



Working Paper Series

Unemployment burden and its distribution: Theory and evidence from India

Sripad Motiram
Karthikeya Naraparaju

ECINEQ WP 2014 - 341

Unemployment burden and its distribution: Theory and evidence from India*

Sripad Motiram[†]

Karthikeya Naraparaju

Indira Gandhi Institute of Development Research (IGIDR), India

Abstract

We develop a measure of unemployment that takes into account both the level and intensity of unemployment and that satisfies several desirable properties, including distribution sensitivity (dealing with differences among the unemployed). It can also be decomposed into mean and distributional components and contributions to unemployment by various subgroups of the population. We then apply this measure to understand unemployment in India using data from National Sample Surveys on employment and unemployment during the period 1993-2012. We show that unemployment has generally fallen in this period, but this finding has to be seen in light of considerable underemployment. Moreover, unemployment is driven to a greater extent by higher educated groups; the unemployment among these groups is also fairly substantial. The distribution of unemployment has also worsened. We explain these findings and suggest some policies.

Keywords: Measurement of unemployment, welfare costs of unemployment, distribution sensitivity, Indian unemployment.

JEL Classification: J60, J64, J68.

*For their comments, we thank Pranab Bardhan, Achin Chakraborty, S. Chandrasekhar, Sudha Narayanan, S. Subramanian, and participants at the Annual Meetings of the Canadian Economics Association (Montreal), Silver Jubilee Conference on Human Development at IGIDR, 55th Annual Conference of the Indian Society of Labour Economics, Growth and Development Conference at Indian Statistical Institute, New Delhi and seminars at Dalhousie University and the Indian Statistical Institute, Bangalore.

[†]**Contacts details:** S. Motiram (corresponding author), Indira Gandhi Institute of Development Research (IGIDR), Gen. A.K. Vaidya Marg, Goregaon (E), Mumbai, India – 400065, e-mail: sripad@igidr.ac.in; K. Naraparaju, IGIDR, Gen. A.K. Vaidya Marg, Goregaon (E), Mumbai, India – 400065, e-mail: karthikeya@igidr.ac.in.

1. Introduction

“I suppose there hasn’t been a single month since the war, in any trade you care to name, in which there weren’t more men than jobs. It’s brought a peculiar, ghastly feeling into life. It’s like on a sinking ship when there are nineteen survivors and fourteen lifebelts.”

- George Orwell, *Coming Up for Air*

It is well known that unemployment imposes severe costs on individuals, both monetary and non-monetary (e.g. loss of self-worth, depression, descent into alcoholism).¹ These costs not only increase in the duration of unemployment, but also do so at an increasing rate (i.e. they are convex). Moreover, people unemployed for long durations face the risk that their skills will atrophy or become obsolete; they can also be considered as victims of an important form of social exclusion.² It is therefore necessary to realize that not all of the unemployed are similar, and that short-term and long-term unemployment are qualitatively different, requiring different kinds of policy responses. However, many commonly used conceptualizations and measures of unemployment (e.g. the head count ratio of the unemployed³) and the official and academic discourses in many countries (e.g. India) do not take this distinction seriously. In this paper, we try to address this gap by developing a “distribution-sensitive” measure, which we use to shed light on unemployment in India in the past two decades.

The above issue arises in poverty too, viz. the distinction between short-term and long-term/chronic poverty.⁴ In fact, the measurement of unemployment and the measurement of poverty share some similarities. Going back to Sen (1976), the measurement of poverty

¹ See for example, the widely used text of Samuelson and Nordhaus (2009, Chapter 13). While our focus is on costs of unemployment to individuals, there are social costs too - underuse of a productive resource (labor), increase in crime, and social unrest. A classic example of the adverse social consequences of unemployment comes from Germany during the interwar years – the high unemployment rate played a crucial role in the Nazis and Hitler coming to power. For a recent statistical analysis of this issue, see Stogbauer and Komlos (2004).

² We discuss in Section 2 the literature that makes the claim about exclusion, and the argument about costs.

³ The number of unemployed as a percentage of the total number of persons in the labor force. It is easy to see that this measure treats all the unemployed in the same manner, irrespective of their durations of unemployment. Ceteris paribus, if a person who is already unemployed becomes more unemployed (i.e. the duration of his/her unemployment increases), this measure is unaffected.

⁴ On the importance of studying poverty over time and the distinction between short-term and chronic poverty, see Christiansen and Shorrocks (2012).

has been conceptualized as comprising of two different exercises – identification and aggregation. The former deals with identifying whether a person is poor or not by using a poverty line, whereas the latter refers to the use of a poverty line and the distribution of income to arrive at a number for a country, region etc. Analogous exercises exist in the case of unemployment too (Shorrocks 1992). Although these similarities and the importance of distinguishing among different durations of unemployment in a substantive manner have been recognized, the theoretical literature on the measurement of unemployment that has incorporated these considerations and arrived at newer measures is sparse. Lambert (2009) provides a survey of this literature, which has been dormant for a while now - most studies (Sengupta 1990; Shorrocks 1992, 1993; Paul 1991, 1992) appeared in the early 1990s, and only a few (Borooah 2002; Basu and Nolen 2006) have appeared more recently. Moreover, these studies have not been motivated from the perspective of developing countries and some (e.g. Shorrocks 1992) have been applied explicitly to developed countries.⁵ As we discuss below, the labor market institutions and other structural features of developing countries are different from those of developed countries; the nature of data that is available from developing countries is also different. Hence, applying these models or approaches to developing countries raises certain problems.⁶ In light of the above, we develop a measure of unemployment that is sensitive to differences among the unemployed and that takes into account some important features of labor and employment in developing countries. It can be decomposed into “mean” and “distributional” (variance) components that can help us understand how unemployment is being affected by changes in the interpersonal distribution of unemployment. It can also be decomposed into contributions made by sub-groups of the

⁵ Paul (1991) is an exception in this regard and deals with India, although his empirical analysis is dated. We discuss this study in section 2.

⁶For example, Shorrocks (1992) and Sengupta (1990) assume uniform labor force participation, whereas, as we show below, labor force participation differs to a certain extent across individuals in India. Sengupta (1990) assumes that all individuals have some employment – we provide evidence that some individuals in India have no employment during the reference period.

population. At a theoretical level, we provide an impetus to an important, but sparse literature on unemployment. Our measure is close to a widely used official measure in India and we use it to shed light on unemployment (and related) trends in India.

Our focus on India is due to the global attention garnered by the issues of employment, unemployment and job-creation in India among academics, policy makers and intelligent lay persons. India has been one of the fastest growing countries in the world since the mid-1980s, but there is concern that this growth has not translated into adequate reduction in poverty (Kotwal et al. 2011; Motiram and Naraparaju 2014). A crucial link that has been highlighted is the inadequate creation of good jobs, particularly in labor-intensive manufacturing, which can absorb the poor from rural areas and the urban informal sector.⁷ The spectre of a large unemployed population in India, particularly among the younger generations, has been haunting the world recently.⁸ Consequently, it is important that the issues of unemployment and employment in India be adequately and properly understood. There are policy documents (e.g. NSS 2009, NSS 2011) and academic studies (e.g. Wadhwa and Ramaswami 2012) that have used official measures to assess unemployment in India. However, to the best of our knowledge, apart from Paul (1991) (which deals with an older/pre-growth period), there is no rigorous study that has attempted to go beyond official measures. Also, there is hardly any literature that gives serious attention to unemployment spells or the distinction between different durations and intensities of unemployment, as we do.⁹ In fact, as we show, data from India displays patterns that necessitate a case for a measure like the one we propose. We therefore use the theoretical perspective that we develop and data from the Indian National Sample Surveys (NSS) on employment and unemployment

⁷ For a discussion see Kotwal et al. (2011) (and the references therein). Planning Commission (2011) and Government of India (2013) (the latest Economic Survey) are policy documents that discuss this issue.

⁸ For example, the Economist (2013 a) has described this in an article titled *Angry Young Indians*. There are also concerns about youth unemployment in other countries, e.g. see Economist (2013 b).

⁹ A companion paper, Naraparaju (2014) provides a description of various features of unemployment spells in India and how these have changed over the past two decades.

during 1993-2012 to shed light on these issues. We focus on this period because India underwent major economic reforms and experienced rapid growth during this period.

Before proceeding further, it is worth summarizing our main findings. Using our measure, we document trends in unemployment in the past two decades for rural and urban areas, for both males and females. Except for females in rural areas, unemployment has either decreased or been stable between 1993-94 and 2011-12. However, this has to be seen in the context of considerable underemployment and lack of decent jobs. There are also some gendered differences that are worth highlighting, e.g. unemployment among females is considerably higher than the same for males in urban areas, and this pattern has been steadily maintained for the past two decades. We also provide a disaggregated (state-level) picture which shows how our measure can differ from the official measure. The decomposition into mean and distributional components reveals that after falling between 1993-94 and 2004-05 (1999-00 for urban females), the contribution of the distributional component has increased, i.e. unemployment is being driven increasingly by its interpersonal distribution, which has itself worsened. Decomposition based upon educational groups reveals that in both rural and urban areas, and both for males and females, the contribution of the highest educated group to unemployment has increased in the past two decades. This is a serious problem in urban areas, particularly among females – more than half the unemployment in 2011-12 is due to the highest educated group, and this is a sharp increase (by about 24 percentage points) from 1993-94. The results of our decomposition analysis are new, and hold important policy implications, which we discuss.

