Population, Education, and Employment in India: 1983-2018

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Executive Summary

1. Job growth 2004/5 to 2017/18

Our estimate of employment for 2017/18 is between 445 and 452 million, or 448 million (principal status definition). This will represent a 20 million increase over the 428 million observed in 2014/15. The Labor Bureau April-December 2015 survey is centered on February 2015; the 2017/18 NSSO July '17-June '18 survey will be centered on June 2017. This is for the principal status definition which is an estimate of employment over the preceding 12 months. Thus, over 2.3 NDA-II years, the economy is estimated to have added (20/2.3) or 8.7 million jobs per year.

Note that 448 million jobs in 2017/18 is an estimate. Only the publication of NSSO results for 2017/18 will confirm how accurate our estimate is.

As a reference, during 2004/5 and 2009/10 the economy added 11 million jobs over 5 years or 2.8 mil jobs per year. Between 2009/10 and 2011/12, the economy lost a million jobs, thus making the 7-year UPA period the slowest period of job expansion (1.4 mil jobs a year) in Indian history (since the availability of unit level NSSO data in 1983). For the entire 2004/5 -2013/14 nine year UPA period, the economy added 21 million jobs, or 2.3 mil jobs a year.

2. Specific employment oriented economic reforms, 2015 onwards

The Modi government has undertaken several economic reforms over the last four years. Some reforms have been specifically geared towards employment generation – e.g. the emphasis on road construction (a labor-intensive activity); the MUDRA initiative (provision of loans to small entrepreneurs); the housing initiative as well as the policy to increase employment via a wage subsidy to employers (this achieved through lowering the provident fund contributions to employers).

The first two years – 2014/15 and 2015/16 – after Modi became PM were drought years, only the fourth time in the last 150 years that this has happened. Droughts are not conducive to economic growth, nor conducive to agricultural (rural) employment.

The next two years the weather was normal, but two major economic reforms were undertaken – demonetization and GST. Both reforms have (had) several objectives; in the main, they have had a considerable effect on direct tax compliance (demonetization) and indirect tax collection (GST). Both these reforms introduce uncertainty, and hence, in the short-run, affect economic growth and employment generation.

In addition, the BJP government also inherited a broken state banking sector; NPA's at a decadal high and close to 8 % for state owned banks. Again, reform of banking is not growth enhancing in the short run.

High real policy rates, lower GDP growth lower growth in employment

Finally, as if growth diminishing factors were not present in abundance, the Indian economy witnessed the largest increase in real policy rates post 2014. In May 2014, the monetary policy repo rate was at 8 %

and CPI inflation was at 8.3 % i.e. a real policy rate of -0.3 %. The average real policy rate for fiscal year 2017/18 was 2.5 %, the highest observed in India since the start of the repo regime in FY2005 when the real policy rate was 2.07 %, and the third highest in the world (behind Brazil and Russia). It is estimated that each 1 % increase in the real lending rate leads to a 0.5 % decline in non-agricultural growth. Real policy rates have increased by 380 bp between 2005-2014 (-1.6 %) and 2005 to present (2.2 %). Since agriculture is one-sixth of GDP, this means that an increase of 1 ppt in real lending rates leads to a decline of 0.4 ppt in GDP growth. This real policy rate increase (and consequent increase in lending rates) has caused GDP growth post 2014 to be *lower* by 1.5 ppt per year

Thus, there have been several factors arguing against "extra" employment generation during the last 2.3 years (i.e. between the last two employment surveys, April-December 2015 and June 2017-July 2018.)

The Non-Existent Modi promise of 10 million jobs a year

It is popularly believed that PM Narendra Modi had promised the generation of 10 million jobs a year. We find no record of any such statement. In the BJP Election Manifesto 2014, there is the following statement "The country has been dragged through 10 years of **Jobless Growth** by the Congress-led UPA Government". At a campaign rally in Agra in August 2013, candidate Modi did talk about the lack of job generation in the UPA years. In the speech, Modi promised that if the BJP/NDA was to be elected, they would create 10 million jobs for the youth of the country (youth defined as those younger than 35 years). This is the only reference to job creation. There is no reference to the promise of 10 million jobs per year that we could find.

3. **Some estimates of job growth 2015-**

There has been a large emphasis on road construction in the last few years, and especially in 2017/18. Indeed, GDP growth of 5.8 % in construction in FY18 was the largest in the last six years. *Construction is a labor-intensive activity and we estimate that construction activity alone added between 1.7 and 3 million jobs in FY18.*

The recently released, but controversial, *EPFO (Employee Provident Fund Organization)* employment data suggests a healthy expansion of 7 million jobs in 2017 in the formal sector , and 3 million jobs in the informal sector(Ghosh and Ghosh 2018). For the very young likely first timers – 18-21 years – EPFO job creation was 2.5 million in the one-year Sept. 2017-Aug. 2018.

Labor force participation rates and jobs needed

One of the main "conventional wisdom" conclusions about the labor market in India is that the labor force participation rates of women in India have declined, and declined "precipitously". This issue is examined in some detail and our preliminary conclusions are: (i) but about half the decline is explained simply by the fact that more women are attending school (and college) and hence half the decline is "artificial"; (ii) labor force participation rates for women have declined, but male participation rates have declined at about the same rate; (ii) after accounting for school enrollment, between 1999/00 and 2014, female LFPR declined from 36.4 % (principal status) to 33.6 %, and male LFPR declined from 92.8 % to 89.9 %. This issue, of both male and female labor force participation rates, is presently under study.

It is commonly believed (assumed) that India needs to provide 10 to 12 million jobs for its expanding labor force. We find that this conclusion has *never* been valid. The maximum expansion in the population ages 15 and above was during 204/5 to 2009/10 when the *population* increased at an average rate of 15.3 million a year. The highest LFPR recorded in India (again since and including 1983) was 60.6 % in 1983, some thirty-five years earlier. A population expansion of 15.3 million, with a 60 % LFPR, yields a labor force expansion of 9 million a year.

There is a further "error" in the computation of jobs needed. One of the big stories of Indian economic development over the last 15 years is the huge, and unprecedented, expansion of individuals ages 15 and above (especially the 15-24 age-group) that are going to school. This subtracts from labor force availability for individuals above 15 years of age.

Our estimate of jobs needed per year (after incorporation of school enrollment) has declined from a peak 8.6 million a year during 1999/00 and 2004/5, to just 5.3 million a year post 2011/12.

One final conclusion – the estimate of jobs needed rests on the estimates of labor force participation rates, especially for women. If this rises, as we think it will, the requirement for job growth will increase to about 6.5 million jobs a year over the next *decade*, from the present 5.3 million level.

