent on irrigation has fallen and farmers are increasingly forced to invest in their own systems. In many cases, cotton cultivators must borrow money to pay for these capital outlays and this is particularly true for marginal farmers with very few resources. As Banks have been found to be reluctant to lend to farmers who lack irrigation facilities as the return they receive on their investment is less assured, high cost of inputs force many farmers into taking ever larger loans, often from private moneylenders charging exorbitant interest rates (upto 60% a year).

Farmers also on their part, prefer to borrow from moneylender due to the cumbersome procedure of obtaining formal credit (Deshpande, 2002).Also, if the over -dues are quite high in most of the formal credit giving institutions, this forces farmers to grow dependent on non-institutional credit facilities such as moneylenders.

Agriculturist moneylender unlike the professional moneylender is a native of the village and powerful in the structure of village economy also. In many cases he is the landowner who lease out land to the peasant. They are also willing to extend credit for unproductive personal consumption and unrelated to productive activity, like loans for expenditure on marriages, religious ceremonies which are unavoidable social requisites or to tide over unforeseen circumstances like accident or ill-ness in the family, and are not dependent on earnings always. Households' expenditure on consumption, education and health has also increased over the years. Besides this, commission agents, dealers and sub-dealers of pesticides and private source also provides credit and generally at very high interest rate and exploit farmers.

As debts keep mounting coupled with inability to repayment from farm proceeds, because of exorbitant interest rates and low sales prices (as discussed before) ,the farmers are caught in a vortex of spiralling debts. Their land is often seized forcefully. The relationship of the moneylenders with the farmers being essentially a predatory one in such a setup, one of exploiting the latter's vulnerability during the periods of crisis by the former(Nagraj 2008).

The loss of assets in rural parts particularly, is a matter of extreme humiliation. The shame, ignominy, loss of face in rural society and the resultant tremendous psychological pressure often drives the farmers to extreme steps like selling a kidney or taking their own lives(Mohan 2004). In this regard, Deshpande (2002) and Mukherjee(2009) identify the fast disappearing support system that was being provided by the family and the village system in the earlier days as one of the critical factors that adds to the farmers' sense of isolation and desolation.

Indebtedness (87%) and deterioration in the economic status (74%) were found to be major risk factors for suicide by Behere and Bhise (2009).Mishra (2006) also found that

debt was the most common factor behind farmer suicides in Maharashtra at 86.5%, followed by deterioration in the farmers' economic status (73.9%).

III.: Continuing importance of informal credit to agriculture over the years

Of the two broad sources of agricultural credit in India, non-institutional and institutional, non-institutional finance, continues to be an important source of rural credit in India, like money-lenders, traders, landlords and commission agents. They do not discriminate between productive and unproductive loans, but often the interest charged by the non-institutional lenders is very high, higher than can be justifiable by the default rate (Basu 1989), taking advantage of the helplessness and ignorance of the farmers. Yet they continue to be an important source of credit to the farmers. If we take a look at the relative share of borrowing of cultivators from the different sources(Table 1), where the non -institutional sources are dominated by moneylenders, and the main sources of institutional

Table 1: relative share of borrowings of cultivator households from different sources

Source	**1951**	**1961**	**1971**	**1981**	**1991**	**2002**	**2010**
Non Institutionalof which	**92.7**	**91.3**	**68.3**	**36.8**	**30.6**	**38.9**	**29.7**
Moneylender	69.7	49.2	36.1	16.1	17.5	26.8	21.9
Institutionalof which	**7.3**	**18.7**	**31.7**	**63.2**	**66.3**	**61.3**	**68.8**
Co-operative Societies/Banks	3.3	2.6	22.0	29.8	23.6	30.2	24.9
Commercial Banks	0.9	0.6	2.4	28.8	35.2	26.3	25.1
Unspecified	-	-	-	-	3.1	-	1.5

Source: All India Debt and Investment Surveys various years

Credit flows are shown as Co-operative Societies/Banks and Commercial Banks. The table has been constructed in accordance to the All India Debt and Investment Surveys, various years from 1951-2010 ,over ten year periods .As elucidated by it, the relative shares of institutional agencies in the total cash debt of rural cultivators increased from 7.3% in 1951 to18.7 in 1961%, 31.7 per cent in 1971 and to highs of to 63.2 per cent in 1981 and further to 66.3 per cent in 1991. There was a marginal fall in 2002 to 61.15 but rose again to 68.8% in 2010.

Though the share of institutional credit has been rising over the decades, with the share of Co-operatives and Commercial Banks rising to almost the same levels in 2010(24.9% and 25.1% respectively), the rise has been uneven in the case of Co-operatives and share of Commercial Banks declining slowly after 1991.

Also though the importance of non-institutional sources has fallen from a whopping 92.7% in 1951 to almost one-third of it(29.7%) in 2010, still it controls 0ne-third the share of credit of cultivator households. The fact that the share of institutional credit is still by no means paltry is borne out by the observations in section I. The continuing importance of informal credit has severe backlashes on agriculture, farmer suicide among others.

But why is this so? As noted previously, Commercial banks have not always been tuned to the needs and requirements of the small and marginal farmers. The Co-operative Society/ Banks on the other hand, were riddled with inadequacy of resources to meet the expected demand, infrastructure and staff, to see to correct sanctioning and checking on proper utilisation of loans. To top it all, political interferences made matters worse. The failure of large commercialised banks along with Co-operative credit Societies /Banks to address the needs of the small/marginal farmers thus resulted in non-institutional sources of agricultural credit continuing to enjoy a reasonably large slice of it agricultural credit.

In the case of the cash crop producing farmers in the suicide affected areas, Kennedy and king (2014) stress that the inadequacy/failure of institutional sources to address the problem of the farmers, was the clinching factor. They isolated three factors, the combination of which namely "cash crop cultivation, with marginal landholdings and debts" being most conducive for farmer suicide. They point out that these three characteristics account for <"75% of the variation in overall male suicide rates seen across India. Kale et al.(2014) in their study found that of 200 victims in Vidarbha, 43.5% were "small farmers" with 1.01–2.00 hectare landholdings, and 23.5% were "marginal farmers" with landholdings less than 1 hectare.

The preferred leaning of institutional credit sources towards large farmers and the resultant push on the small and marginal farmers towards unhealthy dependence on non -institutional sources like money lenders is something that has been reiterated over and over by economists like Basu (1990) and others, like Lipton (1976), Suryabansi (1978) ,Nagaraj (1981),Janakarajan (1986) and Sarap (1986 and 1987). Bardhan(1970) previously commenting on the failure of the Green Revolution elucidated in the same vein. The Green Revolution had failed to improve the condition of the weaker sections (marginal farmers and agricultural labourers); In other words, the new and supposedly progressive technologies benefited the rich landlords , leaving the conditions of the poor peasants and farm labour unaltered or worse off.

Lipton(1976) commenting on agricultural finance and rural credit in poor countries point on the evidence of large farmers getting away more often without repayment, but he observes that they are still more likely to be treated better due to their power and influence, as quite often there is an understanding of bilateral benefits as Basu (1990) too has spoken about in his discourse on agrarian structure and the economics of underdevelopment.

Speaking on the issue of farmer suicides in India, a number of social activist groups are of the opinion that Monsanto's GM seeds create a suicide economy. Whereas it is undeniable that the increased demand for costly inputs pushed up the demand for credit among small and medium sized farmer with not very high savings, at the same time, it is also difficult to deny the ground reality that the inability of institutional credit to meet this demand due to their lack of flexibility / inadequacy had a lot to do with compounding the plight of the farmers ,as these institutions all but pushed the farmers into the waiting debt traps of the moneylenders and other sources of non-institutional credit. It is imperative to realise that advanced technology cannot be beneficial, especially in a still developing country unless these reality checks are simultaneously in operation.

IV.: **The way forward**

The solution to the problem thus lies in dealing with both components of it, namely the high price of the inputs and the inadequacy of institutional credit. In this regard Mishra (2009) stresses on the critical role of the Government in provision for adequate institutional support (credit facilities as well as extension services, remunerative price, quality inputs), development of land and water resources as well as propel research and development in agriculture and provision of health and education. Also, as Bannerjee (2009) points out, robust procurement and distribution operation are of importance for pushing real output prices out of deflationary trends (Banerjee, 2009).

Kumar and Bathla (2017) lay emphasis on farmer's insurance, irrigational facilities, checking price and quality of inputs provided, etc. should be taken care by Government , and reiterate on direct sincere efforts to protect farmers from incessant natural disasters and price volatility through crop insurance and better marketing systems..

However, it is also important to revisit the credit policy with a focus on the outreach of banks and financial inclusion (Kumar and Bathla). On the part of Banks there is need for simplification of disbursement rules and application procedure for credit from formal credit sources, which will go a long way in reducing dependence on non-institutional credit.

There is also need for education of all rural households, training farmers to improve their inherited skills and acquire new skills. Farmers not only need credit but also guidance in adopting improved methods of culti-vation. Thus, it is necessary to provide such guid-ance

and extension services along with credit. They must be taught how to use quality seeds, fertilis-ers, pesticides, etc. and also how to grow crops.

Bhattacharya(2009) adds to these, by stressing the need for counselling to help depressed farmers along with greater support from friends, family, local communities, which along with the changes in the National policies and society as a whole, will lessen the impact stress will have on individuals and families. This calls for public health interventions, which has to go beyond reduction of suicides. There is a case to address the need for mental health care, reduce response time to prevent deaths from poisoning and other self-inflicted harm, ensure that a patient is treated with appropriate protocols when they reach a health facility, seek the help of specialist by appropriate use of information and communication technology, involve farmers' groups in villages to identify individuals under stress or depression and initiate appropriate preventive measures, and restrict and regulate the access to and use of organophosphorous poisons. While these are important, an understanding of farmers' suicides has to go beyond this and focus on socio-economic concerns and quality of life(Mishra 2014). It is crucial thus, as Bhattacharya (2009) concludes, that governments and NGOs work together, on a local, national and global level, to address and solve this critical issue plaguing Indian agriculture at this juncture.

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THE IMPACT OF RURAL INFRASTRUCTURAL DEVELOPMENT ON ECONOMIC GROWTH IN INDIA: AN EMPIRICAL ANALYSIS

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Abstract

There has long been an increasing recognition of the role of rural infrastructural development in economic growth. The concept of rural infrastructure is multifaceted. Its inherent problems barely crowd in private investment. The central research question is that how the rural infrastructural development is linked with the Indian macroeconomic growth process. The main objective of this present study is to examine the role of rural infrastructural development on the Indian macroeconomic growth process utilizing the Indian macroeconomic time-series dataset from 1950-51 to 2016-17 based on autoregressive distributed lag (ARDL) approach. The results suggest that the rural infrastructure development has a positive significant impact on economic growth in the long-run in India. This paper seems to be interesting in terms of changing policy postures in the light of five-year plans, macroeconomic time-series datasets revised and employed methodologies advanced.

Keywords: Public Spending, Infrastructure, Economic Growth, ARDL

JEL Classification Codes: H53; H54 ;O40; C32

I. Introduction

Rural infrastructural development plays an important role for economic growth. Its inadequacy has been identified as one of the main obstacles of the economic development in most of the under-developed countries. Adequate rural infrastructure provides basic amenities that improve the quality of life, raise the productive capacity, lower production costs; and, expand, accommodate and sustain overall economic development The growing importance of its role in economic development has been recognized in the evolution of macroeconomic theory. The concept of infrastructure has evolved since the early works of development economists like Arthur Lewis, Rosenstein-Rodan, Ragner Nurkse, Albert Hirschman and Rostow of the role of social overhead capital in accelerating economic growth and in enhancing public welfare more pronounced in developing economies towards a more comprehensive definition that includes a wider range of public services that facilitate production and trade. Roughly speaking, they characterized the term social overhead capital to refer services provided to

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facilitate the basic economic activities of public goods (utilities) having economic externalities as these services cannot be imported because of investments tend to be indivisible. The term infrastructure is multifaceted. Macroeconomic theory has identified various factors that determine rural infrastructural development that influences growth of the macro economy. This broader definition includes the following components like public expenditure or fixed investment in agriculture, electricity, gas and water supply, and transport, storage and communications, access to credit and financial institutions, health and education services, sanitation, and many other services in rural areas. Public sector gross domestic capital formation (GDCF) in rural areas is proxy as an explanatory variable. In addition to these, it also depends on exogenous economic shocks. Such factors are climatic or political and extraneous in nature.