The rest of the paper is organised as follows. In the next section, we present our theoretical analysis. In section 3, we discuss the data and empirical analysis. Section 4 concludes with a discussion of our findings and their policy implications.

2. The Measurement of Unemployment – Theory

Sengupta (1990), Paul (1991, 1992) and Shorrocks (1992, 1993) are the seminal studies in the literature relevant for us. While noting that unemployment entails a loss of welfare, this literature identifies at least two reasons that underscore the importance of taking the duration of unemployment and its distribution seriously. First, the longer a person is unemployed, the more severe is his/her welfare loss with the losses rising more than proportionately to an increase in the duration of unemployment. As we discussed above, the head count ratio of unemployed, which is indifferent to the distribution of the duration of unemployment, does not incorporate this property.¹⁰ Second, drawing upon the literature on poverty and inequality, the measures suggested are also motivated by a notion of inter-personal equity (Sengupta (1990), in particular). As Sen (2000) notes, prolonged unemployment might predispose the unemployed to nurture a sense of relative deprivation and exclusion towards the rest of the society. A distribution sensitive measure of unemployment is better equipped to capture this. Drawing upon these ideas, we develop a new measure of unemployment below.

Consider a reference period over which we are interested in understanding employment, unemployment and related variables (e.g. labor force participation). Let l_i , L and m denote the days (during the reference period) spent by individual i ($= 1, 2, \dots, m$) in the labor force, the total labor force in person-days, and the number of individuals in the labor force, respectively. Note that $L = \sum_{i=1}^m l_i$. Let s_i denote individual i 's contribution to the labor force, i.e. $s_i = l_i/L$. Let u_i denote the duration (or *level*) of unemployment of individual i during the reference period. We define the *unemployment intensity* for a person i as the number of days the person is unemployed as a ratio of the total time he/she is in the labor force, i.e. u_i/l_i .

Developing countries are characterized by several structural features that are well known.

¹⁰ There are other statistics that specifically capture the duration of unemployment such as those proposed by Akerlof and Main (1980, 1981), Fowler (1968), and Kaitz (1970). Sengupta (1990) shows that these measures fail to satisfy some other desirable properties.

Agriculture and the informal sector (both in rural and urban areas) play a significant role, e.g. in India, according to the decadal census in 2001, 56.6% of the workers are involved in agriculture and allied activities.¹¹ Seasonality is also an important factor - in agriculture, but also in some other activities. A large proportion of the population is involved in self employment or casual labor rather than holding regular/salaried jobs.¹² There are involuntary withdrawals from the labor force by individuals, a point noted by Paul (1991) too. There could also be voluntary withdrawals from the labor force, e.g. women and girls could leave the labor force to take care of domestic chores. The phenomena of voluntary and involuntary withdrawal from the labor force could vary across individuals, resulting in differences in labor force participation shares, s_i . Essentially, both the level of unemployment (u_i) and unemployment intensity (u_i/l_i) are important. Given this background, we can now lay down the properties that are desirable for a measure of unemployment, U .

No Unemployment (NU): If there is no unemployment, i.e. if $u_i = 0 \forall i$, then $U = 0$.

Full Unemployment (FU): If there is full unemployment, i.e. if $u_i = l_i \forall i$, then $U = 1$.¹³

Monotonicity (MON): Ceteris-paribus¹⁴, an increase in the unemployment level of an individual increases U . This is true even if the individual was previously completely employed but has now become either partly or completely unemployed. Thus, an increase in the *number* of unemployed also increases U . Thus Monotonicity is equivalent to $\frac{\partial U}{\partial u_i} > 0$.

¹¹ These are *main* workers. For details, see http://censusindia.gov.in/Census_And_You/economic_activity.aspx.

¹² See the various reports of the National Sample Surveys on Employment and Unemployment, which we discuss below.

¹³ If *NU* and *FU* hold, then $U \in [0,1]$. So, there is no need to separately discuss this principle.

¹⁴ By ceteris paribus, apart from other things, we also hold that each individual's labor force participation (l_i) and thus his/her share in the labor force, s_i , remain constant.

For the next two properties, let us consider two individuals, i and j such that $u_i \geq u_j$ and

$\frac{u_i}{l_i} \geq \frac{u_j}{l_j}$. Using the language of deprivation, individual i can be considered to be

(unambiguously) more deprived than, or equally deprived as, individual j .¹⁵

Increasing Marginals (IMAR): Ceteris paribus, if one individual is more than or equally deprived as another individual, then the responsiveness of U with respect to a change in the unemployment level of the first individual cannot be less than the same for an equivalent change in the unemployment level of the second individual, i.e. if $u_i \geq u_j$ and $\frac{u_i}{l_i} \geq \frac{u_j}{l_j}$ then

$$\frac{\partial U}{\partial u_i} \geq \frac{\partial U}{\partial u_j}.^{16}$$

Distribution Sensitivity (DSEN): Ceteris-Paribus, if one individual is more than or equally deprived as another individual, then an increase in the unemployment level of the first individual accompanied by an equal reduction in the unemployment level of the second individual, increases U .

The above property captures sensitivity to the interpersonal distribution of unemployment, and is in the spirit of the Pigou-Dalton transfer property in the measurement of inequality and the transfer principle in the measurement of poverty (Foster et al. 1984). It is motivated by the notion of viewing the costs of unemployment as being increasing and convex in the level of unemployment as well as in its intensity. This would imply that an increase in the welfare of a more deprived individual through a reduction in his/her unemployment level would more than compensate for the reduction in the welfare through an equivalent increase in the unemployment level of a less deprived individual.¹⁷

¹⁵ Since we intend our unemployment measure to give importance to both the level as well as intensity of unemployment, we need to arrive at an unambiguous ranking of individuals' deprivations in terms of both levels and intensities. Note that for a given unemployment intensity, the *level* of unemployment is indirectly captured through the share in the labor force, s_i .

¹⁶ This property implies a similar property with respect to unemployment *intensities*.

¹⁷ We understand that transfers of income are easier to visualize. However, as in the case of measurement of poverty or inequality, this is partly a "thought experiment," and partly a conceptualization of the impact of real

Having laid down the desirable properties, we can now consider various measures.

One measure that naturally suggests itself is the total number of days of unemployment as a

percentage of the total labor force, i.e. $\hat{U} = \frac{\sum_{i=1}^m u_i}{L}$. This, as we describe in the next section, is

an official measure widely used in India. \hat{U} can be rewritten as $\sum_{i=1}^m s_i (\frac{u_i}{l_i})$ implying that it is a

weighted average of unemployment intensities, with the weights being the shares of labor

force ($s_i = \frac{l_i}{L}$). Given that \hat{U} is a weighted average, it is easy to see that it violates *DSEN*.¹⁸

Using the language of deprivation, this is analogous to the poverty gap ratio (FGT (1) in the

Foster Greer Thorbecke family of poverty indices, see Foster et al. 1984) violating the

transfer principle. Taking a cue from the literatures on the measurement of inequality and

poverty, the following measure can be proposed:

$$U^* = (\sum_{i=1}^m s_i (\frac{u_i}{l_i})^2)^{1/2} \quad (1)$$

The above measure is the square root of the weighted average of squared unemployment

intensities. U^* satisfies *DSEN* in a manner analogous to FGT (2) satisfying the transfer

principle. Simple algebra shows that:

$$U^{*2} = \sum_{i=1}^m s_i (\frac{u_i}{l_i})^2 = \hat{U}^2 + \sum_{i=1}^m s_i (\frac{u_i}{l_i} - \hat{U})^2 \quad (2)$$

The first component (\hat{U}^2) is the “mean” (average) component and the second component

($\sum_{i=1}^m s_i (\frac{u_i}{l_i} - \hat{U})^2$) is the “distributional” component (variance of unemployment intensities).

The ratio of the second component to the first component is the square of the coefficient of

variation of unemployment intensities, which is a natural measure of inequality of

world phenomena (e.g. recession, technological changes etc.) which allocate/reallocate employment and unemployment among individuals.

¹⁸ A simple example can illustrate this point. Suppose the reference period is one year, and the population consists of two individuals each of whom is in the labor force for the entire year. If the first individual is unemployed for six months and the second individual is unemployed for four months, then the value of the measure is 5/12. If the unemployment of the first individual (who is the more deprived) increases by 1 month and the unemployment of the second individual decreases by 1 month, then the value of the measure remains unchanged, violating *DSEN*.

unemployment intensities.¹⁹ Hence, we can use this ratio as a measure of “inequality in unemployment.” If there is no inequality in unemployment, i.e. if all individuals have the same unemployment intensity, then $U^* = \hat{U}$ and the ratio becomes zero. This ratio can also be interpreted as the importance (contribution) of the distributional component to overall unemployment. Since U^* and U^{*2} move in the same direction, this ratio will reveal to what extent changes in unemployment are driven by changes in the interpersonal distribution of unemployment. Two points need to be emphasized here – (i) when we are talking about the inequality in unemployment, we are including those who have zero unemployment intensity too, i.e. with no unemployment, and (ii) we are considering weighted average, variance etc. with the weights being the shares of labor force. The following result is immediate:

Proposition 1: U^* satisfies *NU*, *FU*, *MON*, *IMAR* and *DSEN*

Proof: It is easy to show *NU*, *FU*, *MON* and *IMAR*. *DSEN* follows from the above decomposition (equation (2)). The transfer required for *DSEN* leaves \hat{U} unchanged, whereas the variance component increases, thereby increasing U^* .