Introduction

It is of academic, policy, and perhaps of political interest, to examine the nature of job growth in India. That is the goal of this paper. We examine all data available relating to employment in India from 1983 to 2017/18: the NSSO-EU surveys from 1999/00 to 2011/12; the Labor Bureau employment and unemployment surveys for 2014 and 2015 (EUS4 and EUS5); the Quarterly Employment Survey, the Employee Provident Fund survey of jobs in the formal sector; and the private joint CMIE-BSE employment survey reports based on their tri-yearly Consumer Pyramid Surveys conducted in 2016, 2017 and 2018.

Although NSSO based employment estimates are readily available until 2011/12, estimating employment in recent years is challenging due to the lack of reliable survey or administrative data. The last quinquennial survey on Employment-Unemployment was conducted in 2011/12. Since then NSSO has not published any large Employment-Unemployment survey. The Labor Bureau did undertake four relatively smaller surveys in four consecutive years (2012, 2013, 2014 and 2015). However, we only had access to the unit level data for the 2014/15 and 2015/16 surveys (referred to as EUS4 and EUS5 henceforth).

The lack of data on such an important topic is unfortunate. However, starting late 2018, there will be a large-scale quarterly employment survey in urban areas and an annual employment survey in rural areas. Two major quinquennial NSSO surveys have been undertaken in 2017/18 – an employment-unemployment survey (EU) as well as a consumer expenditure survey. All NSSO EU surveys are for the July-June period; only the 1983 survey was for the calendar year. The NSSO has just completed its labor force survey for 2017/18 (there is a name change from the old "Employment and Unemployment Survey" to the new Periodic Labor Force Survey). It is expected that some results from these two surveys will be available over the next few months.

In the meantime, one is left with speculation about employment generation between 2014/15 and 2017/18. Recently, an attempt has been made to capture, via employee payroll contribution to pension funds (EPFO), the extent of job generation in the formal sector starting September 2017. Unlike the US, EPFO data is not based on a count of employees in an establishment; rather, it is based on pension fund contributions. These data have to be carefully processed to avoid over-estimation of new jobs – if a fresh employee enters the pension system, she may have already had a job before, most likely in the informal

sector. Ghosh and Ghosh(2018) have carefully processed the data, and have estimated that 7 million jobs were created in the formal sector in 2017/18 and about 3 million in the informal sector.

Survey data are needed for verification of the Ghosh-Ghosh EPFO estimate and such data will not be available till the end of 2018. There is, however, a private sector survey of employment in 2016, 2017 and 2018 – one conducted jointly by a data service provider (CMIE) and BSE (Bombay Stock Exchange). These data reveal only a 1.4 million job creation across sectors for all of 2017; for 2018 (till August), the CMIE estimate is of a job loss of 4 million.

There is a wide variance in the job estimate of Ghosh-Ghosh and CMIE. In the first draft of this paper – Bhalla-Das (2018a), entitled "*All you wanted to know about jobs in India – but were afraid to ask*" – we had predicted that the *NSSO* job growth for 2017/18 would be 12.8 million. However, it is the case that NSSO will *not* be publishing any job growth estimates for 2017/18 – as per standard procedure, only the *level* of employment as a percentage of working age population for 2017/18 will be contained in the data. There will be no indication, in the NSSO data, of how much job growth occurred in 2017/18 or any other year. Hence, in this paper, we provide an employment *level* estimate for 2017/18 that enables us to compute the growth in jobs for the six years between 2011/12 and 2017/18, the two NSSO quinquennial survey years.

We have several objectives in this paper. First, we estimate the level of employment in 2017/18, according to the principal status definition since it allows us to construct the longest *definition consistent* employment series. Our findings suggest that employment in 2017/18 period is around 448 million. Second, we examine the hypothesis of low and perhaps declining female labor force participation rate (FLPFR) in India. We find that the tremendous rise in educational enrolment among females explains the low level of FLPR and a large part of the decline in the FLFPR. Third, we provide an estimate of emerging trends in the Indian labor market – in particular, we estimate, and emphasize, that the "demographic dividend" is nearly over for India. For the new working cohort (15-24 age group), population expanded by 15 million 2004-2011; the next seven years (2011-2018), the expansion is a reduced 7 million; the next seven years (2018-2025) it is expected to expand only by 1.5 million[1]. The primary reason for the decline in the rate of

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[1] Source of data is UN (2015) – the UN data presents data on population 1950 to 2100, by five-year age-sex groups, for more than 100 countries. UN estimation relies on Census data, when available, and supplemented by trends in fertility.

population expansion is the declining rate of fertility, now down to the replacement level of 2.1 children per mother. Fourth, to provide an estimate of the number of jobs needed every year to meet the demand for jobs by the new workers. Our analysis suggest that less than 6 million jobs are needed every year to keep pace with the demand for jobs in the next 5-year period (2017 – 2022). This has declined from a level of 8.2 million some 15 years ago.

Our "best" estimates of employment levels in India, in 2017/18, for the principal status definition (the only definition for which a continuous time-series is available 1983 to 2015) is around 448 million, which, if realized, will represent an increase of 21 million from the 429 million level observed in 2011/12. If our estimate is correct[2], this will represent an average job growth of 3 million a year during 2011/12 to 2017/18 period. If indeed such is the case, then 2011/12 to 2017/18 period would represent the fastest spell of job growth since 1999/00 to 2004/05 period when jobs grew by 9.6 million a year. Of course, we make these inferences based on our predicted employment levels, and will stand corrected if the NSSO 2017/18 levels of employment generation in 2017/18 are significantly different from our estimates.

The employment growth in the interim period, that is during 2004/05 to 2011/12, is somewhat puzzling. This is the period when India witnessed the highest GDP growth (an average of a CAGR of 7.6 % per annum), but experienced the slowest employment growth. Over these seven years employment increased by only 10 million, or an average per year increase of 1.4 mil per annum. In fact the total employment in 2011/12 was 1 mil *less* than the drought year of 2009/10. This curious fact is a point of major departure for our analysis. We show that this low job growth was not an anomaly, and not due to the oft-quoted usual suspects – farm mechanization, capital intensive growth, etc. Rather, this was an outcome of fertility decline (demographics) and expansion of education (which is liable to provide rich dividends in the form of higher *future* productivity growth). If the recent six-year period 2011/12 to 2017/18 shows a significantly faster increase in employment than before, then one will be able to question the below normal increase in employment between 2004/5 and 2011/12.

The plan of the paper is as follows. Section 2 describes the data sources, and definitions, used. Section 3 discusses Survey Ratios and National Aggregates i.e. system of estimation of jobs via computation of

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[2] Below we present the methods of calculation in detail and the interested reader can evaluate our estimate with respect to other available estimates of employment in 2017/18.

important ratios like worker participation rate etc. Section 4 discusses the important simultaneous phenomena in India – the expansion in educational enrollment and decline in labor force participation (for both men and women). Section 5 discusses the phenomena of jobless growth and the role of demographics (fertility decline) and greater educational enrollment for both men and women. Section 6 outlines the policy reforms initiatives for employment generation undertaken by the government since 2014. Section 7 discusses the results on employment generation in India for the period 1983 to 2017/18. Section 8 concludes.