Rural infrastructural development involves huge initial investments, long gestation periods, high incremental capital output ratio, high risk and low rate of returns on investment. These may be the attributing factors to rely on the monopoly of public investment in this sector. However, there are good reasons to believe that there exists a role for other than public sector in rural infrastructure development. These asymmetries along with sectoral priorities and structural issues might fundamentally alter whether public investment is much more complementary or competitive to private investment in the Indian rural infrastructural development. However, it is obviously difficult to estimate the private sector's contribution separately because of the dearth of relevant data series. This paper has made an attempt to provide a general assessment of the contribution of planning in this context. It has made an attempt to interpret the empirical results with caution assessing the relative priorities assigned by looking the share in total public sector planned outlays to rural infrastructural development and allied activities pointing the subsequent five-year plans and development planning perspective over the studied sample period.

The central research question is that how the rural infrastructural development is linked with the Indian macroeconomic growth process. The main objective of this present study is to examine the role of rural infrastructural development on the Indian macroeconomic growth process utilizing the Indian macroeconomic time-series dataset from 1950-51 to 2016-17 based on autoregressive distributed lag (ARDL) approach. It examines both the positive and negative, short-run and long-run, how and through which channels the relationships work better even in presence of transitory shocks so as to measure the impact of rural infrastructural development on the Indian macroeconomic growth process. It has hypothesized that rural infrastructural development has significant positive role on the Indian macroeconomic growth process.

The rest of the paper is organized into the following sub-sections. Section II reviews the existing theoretical and empirical literatures. Section III discusses the data sources. Section

IV develops the methodology and empirical framework. Section V reports the empirical results. Section VI concludes the paper.

II. Literature Review

There has long been a vast body of theoretical and empirical literatures analyzing the interrelationship between rural infrastructure development and economic growth across countries and times. Theoretical works earlier on this linkage developed in the hands of development economists like Arthur Lewis, Rosenstein-Rodan, Ragnar Nurkse and Albert Hirschman. Generally speaking, they characterized infrastructure services as social overhead capital having public utilities. The related literatures produce a more comprehensive broader definition of rural infrastructure encompassing a wider range of public services towards power, electricity, gas, water supply, irrigation, roads and transport, telecommunications and information, sanitation, agricultural infrastructure and research and extension, storage , credit and financial institutions, health and education in rural areas that facilitate not only the development of agricultural activities but also rural activities and sometimes even urban activities enhancing production and trade. These services are mainly capital intensive in nature, institutional and having positive externalities. These services are determined not only by the economic factors but also by the physical-climatic, socio-cultural and institutional components.

The inadequacy of infrastructure facilities in rural areas has been observed as a major obstacle for economic development in many empirical studies. To mention a few, the important ones are the studies made by Aschauer (1989, 1990); Binswanger (1990); Ahmad and Hossain (1990), Fernald (1999) (Straub, 2008), Esfahani and Ramirez (2003) and many others. In summary, the majority of the studies recognize that rural infrastructure is not only an important driver for total factor productivity growth, but also directly contributes to a substantial reduction in rural poverty. Generally speaking their main findings mostly cater around a positive significant link between infrastructural development and economic growth. However, the results differ in terms of data frequency references, country sample, econometric model specification performed, time period and coverage of infrastructure variables to include proxy explanatory variables across studies. In other words, the empirical studies found no consensus findings.

There have been very few studies that look into the relationships between investment in infrastructure, rural growth, poverty alleviation and the role of complementarities of investments in the context of the Indian economy. However, the precise linkages between rural Infrastructural development and economic growth in the Indian context are yet to be firmly established. It is important to note that very few studies in the past have taken the advantage of non-stationary data econometric techniques as the conventional estimation methods based on classical ordinary least square may produce the problem of spurious

correlation as most of the time-series exhibit non-stationary contrast to stationary time-series properties.

This paper intends to be a country-specific case study in the context of the Indian economy covering macroeconomic time-series dataset for the period from 1950-51 to 2016-17 employing unit- root tests, ARDL co-integration regression with error correction mechanism (ECM) and Granger causality test to explore the short-run of adjustments and long-term relationship between rural infrastructural development along with other relevant variables and the Indian macroeconomic growth process examining the impact of macroeconomic policy changes and exogenous shocks surfaced over the studied period. .This study is useful in generating specific policy recommendations that are directed towards a general increase in rural public infrastructure development to stimulate economic growth.

III . Data & Sources

Macroeconomic time-series dataset used in this paper are annual covering India's economy-wide, sector - wise and economic activity – wise details for the period from 1950-51 to 2016-17. Annual time-series dataset used such as real GDP, public gross capital formation in agriculture, public gross capital formation in rural infrastructural development, public investment expenditure on rural education and health, exports and imports of goods and services and foreign direct investment have been obtained or compiled from various secondary standard official sources. Rural infrastructural development consists of a set of relevant variables such as electricity, gas and water supply and transport, storage and communications, access to credit and financial development institutions. Public fixed investment in rural areas has been the proxy to measure rural infrastructural development. In this study the data sources are: the Central Statistical Organisation (CSO); balance of payments accounts of the Reserve Bank of India (RBI) and monetary accounts of the Currency and Finance (CF) of the RBI; fiscal accounts pertaining to budget financing operations of the Ministry of Finance (MoE), Government of India (GoI). Despite dataset used for some variables are based on changed base-year series (prices), dataset are comparable particularly to preserve the overall robustness. Some variables had to be transformed to natural logarithms for the purpose of the empirical analysis. However, the dataset used for econometric investigation in this study has been historic as facilitates not only visual illustration to explain the disequilibrium dynamics in the short-run towards long-run equilibrium relationship but also confirms the endogenous and exogenous factors by abstracting the policy analysis with historical antecedents estimating the dynamic adjusted the Indian macroeconomic growth process over the studied sample period.

IV. Methodology & Empirical Framework Specification

Based on the above theoretical and empirical considerations predicted in the existing literatures, it has used the following functional specification to assess the impact of rural infrastructural development and other key variables on economic growth for India:

RY = f (GCFA, GCFINF, PEH, FDI, TOPEN, t)

where, RY is the growth rate of real GDP; GCFA is public gross capital formation in agriculture as percentage of GDP; GCFINF is public gross capital formation in infrastructure development in rural areas as percentage of GDP; PEH is public expenditure on education and health services in rural areas as percentage of GDP; FDI is foreign direct investment in rural infrastructural development as percentage of GDP; TOPEN is trade openness (exports + imports / GDP) and, 't' represents the time trend.

The more encompassing integrated equation is reformulated as follows:

$RY_t = á + ÷ GCFA_t + â GCFINF_t + ë PEH_t + ñ FDI_t + ðTOPEN_{t +} e_t$ …… (1)

Where, á is the intercept, ÷, â, ë, ñ and ð are the coefficients of the selected variables respectively and their expected signs to be positive, and e_t is the stochastic random white-noise error term. Here, GCFINF is the vector (set) of variables such as electricity, gas and water supply and transport, storage and communications, access to credit and financial institutions.

Prior to proceeding with the autoregressive distributed lags (ARDL) model in order to examine the existence of a long - run relationship and short run dynamic interactions among the variables of interest, the Augmented Dickey Fuller (ADF) test is performed to identify whether all candidate variables are stationary and to determine the orders of integration of the variables. One of the main advantages of ARDL methodology (Pesaran *et al*., 2001) is that it can be applied for all series under study irrespective of their level and degree of co-integration whether purely I(0), purely I(1) or mutually co-integrated. The other advantage of ARDL modeling is that it is very simple, relatively more efficient, and robust in small or finite sample data sizes and provides unbiased estimates. However, this test cannot be applied if the series are I(2) as may provide spurious results. To perform the bounds testing procedure, it has used the following formulated conditional ARDL modeling approach pertaining to the variables represented in equation (1):

$ÄRY_t = á_0 + á_1 RY_{t-1} + á_2 GCFA_{t-1} + á_3 GCFINF_{t-1} + á_4 PEH_{t-1} + á_5 FDI_{t-1} + á_6 TOPEN_{t-1 +} © ð_1 ÄRY_{t-i} + © ð_2 Ä GCFA_{t-i} + © ð_3 Ä GCFINF_{t-i} + © ð_4 Ä PEH_{t-i} + © ð_5 ÄFDI_{t-i} + © ð_6 Ä TOPEN_{t-i +} ì_t$ …….. (2);

Where, the suffix ' *i*' (*i*= 1,...,*m*) denotes the period; Ä is the first difference operator; $á_0$ is the intercept; all $á_s$ are long-run coefficients of selected variables; all $ð_s$ are short-run coefficients of the selected variables; $ì_t$ is the random error term; and, all other variables are defined earlier. The equation (2) is estimated by the OLS to test the null hypotheses (no co-integration) i.e.,

H_0: $á_1 = á_2 = á_3 = á_4 = á_5 = á_6 = 0$ against the alternative hypotheses (co-integration) i.e.,

H_1: $á_1$ 'H 0, $á_2$'H 0, $á_3$ 'H 0, $á_4$ 'H 0, $á_5$ 'H 0, $á_6$ 'H 0

In the next step in order to investigate the existence of the long-run relationship among the variables in the system, the computed values of the Wald or F-statistic is compared with the critical values. If the calculated F-statistics is smaller than the lower bound critical value, the null hypothesis of no co-integration is accepted i.e. I(0) i.e., the series are not co-integrated (H_0: $á_1 = á_2 = á_3 = á_4 = á_5 = á_6 = 0$). If the computed (calculated) F-statistic exceeds the upper bound critical value implies the rejection of the null hypothesis of no co-integration i.e., the series are non-stationary and are co-integrated in the long-run i.e., I(1). However, if the F – statistic falls within the lower and upper bound critical values, the decision about co-integration becomes inconclusive. As the co-integration relationships are confirmed, both the long-run and short-run dynamics of the co-integration equations are estimated. The lag orders (lengths) of the dependent variables and regressors are chosen by applying the appropriate lag selection criteria like Schwarz Bayesian Criteria (SBC), Akaike Information Criteria (AIC) and General to Specific modeling approach by strictly following the diagnostic checks to correct for auto-correlated residuals and the problem of endogenous regressors simultaneously in order to determine the optimal structure for the ARDL specification.

The following long-run relationships estimated equation is:

$$RY_t = á_0 + \sum á_1 RY_{t-i} + \sum á_2 GCFA_{t-i} + \sum á_3 GCFINF_{t-i} + \sum á_4 PEH_{t-i} + \sum á_5 FDI_{t-i} + \sum á_6 TOPEN_{t-i} + v_t \quad \ldots\ldots\ldots\ldots\ldots\ldots (3);$$

Then the following error correction model in order to estimate the short-run dynamics of the estimated long-run equation is formulated:

$$ÄRY_t = á_0 + \sum ð_1 ÄRY_{t-i} + \sum ð_2 Ä GCFA_{t-i} + \sum ð_3 Ä GCFINF_{t-i} + \sum ð_4 Ä PEH_{t-i} + \sum ð_5 ÄFDI_{t-i} + \sum ð_6 Ä TOPEN_{t-i} + ë ECM_{t-1} + ñ_t \quad \ldots\ldots\ldots\ldots\ldots\ldots (4);$$

Where, v_t and $ñ_t$ are white noise error terms; ë is speed of adjustment and ECM_{t-1} is one period lagged error correction term estimated from equation (3).