If the population comprises of mutually exclusive sub-groups (e.g. racial groups, caste groups etc.) then another useful decomposition is as follows. Let the number of subgroups be $G \geq 2$ and the total labor force and unemployment measure for each subgroup g ($=1, 2, \dots, G$) be denoted as L_g and U_g^* , respectively. It is easy to establish the following:

$$U^{*2} = \sum_{g=1}^G \frac{L_g}{L} U_g^{*2} \quad (3)$$

We can use $(\frac{L_g}{L} U_g^{*2})/U^{*2}$ as an indication of the contribution of group g to overall unemployment. It is important to recognize that it depends upon both the contribution of g to the labor force ($\frac{L_g}{L}$) and the unemployment within g (U_g^*).

¹⁹ Note that half the square of the coefficient of variation is a member of the single-parameter entropy family of inequality indices (Shorrocks and Wan 2005).

Two further remarks are needed. First, apart from U^* , several other measures would satisfy the above desirable properties. However, we choose U^* because of its simplicity and intuitive appeal, particularly in terms of its decomposition properties. Also, note the similarity of U^* to FGT (2) (average of squared deprivation gaps) used in the literature on poverty measurement. FGT (2) is the simplest measure of the FGT family that satisfies the transfer principle (among other properties) and has also been completely axiomatized (Chakraborty et al. 2008). Moreover, U^* is close to an official measure widely used in India. Second, we could also use U^{*2} (which we do, in a way, in the decomposition) to map trends in unemployment, but we prefer U^* because it can be easily tied to \widehat{U} , as described above.

It is instructive to compare U^* with other measures developed in the literature. U^* is very different from the measure proposed by Sengupta (1990), who assumes uniform labor force participation and that each individual has some employment. U^* is also different from the measures proposed by Shorrocks (1992) and Paul (1992), who also assume uniform labor force participation. U^* is similar to $I(2) = \frac{1}{m} \sum_{i=1}^m (\frac{u_i}{l_i})^2$, one of the members of the family of measures proposed by Paul (1991), who overcomes the problem of accounting for the differences in the labor force participation by considering individuals' unemployment intensities.²⁰ However, there are also certain crucial differences. First, as we show below, U^* can be directly interpreted in relation to a widely used official measure in the Indian context - in the special case of complete equality in the distribution of unemployment intensities, U^* and the official measure are the same. Given the popularity of this official measure among policy makers and its predominance in the official statistics on unemployment in India, this is an important advantage for U^* over $I(2)$. Second, U^* satisfies the property of Increasing

²⁰ The measures proposed in Paul (1991, 1992) belong to the families: $\frac{1}{m} \sum_{i=1}^m (\frac{u_i}{l_i})^\alpha$ and $\frac{n}{m} (\frac{1}{n} \sum_{i=1}^n u_i^\alpha)^{1/\alpha}$ respectively, where m denotes the number of persons in the labor force, n denotes the number of unemployed persons and α is a parameter that takes various values. Note that U^* is somewhat similar to Paul (1991) measure in the case where $\alpha=2$.

Marginals (discussed above), whereas $I(2)$ does not.²¹ At an empirical level, the difference between U^* and measures in Paul (1991) is related to the differences in labor force participation, i.e. the dispersion of s_i . This can be easily seen from the following:

$$U^{*2} = \sum_{i=1}^m s_i (u_i/l_i)^2 = \frac{1}{m} \sum_{i=1}^m \{l_i/\bar{L} - 1\} * [\frac{u_i}{l_i}]^2 + \frac{1}{m} \sum_{i=1}^m [\frac{u_i}{l_i}]^2 \quad (4)$$

As earlier, m denotes the total number of persons in the labor force and $\bar{L} = L/m$ denotes the average labor force participation in the economy. The second term on the Right Hand Side (RHS) in (4) (i.e. $\frac{1}{m} \sum_{i=1}^m [\frac{u_i}{l_i}]^2$) is the measure given by Paul (1991) for parameter value 2 (I(2)). The first term can be said to capture the dispersion in the labor force participation. If there is complete equality in labor force participation, then this term would be zero and U^{*2} would boil down to I(2). As we show below, there is considerable dispersion in India, particularly among women. Moreover, (4) can be rewritten as:

$$U^{*2} = \frac{1}{\bar{L}} \left\{ \frac{1}{m} \sum_{i=1}^m [l_i - \bar{L}] * \left[\left(\frac{u_i}{l_i}\right)^2 - \frac{1}{m} \sum_{i=1}^m \left(\frac{u_i}{l_i}\right)^2 \right] \right\} + I(2) \quad (5)$$

The term in brackets on the RHS of (5) is the co-variance between labor force participation and the square of the unemployment intensity. Thus, if U^{*2} is higher (lower) than I(2), then there is a positive (negative) correlation between labor force participation and unemployment intensity. In other words, those who have been experiencing higher (lower) than average unemployment intensity are also those who have spent longer (shorter) than average time in the labor force. Thus while Paul (1991) allows us to see how the average unemployment intensity has changed over time, when combined with U^* , we can also understand how unemployment intensity varies with labor force participation.

²¹ This stems from the fact that $I(2)$ gives the same weight to two individuals with the same unemployment intensities, irrespective of their unemployment levels, whereas U^* gives higher weight to the one with a higher unemployment level. To see this, consider the following example where the reference period is a year. $l_1 = 1, l_2 = 0.5, u_1 = 1, u_2 = 0.5$.

To briefly summarize this section, we have developed a measure of unemployment, that takes into consideration both the intensity and level of unemployment and that is therefore suited to analyzing unemployment in developing countries like India. This measure satisfies several desirable properties and is different from other measures developed in the literature. We will now turn to the analysis of unemployment in India.

3. Unemployment in India – Data, Concepts, Measures and Trends

3.1 Description of Data

We use data from the Indian National Sample Surveys (NSS) on “Employment and Unemployment Situation in India,” conducted by the National Sample Survey Organisation (NSSO) for the years 1993-94 (50th round), 1999-00 (55th round), 2004-05 (61st round), 2009-10 (66th round), and 2011-12 (68th round). These surveys, conducted roughly every five years²², are nationally representative and contain large samples.²³ The methodology (sample design, estimation procedure, schedule used etc.) for these surveys can be obtained from the respective NSS reports.²⁴ We are focusing on the period 1993-2012 because it will give us a picture of the changes that India has been going through in roughly the past twenty years - since India embarked on a set of major economic reforms. These surveys have been the source of estimates of labor force participation, employment and unemployment for researchers and policy makers. They contain rich information on many aspects of work and livelihood of individuals, e.g. the activities they are involved in, the nature of the enterprises that they work in etc. These surveys consider a “reference week” (preceding the date of the survey) and enumerate the “activities” of an individual during every day of this week – two

²² The survey conducted in 2011-12 is an exception, being conducted only two years after the previous survey in 2009-10. This departure from existing practice was done because 2009-10 was considered a ‘non-normal year’ (NSC 2011) - a bad agricultural year.

²³ For example, in the latest survey, conducted in 2011-12, 456,999 persons (280,763 in rural areas and 176, 236 in urban areas) were enumerated.

²⁴ For the 50th round, see Chapter 3 of NSS (1996); for the 61st round see Appendices B & C of NSS (2006); for the 66th round, see Appendices B & D of NSS (2011); for the 68th round, see Appendices A & B of NSS (2013).

activities per day.²⁵ These activities describe work, but also search for a job (being unemployed) and being out of the labor force. Since two activities are enumerated per day, an individual can be unemployed for half a day or the full day. For individuals unemployed during the whole week, there is a separate module wherein the details of their current (“in progress”) unemployment spell, e.g. how long they have been unemployed, have they ever worked, if they have worked in the past, the reasons for leaving etc., have been collected.

There are certain limitations of the data that are relevant for us and therefore need discussion. Considering a reference period longer than a week is not possible. As we described in the previous section, for computing our measure of unemployment, we need two pieces of information for each individual (i) during the reference period: the time he/she is in the labor force (l_i) and his/her duration of unemployment (u_i). The surveys give this information only for the period of a week. As we point out in the next section (see table 1), a reference period of one year is used to determine for each individual, his/her “usual principal status,” which is provided in the data. However, usual principal status does not allow us to distinguish two individuals from each other in terms of their durations or intensities of unemployment. For discussing policies, richer information on employment, unemployment and labor market history (in general) would have been useful. For those unemployed on all the seven days of the reference week, data on the length of the current (“in progress”) spell of unemployment and information on labor market experience is available. Such data is not available for the others, i.e. those with some employment during the week. Ideally, we would have liked to have information on all the unemployment spells (complete as well as “in progress”) and labor market experience for each individual, over a reasonably long period.