Section 2: **Data and Definitions**

The question of employment trends in India is clouded in uncertainty. Employment data are not consistently available, and definitions vary. This section discusses the available data on employment from a variety of sources, and the different definitions used.

Sources of data on employment

NSSO-EU surveys, 1983 – 2011/12

In the main, this study uses the large sample quinquennial National Sample Surveys (NSS) for the years 1983, 1993/94, 1999/00, 2004/5, 2009/10 and 2011/12. These NSS surveys provide a rich basis for examining labor force and employment trends. These NSSO Employment Unemployment (NSSO-EU) surveys have significant detail on the labor market and are the "gold standard" for analysis of issues related to employment and unemployment.

The NSSO provides estimates for *five* different employment definitions. Three of these definitions have to do with long-term (365 days) employment. These three are usual principal status, usual secondary status, and usual (*principal* combined with *subsidiary)* status. The usual status definition pertains to employment in the *preceding 12 months* starting from the date of interview. Thus, for interviews conducted in July 2011 (the beginning month of EU surveys which run from July to June, corresponding to the agricultural year in India), the employment reference period is from July 2010 to June 2011 (for usual and principal status) and is centered at the halfway mark, December 2010. For interviews conducted in June 2012 (the last month of the survey), the "center" of the reference period is six months before i.e. December 2011. *Hence, a*

July 2011-June 2012 interview schedule yields usual activity status estimates centered on the beginning month of the annual survey, i.e. July 2011.

In addition, the NSSO-EU reports an estimate of weekly status of employment (i.e. were you employed for at least 1 hour on any day last week), and daily status of employment (obtained from daily estimates of employment for each of the preceding 7 days). The NSSO defines daily status as: "The workforce measured in terms of current daily status (CDS) gives the average picture of the person-days where a person was found employed on an average on a day during the survey period." For daily and weekly definitions, the "center" of the reference period is December.

 Labor Bureau Surveys, 2014 and 2015

For 2014 and 2015, the study uses Labor Bureau's Annual Employment and Unemployment Surveys (fourth and fifth rounds). Both surveys measure labor force and employment estimates based on the usual activity status definition of employment (i.e. usual (principal + secondary) or just principal status (PS) alone. The PS definition is contained in both the NSSO-EU and LB-EU surveys. Thus, for principal status, and principal status alone we have a continuous time-series data for more than thirty years.

The field work of the annual surveys four and five, however, was less than 12 months unlike the benchmark NSS employment and unemployment surveys. Field work for the fourth round of Labor Bureau's annual employment survey (EUS4) was conducted between January 2014 and July 2014 and therefore the moving reference period as measured by the principal activity status centers around September 2013 (see discussion above on the "reference" month**).** Similarly, the fieldwork for the fifth round (EUS5) was conducted between April 2015 and December 2015, therefore, the reference period (moving average of previous 12 months) as measured by the usual or principal activity status centers around February 2015.

What this referencing of survey means is that the employment estimate for the 2014 survey is for economic conditions *unaffected* by the 2014 drought. The 2015 survey, centered on February 2015, is deeply affected by the 2014 drought, indeed its employment estimate is right in the middle of the 2014 agricultural drought year.

In the tables presented in this paper the fourth-round survey is referenced as taking place in 2013/14, not 2014; the fifth-round survey (technically 2015) is referenced as having taken place in 2014/15.

CMIE employment and unemployment survey 2016-2018.

CMIE, in collaboration with BSE, has published detailed statistical reports from their triannual Consumer Pyramid Survey for the years 2016, 2017 and at the time of this study, till August 2018. These triannual reports are publicly accessible from CMIE's website, and have data by age-groups on employment, labor force participation rates and unemployment.

For the most recent period, 2016 onwards, the CMIE's is the **only** source that presents employment statistics. It is a monthly household survey (but reported on a four-month basis) which collects the most basic labor market information – age, sex, and whether the person was employed. So far CMIE has published eight reports based on the surveys conducted during 2016, 2017 and 2018. (Three for each year 2016 and 2017 (January-May, June-August and September-December), and two (to date) for 2018).

Definitions – CMIE and NSSO vary

CMIE's definition of employment is somewhat different from NSSO-EU's definition of employment. CMIE's definition of employment is as follows: "Any person who is engaged in any economic activity either on the day of the survey or on the day preceding the survey or is *generally regularly* engaged in an economic activity but did not work on any of these days only temporarily because of scheduled rest days, inability to work on these specific days for reasons such as illness, bad conditions that did not allow him to reach work, festivals or other contingencies or constraints" (emphasis ours).

In recent work, Mr. Mahesh Vyas, CEO of CMIE, believes that the current daily status (CDS) in the NSSO definition corresponds closely to the CMIE definition. However, NSSO CDS is a weighted average of work in the *previous seven* days, whereas the CMIE measure seems to be part daily status (*first two days*) and part *unspecified status (remaining 5 days of the week)*. We do not know how to interpret the CMIE condition "or is generally regularly engaged in economic activity", and were unable to compare it with the NSSO definitions.

Thus, NSSO's definition of daily employment substantially differs from CMIE's definition. As a consequence, CMIE's employment estimates cannot be directly compared to the principal status estimate from the NSSO surveys.

We therefore compute employment (and related variables like labor force and unemployment) based on the NSSO's principal status definition. This definition is our *preferred* choice because principal status separates the respondents whose primary activity is to work from those whose main activity is something other than work. In addition, for the principal status definition, we have the longest time-series of data (from 1983 to 2015/16). Finally, most researchers concentrate their analysis on the principal status definition.

Section 3 – Survey Ratios and National Aggregates

Official government of India reports on the labor force, employment and unemployment present results in the form of *ratios* – the ratio of the labor force to the working age population (labor force participation rate -LFPR), the ratio of the work force to the working age population (called the worker participation rate - WPR), and the unemployment rate (the ratio of those unemployed to those in the labor force).

NSSO data only report on the two **ratios** WPR and LFPR i.e., **NSSO does not report total employment for any definition, or for any age-sex group**. Why? Because the NSSO survey estimate of absolute levels of each of the three variables – population, labor force, and employment – may not be "accurate". The inaccuracy occurs if the population is not correctly estimated i.e. does not match the Census estimate. Studies done by the NSSO itself point to an under-estimation of around 5 to 10 % for the total population in any given survey year *("Review of Concepts and Measurement Techniques in Employment and Unemployment Surveys of NSSO"*, NSSO (SDRD) Occasional Paper/1/2008). If the analyst does not account for this possible discrepancy, gross errors of interpretation of the results, or judgment can occur.

However, the ratio estimates are considered to be more accurate (because the population error is likely to cancels out (it is present in both the numerator and denominator of a ratio)). The ratios are multiplied with more reliable (census based) population levels to arrive at the employment figure. For the census years, we draw data from census population data, whereas for the non-census years, we draw data from extensions of Census data.