This paper under such a framework is interested to assess the impact of rural infrastructural development and other variables on the Indian macroeconomic growth process using the data for the period from 1950-51 to 2016-17. The signs of these coefficients of selected

variables have been estimated empirically for India. To establish the stability of the long-run and short-run coefficients, the CUSUM and CUSUMSQ tests to the residuals of the estimated equation performed. Various diagnostic tests of the selected models performed including residual serial correlation and normality, heteroscedasticity, functional form misspecification, structural breakpoint and parameter stability.

V. Empirical Results

To investigate the impact of rural infrastructural development and other variables on the Indian macroeconomic growth process over the studied sample period 1950-51 to 2016-17, this sub-section provides the results of unit-root test, long-run coefficient estimates, error correction representation and short-run elasticity estimations, ARDL bound test for co-integration, Granger causality tests, and diagnostic tests. Though the use of ARDL model does not require pre-testing of variables for unit root problems as this method can accommodate both purely I(0), purely I(1) , or mutually co-integrated variables, unit root tests are conducted in order to find out whether there are mixtures in the order of integration of the candidate variables. The existence of unit roots and the order of integration of all selected variables using the ADF tests are reported in Table 2. From the table, all variables exhibit non-stationarity at levels, but become stationary at first difference, or I (1).

Notations	*Description*
RY	*growth rate of real gdp at constant prices*
GCFA	*public gross capital formation in agriculture as percentage of GDP*
GCFINF	*public gross capital formation in infrastructure development in rural areas as percentage of GDP*
PEH	*public expenditure on education and health services in rural areas as percentage of GDP*
FDI	*foreign direct investment in rural infrastructural development as percentage of GDP*
TOPEN	*trade openness (exports + imports / GDP)*

Table 2: Tests for Unit Roots of Variables used In the Econometric Analysis

Variables	*ADF test of H_0: I (1) versus H_1: I(0)*	*Whether I(1) or I(0)*
RY	-2.92(0)[3]	I(0)
GCFA	*-1.76(2)*	I(1)
GCFINF	*-2.12(2)*	I(1)
PEH	-3.24(2)	I(1)
FDI	*-3.60(2)*[3]	I(0)
TOPEN	*-2.30(2)*	I(1)

Notes:

1. Except for RY, all the tests are performed with 'trend and intercept'. The Mckinnon critical value at the 5 per cent level is -3.49. For RY, allowing no intercept and no trend, the Mckinnon critical value at the 5 per cent level is -1.94.
2. Figures in parentheses are the order of augmentation required to obtain residual whiteness.
3. The null hypothesis of the tests is co-integration. Rejection of null hypothesis indicates dataset stationarity.
4. If computed ADF test statistic < the critical values, the variables are found to be integrated of order one I(1) retaining the long-run information

Source: Author's calculation

Therefore, it is surmised that all the variables can well be characterized as I(0) and I(1) process at 5 percent significance level, while the absence of a unit root shows that the stochastic process is stationary. Since the computation of ADF-statistics for unit roots is very much sensitive to lag length. Here, a lag order of 2 is selected based on both AIC and SBC criteria. The presence of a unit root indicates that the time series under study is non-stationary. However, RY and FDI are found greater than McKinnon critical value and thus are stationary. The results for the ADF test presented in the above Table 2 suggest that the variables do not have the same order of integration. It suggests that the variables- public gross capital formation in agriculture, public gross capital formation in infrastructure development in rural areas, public expenditure on education and health services in rural areas and trade openness found to be integrated of order one I(1) retaining long-run information against the variables – growth rate of real GDP and foreign direct investment in rural infrastructural development belong to the I(0) category. The non-rejection of the null of non-stationary implies co-integration relationship holds and if otherwise, not. Results obtained reveal that there exists a long run equilibrium relationship between rural infrastructural development, which is proxy by the public gross capital formation in rural areas for a set of selected variables and economic growth in the Indian context.

The long-run elasticities of the candidate variables in estimated error correction representation from ARDL equation (2) are reported in the following Table 3.

Table 3: ARDL long-run elasticities of the explanatory variables

Variables	*Long-run coefficients (Probability)*
GCFA	*0.43(0.06)*
GCFINF	*0.12(0.00)*
PEH	*0.07(0.002)*
FDI	*0.02(0.57)*
TOPEN	*0.05(0.002)*

Source: Author's calculation

The estimated coefficients of the long-run relationship are significant for public gross capital formation in agriculture, public gross capital formation in rural infrastructure, public investment on education and health in rural areas and trade openness but not significant for foreign direct investment. As shown in Table 3, all coefficients have the expected signs and are statistically significant. As anticipated, the long run coefficient of rural infrastructure is 0.12 as is proxy by the public investment behind infrastructural development in rural areas. In general, the results indicate that infrastructure development in rural areas has a positive significant impact on economic growth as facilitates development in the long-run in India. Likewise the coefficient of public investment expenditure on human capital such as health and education is around to be 0.07 indicating statistically significant positive contribution to economic growth even though the value of this coefficient is lowers than the elasticity of rural infrastructural development.

The short-run dynamic parameters estimated by an error correction model associated with the equation (4) that influence the disequilibrium short-run dynamics underlying the impact of rural infrastructural development and other selected variables on economic growth in the Indian context are given in the following Table 4.

TABLE 4: Results of Error Correction Model (ECM) for short-run elasticity ARDL (1,1,2,0,0)

Variables	Short-run Coefficients (Prob)
Constant	-0.03 (0.67)
D (GCFA)	-0.78 (0.00)
D(CFINF)	-0.46 (0,17)
D (PEH)	.026 (.57)
D(FDI)	.037 (0.68)
D (TOPEN)	-.03 (0.48)
ECM (-1)	-.57 (0.003)
Short-run Diagnostic Test Results	
R – Squared	0.78
F-statistic	9.70 (0.00)
DW-statistic	2.004

In the short run, only public gross capital formation in agriculture is significant and has an important impact on overall economic growth. Public gross capital formation in rural infrastructural development and trade openness have a negative impact but not significant. The impact of public expenditure on health and education and the impact of foreign direct investment on overall economic growth are positive but not significant. The coefficient on

the lagged error-correction term is significant with the expected sign, which reconfirms the result of the bounds test for co- integration. Its value is estimated to be -0.57 signifying that the speed of adjustment to equilibrium after a shock is high. Around 57% of disequilibria from the previous year's shock correct back to the long-run equilibrium in the current year. The results show that the infrastructure transitory shock in the short-run being a minor contributing factor to the economic growth; however, in the long run the infrastructure transitory shock being the major driving force as explains significantly the fluctuations in the economic growth.

The results for ARDL bounds test are reported in Table 5.

Table 5: ARDL Bounds Test for Co-integration Analysis based on Equation (2)

Critical Value	*Lower Bound value*	*Upper Bound value*
1%	*3.74*	*5.06*
5%	*2.86*	*4.01*
10%	*2.45*	*3.52*

Notes:

1. Computed F – statistic: 4.997 (significant at 5% level
2. Model: Unrestricted intercepts and no trend

Source: Author's calculation

The ARDL model is then employed to find out the long run relationship among the selected variables. As shown in Table 5, the value of computed F statistics (F = 4.997) exceeds the upper bound critical value (4.01) at the 5% level, therefore, rejecting the null hypothesis of no co-integration and establishing a long run relationship between infrastructural development consisting set of selected variables in rural areas and economic growth in India.

Results of Granger causality tests are shown in the following Table 6.

TABLE 6: Results of the Granger Causality

Variables	Null Hypothesis		
	Variables do not Cause RY F- statistic(Prob.)	RY does not Cause Variables F – statistic(Prob)	Direction of Causality
	GR	GR	Granger
GCFA	14.81 (0.00)	15.70 (0.648)	$GCFA \rightarrow RY$
GCFINF	14.42 (0.00))	1.90 (0.00)	$GCFINF \leftrightarrow RY$
PEH	6.96 (0.00)	5.94 (0.0051)	$PEH \rightarrow RY$
FDI	11.80 (7E-05)	16.53 (4E-06)	X
TOPEN	17.30 (0.00)	3.67 (0.033)	$TOPEN \rightarrow RY$

Note: 'x' denotes no causality; '$\rightarrow$' denotes unidirectional causality; and, '$\leftrightarrow$' denotes bidirectional (feedback) causality

Source: Author's calculation.

The F-statistics and corresponding probabilities nearing zero on the explanatory variables suggest that the rejection of the null hypothesis. There is bi-directional Granger causality between public investment in rural infrastructural development and unidirectional Granger causality running from public gross capital formation in agriculture, public investment expenditure on education and health and trade openness to economic growth. Turning to the Granger causality test results for foreign direct investment, there is no significant Granger causality from foreign direct investment to economic growth. Furthermore, the empirical results also support the idea that FDI would only be growth enhancing if it affects technology permanently. These findings generate important policy implications and recommendations for policy makers in India. We can conclude that public fixed investment that promotes rural infrastructural development contributes positive to economic growth in the long-run for India. Thus public sector led domestic capital formation in rural areas is the main catalyser of economic growth in India. The government of India has already undertaken serious policy reforms and programmes with clear objectives and strong commitments to promote rural infrastructural development and rural poverty alleviation. This paper also passes through all the diagnostic tests against serial correlation, heteroscedasticity, normality of errors, model adequacy specified tests, parameter stability tests for short-run and long-run estimated coefficients, and structural breakpoints tests. However, all the results are not reported due to conserve the space of this paper.

VI. Conclusions

There has been increasing recognition of the role of rural infrastructural development in economic growth. It plays a strategic role in producing large multiplier effects in the economy. It plays a key role for agriculture, agro-industries and overall economic development in rural areas via providing basic amenities to improve the quality of life. To recognize the spread of technology, to reduce poverty and the growth of farm productivity and non-farm rural employment are linked closely to rural infrastructure provision. Better endowment of infrastructure services leads to poverty alleviation, expansion of markets, economies of scale and improvement in factor market operations.

Adequate infrastructure raises productivity and lowers production costs also opens up the rural economy to greater competition from outside leading comparative cost provisions. Capital formation in rural infrastructure brings transportation costs lower, farmers' access to markets increased, and substantial agricultural expansion. Improved roads also leads the transaction costs of credit services to be lower, lending to farmers to be increased, higher demands for agricultural inputs, higher crop yields, and reducing poverty as could have a direct or indirect bearing upon the income generating opportunities for the poorest rural populations. But infrastructure has to expand fast enough to accommodate growth momentum enhancing public welfare considering the problem of indivisibility.

However, incidentally, rural sector involves the problems of huge initial investments, long gestation periods, high incremental capital output ratio, high risk and low rate of returns on investment. These factors impede the private sector to enter into infrastructure development as arising out difficulties for them to design, construct, operate and maintain these services effectively and efficiently. These attributes result in strongly to believe public sector involvement in the provision of rural infrastructural services. However, the role of private sector in the production of such services can in no way be denied.

Reckoning the crucial role played by public sector led infrastructure in the development process of the country started in the Indian economy since the heydays of independence. Consequently, highest priority was accorded to investments in basic sectors such as power, irrigation, transport, communication, etc. in the First Five Year Plan pronouncing agricultural development the highest precedence necessitating the rural infrastructural development. The First and Second Plans undertook programmes to develop major and medium irrigation projects. Rural infrastructure development essentially continued to be an important element from the Indian policy perspective over the years in successive five-year plans. The Sixth Five Year Plan re-emphasized the need for massive public investment in rural infrastructure and ensuring that the gains of economic progress are more equitably distributed in rural areas accentuating the long-term growth trajectory. The Eighth Five Year Plan reiterated

rural infrastructure development and considered it to be one of the basic elements of an employment induced growth strategy as witnessed large-scale plan expenditure of the government behind major infrastructure items in India.