²⁵ If an individual is involved in two activities, then each of these activities is considered to be at “half intensity”.

3.2 Measures of Labor Force Participation and Unemployment

In India, the unemployment rate has traditionally been calculated from the National Sample Survey (NSS) data using four methods, with three different reference periods: Usual Principal Status (UPS), Usual Principal and Subsidiary status (UPSS), Current Weekly Status (CWS), and Current Daily Status (CDS). The details of these methods are given in the various NSS reports that we cited above. In the interests of space, we summarize these methods in table 1.

Insert table 1 here

CDS is considered to be the most reliable measure of unemployment because it takes into account the fact that individuals are involved in multiple activities during the day (Wadhwa and Ramaswami 2012). Therefore, in the remainder of the paper, we will focus only on this measure. It is essentially the measure \hat{U} that we discussed in Section 2 with the reference period being a week.

None of the above measures satisfies the property of distribution sensitivity that we discussed in Section 2.²⁶ However, one would have to ask how important this is given the Indian data. In 2011-12, 8.7% (8.2%) of rural males (females) in the labor force have some unemployment during the reference week. For the same period, the corresponding figures for urban areas are 6.7% for males and 8.8% for females. Figures 1.a and 1.c clearly show that for those with some unemployment during the reference week, there is considerable variation in unemployment in both rural and urban areas, for both males and females. For those unemployed during the entire week, figures 1.b and 1.d show that in both rural and urban areas and for both males and females, the dominant group consists of individuals whose current spell of unemployment has lasted for more than a year. But, even here, there is some variation.²⁷ We will discuss labor force participation trends in detail below, but a significant proportion is not present in the labor force for even half a day during the week. For rural

²⁶ Other properties (e.g. Increasing Marginals) are also violated by these measures.

²⁷ The patterns depicted in figures 1.a to 1.d have been preserved for the past two decades, i.e. they were roughly similar in 1993-94.

males and females in 2011-12, the figures are 46% and 79%, respectively. Among rural males who are in the labor force, about 6% are present for less than a week, whereas the rest are present for the entire week. The corresponding figures for females are 33% and 67%, respectively. For urban males and females in 2011-12, the percentage of individuals who are not in the labor force for at least half a day during the reference week are 44% and 85%, respectively. For urban areas, in terms of the distribution of those in the labor force for less than a week vis-a-vis those who are in the labor force for the entire week, the corresponding figures for males are 3% and 97%, and for females are 16% and 84%, respectively.

Essentially, there is sufficient variation in labor force participation across individuals. Even among those who are participating in the labor force, there is considerable variation in labor force participation – although this is (as expected) much higher for women, as compared to men. In our opinion, all these observations clearly support a case for using a distribution sensitive measure of unemployment that also takes into account differences in labor force participation. In the next section, we will therefore present an analysis using the distribution sensitive measure of unemployment that we developed in Section 2 (U^*), but we will also use CDS and $I(2)$.

Insert figures 1.a, 1.b, 1.c and 1.d here

3.3 Unemployment and Related Trends

Tables 2 and 3 present Labor Force Participation Rates (LFPR) (based upon the CDS method) and unemployment measures for rural and urban areas, respectively for both males and females. As we can observe, the LFPR for males in rural areas has been roughly stable in the past two decades, whereas it has fallen for females. In urban areas, male LFPR has shown a slight increase, whereas female LFPR has been stable. In both rural and urban areas, the LFPR for females is considerably lower than the same for males. For unemployment, as we can observe, the estimates of CDS, our measure (U^*) and $I(2)$ display similar trends over

time. For rural areas, male unemployment rose during the period 1993-94 to 2004-05, but fell thereafter to a level in 2011-12 that was similar to what it was in 1993-94. For female unemployment, the trends are similar except that the 2011-12 level is higher than the same for 1993-94. For urban areas, male unemployment rose during the period 1993-94 to 2004-05, fell during 2004-05 to 2011-12, but unlike in rural areas, was lower than the corresponding value in 1993-94. Female unemployment showed a similar trend. Another noteworthy finding is that using all the three measures, unemployment among females is higher than the same for males – this difference is quite stark for urban areas.

Insert tables 2 and 3 here

The low unemployment reflected by various measures (5%-8%, according to the CDS) coexists with (and can be explained by) considerable underemployment. The poor cannot afford to be unemployed for long, so it is possible that they are forced to take jobs that come their way, even if these jobs are unremunerative or unsuited for them. We can observe this by comparing the average Monthly Household Per-capita Expenditure (MPCE) for three kinds of individuals, using the reference week: those who have no unemployment, those who have some unemployment but for less than seven days, and those who are unemployed on all the seven days. In rural areas, individuals in the third category (with an MPCE of Rs. 1274 in 2011-12) fare the best (compared to Rs 1192 for the first category and Rs. 1105 for the second category) and in urban areas, they do better (with an MPCE of Rs. 2202 in 2011-12) than those in the second category (Rs. 1459), although worse than those in the first category (Rs. 2321). Individuals in the third category are on the average more educated than those in the first two categories – the percentage of illiterates is the lowest (23% in rural areas and 7% in urban areas in 2011-12), and the percentage with secondary school or higher education is the highest (40% in rural areas and 68% in urban areas in 2011-12).

Unemployment is generally falling in the period 2004-05 to 2011-12 – this is due to the 14.7 million jobs²⁸ created during this period. However, out of the 48 million non-agricultural jobs that have been created, 23.9 million have been in construction, many of which are in rural areas. These jobs (and this adds to our point above on underemployment) are unremunerative. On the contrary, only a small proportion (10.6% - 5.1 million out of 48 million) of manufacturing jobs have been created. This pattern of job creation could be detrimental to growth in the long run; it is also likely to leave many of the skilled and educated, unemployed or underemployed. A decomposition exercise of U^* (discussed in section 2) based upon educational categories can give us insights into this. So, we divide the labor force into four categories: Illiterate; Literate, but less than or equal to Middle school; Secondary or Higher Secondary school; and Higher than Higher Secondary School.²⁹ Tables 4 and 5 present the results of this decomposition exercise for rural and urban areas, respectively. We have considered a period of two decades by examining changes between 1993-94 and 2011-12. We will first focus on results from rural areas (table 4). As we can observe from comparing columns (2) and (6) (and as expected), the labor force in rural areas is getting more educated. For both males and females, the contributions of higher educated categories have increased – this increase has occurred at the expense of the lowest (Illiterate) category. This is heartening. However, the higher education groups are also increasingly driving unemployment. From columns (5) and (9), we can see that for both males and females, the contribution to unemployment of the lowest educational category has fallen sharply, whereas the contributions of other categories have risen.³⁰ It is important to note that these contributions are driven by both labor force shares and unemployment *within* these educational categories. Comparing the contributions to labor force shares for 2011-12

²⁸ This figure and other figures on job-creation are taken from Thomas (2014, Table 2).

²⁹ Data on years of education is not available in the NSS surveys, so we will have to rely on educational categories.

³⁰ Except for category 3 for rural males where there is a slight decrease.

(columns (6) and (9)), we can observe that higher educated categories are generally overrepresented whereas lower educated categories are underrepresented. In 2011-12, unemployment increases as we move up the educational ladder (column (7)) – it is highest within the highest educational category. Coming to urban areas (table 5), as in rural areas, the labor force is getting more educated. There is a sharp increase in the proportion of the highest educational category in the labor force for both males and females. For both males and females, there is a sharp increase in the contribution to unemployment of the highest educational category, and this has occurred at the expense of all the other categories. In terms of levels, in 2011-12, a considerable contribution to unemployment is being made by the highest educational category - as much as 53% for females. The higher educated are overrepresented among the unemployed (comparing columns (6) and (9)) and unemployment generally increases with education; unemployment is highest for the most educated (higher than higher secondary education). Overall, the picture revealed by the decomposition analysis is consistent with the job creation story – since inadequate jobs are being created that can absorb the educated/skilled, unemployment is being driven increasingly by the educated, and is highest among them.

The stark difference between male and female unemployment in urban areas needs comment. We are not aware of a rigorous study that sheds light on this issue. But, this could be due to labor market discrimination and a higher mismatch (as compared to the same for males) between the skills that women possess and the requirements of the urban labor market.³¹ There may also be factors (e.g. safety concerns; social norms) that reduce the pool of potential jobs available for women as compared to men.

Insert tables 4 and 5 here

³¹ This could itself be due to past discrimination.