The Census equivalent population for each age-sex group is taken from UN (2015); the UN estimates are based on Census data and extrapolated for future years via assumptions of fertility (we take the medium variant; extrapolations are present till 2100). These UN population estimates are taken for each age-sex group and multiplied by the relevant ratios obtained from the *survey* data to arrive at estimates of working age population, labor force, school enrollment and employment *for each age-sex group*. The aggregate of these age-group estimates provides an estimate of the total in any given year.

With this estimation we are able to have a consistent series for the major labor-market variables – LFPR, WPR, employment and unemployment – for 22 age-sex groups (for each sex, there are 11 age-groups separated by five years except for the >=65 group e.g. age-group 15-19, 20-24,25-29,…,60-64 and >=65 years). Only the employment level is derived from data outside of the NSSO reports; the other variables are contained in the unit-level NSSO data (used for the years 1983, 1993/94, 1999/00, 2004/5, 2009/10 and 2011/12).

Estimating Employment Levels for different survey years

Table 1 presents estimates of employment (principal status) for all the NSSO survey years since 1983 and the LB survey estimates for 2013/14 and 2014/15 (EUS4 and EUS5 respectively). The 2017/18 estimates are according to CMIE data and definition – it is *not comparable* to the principal status definition, either in LFPR and WPR estimates or in the employment estimates. Both the internal survey estimates, and Census population adjusted estimates, are presented. All subsequent tables report only the Census population adjusted data.

Survey Capture

There has been a lot of analysis, and criticism, of the low level of survey capture in the NSSO surveys of *consumption*. The last three consumption surveys (1999/00, 2004/5 and 2011/12) have captured less than 50 % of aggregate consumption as revealed by the national accounts (NA) estimate of the same. In other words, survey consumption estimates are considerably lower than NA estimates. Could a similar error be occurring in the estimate of employment as revealed by the survey data and census population (NA) data?

We consider a parallel error occurring with employment data to be considerably less. There are two reasons for this accuracy in employment estimates. First, the employment estimate is based on a binary question – were you, or were you not, employed. And were you looking for work if not employed. Contrast this simple question with the multitude of questions involved in questions pertaining to consumption – how much did the household spend on each vegetable, each fruit, each cereal, and literally each item of consumption. The two errors, and/or the source of the errors, are not comparable.

The second reason for not expecting much error in the employment estimate is because it is based on a ratio i.e. the number of individuals who said they were working as a proportion of the total number of individuals in the economy. As Table 1 shows, there are errors in the estimate of population, and most often in the 10-15 % range i.e. survey estimates of population are generally lower than Census estimates, and are lower by 10 to 15 %. But this error does not translate into errors in the estimate of LFPR, or WPR, or, by extension, into the error in employment (equal to WPR*Census population).

Table 1: Survey Data on employment, 1983-2017/18

Years	Population (>=15 years)		Participation rate		Employment		Ratio Survey to Census
	Census	Survey	Labour Force	Worker	Census	Survey	
	in millions		in %	in %	in %	in %	in %
1983	456	384	60.6	58.6	268	225	84
1993/94	579	497	58.4	56.8	330	282	86
1999/00	665	469	57.4	55.6	371	261	71
2004/5	742	644	58.4	56.4	419	363	87
2009/10	818	708	53.8	52.2	430	370	87
2011/12	848	763	52.0	50.2	429	383	90
2013/14	878	850	52.7	49.9	440	424	97
2014/15	893	838	50.5	47.8	428	401	94
CMIE non-comparable definition to NSSO principle status definition							
2017/18	937	966		41.9	393	405	103

Source: NSS Employment-Unemployment surveys, 1983 to 2011/12; Labour Bureau survey no. 4 (2013/14) and no. 5 (2014/15)
Notes: As explained in the text the 2014 LB survey is centered around December 2013 and the 2015 April-December Survey is centered around February 2015. Hence, these years are referred to as 2013/14 and 2014/15. For 2017/18, the CMIE data refers to the averages obtained between June of 2017 and August of 2018, these data are not comparable to principal status data from NSSO-LB for other years

The NSSO survey/census population and/or employment ratio fell to as low as 71 % in 1999/00[3], and reached a peak of 90 % in 2011/12. Since then, the two Labor Bureau (LB) surveys have captured the population trends better, averaging around 96 %. This may augur well for the population capture in the NSSO survey for 2017/18 (because the sampling framework may have improved).

What will concern us in the next two sections is the wide "divergence" in the *census* based employment change estimate[4] between 1999/00 and 2004/5 – 48 million jobs created – and the low job expansion in the high GDP growth years of 2004/5 and 2011/12 - only around 10 million jobs. Now note the employment growth between 1999/00 and 2004/5 – 48 million jobs created (371 million employed in 1999/00 rising to 419 million in 2004/5). That is close to 10 million new jobs a year. Growth in GDP during this period – only 5.9 % a year.

Section 4 – Education and Labor Force Participation Rate– Any link?

A much studied, and controversial, subject is the low level of female participation in the labor force. While the pattern in India is broadly comparable to that in other South Asian economies, and Middle Eastern economies, it is lower than the rest of the world. It is an important subject deserving several papers in its own right, but is not something that we will consider in depth in this paper. However, we do examine female labor force participation rates (FLPR) to obtain clues, and insights, into the level of employment in India over the last 30 years.

The determinants of labor force participation are in large part the determinants of employment. The former broadly reflects supply factors, and the latter is what results from a resolution of supply and demand. Historically, as fertility rates have declined, the labor force participation rates of women have tended to increase (male LFPR have stayed steady in the 75-80 % range, though even male LFPR rates are declining both in India and elsewhere). One other factor associated with female LFPR is the increase in educational attainment. As women get more educated, they tend to participate more in the formal labor market, and this increase in formal work shows up in an increased participation rate. (See Bhalla(2017) for a discussion of how the trend of the next few decades is female empowerment and female participation in

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[3] We are exploring the reasons why this might be the case.

[4] This is unlikely to be affected by the "discrepancy" in the survey and census based estimate for 1999/00 noted in the text.

the labor force, economy, and politics. It is the link of female LFPR with education that is *the* factor in explaining female empowerment, and female participation).

But the most talked about statistic is not the comparatively low LFPR of women in India but rather the *decline* in FLFPR over the last decade, termed the "precipitous drop" by World Bank authors Andres et. al. (2017). Co-incident with this drop is the observation that there has been a large increase in female school (school and college) enrollment. In 2017/18, women were 45 % of school enrollment ages 15 and above, up from 27 % in the early 1980s. For college education, the female/total ratio was 47 % in 2014/15 and has likely reached, if not exceeded, parity today. The relevant question in our view is the strength of the linkage between low FLFPR and high, and increasing, levels of college education for females. If the two are linked (as we think they are and as all the cross-country evidence suggests) then the present low and declining FLFPR is a pre-requisite for an increasing, and higher, FLFPR in the future. In other words, the much talked about low FLFPR and aggregate low LFPR maybe more a case of correlation rather than causation.