Various rural infrastructural development programmes over the Planning era initiated in India such as: *The Accelerated Rural Water Supply Programme (ARWSP, 1972-73), Rajiv Gandhi National Drinking Water Mission (RGNDWM), Bharat Nirman (2006), The Rajiv Gandhi Grameen Vidyutikaran Yojna (RGGVY, 2005), The Pradhan Mantri Gram Sadak Yojana (PMGSY, 2000) , Creation of Rural Infrastructure Development Fund (RIDF inder Ninth Five Year Plan)* was set up within NABARD covering Panchayati Raj institutions, SHGs and NGOs, *The Accelerated Irrigation Benefit Programme (AIBP, 1996), the National Solar Mission (2009), Indira Awaas Yojana (IAY, 2011-12), National Rural Drinking Water Programme (NRDWP, 2009), Total Sanitation Campaign (TSC, 2009), Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA, 2005) National Rural Livelihood Mission(NRLM, 2011), Rural Roads Development Vision Plan (RRDPV, 2007),* and many others - that cater to the requirements of agriculture and other basic activities, including sectors like irrigation, roads, bridges, education and rural health production, transport, marketing and other allied activities.

This paper evaluates the impact of rural infrastructural development and other related variables on economic growth in the Indian economy. It facilitates to understand many dimensions of rural development. It investigates the relationship between rural infrastructure development and economic growth in India. Utilizing a time series data for the period of 1950-51 to 2016-17, the autoregressive distribution lag (ARDL) model is applied to estimate the impact of rural infrastructural development and other variables on economic growth in the context of the Indian economy. The effects of together with other variables such as public investment on human capital - on education and health, trade openness and foreign direct investment on economic growth are estimated. The results suggest that the rural infrastructure development has a positive significant impact on economic growth in India. Considering intuitively the impact of rural infrastructural development on labour force, the result may significantly be negatively signed indicating the growing unemployment problem and the low productivity of labour in India.

The development and maintenance of rural infrastructure has been a cause of general concern. This is an area where public investment is neglected. Both foreign and domestic sources of capital will need to be tapped. If this trend towards raising non-budgetary resources for infrastructure is to continue, financial markets will have to respond by providing the necessary long-term resources. Rural infrastructural development via improved physical and social infrastructure and livelihood opportunities enhance agricultural productivity and output, improve literacy and life expectancy, and reduce poverty and infant mortality.

Despite several public initiatives for infrastructure development in rural India, progress and performances still remain mostly unsatisfactory. Therefore, the government of India should strive continuously to improve the infrastructure facilities as well as the human capital formation to achieve a sustainable economic growth. The empirical findings, revealing the relative importance of various relevant indicators of infrastructural development, suggest that the government should prioritize additional more investments in electricity, roads, irrigation, housing and telecommunications to expand overall well-being. However, since recent years, there has been a perceptible shift in government posture to rural infrastructural development towards public-private partnership provision.

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NON-FARM EMPLOYMENT AMONG THE RURAL YOUTH: THE ROLE OF EDUCATION

Aparajita Dhara*

Abstract

The extent to which the rural non-farm sector can reduce rural poverty levels depends on the households' and individuals' access to such employment and income sources. This access and income-earning potential in turn depends on the households' and individuals' characteristics, especially regarding their asset endowments. In this paper an attempt has been made to analyse the role of human capital (in terms education-level) in enabling a rural youth to enter the non-farm workforce in India. The analysis is based on unit-level NSS-data on employment-unemployment situation in India for the 68thround (2011-12) and covers the usual principal status (UPS) workforce belonging to the 15-29 years age-group. It has been foundthat apart from construction and transport sector jobs, all the other major activities in non-farm sector, and especially the better-return regular employment opportunities, place a higher entry-barrier for a less-educated person. Moreover, it has been found that though there are much inter-state differences in the human-capital content of the workforce in terms of general-education level, vocational training seems to enhance the probability of a worker to shift from agriculture to non-agricultural activities.

Key words: Rural employment, Non-Farm employment, Youth Employment, Human Capital

JEL Classification Codes: J21, J24, J82, R11, R58

I.Introduction

The share of agriculture in an economy's total value-added and total employment falls as the economy grows – and this leads to a shift in the occupational structure of the rural workforce from agriculture towards various non-agricultural (or non-farm) activities. During the past two decades researchers have been studying the potential of rural non-farmemployment as a pathway out of poverty, especially for landless households and land-constrained marginal farmers. But the extent to which the rural non-farm sector can reduce poverty depends on the rural household' and individuals' access to such employment and income sources. This access and income-earning potential in turn depends on the households' and individuals' characteristics, especially regarding their asset endowments. The asset of an individual or a household can be categorised into three major types – physical and financial capital (wealth, land, savings, supply of credit), human capital (skill, knowledge, education)

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and social capital (contacts, social network) – and these form the most important supply-side micro-level determinants for the rural labour force in gaining access to the non-farm job-market.

In this paper we attempt to analyse the role of human capital in enabling a rural youth (belonging to the 15-29years age-group) to enter the non-farm workforce in India. The education-level has been used as a proxy for the worker's knowledge and skill. The analysis has been done with the 68th round of NSSO unit-level data on the employment and unemployment situation in India, corresponding to the year 2011-12. We focus on the nineteen major states of India, which cover 89.3% of the country's total area and 97.7% of the country's total rural population.

Our objective is to find out:

a) The role of general education-level in determining the access of an individual to rural non-farm sector employment – by employment-status and sub-sectors

b) The role of technical and vocational training in enabling a rural youth to access different types of non-farm activities, and

c) The likelihood of a rural female worker of entering the different non-farm sub-sectors

The paper has been organised as per the following sections. We begin with a brief survey of the relevant literature in Section II. Section III gives an overview of the distribution of the young workforce in rural India (and the 19 major states) by their principal employment-status (UPS), principal industry of employment, gender-composition and education-level. In Section IV we perform an econometric analysis with workers' education-levels and their occupational choices/access. Section V concludes with some policy issues.

II. Literature Review

Access to non-farm employment is determined by a wide and complex range of factors. Characteristics intrinsic to households and their members determine the relative ability of households and individuals to exploit existing opportunities in the rural non-farm employment (RNFE). This implies that the most disadvantaged in village societies are rarely found to be employed in the non-farm sector, especially in those activities that are well-paid. Hoffman (1991) argues that individual characteristics play a key role in sorting people across low and high productivity employment and the decision of individuals to participate in the rural non-farm labour market is based on the individual's self-selection rather than random assignment. Individuals with higher initial wealth and human capital are more able to engage in high-return non-farm activities and benefit most from the RNFE, so there could be significant selection effects involved in this oft-found association (Barrett *et al*., 2001).

Analysis of nonfarm employment probabilities and earnings finds strong evidence of the importance of education in determining access to nonfarm occupations. A positive and significant association between education levels and non- farm income at the household and individual levels has been empirically established in different developing country contexts in the studies by Chadha (1993, 2004), Pal *et al*. (1995), Shylendra and Thomas (1995), Fisher *et al*. (1997), Reardon *et al*. (2001), Barret*et al.* (2001), Coppard (2001), Som*et al*, (2002), Rath*et* al (2002), Lanjouw and Shariff (2004), Kijima and Lanjouw (2005), Eswaran*et al*. (2009) among others. The literature indicates clear evidence that education improves prospects of finding nonfarm employment, and that with higher levels of education the odds of employment in well-paid regular nonfarm occupations rises. An important aspect of this general finding is that relative to no education at all, even small amounts of education can improve prospects considerably. The average number of years of education completed by those in RNFE has been found to be 2-3 years more than those working in agricultural activities. This has important policy implications because it suggests one might expect to see appreciable changes in nonfarm employment patterns and levels, even with incremental improvements in general education outcomes. Studies are unanimous in their finding that the educational attainment of RNF workers is higher than in the agricultural sector, suggesting that education is an important preparation or precondition for rural workers to enter the RNFE and lack of education and skills training remain a principal barrier. More educated and literate individuals have greater access to information and facilities from government institutional systems and better educated individuals are likely to possess skills which facilitate successful involvement in non-farm activities, including the ability to manage a business, process relevant information and adapt to changing demand patterns. Moreover, they are also likely to have greater aspirations with regard to working outside agriculture. In most countries a minimum educational criteria are set for regular government and private sector jobs, and so individuals with a lower level of education face an entry barrier to those jobs. However, relatively high educational levels are by no means a guarantee of remunerative wage or self-employment in the non-farm economy. Complementary assets such as finance and a dynamic rural labour market are equally important. Due to lack of demand unemployment rate among rural graduates is often very high, reflecting the limited availability of formal and regular job options.

Among other individual-characteristics, some studies have also focussed on the age and gender composition of the rural non-farm workforce. According to Unni (1996), while older men specialise in agricultural activities, better educated younger men specialise in non-agricultural activities. Abdulai and Delgado (1999) found that the probability of participation in non-farm work increases with age up to 33 for men and 30 for women, and is thereafter inversely related to age. Eswaran et al (2009) has also observed that it is primarily the males

in the age group of 18-26 years old who have some education that are moving out of agriculture into non-farm jobs.

The literature (Srivastava *et al*. 1995, Chadha and Sahu 2002, Pandey 2002, Rath 2002, Som *et al*. 2002, Lanjouw and Shariff 2004, Dirven 2011) documents a significantly lower probability of non-farm employment by women at the national as well as regional levels. Moreover it has been found that women are generally concentrated in less-remunerative refuge non-farm activities. Low literacy rate, early marriage and child-rearing, household responsibilities, social attitudes and cultural barriers against women working outside home have been identified in the literature as some of the major reasons for this low participation of women in the rural non-farm sector. In rural areas of Uganda, Armenia, Georgia, Romania too studies by Coppard (2001), Davis and Medkhidze (2002), Kharatyan (2002), Bezemer and Davis (2003) have found that it is the men who generally start and manage small and medium-sized non-farm businesses, often in combination with farming activities and the female participation rate in the non-farm sector is low. However, while some general features are found across the studies, the role of gender in enabling or restricting access to different economic activities varies from region to region, across socio-economic groups and also over time.

It needs to be noted that the value of a specific asset often depends on other complementary assets and the importance of a particular asset varies with the type of employment. Education and social contacts might be particularly important for accessing formal jobs in government or the private sector, whereas skills acquired outside the formal schooling system and access to finance and market networks play a significant role in the developing entrepreneurial activities. Moreover, the availability of a particular asset often influences the level of other assets – social capital may enhance access to financial resources, education tends to be positively correlated with social capital and access to formal credit, land availability can serve as collateral for bank loans and so on. Finally, asset endowments are neither static nor necessarily cumulative over time; since households and individuals may decide to alienate certain assets (such as land or savings in kind and cash) in order to acquire other assets (such as education and equipment). We thus find that the access of an individual or a household towards non-farm employment and income depends on their inherent characteristics to a great extent, but the dynamics are quite heterogeneous and complex.