The above analysis focuses on an all-India picture, which can conceal a lot of heterogeneity since different states within the country can display different unemployment trends and patterns. We therefore present a disaggregated picture in tables 6 and 7, i.e. the unemployment rates for the major states in rural and urban areas, respectively. With respect to the level of unemployment, we can see that for rural males in 2011-12, the unemployment rates vary, as per U^* , from 0.131 (Gujarat) to 0.303 (Kerala) against an all-India level of 0.210. Similarly for rural females in 2011-12, they vary from 0.104 (Rajasthan) to 0.506 (Kerala) whereas the all-India level was 0.226. The same can be seen for urban areas as well: while the all-India unemployment rate for males was 0.208, the state-level unemployment rates varied from 0.102 (Gujarat) to 0.291 (Chhattisgarh). Similarly for females, while the all-India unemployment rate was 0.275, state-wise unemployment rates varied from 0.136 (Gujarat) to 0.516 (Bihar). In both rural and urban areas, there is greater heterogeneity in female unemployment rates than in male unemployment rates. In terms of changes over time, in rural areas, unemployment for males has been stable at the all-India level, whereas several states have shown increasing or decreasing unemployment; unemployment for females has increased at the all-India level, whereas some states (e.g. Andhra Pradesh, Assam, Karnataka) have shown the opposite trend. For urban areas, some states, e.g. Punjab and Rajasthan (for males); Andhra Pradesh and Himachal Pradesh (for females) experienced trends in unemployment that were different from all-India trends. The broad observation that emerges from a disaggregated analysis is that the all-India picture conceals considerable heterogeneity at the state-level, both in terms of levels and trends of unemployment. This is due to considerable differences among states in terms of their economic structure, job creation and the characteristics of the labor force (e.g. age, education etc.).

Insert tables 6 and 7 here

As we discussed earlier, U^* can be decomposed into mean and distributional components which can provide a richer picture of changes in unemployment. So, we present these results in tables 8 and 9, for rural and urban areas, respectively. For rural areas, both the components are moving in the same direction for both males and females. After falling between 1993-94 and 2004-05, the contribution of the inequality component has been rising since 2004-05; alternatively (see Section 2) we can say that the inequality in unemployment has been rising since 2004-05. In urban areas, the distribution of unemployment has worsened since 2004-05 for males and since 1999-00 for females.

Insert tables 8 and 9 here

The differences between the trends in CDS and U^* are dictated by changes in the distributional component. Although at the all-India level, the trends in CDS and U^* are similar, the state-level trends and comparisons reveal that these two measures need not move in the same direction. For instance, from table 6, for rural males in 2011-12, while the CDS measure is the same in Andhra Pradesh and Assam, U^* is higher in Assam suggesting that unemployment is more unequally distributed in this state. Similar is the case for Maharashtra and Haryana. Jharkhand and Karnataka, on the other hand, have the same levels of U^* , but the latter has a higher CDS implying that it has a more equal distribution of unemployment. For urban males in 2011-12 (table 7), the CDS is similar in Tamil Nadu and Uttar Pradesh, but the latter has a higher U^* .

4 Discussion and Conclusions

In the analysis above, we have developed a measure of unemployment that satisfies several desirable properties, in particular distribution sensitivity, which allows it to incorporate differences among the unemployed. This measure takes into account both the level of unemployment and its intensity. It can also be decomposed into mean and variance components and contributions due to different subgroups of the population. We use this

measure and the Indian National Sample Survey data on unemployment and employment situation to map changes in unemployment during the past two decades (1993-94 to 2011-12). We show that unemployment has fallen in this period except for females in rural areas. However, this has to be seen in light of the fact that there is considerable underemployment. We also show that unemployment is being driven to a greater extent today by educated groups and that the interpersonal distribution of unemployment has worsened. We try to provide explanations for our findings.

One of the implications of our analysis is that it is important to distinguish between those unemployed for short periods and long periods and provide different kinds of policies for these two groups. Serious discussions and attempts on this front are lacking in the Indian context. As we have mentioned above, our findings have to be seen in light of Indian experience with jobs. Since the onset of economic reforms in the early nineties, but particularly in the past decade, jobs have been created, but job growth in manufacturing has been disappointing. Jobs are being created in sectors (e.g. rural construction) that are unlikely to be remunerative and attract skilled/educated people. There is considerable debate on this issue, and scholars have identified various culprits – labor laws, structural features, nature of the growth process itself etc. This is not the place to go into the debate, but in terms of policies, two kinds of policies are needed. First, we need policies that protect the unemployed and ensure that they develop appropriate skills and that their skills do not become obsolete. Unemployment insurance and training/retraining programs of the kind present in developed countries, and even in some developing countries (e.g. Chile, see World Bank (2012)) are virtually absent in India. Moreover, infrastructure put in place to deal with unemployment (e.g. unemployment exchanges) is non-functional in many parts of India (World Bank 2010).³² Many of the long-term unemployed have never worked (Naraparaju 2014) and it is

³² Two reports of the World Bank (2010, 2012) discuss the issue of jobs in India.

important to understand how this vicious cycle operates (e.g. through lack of experience, absence of access to networks etc.) and what can help them break it. Second, policies that promote growth and particularly job growth are the need of the hour. As we have observed above, unemployment is disproportionately high among the educated and is in fact being driven to a great extent by them. In the future, one can expect educational levels to rise further, but if adequate jobs are not created to absorb the educated, unemployment and/or underemployment will also increase.³³ The state has a crucial role to play in promoting growth and creating jobs and thereby preventing this outcome, e.g. through investment in infrastructure and skill development.

³³ Increase in educational levels is a positive outcome, which may lead to an increase in unemployment and/or underemployment – a negative outcome. An analogous (but reverse) scenario exists in the case of poverty, wherein deaths of the poor (a negative outcome) lead to a reduction in poverty (a positive, but perverse outcome) according to several commonly used measures (see Kanbur and Mukherjee (2007) for a discussion).

References:

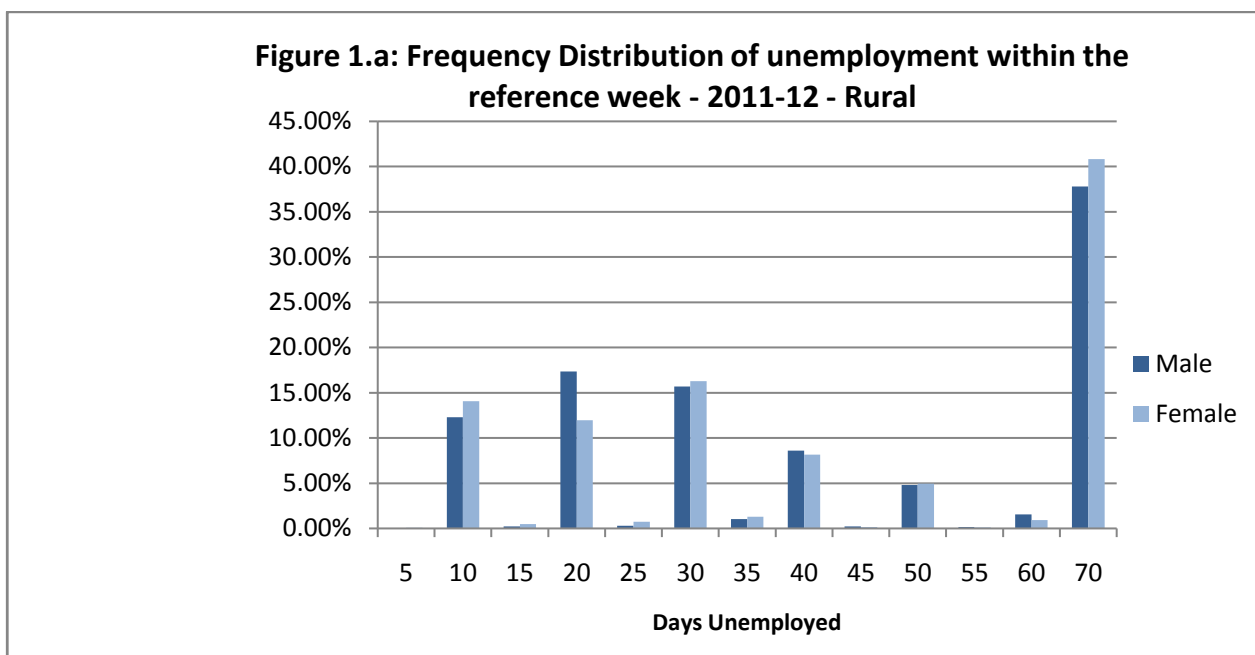
1. Akerlof, G.A., Main, B.G.M.: Unemployment spells and unemployment experience. *American Economic Review* 70(5), 885–893 (1980)
2. Akerlof, G.A., Main, B.G.M.: An experience-weighted measure of employment and unemployment durations. *American Economic Review* 71(5), 1003–1011 (1981)
3. Basu, K., Nolen, P.: Vulnerability, unemployment and poverty: a class of distribution and sensitive measures, its axiomatic properties and applications. *Economics Discussion Papers* 623, University of Essex, Department of Economics (2006)
4. Borooah, V.K.: A duration-sensitive measure of the unemployment rate: theory and application. *Labour* 16(3), 453–468 (2002)
5. Chakraborty, A., Pattanaik P.K., Xu, Y.: On the mean of squared deprivation gaps. *Economic Theory* 34 (1), 181-187 (2008)
6. Christiaensen, L., Shorrocks A.: Measuring poverty over time. *Journal of Economic Inequality* 10, 137-143 (2012)
7. Clark, K.B., Summers, L.H.: Labor market dynamics and unemployment: a reconsideration. *Brookings Papers on Economic Activity* 1, 13-60 (1979)
8. Clark, K.B., Summers, L.H.: Unemployment reconsidered. *Harvard Business Review* 58, 171-179 (1980)
9. The Economist: Angry young Indians: what a waste & India's demographic challenge: wasting time. May 11 (2013a)
10. The Economist: Work and the young: generation jobless. April 27. (2013b)
11. Foster, J.E., Greer, J., Thorbecke, E.: A class of decomposable poverty measures. *Econometrica* 52, 761-766 (1984)