If causation, then it substantiates our case that one of the biggest "missed" stories on employment in India (and other developing economies undergoing this transition), indeed possibly the biggest story, is what has been happening to female educational enrollment over the last twenty odd years. Bhalla-Kaur(2011) were the first to empirically point out that labor force participation rates appear *distorted* because of this educational expansion. The link is straightforward – women (or men) cannot both attend college and work at the same-time basis. Of course, they do, but they do so on a part-time basis. But the data being examined is that of "full-time" principal status. Mehrotra(2018) also expands on this view.

The simple point is that in order to interpret employment and associated data, we need to incorporate the changing dynamics of education. One method of assessing this transformation is via a different definition of the labor force. Labor force can alternatively be defined as the conventionally defined labor force (employed + unemployed) plus those attending school/college on a full-time basis (code 91 in the employment survey codes, NSSO and LB data).

Table 2 documents the increase in educational enrollment for the 15-24 age-group and for ages>=15 years. The enrollment data, for all the years prior to 2017, are from the NSSO-LB surveys. These surveys have a classification "attended educational institution" for principal status (code is 91, referred to as PS91 below).

Since this classification is for principal status, it is assumed that this represents full-time students. For 2017/18, we do not have survey data on education, but do have available secondary and higher secondary school enrollment data from the publication Educational Statistics at a Glance, 2018 (for the years till 2015/16; hereafter ES). Between 2011/12 and 2014/15 ES data suggests a CAGR of 4.3 % per annum. Applying this growth rate for the next three years, we obtain an estimate of (118.4*1.14) or 136 million students enrolled in school (age >=15 years) in 2017/18 (composed of 65.3 mil women and 70.7 mil men).

The All-India Survey of Higher Education (AISHE) has published an estimate of higher education for 2017/18 of 36.6 million, which is up from 34.2 million in 2014/15. This represents a CAGR of 2.3 % a year. Taking 3 % as the average rate of growth of *all* school enrollment for ages>=15 years, one obtains a PS91 estimate for 2017/18 of 130 million. In 2014/15, *Census school enrollment was 6 million higher*. This same adjustment yields 136 million as the school enrollment estimate for 2017/18.

Now consider the implications for the labor force (principal status) for this age group (15-24). The measured labor force, between 1999/00 and 2011/2, declined by 12 m - from 88 m to 76 m! (Table 3)

Table 2 also reports the female and male LFPR for 2 age categories – ages 15-24 (the young) and all (age >=15). For all women ages 15 and above – there is indeed a precipitous drop – from 29.1 % in 1999/00 to 21.3 % in 2011/12. But note three additional trends. First, that FLFPR had stayed broadly constant for 21 years – it was 29.4 % in 1983. Second, that it is only post 2004/5, that school enrollment for women accelerates, jumping by 19 percentage points (ppt) in the space of seven years, compared to an increase of 18 ppt in 18 years (1983 to 2004/5). Third, note the fact that FLFPR shows the first increase to 22.9 % in 2013/14, while in the drought year it falls back to the good agricultural year level of 21.3 in 2011/12. This pattern is suggestive of an *increase* in FLFPR in 2017/18.

Also presented is an adjusted labor force estimate for men and women for the two age-groups. The adjusted LFPR is defined as (educational enrollment + labor force) divided by working age population.

In contrast to the declining pattern observed for the conventional definition of FLFPR, adjusted FLFPR for young females has shown an increasing pattern for the last thirty years – it was 40.4 % in 1983, and 51.2 % in 2011/12. Indeed, for the last two years of observed survey data, adjusted LFPR for young women has

increased further, jumping by a substantial 8 ppt in just two years to 60.5 % in 2013/14 (and staying at that level in the drought year 2014/15).

For young males, conventional LFPR declines from 73.6 % in 1983 to 41.7 % in 2014/15; adjusted LFPR shows that there aren't too many young men loitering around – the LFPR is in the mid-90s (since 1983).

Table 2: LFPR – Conventional and Adjusted for Education Enrollment

Years	Population		Enrollment		Labour Force Participation Rate			
					Actual		Adjusted	
	Women	Men	Women	Men	Women	Men	Women	Men
	in millions		*in millions*		*in %*		*in %*	
Ages 15 & above								
1983	218.8	236.8	7.0	18.7	34.1	86.6	37.3	94.5
1993/94	279.2	300.3	14.7	28.7	31.0	85	36.3	94.6
1999/00	321.5	343.8	20.4	33.7	30.7	83.6	37.0	93.4
2004/05	359.4	382.3	25.2	38.2	32.5	83.9	39.5	93.9
2009/10	397.2	420.9	37.3	52.4	26	81.3	35.4	93.8
2011/12	412.0	436.3	41.8	58.3	23.3	80.4	33.4	93.8
2013/14	426.7	451.6	50.6	64.5	25.5	75.7	37.4	90.0
2014/15	434.0	459.2	55.7	68.9	23.4	76	36.2	91.0
2017/18	455.5	481.8	65.3	70.7				
Ages 15-24								
1983	70.0	76.6	6.8	18.3	30.7	73.6	40.4	97.5
1993/94	85.0	92.3	14.5	27.9	26.1	66.8	43.2	97.1
1999/00	95.5	103.4	20.1	32.9	24.0	64.1	45.0	95.9
2004/05	103.4	111.9	24.9	37.3	24.3	63.9	48.4	97.2
2009/10	108.6	118.4	36.6	51.1	17.5	53.8	51.2	97.0
2011/12	109.9	120.2	41.0	56.6	14.8	50.5	52.1	97.6
2013/14	110.7	121.6	48.3	61.9	16.9	44.1	60.5	95.0
2014/15	111.1	122.3	51.0	64.6	13.8	41.3	59.7	94.1
2017/18	112.2	124.1	60.1	65.2				

Source: NSS Employment-Unemployment surveys, 1983 to 2011/12; Labour Bureau survey no. 4 (2013/14) and no. 5 (2014/15)

Notes: 1. Census based figures

2. Notes: As explained in the text the 2014 LB survey is centered around December 2013 and the 2015 April-December Survey is centered around February 2015. Hence, these years are referred to as 2013/14 and 2014/15.

For the age>=15 years, women show a steady 33 % adjusted LFPR for the last thirty years; men a steady 94 % level until 2913/14 when the adjusted LFPR drops by 3 ppt. This suggests that movements in LFPR,

which have been interpreted of a trend, maybe in error. We await the 2017/18 to see if the above patterns continue. A firm *inference* from the data presented is that the decline in FLFPR might be a thing of the past.