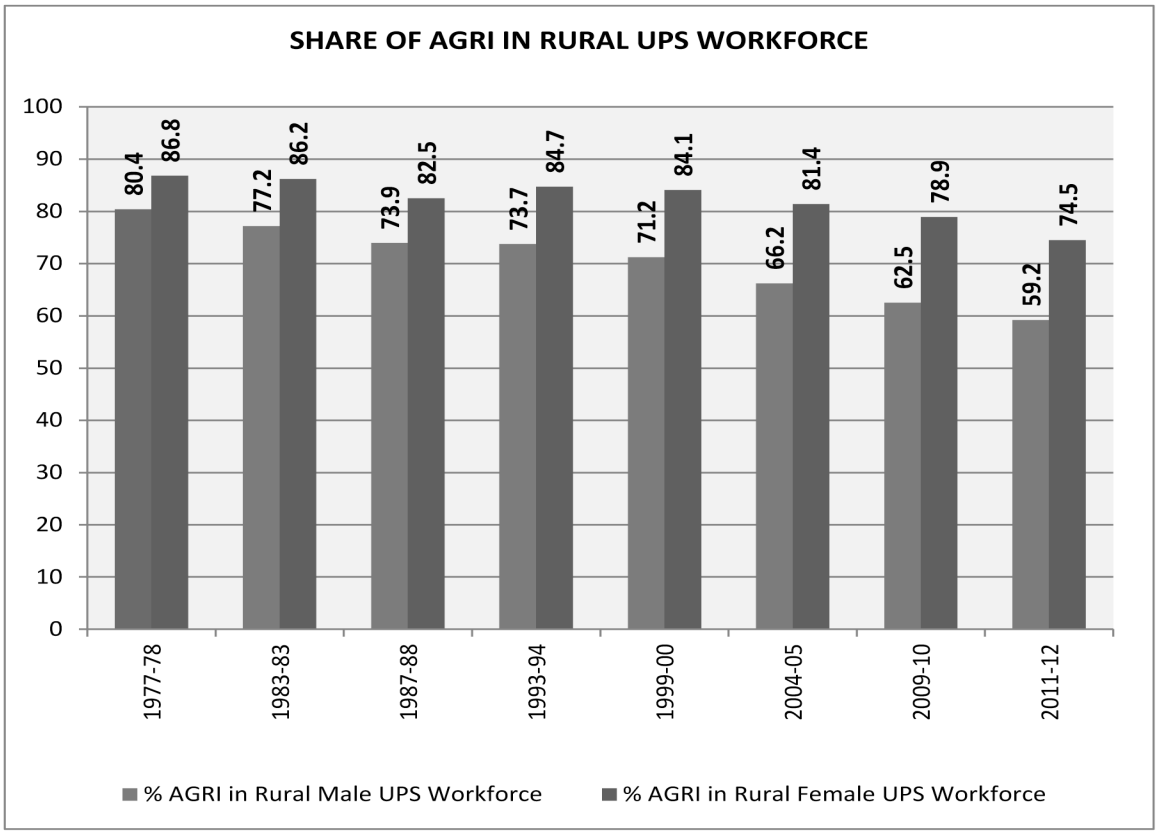
With this background we now move on to the analysis regarding the role of human-capital (proxied by education-level) and access to non-farm employment among the youth of rural India in the following sections.

II. Profile of the rural workforce in 15-29 years age-group:

The data on rural non-farm employment in India (presented in Figure-1) reveals that the share of agriculture in rural male usual-principal-status (MPS) workforce has been gradually decreasing over the last 35 years, from 80.4% in 1977-78 to 59.2% in 2011-12, while that for the rural female usual-principal-status (FPS) has decreased from 86.8% to 74.5% during the same period. This implies that there has been an occupational shift towards non-farm activities for both the male and female workforce and especially for the rural male UPS workers over the years. Data also shows that the new entrants to the workforce are mostly going towards the non-farm sector since new employment opportunities in the agricultural sector is getting more and more limited over the years.

Table-1 and Table-2 present the profile of the young (belonging to 15-29 years of age-group) rural UPS workforce in India with respect to economic activities, non-farm employment-status, gender composition and general-education levels.

Figure-1: **Share of Agriculture in Rural UPS workforce during 1978-2012**



Source: Compiled from various NSS-rounds

It can be observed that while the share of non-farm employment for male-UPS on the whole stands at 40.8% in 2011-12, the share of non-farm employment among the rural youth stands at a much higher level of 54.4%, implying that the incidence of non-farm employment in higher among the younger section of the workforce as compared to the older workforce, and this trend is likely to be more pronounced over the coming years as new employment opportunities are becoming limited in agricultural activities.

At the state-level one finds that Kerala has 90.2% of the rural youth taking up non-farm jobs, while in Himachal Pradesh (the most 'agricultural' among the states as far as rural youths are concerned) the 36.6% are going for non-farm activities. Karnataka, Bihar, Assam, Andhra Pradesh, Uttar Pradesh, Orissa , Rajasthan, Haryana and Jharkhand has more than 50% of rural youth in non-farm employment while for Punjab, West Bengal and Tamil Nadu the share is more than 60%.

Table-1: Composition of 15-29 year old rural UPS workforce – by economic activities and employment-status

Profile of Rural Youth (15-29 yrs. Age group)	AGRI	NONAGRI	MFG	CON	TRD	TRA	SVS	OTH	NonAgri SELFEMP	NonAgri CASUAL	NonAgri REGULAR		
Eastern India													
ASSAM	46.9	53.1	7.7	9.7	18.0	4.9	12.5	0.3	27.1	17.2	8.8	TRD	SLF
WEST BENGAL	32.5	67.5	23.0	14.9	12.0	5.0	12.1	0.5	33.2	21.0	13.4	MFG	SLF
BIHAR	47.1	52.9	7.0	17.4	14.5	3.7	10.2	0.2	25.9	20.1	6.8	CON	SLF
JHARKHAND	41.4	58.6	7.9	26.2	11.2	5.5	5.8	2.0	20.0	31.4	7.2	CON	CAS
ORISSA	44.5	55.5	10.6	17.5	12.5	5.4	9.0	0.5	26.3	18.2	11.0	CON	SLF
Southern India													
ANDHRA PRADESH	46.5	53.6	12.2	10.1	11.2	8.5	10.8	0.7	25.7	12.9	14.9	MFG	SLF
TAMIL NADU	28.8	71.2	23.2	15.1	11.4	9.1	11.3	1.1	19.4	25.7	26.2	MFG	REG
KERALA	9.8	90.2	13.1	24.3	17.6	15.5	18.9	0.9	22.2	39.0	28.9	CON	CAS
KARNATAKA	49.7	50.4	14.2	9.5	7.6	8.0	9.9	1.1	17.6	13.5	19.2	MFG	REG
Western & Central India													
MAHARASHTRA	55.0	45.0	10.5	8.2	10.9	6.0	9.0	0.5	20.4	10.0	14.5	TRD	SLF
GUJARAT	53.5	46.5	15.1	7.9	9.5	4.9	8.8	0.4	18.7	10.0	17.8	MFG	SLF
RAJASTHAN	43.2	56.8	8.9	27.8	7.3	3.9	6.9	2.0	15.7	29.9	11.1	CON	CAS
MADHYA PRADESH	56.8	43.2	6.7	18.3	7.6	2.4	7.4	0.9	15.9	19.9	7.5	CON	CAS
CHATTISGARH	58.4	41.6	9.7	5.3	10.0	1.9	13.2	1.6	18.6	9.0	14.0	SVS	SLF
Northern India													
UTTAR PRADESH	45.0	55.0	11.6	21.1	10.0	4.6	7.2	0.5	20.2	25.0	9.8	CON	CAS
UTTARANCHAL	50.9	49.1	10.4	15.1	10.9	7.2	5.4	0.3	19.3	14.6	15.3	CON	SLF
HIMACHAL PRADESH	63.4	36.6	5.0	14.1	3.6	4.9	8.5	0.5	8.4	13.6	14.6	CON	REG
PUNJAB	36.0	64.0	12.5	24.1	10.1	4.1	12.4	0.8	21.1	23.2	19.7	CON	CAS
HARYANA	42.3	57.7	9.3	19.6	10.7	5.2	12.4	0.5	19.4	20.8	17.5	CON	CAS
INDIA	**45.6**	**54.4**	**11.2**	**15.9**	**10.5**	**5.6**	**10.4**	**0.9**	**20.7**	**19.0**	**14.8**	CON	SLF
	HP	**KER**	**TN**	**RAJ**	**ASM**	**KER**	**HRY**	**RAJ**	**WB**	**KER**	**KER**		

Source: Extracted from unit-level 68th round NSS-data

A look at the sub-sector wise employment within the non-farm sector shows that for the all-India situation Construction activities (CON) have provided employment to 16% of rural youth, followed by Manufacturing (MFG), Trade-Hotel-Restaurant related activities (TRD) and miscellaneous Services (SVS) at around 10% each and 5% in Transport-Storage-Communication (TRA). Tamil Nadu and West Bengal has more than 20% share of MFG-employment while Rajasthan, Jharkhand, Punjab, Kerala and Uttar Pradesh has more than 20% of youth going towards the CON-sector. In TRD-sector Assam provides more than 18% employment to the youth there while Kerala has more than 15% going for TRD, TRA and SVS sectors each.

Around 20% of the youth have gone for non-farm self-employment and non-farm casual-wage employment each in India, while 15% have found opportunities in non-farm regular employment. Among the states West Bengal has the highest share of non-farm self-employment at 33%, while Kerala has the highest shares in non-farm casual-employment (40%) and non-farm regular-employment (30%).

Table-2: **Composition of 15-29 year old rural UPS workforce- by gender and education-levels**

	FEMALE	NOT LITERATE	UPTO PRIMARY PASSED	MIDDLE PASSED	SECONDARY & ABOVE	TECH EDU	VOC EDU
Eastern India							
ASSAM	14.2	9.1	26.4	30.2	34.4	1.2	6.0
WEST BENGAL	14.0	14.4	39.5	18.5	27.6	1.7	24.0
BIHAR	5.4	21.1	24.0	16.5	38.5	0.9	2.6
JHARKHAND	12.7	21.2	26.2	21.2	31.5	0.7	1.6
ORISSA	19.1	12.7	25.3	34.7	27.3	1.3	32.9
Southern India							
ANDHRA PRADESH	39.3	22.9	21.7	17.8	37.6	2.4	21.4
TAMIL NADU	29.9	6.2	22.2	28.0	43.6	7.3	22.9
KERALA	19.6	0.3	7.9	35.5	56.3	14.5	39.3
KARNATAKA	24.0	14.9	17.2	22.8	45.1	3.2	11.5
Western & Central India							
MAHARASHTRA	26.9	7.3	16.7	28.9	47.0	3.9	11.6
GUJARAT	22.2	10.5	29.5	27.3	32.7	2.5	23.0
RAJASTHAN	27.2	25.9	30.4	20.7	23.1	1.2	14.7
MADHYA PRADESH	21.5	22.1	30.4	21.4	26.1	0.9	14.6
CHATTISGARH	36.4	11.2	27.5	26.0	35.3	1.3	41.8
Northern India							
UTTAR PRADESH	8.1	19.9	21.8	22.8	35.5	0.8	13.1
UTTARANCHAL	37.0	7.7	17.3	29.9	45.2	2.0	8.2
HIMACHAL PRADESH	49.1	4.1	19.1	15.2	61.6	4.2	16.3
PUNJAB	7.7	12.6	26.4	16.5	44.5	2.2	56.0
HARYANA	8.7	7.8	25.7	14.6	52.0	4.0	12.0
INDIA	**22.9**	**13.6**	**24.6**	**24.1**	**37.7**	**2.5**	**17.1**

Source: Extracted from unit-level 68th round NSS-data

Table-2 shows that among the youth in 15-29 year age group, 23% are female workers. But female workforce participation among the rural youth varies from more than 30% in Himachal Pradesh, Andhra Pradesh, Uttaranchal and Chhattisgarh to less than 10% in Haryana, Uttar Pradesh, Punjab and Bihar.

From a look at the education-wise break-up of the young rural UPS workforce in the major states of Indiaone finds that 13.6% of India's rural workforce belonging to 15-29 year age-group are not literate, while 24.6 are literate up to Primary-level. 24.1% are Middle-school passed and 37.7% of the young-workers have passed Secondary examination. Among the major states, Himachal Pradesh, Kerala and Haryana have more than 50% share of secondary-passed youths in the workforce. Kerala, Orissa and Assam have more than 30% of young workers with middle-school education while West Bengal, Madhya Pradesh and Rajasthan have more than 30% of this workforce with primary-level education.

In India 4.2% of rural young-workers have some technical education while 16.3% have some sort of vocational training (formal or informal). Kerala has 14.5% of the youth with technical-education and Punjab has 56% with some sort of vocational training. Jharkhand ranks the lowest among the states in these aspects, at 0.7% and 1.6% respectively.

Thus in this section we get an overview of the state-wise composition of the rural workforce in the 15-29 year age-group – by their industry of occupation, employment-status and educational levels. We now move on to the empirical part of our analysis in order to understand the role of education in determining a worker's access to the different sub-sectors and employment-types. Here we consider the probability of a worker to shift from agriculture to non-agricultural activities with respect to gender and educational qualifications.

[It is to be mentioned here that the analysis here leaves out several other important characteristics at individual and household levels, especially regarding the households' wealth and asset-endowment, socio-religious status and access to various infrastructural facilities – which are other-wise important in determining the access to non-farm employment. The models just focus on the educational-aspect of the individual workers, and thus somewhat limited in their explanatory power].