12. Fowler, R.F.: Duration of unemployment on the register of the wholly unemployed. Studies in Official Statistics Research Series 1. Her Majesty's Stationery Office London (1968)
13. Government of India: Economic Survey 2012-13. Government of India New Delhi (2013)
14. Kaitz, H.B.: Analysing the length of spells of unemployment. Monthly Labor Review 93, 11-20 (1970)
15. Kanbur, R., Mukherjee, D.: Premature mortality and poverty measurement. Bulletin of Economic Research 59 (4), 339-359 (2007)
16. Kotwal, A., Ramaswami, B., Wadhwa, W.: Economic liberalization and Indian economic growth: what's the evidence? Journal of Economic Literature 49, 1152-1199 (2011)
17. Lambert, P.J.: Mini-symposium: The 1990, 1992 and 1993 papers on distributionally sensitive measures of unemployment by Manimay Sengupta and Anthony Shorrocks. Journal of Economic Inequality 7, 269-271 (2009)
18. Motiram, S., Naraparaju, K.: Growth and deprivation in India: what does recent evidence suggest on "inclusiveness"? Oxford Development Studies (forthcoming) (2014)
19. Naraparaju, K.: Unemployment spells in India: certain basic patterns and trends. Mimeo. Indira Gandhi Institute of Development Research, Mumbai (2014)
20. NSC: National Statistical Commission Annual Report 2010-11. Government of India, New Delhi (2011)
21. NSS: Key Results on Employment and Unemployment, 1993-1994. Revised Report No. 406. Government of India, New Delhi (1996)
22. NSS: Employment and Unemployment Situation in India, 2004-05, Parts I & II. Report No. 515 (61/10/1). Government of India, New Delhi (2006)

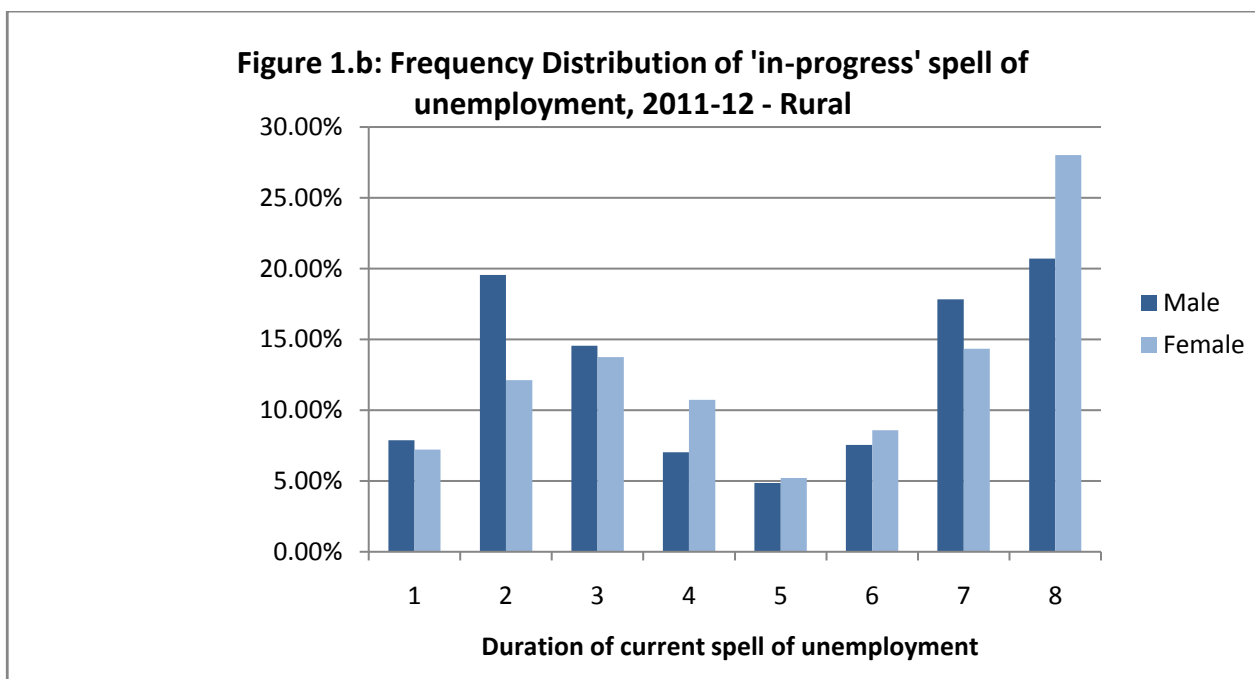
23. NSS: Employment and Unemployment Situation in India, 2009-10. Report No. 537 (66/10/1). Government of India, New Delhi (2011)
24. NSS: Key Indicators of Employment and Unemployment in India Report No. NSS KI. (68/10). Government of India, New Delhi (2013)
25. Orwell, G.: Coming Up For Air. Harcourt, New York (1969) [1939]
26. Paul, S.: On the measurement of unemployment. *Journal of Development Economics* 36, 395-404 (1991)
27. Paul, S.: An illfare approach to the measurement of unemployment. *Applied Economics* 24, 739–743 (1992)
28. Planning Commission: Report of the Working Group on Employment, Planning & Policy for the Twelfth Five Year Plan. Government of India, New Delhi (2011)
29. Samuelson, P.A., Nordhaus, W.D.: *Economics*. Nineteenth Edition. McGraw-Hill/Irwin. (2009)
30. Sen, A.K.: Poverty: an ordinal approach to measurement. *Econometrica* 44, 219-231 (1976)
31. Sen, A.K.: Social exclusion: concept, application, and scrutiny. *Social Development Papers No.1*, Office of Environment and Social Development, Asian Development Bank (2000)
32. Sengupta, M.: Unemployment duration and the measurement of unemployment. *Economics Discussion Paper, 9003*, University of Canterbury, New Zealand (1990)
33. Shorrocks, A.F.: Spell incidence, spell duration and the measurement of unemployment. *Economics Discussion Paper, 409*, University of Essex (1992)
34. Shorrocks, A.F: On the measurement of unemployment. *Economics Discussion Paper, 418*, University of Essex (1993)

35. Shorrocks, A., Wan, G.: Spatial decomposition of inequality. *Journal of Economic Geography* 5, 59-81 (2005)
36. Stogbauer, C., Komlos, J.H.: Averting the Nazi seizure of power: a counterfactual thought experiment. *European Review of Economic History* 8 (2), 173-199 (2004)
37. Thomas, J.J.: The demographic challenge and employment growth in India. *Economic & Political Weekly* 49 (6), 15-17 (2014)
38. Wadhwa, W., Ramaswami, B.: The measurement of unemployment. In Basu, K., Maertens, A. (eds.) *The New Oxford Companion to Economics in India*. Oxford University Press, New Delhi (2012)
39. World Bank: *India's Employment Challenge: Creating Jobs, Helping Workers*. Oxford University Press, New Delhi (2010)
40. World Bank: *More and Better Jobs in South Asia*. Oxford University Press, New Delhi (2012)