There are three papers that one or both of us are involved in that explore the important question of declining LFPRs; see Das-Bhalla-Kaur (2018), Kaur et al (2016) and Bhalla-Kaur (2011) for details. The transition from poor to emerging middle class to middle class – and/or from uneducated to educated – may provide some clues. There is even the (likely) possibility that LFPR for women will increase from now on (in India).

Section 5 – Jobless Growth: Explained by Demographics and Education

We get back to the puzzle – low employment growth, and high GDP growth, termed jobless growth by many. Employment levels are a net resolution of demand and supply. All indicators of demand e.g. GDP growth, wage growth (agricultural wages increased at a CAGR rate of 2.9 % per annum between 2004/5 and 2011/12, after having declined at a 0.6 % rate in the previous five years). How is this possible – robust job expansion when wage growth is low (1993/4-1999/2000), and slow job expansion when wage growth is high (2004/5-2011/12)? There are some demand effects present during 1999/00 and 2004/5 – GDP growth low, and three of the five years were low rainfall years.[5] Yet employment growth was robust. Rainfall during the seven years 2004/5 to 2011/12 was at least twice more than earlier, and annual GDP growth was nearly 3 percentage points higher (7.8 % vs. 5.9 % earlier (1999/00 to 2004/5)).

What partially explains this puzzle of low employment growth 2004/5-2011/12 is education, and some demography. As we will soon see, the continuity in lack of robust employment growth post 2011/12 is more due to demography and somewhat less due to expansion in education.

Table 3 documents the trend in several employment related variables for two age-groups: >=15 years, and 15-24 years.

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[5] A popular measure of rain deficiency – percentage deviation of rainfall from normal – registered -8.1 %, -11.4, -9.1, and -22.2 % in the consecutive years 1999/00 to 2002/3q

Table 3: Labor Force and Associated Data, 1983-2017/18

Years	Population *(in millions)*	Enrol-ment *(in mil)*	Labour Force			Employment *(in mil)*	Unemployment Rate (%)	
			LFPR *(in %)*	Total *(in millions)*	Adjusted LFPR *(in %)*		Actual	Adjusted
Ages 15 & above								
1983	455.6	25.6	60.6	276.0	66.2	268.2	2.8	2.7
1993/94	579.4	43.7	58.4	338.6	66.0	329.6	2.7	2.4
1999/00	665.2	54.2	57.4	381.8	65.5	371.0	2.8	2.5
2004/05	741.7	63.5	58.4	432.9	66.9	419.2	3.2	2.8
2009/10	818.1	89.8	53.8	440.5	64.8	429.5	2.5	2.1
2011/12	848.3	100.1	52.0	440.8	63.8	428.6	2.8	2.3
2013/14	878.3	115.7	52.7	462.8	65.9	440.0	4.9	4.1
2014/15	893.2	124.7	50.5	450.9	64.4	428.2	5.0	4.1
2017/18	937.3	136.0						
Ages 15-24								
1983	146.6	25.1	52.2	76.5	69.2	70.9	7.3	5.8
1993/94	177.3	42.7	46.9	83.2	71.0	77.0	7.5	5.2
1999/00	198.8	53.1	44.5	88.4	71.4	81.3	8.0	5.3
2004/05	215.4	62.3	44.6	96.0	73.6	87.4	9.0	5.7
2009/10	226.9	87.8	36.2	82.2	75.9	74.8	9.0	4.5
2011/12	230.1	97.6	33.2	76.5	76.8	68.8	10.1	4.6
2013/14	232.3	110.9	32.1	74.6	80.2	61.9	17.0	7.3
2014/15	233.4	115.8	28.3	66.1	77.9	54.0	18.3	7.1
2017/18	236.2	125.3						

Source: NSS Employment-Unemployment surveys, 1983 to 2011/12; Labour Bureau survey no. 4 (2013/14) and no. 5 (2014/15)

Notes: As explained in the text the 2014 LB survey is centered around December 2013 and the 2015 April-December Survey is centered around February 2015. Hence, these years are referred to as 2013/14 and 2014/15.

Unemployment Rates

Table 3 also provides details according to principal status for two different measures of unemployment – the conventional definition, and the adjusted definition. In the aggregate, the unemployment rate stayed relatively constant at 2.8 % and then jumps, somewhat inexplicably, to 4.9 % in 2013 and 5.0 % in 2014 as per the PS definition. The adjusted labor force and employment series, on the other hand, shows only a 1.5 percentage point (ppt) increase in the unemployment rate.

1999/00 to 2004/5 – Job Growth

Between 1999/00 and 2004/5, the youth population increased by 16.6 million. Education enrollment increased by 9.2 million to 62.3 million from 53.1 mil in 1999/00. Employment for this age-group increased by 6.1 million, and the unemployment rate edged up from 8 % in 1999/00 to 9 % in 2004/5. Summarizing, population increases by 16.6 mil, and education and employment account for 15 million leaving an "excess" of 2 million for other activities.

2004/5 – 2011/12 – Jobless Growth

Now consider the jobless growth period 2004/5 to 2011/12. Population increase for the young is 14.7 million. Demography is beginning to have an effect because in the previous five years the population had expanded by a larger 16.6 mil compared to now a 14.7 mil expansion for seven years. Now note the jump in educational enrollment – up from 62.6 mil in 2004/5 to just over a 100 mil in 2011/12. This is an increase of 37.6 mil and is an increase which is more than double the size of the population increase. We noted earlier how real wage growth had accelerated, and hence the opportunity cost of attending school had increased. Yet, more individuals chose to enroll in education. Consequently, the employment among the young declined by 18.6 million from 68.8 mil in 2011/12 from 87.4 mil in 2004/5.

The education expansion seems quite independent of labor market conditions. For the age>=15 years group, the jobless growth period statistics are as follows – population increase of 107 million, enrollment increase of 37 million, and job growth a paltry 9.4 million. Despite this miniscule job-growth (9.4 million over 7 years or just 1.3 million a year!). Yet, the unemployment rate shifts down, from 2.9 % in 2004/5 to 2.1 % in 2011/12.