III. Empirical Analysis

The data-set used in this analysis is categorical in nature and we perform multinomial/ categorical logistic regression analysis on it to find out the probability of an individual to work in the non-farm sector, where we assume 'non-farm-occupations' as 'success' and 'agricultural-occupation' as 'failure'.

Methodology –

Mathematically we can formulate the logistic regression model as follows.

Suppose Y is the binary dependent variable which takes the value either 1 (success) or 0 (failure), and $X_1, X_2,\ldots,X_k$ are k number of independent explanatory variables and we would like to know about the impact of these independent variables on the probability that Y takes the value of 1.

Now, the cumulative standard logistic distribution with Y and Xs can be written as

$$\Pr(Yi=1 \mid Xi) = F(\hat{a}X_i)$$

$$= \frac{1}{1+e^{-\beta Xi}}$$

$$= \frac{e^{\beta Xi}}{1+e^{\beta Xi}} \quad \ldots \quad \text{Equation - 1}$$

or $$\frac{\Pr(Yi=1 \mid Xi)}{1-\Pr(Yi=1 \mid Xi)} = e^{\beta Xi} \quad \ldots \quad \text{Equation - 2}$$

or $$\text{Ln}[\,] = \hat{a}X_i \quad \ldots \quad \text{Equation - 3}$$

Here is the ratio of the probability of success (i.e. Y=1) and probability of failure (i.e. Y=0), and is known as the 'odds-ratio'. The natural logarithm of this ratio is the logit-equation-3. The coefficient estimated by the logistic regression model gives the unit change in log-odds of success due to 1 unit change in the independent variable under consideration (i.e., keeping all other explanatory variables constant). A positive sign of the coefficient denotes that the probability of success increases, and a negative sign means that as the X increases the probability of Y being 1 falls. The odds-ratio for the explanatory variables can be obtained by exponentiation of the coefficients and they show the degree by which the probability of success increases (if odds-ratio>1) or decreases (if odds-ratio<1). We can also calculate the predicted probability of success and failure at each level of the variable X if we want, and the marginal effects show how this probability changes (and by how much) if X changes.

The binary-choice model can be expanded to a multinomial logistic regression model when the dependent variable has more than two categories. Multinomial logistic methodology, like binary logistic regression, also uses maximum likelihood estimation procedure. But since there are more than two values for Y, we have to declare one category of Y as the reference-category. The parameter estimates are relative to the referent-group, and the standard interpretation of the multinomial logit is that for 1 unit change in the predictor variable the

logit (or log-odds) of m^{th} outcome relative to the referent-group is expected to change by its respective coefficient (keeping all other variables in the model as constant).

Moreover, for multinomial logistic regression we have the 'relative risk ratio'(RRR) instead of the 'odds-ratio' (OR). This ratio indicates how the risk of the outcome falling in the comparison group (as compared to the risk of the outcome falling in the referent-group) changes with the change in the independent variable under consideration. An RRR > 1 indicates that the risk of the outcome falling in the comparison group relative to the risk of the outcome falling in the referent group increases as the variable increases. In other words, the comparison outcome is more likely. An RRR < 1 indicates that the risk of the outcome falling in the comparison group relative to the risk of the outcome falling in the referent group decreases as the variable increases. In general, if the RRR < 1, the outcome is more likely to be in the referent group.

Econometric Modelling –

For understanding an individual worker's access to the non-farm sector employment with respect to his/her individual characteristics, we have done two models:

1. Multinomial Logistic Regression, with

   Dependent Variable - Non-Farm Sub-Sectors

   Explanatory Variables - Female, General-education, Technical-Education , Vocational-education

2. Multinomial Logistic Regression, with

   Dependent Variable - Non-Farm Employment-Status

   Explanatory Variables - Female, General-education, Technical-Education , Vocational-education

The Referent group for both the models is AGRI (Agricultural activities).

The Comparison groups are:

MFG - Manufacturing

CON - Construction

TRD - Trade-Hotel-Restaurant

TRA - Transport-Storage-Communication

SVS	-	Other miscellaneous Services
NONFARM SELFEMP	-	Self-employment in non-farm activities
NONFARM CASUAL	-	Casual wage employment in non-farm sector
NONFARM REGULAR	-	Regular salaried employment in non-farm sector

The explanatory variables (determinants) are also categorical in nature:

FEMALE	= 0	if	worker ismale
	= 1	if	workerisfemale
GENERAL-EDUCATION	= 0	if	worker is not literate
	= 1	if	worker is literate up to Primary-school passed
	= 2	if	worker is Middle-school passed
	= 3	if	worker is Secondary-school passed
TECHNCAL-EDUCATION	= 0	if	worker has no technical education
	= 1	if	worker has some technical education
VOCATIONAL-EDUCATION	= 0	if	worker has no vocational training
	= 1	if	worker has some vocational training

Results –

We begin with the gender-aspect of rural non-farm employment among the youth first and then analyse the education-aspects.

Females are more likely than males to be in MFG-sector employment as compared to AGRI in Punjab, West Bengal, Kerala and Orissa, while females are less likely to take up MFG at the national level, and also for the states of Assam, Chhattisgarh, Gujarat, Himachal Pradesh, Maharashtra, Rajasthan and Uttaranchal. In CON, TRD and TRA sectors females are less likely to shift from AGRI, in all the states. In most of the states and also at all-India level, females are more likely than males to take up SVS-activities compared to AGRI, but less likely in states like Andhra Pradesh, Himachal Pradesh, Maharashtra and Uttaranchal.

Moreover, females are more likely than males to take up non-farm regular employment as compared to AGRI in states like Bihar, Jharkhand, Madhya Pradesh, Orissa, Punjab, Uttar Pradesh and West Bengal, and non-farm self-employment in Punjab and West Bengal. Males are more likely than females to take up non-farm casual employment.

At the all-India level, technical education and vocational training increases the probability of a young worker taking up non-farm sector employment as compared to agriculture significantly for all the sub-sectors and employment-status. General education level up to middle-school increases a worker's probability of taking up MFG activities as compared to AGRI. TRD and SVS-participation and also regular non-farm employment increases significantly for all education levels and especially Secondary-education. Ability to take up self-employment in non-farm sectors is also positively and significantly dependent on general education level of the worker. But education is insignificant for TRA-participation and higher levels of education decreases the probability of taking up CON-sector employment and casual non-farm employment by the youth in rural India.

Table-3 to Table-10 give the state-wise results of the logistic regression analysis and one can observe the role of general and technical education as well as vocational training in determining a worker's access to non-farm employment for each individual states. There exist much heterogeneity among the states but one can find a general trend too. Vocational training has a positive and significant impact on a worker's access to MFG, TRA and SVS sector employment as well as non-farm self-employment and non-farm regular-employment in almost all the states and to CON-sector employment in most states (except Punjab, Madhya Pradesh and Uttar Pradesh, where vocational traing lowers the probability of shifting from AGRI to CON). TRD and non-farm casual employment show mixed results with regard to vocational training. On the other hand, technical education is highly significant for a worker to gain access to SVs-sector jobs and non-farm regular employment.

Andhra Pradesh, Gujarat, Karnataka and Tamil Nadu seem to have a higher human capital content in their MFG-workforce as compared to the other major states of the country, while educated youth seem to opt for TRD activities ovr AGRI in Andhra Pradesh, Assam, Karnataka, Orissa, Punjab, Rajasthan and West Bengal. [But surprisingly education does not seem to be a determining factor for shifting from AGRI towards SVS-employment and also non-farm regular employment in Himachal Pradesh, Karnataka, Kerala and Uttaranchal – and this aspect needs further probing.]

Table-3: Results for MANUFACTURING over AGRICULTURE

Multinomial Logistic Regression Results: reporting Relative-Risk-Ratios ***, **, * denotes 1%, 5% and 10% levels of significance respectively								
AGRI to	(male)	(not lit)	(not lit)	(not lit)	(no tech)	(no voc)		No. of
MANUFACTURING	FEMALE	PRI	MID	SEC	TECH	VOC	constant	Obs.
Eastern India								
ASSAM	0.29 ***			0.45 *		3.68 ***	0.20 ***	1243
WEST BENGAL	3.70 ***					5.89 ***	0.29 ***	1669
BIHAR		2.06 **		0.39 ***		9.17 ***	0.15 ***	1377
JHARKHAND				0.38 **			0.26 ***	874
ORISSA	1.95 ***					2.35 ***	0.16 ***	1468
Southern India								
ANDHRA PRADESH		1.46 *	1.59 **	2.71 ***		3.58 ***	0.11 ***	2239
TAMIL NADU		3.64 ***	2.48 **	3.88 ***		13.13 ***	0.15 ***	1430
KERALA	2.48 **					5.92 ***		774
KARNATAKA		2.18 **	3.50 ***	2.67 ***		19.34 ***	0.08 ***	1293
Western & Central India								
MAHARASHTRA	0.48 ***					6.48 ***	0.13 ***	2588
GUJARAT	0.40 ***		5.78 ***	5.81 ***		7.85 ***	0.04 ***	1185
RAJASTHAN	0.12 ***					4.75 ***	0.29 ***	1678
MADHYA PRADESH			1.73 *			1.92 ***	0.08 ***	1714
CHATTISGARH	0.54 **					1.47 *	0.19 ***	973
Northern India								
UTTAR PRADESH				0.38 ***		3.09 ***	0.28 ***	3260
UTTARANCHAL	0.11 ***			0.31 *		26.56 ***		405
HIMACHAL PRADESH	0.14 ***					8.85 ***	0.02 ***	990
PUNJAB	13.40 ***					3.39 ***	0.11 ***	831
HARYNA					2.99 *	2.13 **	0.12 ***	756
INDIA	0.87 ***	1.21 ***	1.24 ***		2.13 ***	4.49 ***	0.16 ***	31362

Source: Author's calculations

Table-4: Results for CONSTRUCTION over AGRICULTURE

Multinomial Logistic Regression Results: reporting Relative-Risk-Ratios ***, **, * denotes 1%, 5% and 10% levels of significance respectively								
AGRI to	(male)	(not lit)	(not lit)	(not lit)	(no tech)	(no voc)		No. of
CONSTRUCTION	FEMALE	PRI	MID	SEC	TECH	VOC	constant	Obs.
Eastern India								
ASSAM	0.22 ***					3.10 ***	0.27 ***	1243
WEST BENGAL	0.21 ***		0.59 **	0.33 ***		2.27 ***	0.60 ***	1669
BIHAR	0.06 ***	1.58 **	0.44 ***	0.24 ***			0.57 ***	1377
JHARKHAND	0.12 ***		0.43 ***	0.23 ***			1.44 **	874
ORISSA	0.44 ***		0.62 **	0.27 ***			0.65 **	1468
Southern India								
ANDHRA PRADESH	0.16 ***					1.39 *	0.48 ***	2239
TAMIL NADU	0.37 ***	0.57 *	0.40 ***	0.30 ***		4.47 ***		1430
KERALA	0.35 ***					3.02 ***		774
KARNATAKA	0.12 ***			0.33 ***		2.87 **	0.35 ***	1293
Western & Central India								
MAHARASHTRA	0.13 ***		0.54 **	0.38 ***		2.32 ***	0.41 ***	2588
GUJARAT	0.37 ***	0.50 **		0.26 ***		2.15 ***	0.30 ***	1185
RAJASTHAN	0.15 ***		0.50 ***	0.36 ***			1.63 ***	1678
MADHYA PRADESH	0.38 ***	0.67 **	0.56 ***	0.27 ***		0.42 ***	0.71 ***	1714
CHATTISGARH	0.15 ***						0.15 ***	973
Northern India								
UTTAR PRADESH	0.06 ***		0.54 ***	0.22 ***		0.73 *		3260
UTTARANCHAL	0.02 ***			0.19 ***		5.17 *		405
HIMACHAL PRADESH	0.02 ***					1.73 *		990
PUNJAB		1.75 *		0.45 ***		0.64 **		831
HARYNA	0.45 *			0.21 ***				756
INDIA	0.17 ***	0.83 ***	0.61 ***	0.34 ***	1.87 ***	1.24 ***	0.74 ***	31362