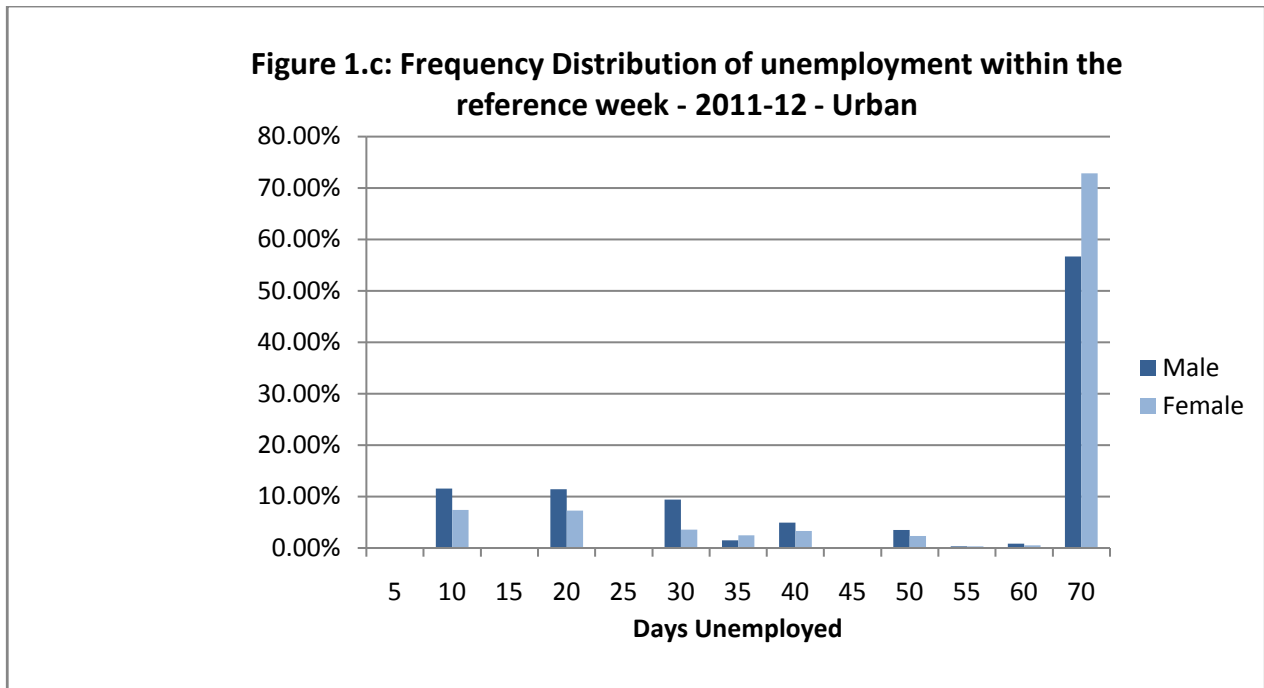
Figures and Tables



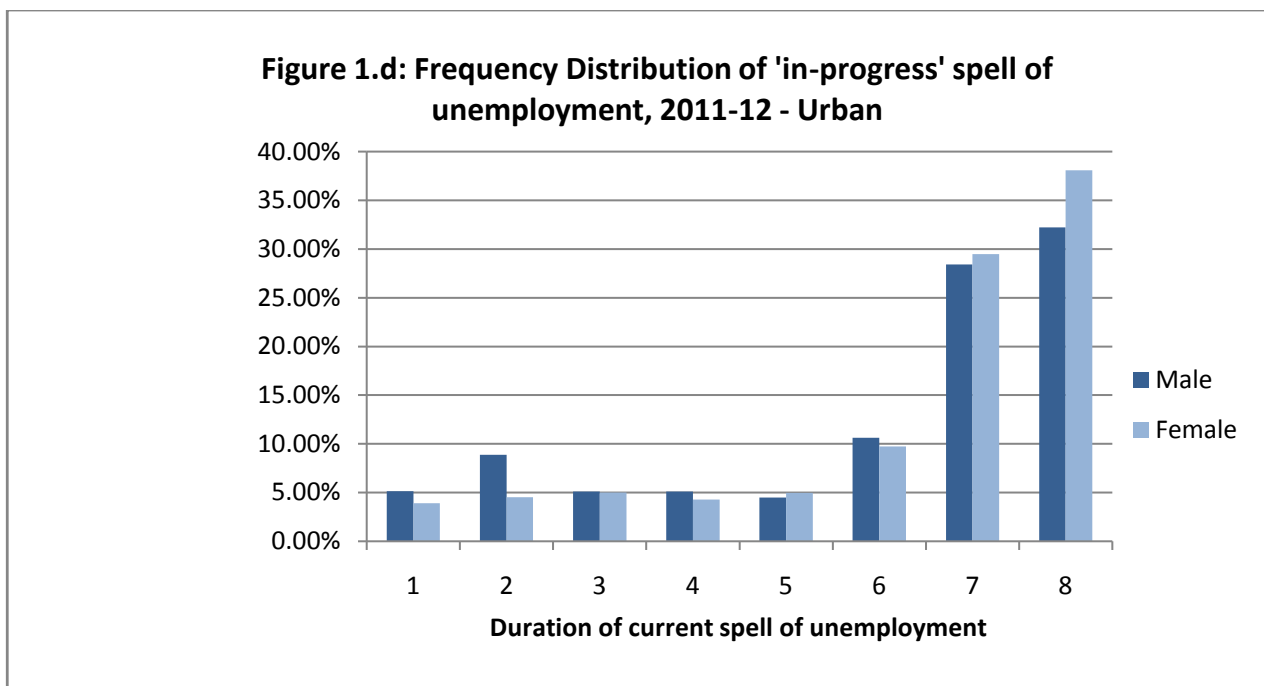
Note: In the above figure, half-a-day of unemployment is represented by “5” and a full day of unemployment is represented by “10”. Thus, e.g., 35 would correspond to unemployment for half-a-week and so on. All percentages calculated on the basis of those unemployed at least half-a-day of the reference week.



Note: In the above figure, the legend for the x-axis is as follows: *1-unemployed for only 1 week; 2-unemployed for more than 1 week to 2 weeks; 3-unemployed for more than 2 weeks to 1 month; 4-unemployed for more than 1 month to 2 months; 5-unemployed for more than 2 months to 3 months; 6-unemployed for more than 3 months to 6 months; 7-unemployed for more than 6 months to 12 months; 8-unemployed for more than 12 months.* All percentages calculated based upon those unemployed on all seven days of the reference week.



Note: In the above figure, half-a-day of unemployment is represented by “5” and a full day of unemployment is represented by “10”. Thus, e.g., 35 would correspond to unemployment for half-a-week and so on. All percentages calculated on the basis of those unemployed at least half-a-day of the reference week.



Note: In the above figure, the legend for the x-axis is as follows: *1-unemployed for only 1 week; 2-unemployed for more than 1 week to 2 weeks; 3-unemployed for more than 2 weeks to 1 month; 4-unemployed for more than 1 month to 2 months; 5-unemployed for more than 2 months to 3 months; 6-unemployed for more than 3 months to 6 months; 7-unemployed for more than 6 months to 12 months; 8-unemployed for more than 12 months.* All percentages calculated based upon those who are unemployed on all seven days of the reference week.

Table 1: Measures of Labor Force, Unemployment Status and Unemployment Rate

	In Labor Force	Unemployed	Unemployment Rate
UPS (Usual Principal Status)	If for the major part of the last 365 days preceding the survey, a person is either working, or did not work but was seeking or was available for work.	If for the major part of the time spent in the (UPS) labor force, a person did not work but was seeking or was available for work.	The head count ratio of the (UPS) unemployed in the (UPS) labor force.
UPSS (Usual Principal and Subsidiary Status)	In addition to the UPS labor force, those outside it are also included if they've worked for at least 30 days over the last 365 days preceding the survey.	If a person in the (UPSS) labor force has not worked for at least 30 days over the last 365 days preceding the survey.	The head count ratio of the (UPSS) unemployed in the (UPSS) labor force.
CWS (Current Weekly Status)	If, in the reference week preceding the survey, a person was either working, or did not work but was seeking or was available for work for at least half-a-day.	If a person did not work but was seeking or was available for work for the entire time spent in the (CWS) labor force during the week preceding the survey.	The head count ratio of the (CWS) unemployed in the (CWS) labor force.
CDS (Current Daily Status)	(Reference week divided into 14 half-days and status determined for each of the half-days separately) If a person was either working, or did not work but was seeking or was available for work during the particular half-day.	(Reference week divided into 14 half-days and status determined for each of the half-days separately) If a person did not work but was seeking or was available for work during the particular half-day.	(Combining the 14 half-day statuses) The ratio of unemployed person-days to the total person-days in the labor force during the reference week.

Source: Various NSS Reports

Table 2: Labor Force Participation (LFPR) and Unemployment Rates– Rural

Year	Labor Force Participation Rates (LFPR) [^]		CDS		U*		I(2) [#]	
	Male	Female	Male	Female	Male	Female	Male	Female
1993-94	0.53	0.23	0.056	0.056	0.209	0.208	0.043	0.041
1999-00	0.52	0.22	0.072	0.070	0.236	0.235	0.054	0.048
2004-05	0.53	0.24	0.080	0.087	0.242	0.260	0.057	0.058
2009-10	0.54	0.20	0.064	0.080	0.217	0.244	0.046	0.052
2011-12	0.53	0.18	0.055	0.062	0.210	0.226	0.043	0.044

Note: [^] The LFPR is as per the Current Daily Status, see table 1. [#] As defined in Paul (1991), see Section 2. For the definitions of CDS and U*, see table 1 and Section 2, respectively. Authors' computations.

Table 3: Labor Force Participation (LFPR) and Unemployment Rates - Urban

Year	Labor Force Participation Rates (LFPR) [^]		CDS		U*		I(2) [#]	
	Male	Female	Male	Female	Male	Female	Male	Female
1993-94	0.53	0.13	0.067	0.104	0.243	0.311	0.059	0.092
1999-00	0.53	0.12	0.073	0.094	0.253	0.293	0.063	0.08
2004-05	0.56	0.15	0.075	0.116	0.251	0.326	0.063	0.098
2009-10	0.55	0.13	0.051	0.091	0.207	0.289	0.043	0.078
2011-12	0.56	0.14	0.049	0.080	0.208	0.275	0.043	0.071

Note: [^] The LFPR is as per the Current Daily Status, see table 1. [#] As defined in Paul (1991), see Section 2. For the definitions of CDS and U*, see table 1 and Section 2, respectively. Authors' computations.