Bhalla-Kaur (2009) had warned that ignoring this education expansion would have serious implications (and wrong judgements) about changes in the much-discussed decline in the LFPR of women. The figures for the low employment change during 2004/5-2011/12 is testimony to the large effects induced by the youth opting for education rather than work.
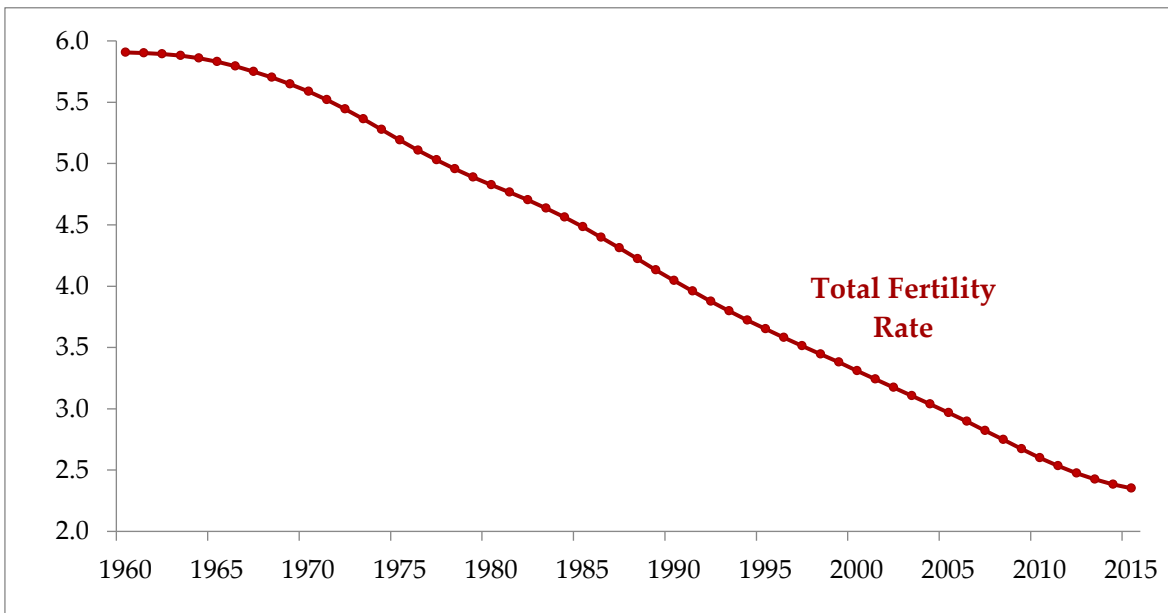
We will examine the pattern of employment and population change in some detail later (Tables 5 and 6). But first, we need to examine the other much discussed issue for India – the demographic dividend. This dividend was supposed to radically increase the supply of labor and thus add to GDP growth. But

effective labor supply, and growth in employment (which is labor in the production function generating GDP) has slowed to a crawl. What happened?

Jobless Growth and the Demographic Dividend

Figure 1 plots the steep decline in fertility, especially in the last decade. Between 1960 and 1990, the total fertility rate declined by almost 2 full points – from 6 children per woman in 1960 to 4 children per woman in 1991. Another 0.70 point reduction occurred in the next decade (3.3 in 2000), and the next 16 years has witnessed the fertility rate to near replacement levels (2.3 in 2016 and likely to be 2.1 in 2018).

Figure 1: Rapid decline in fertility rate in India, 1960-2015

Population change data reported in Table 4 suggests that the demographic dividend (a bulge in the youth population) is all but over. What has not been fully appreciated is the sharper than expected decline in the fertility rate (as reported in Figure 1). The first decade (1983 to 1993/4) witnessed a total increase in the youth population of 31 million; the next 11 years maintained the pace with an increase of 38 million; the next decade (till 2014/15) an increase of 18 million or 1.8 mil a year. The six years 2011 to 2017 have witnessed an increase of just 6 million but the collapse will be witnessed in the next six years (till 2023) – the youth population is expected to increase by just 2.5 million, or a not noticeable increase of 41000 a year.

Table 4: The Lost Demographic Dividend

Age Group	Population 15-24		Population 25-64		Population >=65		Population >=15	
	Actual	Change	Actual	Change	Actual	Change	Actual	Change
1983	146.6		284.5		24.6		455.6	
1993/94	177.3	3.1	369.8	8.5	32.4	0.8	579.4	12.4
1999/00	198.8	3.6	427.7	9.7	38.7	1.1	665.2	14.3
2004/05	215.4	3.3	481.3	10.7	45	1.3	741.7	15.3
2009/10	226.9	2.3	539.8	11.7	51.3	1.3	818.1	15.3
2011/12	230.1	1.6	564.2	12.2	54	1.4	848.3	15.1
2013/14	232.3	1.1	589.1	12.5	56.9	1.5	878.3	15.0
2014/15	233.4	1.1	601.6	12.5	58.3	1.4	893.2	14.9
2017/18	236.2	0.9	636.1	11.5	64.9	2.2	937.3	14.7
2023	238.7	0.4	699.9	10.6	81.9	2.8	1020.5	13.9

Sources: Census (National Accounts); United Nations
Notes: 1. The survey estimates (raw data) are adjusted by gender and age-group population, as per Census - National Accounts
(NA); population data for non-Census years obtained from UN.
2. All Data is in millions

There is a bulge in the share of population in the 25-64 age-group, the age-group with the highest fraction of the labor force. In addition, the age-group >=65 years, rate of growth is also expanding and its pace has picked up in the last few years. It had been steadily expanding at about 1.4 million a year (up from approximately 1 million a year in the 1990s), but in just the last three years (2014/15 to 2017/18) the per year expansion has accelerated to 2.2 mil a year. And the next six years, the expansion will accelerate to 2.8 mil/year. This is also the group with the lowest aggregate LFPR, around 25 %.

In the aggregate, the >=15 population was expanding at a peak 15.3 mil/year rate during 1999/00 to 2009/10. A part of this period was also the period when job-growth was the least, leading to the conclusion that India had entered the stage of jobless-growth. We examine this issue next, but we also note that population growth per se will be reduced to just 13.9 mil/year over the next six-years.

Jobless Growth

The phenomenon of very low job growth in the last decade emerges as a serious concern to most Indian economists, as well as policymakers. Such concern arises primarily because low growth in employment may lead to rising unemployment, social unrest, and worse. However, slow growth in employment does not necessarily indicate higher unemployment.

To check whether the observed slow employment growth in India is necessarily harmful for the society or not, it is imperative that we clearly understand how labor market determines the employment level and hence its growth. Observed employment level is the net outcome of the balance between demand for labor and supply of labor. Joblessness is a problem when the demand for labor grows considerably slower than the supply of labor. In such a situation one would expect to see a rise in unemployment rate. However, as noted earlier, during 2004/05 to 2011/12 , the period of maximum "jobless" growth, the unemployment rate actually fell from 2.9 % to 2.1 %.

What this means is that determination of "joblessness" has to do with how much supply of labor is forthcoming, *ceteris paribus*. It is on this issue where our findings depart from the findings and conclusions obtained by other scholars. The refrain that India's population, and economy, needs 8-12 million jobs a year or needs to create approximately one million jobs a month for the people joining the labor force is very common (PWC2018); ILO(2018); Rajan(2018)).

Table 5 presents data to examine the question of what kind of job growth we should expect (given exogenous changes in population and educational enrollment). Population change represents the decision about fertility and family planning decisions made 15 years earlier. This change is exogenous; however, one cannot ignore a likely (but small) business cycle effect on the decision to enroll in school.