Source: Author's calculations

Table-5: Results for TRADE-HOTEL-RESTAURANT over AGRICULTURE

Multinomial Logistic Regression Results: reporting Relative-Risk-Ratios ***, **, * denotes 1%, 5% and 10% levels of significance respectively								
AGRI to	(male)	(not lit)	(not lit)	(not lit)	(no tech)	(no voc)		No. of
TRADE-HOTEL-REST.	FEMALE	PRI	MID	SEC	TECH	VOC	constant	Obs.
Eastern India								
ASSAM	0.35 ***	2.30 *	5.62 ***	7.61 ***			0.09 ***	1243
WEST BENGAL	0.37 **		1.84 *	2.89 ***		0.56 **	0.27 ***	1669
BIHAR		1.71 *		1.70 *			0.21 ***	1377
JHARKHAND	0.20 ***	2.70 **	2.33 *	2.45 **			0.15 ***	874
ORISSA	0.54 **	2.12 *	3.32 ***	4.62 ***		0.59 ***	0.12 ***	1468
Southern India								
ANDHRA PRADESH	0.63 ***		1.63 **	2.92 ***	2.81 **		0.18 ***	2239
TAMIL NADU	0.49 ***					5.38 ***	0.27 ***	1430
KERALA						3.76 ***		774
KARNATAKA	0.53 **	4.70 **	4.18 **	9.85 ***		3.19 **	0.03 ***	1293
Western & Central India								
MAHARASHTRA	0.24 ***			2.46 **		2.52 ***	0.14 ***	2588
GUJARAT	0.18 ***						0.17 ***	1185
RAJASTHAN	0.04 ***		3.01 ***	3.77 ***			0.12 ***	1678
MADHYA PRADESH	0.25 ***		2.12 **	2.09 **	6.07 *	0.27 ***	0.11 ***	1714
CHATTISGARH	0.32 ***			3.74 **		0.57 **	0.12 ***	973
Northern India								
UTTAR PRADESH	0.35 ***						0.20 ***	3260
UTTARANCHAL								405
HIMACHAL PRADESH	0.04 ***					3.08 **		990
PUNJAB		4.91 **	3.53 *	4.27 **			0.06 ***	831
HARYNA	0.25 *				3.19 *		0.22 ***	756
INDIA	0.35 ***	1.46 ***	1.97 ***	2.62 ***	2.32 ***	1.11 *	0.04 ***	31362

Source: Author's calculations

Table-6: Results for TRANSPORT-STORAGE-COMMUNICATION over AGRICULTURE

Multinomial Logistic Regression Results: reporting Relative-Risk-Ratios ***, **, * denotes 1%, 5% and 10% levels of significance respectively								
AGRI to	(male)	(not lit)	(not lit)	(not lit)	(no tech)	(no voc)		No. of
TRANS-STOR-COMM	FEMALE	PRI	MID	SEC	TECH	VOC	constant	Obs.
Eastern India								
ASSAM	0.12 ***					8.89 ***	0.09 ***	1243
WEST BENGAL			0.43 **	0.34 ***			0.28 ***	1669
BIHAR				0.38 **	12.09 **		0.11 ***	1377
JHARKHAND		3.15 *	2.66 *				0.08 ***	874
ORISSA		0.33 *				1.57 *	0.12 ***	1468
Southern India								
ANDHRA PRADESH	0.01 ***			1.71 **	0.15 *	6.86 ***	0.16 ***	2239
TAMIL NADU	0.04 ***					13.50 ***	0.19 ***	1430
KERALA	0.09 ***					8.24 ***		774
KARNATAKA	0.08 ***			2.26 *		15.89 ***	0.09 ***	1293
Western & Central India								
MAHARASHTRA	0.03 ***					15.79 ***	0.10 ***	2588
GUJARAT		0.37 **				5.76 ***	0.14 ***	1185
RAJASTHAN			3.09 **			1.86 *	0.07 ***	1678
MADHYA PRADESH	0.05 ***			0.15 ***			0.09 ***	1714
CHATTISGARH	0.08 **					3.27 **	0.02 ***	973
Northern India								
UTTAR PRADESH			0.52 ***	0.32 ***		2.56 ***	0.17 ***	3260
UTTARANCHAL						25.18 ***		405
HIMACHAL PRADESH	0.01 ***					9.66 ***	0.16 *	990
PUNJAB							0.10 ***	831
HARYNA							0.09 ***	756
INDIA	0.04 ***				2.09 ***	4.20 ***	0.12 ***	31362

Source: Author's calculations

Table-7: Results for OTHER MISCELLANEOUS SERVICES over AGRICULTURE

Multinomial Logistic Regression Results: reporting Relative-Risk-Ratios ***, **, * denotes 1%, 5% and 10% levels of significance respectively								
AGRI to	(male)	(not lit)	(not lit)	(not lit)	(no tech)	(no voc)		No. of
OTHER MISC. SVS.	FEMALE	PRI	MID	SEC	TECH	VOC	constant	Obs.
Eastern India								
ASSAM				5.53 ***	4.18 **		0.09 ***	1243
WEST BENGAL	3.66 ***	0.52 *	2.00 *	8.39 ***	5.58 ***	1.87 ***	0.09 ***	1669
BIHAR	3.38 ***			3.33 ***	4.95 **		0.08 ***	1377
JHARKHAND	2.72 ***			15.71 ***			0.02 ***	874
ORISSA	3.52 ***		3.85 ***	18.81 ***			0.03 ***	1468
Southern India								
ANDHRA PRADESH	0.67 **		1.77 *	6.78 ***	4.96 ***	1.59 **	0.09 ***	2239
TAMIL NADU		0.47 *	0.35 **		3.00 ***	3.40 ***	0.42 **	1430
KERALA	4.63 ***					4.40 ***		774
KARNATAKA						6.63 ***		1293
Western & Central India								
MAHARASHTRA	0.70 **	6.65 *	10.20 **	27.14 ***	4.15 ***	4.03 ***	0.01 ***	2588
GUJARAT	1.85 **			11.07 ***	3.30 **	2.55 ***	0.03 ***	1185
RAJASTHAN		3.29 **	5.21 ***	32.24 ***	8.43 ***		0.02 ***	1678
MADHYA PRADESH	2.13 ***	7.16 ***	13.12 ***	51.27 ***	13.10 ***	2.17 ***	0.01 ***	1714
CHATTISGARH	1.65 **		2.94 *	15.47 ***	6.48 ***	0.58 **	0.04 ***	973
Northern India								
UTTAR PRADESH	2.38 ***		1.85 **	3.88 ***	2.72 *	2.09 ***	0.05 ***	3260
UTTARANCHAL	0.30 **				13.01 **	12.08 ***	0.13 *	405
HIMACHAL PRADESH	0.28 *				2.53 **	2.11 **	0.15 ***	990
PUNJAB	15.79 ***			2.16 *			0.11 ***	831
HARYNA	2.63 ***			4.81 **	3.32 **		0.06 ***	756
INDIA	1.14 ***	1.29 **	1.83 ***	7.07 ***	4.55 ***	1.71 ***	0.06 ***	31362

Source: Author's calculations

Table-8: Results for NON-FARM SELF-EMPLOYMENT over AGRICULTURE

Multinomial Logistic Regression Results: reporting Relative-Risk-Ratios ***, **, * denotes 1%, 5% and 10% levels of significance respectively								
AGRI to	(male)	(not lit)	(not lit)	(not lit)	(no tech)	(no voc)		No. of
NONFARM SELFEMP	FEMALE	PRI	MID	SEC	TECH	VOC	constant	Obs.
Eastern India								
ASSAM	0.33 ***		2.66 ***	3.41 ***		2.14 **	0.27 ***	1243
WEST BENGAL	2.19 ***			1.70 **		2.94 ***	0.62 ***	1669
BIHAR		2.04 ***		1.39 *		2.53 **	0.39 ***	1377
JHARKHAND	0.27 *	2.22 **	1.86 *	1.82 *			0.32 ***	874
ORISSA			1.54 *	2.00 ***		1.41 **	0.36 ***	1468
Southern India								
ANDHRA PRADESH	0.75 **			2.39 ***		3.03 ***	0.34 ***	2239
TAMIL NADU						9.50 ***	0.55 *	1430
KERALA						6.74 ***		774
KARNATAKA	0.56 ***	2.20 **	1.89 **	2.73 ***		12.02 ***	0.15 ***	1293
Western & Central India								
MAHARASHTRA	0.33 ***			2.17 ***		6.51 ***	0.22 ***	2588
GUJARAT	0.33 ***		1.86 *	1.94 **		3.76 ***	0.22 ***	1185
RAJASTHAN	0.11 ***	1.69 *	2.51 ***	3.12 ***		2.88 ***	0.24 ***	1678
MADHYA PRADESH	0.50 ***	1.52 *	2.41 ***	2.08 ***	7.92 **		0.17 ***	1714
CHATTISGARH	0.48 ***			2.32 **			0.22 ***	973
Northern India								
UTTAR PRADESH		1.36 **				2.14 ***	0.41 ***	3260
UTTARANCHAL	0.04 ***					15.79 ***		405
HIMACHAL PRADESH	0.05 ***		0.17 **			5.35 ***		990
PUNJAB	5.90 ***	1.88 *				2.90 ***	0.16 ***	831
HARYNA						1.92 **	0.39 **	756
INDIA	0.53 ***	1.21 ***	1.37 ***	1.65 ***	1.60 ***	2.83 ***	0.32 ***	31362

Source: Author's calculations

Table-9: Results for NON-FARM CASUAL EMPLOYMENT over AGRICULTURE

Multinomial Logistic Regression Results: reporting Relative-Risk-Ratios ***, **, * denotes 1%, 5% and 10% levels of significance respectively								
AGRI to	(male)	(not lit)	(not lit)	(not lit)	(no tech)	(no voc)		No. of
NONFARM CASUAL	FEMALE	PRI	MID	SEC	TECH	VOC	constant	Obs.
Eastern India								
ASSAM	0.28 ***						0.42 ***	1243
WEST BENGAL	0.47 ***		0.61 **	0.34 ***		2.15 ***		1669
BIHAR	0.11 ***		0.46 ***	0.19 ***			0.72 ***	1377
JHARKHAND	0.19 ***		0.50 ***	0.23 ***			1.60 ***	874
ORISSA	0.49 ***		0.63 **	0.24				1468
Southern India								
ANDHRA PRADESH	0.20 ***			0.72 *			0.58 ***	2239
TAMIL NADU	0.44 ***		0.47 ***	0.38 ***		5.14 ***	1.77 **	1430
KERALA	0.48 *					3.77 ***		774
KARNATAKA	0.26 ***		1.66 *			7.60 ***	0.29 ***	1293
Western & Central India								
MAHARASHTRA	0.20 ***		0.63 *	0.43 ***		2.13 ***	0.42 ***	2588
GUJARAT	0.40 ***			0.39 ***		2.29 ***	0.31 ***	1185
RAJASTHAN	0.15 ***		0.47 ***	0.34 ***		0.50 ***	1.91 ***	1678
MADHYA PRADESH	0.36 ***	0.65 ***	0.52 ***	0.23 ***		0.47 ***		1714
CHATTISGARH	0.19 ***		0.48 *	0.27 ***			0.49 **	973
Northern India								
UTTAR PRADESH	0.10 ***	0.80 *	0.54 ***	0.18 ***		0.76 *	1.26 **	3260
UTTARANCHAL	0.02 ***			0.13 ***				405
HIMACHAL PRADESH	0.02 ***					1.82 *		990
PUNJAB		1.63 *		0.38 ***		0.49 ***		831
HARYNA				0.23 ***				756
INDIA	0.21 ***	0.82 ***	0.64 ***	0.35 ***	1.77 ***	1.19 ***	0.86 ***	31362