Table 4: Decomposition of Unemployment – Education Categories - Rural

1993-94					2011-12			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Education Categories</i>	<i>Share of labor force (%)</i>	<i>U^{*2}</i>	<i>Contribution (Labor force share * U^{*2})</i>	<i>Contribution (%)</i>	<i>Share of labor force (%)</i>	<i>U^{*2}</i>	<i>Contribution (Labor force share * U^{*2})</i>	<i>Contribution (%)</i>
Male								
1	44.02	0.034	0.015	33.97	27.43	0.035	0.010	22.16
2	42.59	0.038	0.016	37.45	46.55	0.043	0.020	45.24
3	10.98	0.081	0.009	20.32	19.39	0.045	0.009	19.70
4	2.83	0.127	0.004	8.25	6.54	0.087	0.006	12.90
Total	100		0.044	100	100		0.044	100
Female								
1	78.09	0.035	0.028	63.82	54.51	0.036	0.020	38.98
2	18.52	0.042	0.008	18.19	32.29	0.038	0.012	23.97
3	2.80	0.195	0.005	12.61	9.37	0.109	0.010	20.07
4	0.69	0.336	0.002	5.38	3.86	0.224	0.009	16.98
Total	100		0.043	100	100		0.051	100

Note: The Educational Categories are defined as the following: **1-Illiterate**; **2-Ranges from 'Literate without formal schooling' to 'Middle School'**; **3-Secondary and higher secondary school education**; **4-Higher than Higher secondary education**. See Section 2 for details on the decomposition. Authors' computations.

Table 5: Decomposition of Unemployment – Education Categories - Urban

(1)	1993-94				2011-12			
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Education Categories</i>	<i>Share of labor force (%)</i>	U^{*2}	<i>Contribution (Labor force share * U^{*2})</i>	<i>Contribution (%)</i>	<i>Share of labor force (%)</i>	U^{*2}	<i>Contribution (Labor force share * U^{*2})</i>	<i>Contribution (%)</i>
Male								
1	18.04	0.036	0.006	10.98	10.91	0.032	0.003	8.06
2	42.97	0.056	0.024	40.97	35.91	0.038	0.014	31.63
3	24.48	0.078	0.019	32.45	27.24	0.040	0.011	25.16
4	14.51	0.064	0.009	15.60	25.83	0.059	0.015	35.15
Total	100		0.059	100	100		0.043	100
Female								
1	44.19	0.034	0.015	15.37	25.52	0.027	0.007	9.12
2	27.33	0.094	0.026	26.41	29.79	0.044	0.013	17.51
3	14.53	0.199	0.029	29.89	16.43	0.095	0.016	20.66
4	13.84	0.198	0.027	28.33	28.53	0.139	0.040	52.71
Total	100		0.097	100	100		0.075	100

Note: The Educational Categories are defined as the following: *1-Illiterate; 2-Ranges from 'Literate without formal schooling' to 'Middle School'; 3-Secondary and higher secondary school education; 4-Higher than Higher secondary education.* See Section 2 for details on the decomposition. Authors' computations.

Table 6: Unemployment Rates - State Wise (Major States) – Rural

State	1993-94				2011-12			
	CDS		U*		CDS		U*	
	Male	Female	Male	Female	Male	Female	Male	Female
Andhra Pradesh	0.059	0.069	0.208	0.224	0.049	0.058	0.197	0.217
Assam	0.070	0.124	0.249	0.346	0.049	0.089	0.217	0.296
Bihar	0.063	0.046	0.216	0.185	0.042	0.131	0.194	0.346
Chhattisgarh [#]	N/A	N/A	N/A	N/A	0.059	0.030	0.233	0.167
Gujarat	0.060	0.047	0.205	0.177	0.026	0.039	0.131	0.148
Haryana	0.075	0.033	0.245	0.179	0.042	0.067	0.201	0.246
Himachal	0.026	0.005	0.140	0.065	0.027	0.015	0.159	0.119
Jammu & Kashmir	0.022	0.012	0.145	0.109	0.050	0.118	0.201	0.334
Jharkhand [#]	N/A	N/A	N/A	N/A	0.026	0.068	0.155	0.256
Karnataka	0.047	0.039	0.179	0.161	0.036	0.031	0.155	0.156
Kerala	0.131	0.189	0.324	0.418	0.122	0.278	0.303	0.506
Madhya Pradesh	0.026	0.026	0.152	0.149	0.036	0.021	0.162	0.116
Maharashtra	0.046	0.040	0.195	0.176	0.042	0.042	0.179	0.177
Orissa	0.076	0.051	0.249	0.214	0.088	0.085	0.263	0.271
Punjab	0.027	0.023	0.152	0.153	0.056	0.033	0.217	0.182
Rajasthan	0.015	0.004	0.113	0.060	0.045	0.012	0.198	0.104
Tamil Nadu	0.129	0.113	0.294	0.270	0.106	0.121	0.267	0.277
Uttar Pradesh	0.029	0.039	0.158	0.193	0.056	0.027	0.215	0.155
Uttarakhand [#]	N/A	N/A	N/A	N/A	0.053	0.043	0.198	0.195
West Bengal	0.087	0.113	0.257	0.305	0.081	0.093	0.253	0.290

Note: [#]These states were created in 2000, Chhattisgarh from Madhya Pradesh, Jharkhand from Bihar and Uttarakhand from Uttar Pradesh. Hence, we do not have separate unemployment numbers for them in 1993-94. N/A – Not Applicable. Authors' computations.

Table 7: Unemployment Rates - State Wise (Major States) – Urban

State	1993-94				2011-12			
	CDS		U*		CDS		U*	
	Male	Female	Male	Female	Male	Female	Male	Female
Andhra Pradesh	0.075	0.095	0.248	0.286	0.054	0.097	0.225	0.303
Assam	0.065	0.257	0.243	0.505	0.058	0.073	0.237	0.270
Bihar	0.083	0.124	0.284	0.347	0.059	0.271	0.235	0.516
Chhattisgarh [#]	N/A	N/A	N/A	N/A	0.093	0.081	0.291	0.275
Gujarat	0.057	0.078	0.218	0.261	0.014	0.024	0.102	0.136
Haryana	0.065	0.073	0.244	0.264	0.041	0.063	0.202	0.251
Himachal	0.040	0.012	0.192	0.101	0.023	0.077	0.147	0.278
Jammu & Kashmir	0.072	0.140	0.264	0.369	0.052	0.242	0.221	0.489
Jharkhand [#]	N/A	N/A	N/A	N/A	0.057	0.103	0.238	0.321
Karnataka	0.057	0.089	0.218	0.284	0.037	0.056	0.182	0.233
Kerala	0.141	0.279	0.346	0.516	0.086	0.213	0.254	0.452
Madhya Pradesh	0.071	0.059	0.256	0.237	0.045	0.049	0.198	0.221
Maharashtra	0.060	0.078	0.237	0.271	0.030	0.067	0.163	0.251
Orissa	0.099	0.093	0.300	0.295	0.064	0.028	0.236	0.167
Punjab	0.039	0.058	0.191	0.242	0.043	0.048	0.197	0.217
Rajasthan	0.026	0.015	0.160	0.120	0.054	0.042	0.227	0.203
Tamil Nadu	0.087	0.128	0.260	0.327	0.063	0.085	0.214	0.271
Uttar Pradesh	0.048	0.048	0.212	0.213	0.062	0.055	0.240	0.232
Uttarakhand [#]	N/A	N/A	N/A	N/A	0.043	0.243	0.193	0.485
West Bengal	0.102	0.208	0.296	0.449	0.064	0.088	0.242	0.291

Note: [#]These states were created in 2000, Chhattisgarh from Madhya Pradesh, Jharkhand from Bihar and Uttarakhand from Uttar Pradesh. Hence we do not have separate unemployment numbers for them in 1993-94. N/A – Not Applicable. Authors' computations.

Table 8: U* and its components - Rural

Year	<i>CDS</i> ² (1)		<i>Inequality component</i> (2)		$U^{*2} = (1) + (2)$		<i>Contribution of inequality (%)</i> (2) ÷ (1)	
	Male	Female	Male	Female	Male	Female	Male	Female
1993-94	0.003	0.003	0.041	0.040	0.044	0.043	12.93	12.80
1999-00	0.005	0.005	0.051	0.050	0.056	0.055	9.74	10.27
2004-05	0.006	0.008	0.052	0.060	0.059	0.068	8.15	7.93
2009-10	0.004	0.006	0.043	0.053	0.047	0.060	10.50	8.30
2011-12	0.003	0.004	0.041	0.047	0.044	0.051	13.58	12.29

Note: See Section 2 for details on the decomposition. Authors' computations.

Table 9: U* and its components – Urban

Year	<i>CDS</i> ² (1)		<i>Inequality component</i> (2)		$U^{*2} = (1) + (2)$		<i>Contribution of inequality (%)</i> (2) ÷ (1)	
	Male	Female	Male	Female	Male	Female	Male	Female
1993-94	0.004	0.011	0.055	0.086	0.059	0.097	12.15	7.94
1999-00	0.005	0.015	0.059	0.071	0.064	0.086	11.01	4.67
2004-05	0.006	0.013	0.057	0.093	0.063	0.106	10.20	6.90
2009-10	0.003	0.008	0.040	0.075	0.043	0.084	15.47	9.09
2011-12	0.002	0.006	0.041	0.069	0.043	0.076	17.02	10.82

Note: See Section 2 for details on the decomposition. Authors' computations.