Source: Author's calculations

Table-10: Results for NON-FARM REGULAR EMPLOYMENT over AGRICULTURE

Multinomial Logistic Regression Results: reporting Relative-Risk-Ratios ***, **, * denotes 1%, 5% and 10% levels of significance respectively								
AGRI to	(male)	(not lit)	(not lit)	(not lit)	(no tech)	(no voc)		No. of
NONFARM REGULAR	FEMALE	PRI	MID	SEC	TECH	VOC	constant	Obs.
Eastern India								
ASSAM				6.42 ***		3.87 ***	0.06 ***	1243
WEST BENGAL	2.25 ***		2.34 **	6.81 ***	4.17 ***	2.88 ***	0.10 ***	1669
BIHAR	6.45 ***	3.59 **		6.37 ***	8.22 ***		0.03 ***	1377
JHARKHAND	1.91 *			9.24 ***			0.03 ***	874
ORISSA	1.63 *	3.09 *	6.11 ***	22.79 ***			0.03 ***	1468
Southern India								
ANDHRA PRADESH	0.32 ***	1.70 *	3.12 ***	9.98 ***	3.19 ***	2.49 ***	0.09 ***	2239
TAMIL NADU	0.66 **		2.66 *	6.76 ***		9.13 ***	0.18 ***	1430
KERALA	3.15 ***					4.20 ***		774
KARNATAKA		2.74 ***	4.94 ***	9.13 ***	2.32 **	9.08 ***	0.06 ***	1293
Western & Central India								
MAHARASHTRA	0.35 ***		3.35 **	6.54 ***	2.97 ***	4.79 ***	0.06 ***	2588
GUJARAT	0.63 **		2.68 **	6.95 ***	2.72 *	4.15 ***	0.08 ***	1185
RAJASTHAN	0.29 ***	2.59 ***	3.21 ***	8.75 ***	6.16 **	3.06 ***	0.08 ***	1678
MADHYA PRADESH	1.65 **		2.28 *	9.71 ***	9.93 ***	1.68 **	0.03 ***	1714
CHATTISGARH		6.54 *	13.09 **	58.22 ***	5.21 **	0.56 ***	0.01 ***	973
Northern India								
UTTAR PRADESH	1.54 **	1.81 **	1.79 **	2.82 ***	3.89 ***	2.03 ***	0.09 ***	3260
UTTARANCHAL	0.09 ***				10.16 *	16.87 ***		405
HIMACHAL PRADESH	0.16 ***				2.44 **	3.58 ***	0.30 *	990
PUNJAB	8.99 ***	2.48 **	2.59 **	2.13 **	2.89 *		0.17 ***	831
HARYNA				3.70 **	4.19 ***	1.94 **	0.11 ***	756
INDIA	0.76 ***	1.98 ***	2.72 ***	6.97 ***	4.65 ***	2.53 ***	0.07 ***	31362

Source: Author's calculations

Looking back on the data –

From the above menioned econometric analysis one thus finds that apart from Construction and Transport sectors, the non-farm sector impose some sort of an entry- barrier for a less-educated rural youth, and especially for the better-paid activities. An education-wise break-up of the rural population in the 15-29 years age-group show that illiterate and primary-passed workers tend to go more towards towards agricultural and construction sectors, while higher education enables one to go for trading and service-sector activities. Table-11 and Table-12 presents the occupational profile of the middle-school-passed and secondary-examination(&above)-passed rural youth in India respectively. Here one can see that among the rural youth, especially in the southern part of India, employment in the non-farm sector is higher than that in the agricultural sector. Moreover, Table-11 shows that for the middle-passed young workforce, CON activities dominate the occupational structure (and for all the northern states) followed by TRD and MFG sectors. On the other hand for the secondary-passed workforce, it is either the SVS sector or the TRD sector. Tamil nadu seem to be an exception, where the top two employers are the MFG and CON sectors.

Table-11: Profile of Middle-School passed Rural UPS workforce (15-29 yrs.)

Profile of Middle-School-Passed Rural UPS Workforce belonging to 15-29 years age-group										
	% Middle passed	AGRI	NONAGRI	MFG	CON	TRD	TRA	SVS		
Eastern India										
ASSAM	29.2	44.6	55.4	10.4	10.5	21.6	5.6	7.2	TRD	**CON**
WEST BENGAL	18.6	33.2	66.8	25.7	13.1	14.2	4.5	9.3	MFG	TRD
BIHAR	16.9	54.3	45.7	7.6	13.6	16.8	2.7	4.9	TRD	**CON**
JHARKHAND	20.5	43.4	56.6	10.3	22.8	13.8	6.2	1.4	**CON**	TRD
ORISSA	36.2	44.4	55.6	10.6	17.5	14.1	6.5	6.1	**CON**	TRD
Southern india										
ANDHRA PRADESH	18.8	48.3	51.7	12.9	11.0	10.9	9.6	7.3	MFG	**CON**
TAMIL NADU	29.6	34.6	65.4	23.2	16.8	11.7	7.8	5.9	MFG	**CON**
KERALA	36.2	12.9	87.1	13.3	36.9	12.0	20.2	4.7	**CON**	TRA
KARNATAKA	23.0	46.2	53.8	17.9	15.9	5.6	8.8	5.2	MFG	**CON**
Western & Central india										
MAHARASHTRA	30.1	58.0	42.0	12.1	9.8	8.7	5.8	5.2	MFG	**CON**
GUJARAT	28.0	48.8	51.2	21.3	11.0	9.6	5.8	3.4	MFG	**CON**
RAJASTHAN	21.5	40.1	59.9	12.3	24.6	11.0	5.8	3.9	**CON**	MFG
MADHYA PRADESH	22.7	55.4	44.6	9.3	18.3	8.4	2.5	5.6	**CON**	MFG
CHATTISGARH	27.3	59.3	40.7	12.7	5.4	11.8	1.8	6.8	MFG	TRD
Northern India										
UTTAR PRADESH	23.6	45.0	55.0	13.3	22.6	9.5	4.4	4.7	**CON**	MFG
UTTARANCHAL	29.8	47.5	52.5	13.9	22.8	5.9	7.9	2.0	**CON**	MFG
HIMACHAL PRADESH	15.3	67.2	32.8	5.3	19.1	2.3	4.6	0.8	**CON**	MFG
PUNJAB	16.8	32.8	67.2	12.6	33.6	6.7	5.0	8.4	**CON**	MFG
HARYANA	14.6	41.6	58.4	5.6	29.2	11.2	6.7	5.6	**CON**	TRD
INDIA	**24.8**	**46.8**	**53.2**	**12.8**	**17.5**	**10.7**	**6.1**	**5.4**	**CON**	**MFG**

Source: Extracted from unit-level 68th round NSS-data

Table-12: Profile of Secondary (& above)l passed Rural UPS workforce (15-29 yrs.)

Profile of Secondary (& above) Passed Rural UPS Workforce belonging to 15-29 years age-group										
	% Secondary passed +	AGRI	NONAGRI	MFG	CON	TRD	TRA	SVS		
Eastern India										
ASSAM	34.5	39.2	60.8	3.6	7.2	24.4	6.1	19.4	TRD	SVS
WEST BENGAL	26.3	28.6	71.4	13.0	7.1	18.0	2.6	29.9	SVS	TRD
BIHAR	36.9	53.6	46.4	3.2	7.2	17.0	3.0	15.7	TRD	SVS
JHARKHAND	31.1	48.2	51.8	4.5	13.2	15.0	5.5	11.8	TRD	**CON**
ORISSA	25.8	38.8	61.2	9.7	6.4	16.1	9.4	18.5	SVS	TRD
Southern india										
ANDHRA PRADESH	38.4	33.9	66.1	14.0	8.7	14.4	9.3	19.0	SVS	TRD
TAMIL NADU	43.1	24.2	75.8	24.2	10.0	12.9	10.2	17.3	MFG	SVS
KERALA	56.1	5.3	94.7	13.3	17.2	19.9	14.4	28.5	SVS	TRD
KARNATAKA	46.3	41.9	58.1	15.1	4.2	11.7	9.9	16.5	SVS	MFG
Western & Central india										
MAHARASHTRA	47.6	48.0	52.0	11.7	5.7	13.5	6.2	13.9	SVS	TRD
GUJARAT	32.2	42.1	57.9	18.5	2.4	11.9	4.8	20.0	SVS	MFG
RAJASTHAN	22.5	35.9	64.1	8.7	15.8	12.7	2.8	22.6	SVS	**CON**
MADHYA PRADESH	25.7	54.0	46.0	6.8	9.0	11.2	0.8	17.7	SVS	TRD
CHATTISGARH	34.0	44.9	55.1	8.3	4.3	12.3	0.7	28.6	SVS	TRD
Northern India										
UTTAR PRADESH	35.4	54.5	45.5	7.7	10.4	12.0	2.8	11.8	TRD	SVS
UTTARANCHAL	46.3	52.2	47.8	8.9	7.6	16.6	5.1	9.6	TRD	SVS
HIMACHAL PRADESH	61.6	64.3	35.7	4.9	9.3	4.6	5.1	11.4	SVS	**CON**
PUNJAB	44.4	40.0	60.0	10.5	12.4	12.7	4.1	18.7	SVS	TRD
HARYANA	51.4	47.5	52.5	12.1	8.6	13.1	2.9	15.3	SVS	TRD
INDIA	**37.4**	**41.6**	**58.4**	**10.5**	**8.9**	**13.4**	**5.6**	**19.0**	**SVS**	**TRD**

Source: Extracted from unit-level 68th round NSS-data

Secondary-educated workers also take up CON-activities in Jharkhand, Rajasthan and Himachal Pradesh too. Thus, though the analysis shows that Construction is a 'low-skilled' sector, as far as formal-education is concerned, in some of the states it is being pursued by the educated population also. (This might me due to lack of other alternatives or they may be taking up the better-paid construction-sector opportunities – the issue requiring further probing.)

IV. Concluding Remarks

Studies have found that the share of income from non-agricultural sources accounts for approximately 35% in Asia, 40% in Latin America, 45% in Sub-Saharan Africa and varies between 30-45% on average in the rural areas of developing-world, emphasizing the fact that the rural economy consists of much more than agricultural activities. The ability of a worker to gain access to non-farm employment opportunities depends on his/her individual characteristics and in this chapter we have focussed on this accessibility issue with respect to

a worker's human capital (in terms of education and gender).The literature as well as our analysis here finds a strong determining factor in the education-level of an individual worker in accessing non-farm jobs, and specifically regular non-farm employment. Apart from construction and transport sector jobs, all the other major activities in non-farm sector place a higher entry-barrier for a less-educated person. The service sector opportunities, which offer more regular employment and higher income, seem to be taken up by individuals having higher education. Thus we find that differences in initial endowments lead to differences in accessibility and the workforce gets separated into 'low-endowment – low productivity' and 'high-endowment – high productivity' non-agricultural opportunities. So policies must aim at somehow enhancing the capacity of the low-endowment individuals and increase their productive capacity and make the non-farm sector more vibrant.

The analysis in this paper has shown us the importance of human capital in enabling a rural worker to gain access to non-farm employment On the other hand, data reveals that 8.5% of the labour force in the age-group 15-29 years are unemployed according to usual principal status and only 13.5% among them has taken up any subsidiary employment. 67% of the unemployed labourforce in this group are male and 33% female, and the majority belongs to 20-25 years age-group. A look at the educational-levels of this unemployed labour-force reveals that 3% are not literate, 8% are literate up to Primary-level, 17.6% have middle-level education, while 71.6% have passed secondary-examination and have higher qualifications. Moreover 10% have some technical education and 12.5% have taken some sort of vocational training. Thus rural India also seem to suffer from the problem of educated unemployment among the youth. Our analysis showed a high correlation between education level and SVS-sector regular non-farm employment. But other studies have shown that such employment opportunities are coming down over time. So policies need to be taken up to encourage entrepreneurship among the educated youth and enable them to take up self-employment in the non-farm sector and set up small and medium scale enterprises.

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