For several time-periods the net increase in population (net of education) hovers around 12 mil/year and perhaps is the source of the commonly cited estimates of 8-12 million jobs needed a year. The number of jobs required per year is a function of the adjusted LFPR and the "expected" unemployment rate. Approximate historical values for these two variables are given in Table 5, along with approximations for the period post 2011/12.

Table 5: Jobs needed with population and educational change

Indicator	1983-93	1993-99	1999-04	2004-11	2011-17	2017-23
Population Change						
Actual *(in millions)*	123.8	85.8	76.5	106.6	89.0	83.2
Annual *(in %)*	12.4	14.3	15.3	15.2	14.8	13.9
Enrolment Change						
Actual *(in millions)*	18.0	10.6	9.3	36.6	35.9	12.3
Annual *(in %)*	1.8	1.8	1.9	5.2	6.0	2.1
Population - Enrolment Change						
Actual *(in millions)*	105.8	75.2	67.2	70.0	53.1	70.9
Annual *(in %)*	10.6	12.5	13.4	10.0	8.8	11.8
Adjusted LFPR *(in %)*	66.1	65.8	66.2	65.3	64.4	
Unemployment Rate *(in %)*	2.8	2.7	3.0	3.0		
Jobs needed per year *(in millions)*	6.6	7.7	8.2	6.2	5.1	
Jobs created per year *(in millions)*	6.2	6.8	9.6	1.4	3.3	

Source: NSS Employment-Unemployment surveys, 1983 to 2011/12; Labour Bureau survey no. 4 (2013/14) and no. 5 (2014/15)
Notes:

Ideally, the number of new jobs needed should be equal to the number of additional job seekers in a particular year. This includes the newly added people who are willing to work and the existing workers who are seeking jobs. However, all additional potential job seekers may not be able to find jobs. There will always be some unemployment (e.g. frictional unemployment; structural unemployment), for which a fraction of this group will remain unemployed. Thus, a reasonable way to measure the jobs needed is to compute the additional jobs needed assuming some unemployment rate. We do so by holding the previous period's unemployment rate constant for every quinquennial survey year in the following manner.

Suppose P_{t-1} and P_t represent the total number of people in the 15 and above age-group in period $(t-1)$ and t respectively. Because we have already established that the educational attainments changed

exogenously, the population that is relevant for computing the jobs needed are those who can potentially work (*adj*usted population) , that is the working age population minus the people who are enrolled. Thus, the relevant population for this computation in each these periods are $P_{t-1}^{adj} = P_{t-1} - Enrol_{t-1}$ and $P_t^{adj} = P_t - Enrol_t$, where $Enrol_{t-1}$ and $Enrol_t$ represent the number of people enrolled in the respective periods. Hence, the change in this population between $(t-1)$ and t is $(P_t^{adj} - P_{t-1}^{adj})$.

Suppose λ_t represents the proportion of $(P_t^{adj} - P_{t-1}^{adj})$ (*change in potential workers*) who are willing to work. Thus, the number of additional people who are available for work in period t is

$$\Delta LF_t = \lambda_t(P_t^{adj} - P_{t-1}^{adj})$$

Ideally, ΔLF_t should be the total number of new jobs needed in period t. However, all unemployment cannot be avoided. As already mentioned, there will always be some unemployment (e.g. frictional unemployment; structural unemployment), for which a fraction of these new job seekers ΔLF_t will remain unemployed[6]. If δ_t represents the unemployment rate, i.e. the fraction of ΔLF_t who were unable to find jobs due to the reasons such as frictional unemployment or structural unemployment, then the total number of new jobs needed will be:

$$\Delta JOB_t^{needed} = (1 - \delta_t) \times \Delta LF_t$$

The changes in the working age population $(P_t^{adj} - P_{t-1}^{adj})$ are generally known, but δ_t and λ_t are unknown unless employment data is available in t. It is reasonable to perform the computations based on the previous year's or most recent available year's values for δ and λ. For instance, in 2011/12 the values of $\delta_t = 0.97$ (3 % unemployment rate) and (fraction of adjusted labor force that worked in the previous period) $\lambda_t = 0.59$; and $\left(P_{2017 \atop 18}^{adj} - P_{2011 \atop 12}^{adj} \right) = 53.1$. Based on these values one can compute the additional jobs needed between 2011/12 – 2017/18 in the following manner:

$$JOB_{2011-2017}^{needed} = 0.97 \times 0.59 \times 53.1 = 30.4 \text{ million}$$

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[6] These are the people who not work voluntarily to find better jobs; or they may be the ones who become unemployed due to the expected labor market turnovers due to structural adjustment in the economy.

That is 30.4 mil over 6 years or 5.1 mil every year, some 3 million lower than that estimated by the World Bank[7]. Thus, the numbers of new jobs needed in 2017/18 to keep the unemployment rate constant is 5.1 mil which is in contrast with the conventional wisdom of 8-12 million jobs a year. The main reasons for this mismatch is due the demographic shifts, and most importantly the due to the tremendous increase in educational enrollments. Table 5 also presents similar statistics for each quinquennial survey rounds since 1993/94.

Modelling Employment Growth

A simple model of employment change, suggested by these data, is as follows. Let P represent population, E employment and X the share of employment in the population (the worker population ratio). Let Ed represent the school going population, XEd the share of the school going population. Expected share of employment at any point in time (hX) is given by the formula

Expected share of employment in population: $\quad hX_t = X_{t-1} - (XEd_t - XED_{t-1})$

For example, the percentage of people employed in 1999/00 was 55.8 %, and the share of the school-going population increased by 0.4 percentage points between 1999/00 and 2004/5. Hence the expected share of the employed population is 55.8 – 0.4 or 55.4 %. Population in 2004/5 was 741.7 million; expected employment is 0.554*741.7 or 410.6 mil. Actual employment in 2004/5 was 419.2 million.

The performance of this simple model is provided in Table 6 and Figure 2. Note that no endogenous information is used in the model; the approximate change in school enrollment, and the population, is known at the time the expectation exercise is undertaken.

It is striking that this simple model is able to capture large (and small) employment changes within a small margin of error. For 2017/18 we obtain a prediction of 444 million jobs, but this is based on change from a drought year 2014/15. If the model is applied with change from 2013/14, then the expected employment rate is 47.8 %, rather than 47.4 %, and 47.8 % employment share yields 448 million. With a

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[7] World Bank Jobless Growth Report (2018) estimates that 8.1 mil additional jobs are needed, holding the employment-to-population ratio constant.

standard deviation of the error of 1.1 %, we obtain the range of 444 to 452 mil as our estimate of jobs in 2017/18 and 448 million as our estimate of principal status employment in 2017/18.

Table 6: Modelling Employment Change in India, 1983-2017/18

Years	Pop	Emp	Share in Population		Model Predictions		Prediction Error	
			Emp	Education	Emp as a part of Pop	Emp	Emp	Error as % of Emp
	in millions		*in %*		*in %*	*in millions*	*in millions*	*in %*
Ages 15 & above								
1983	455.6	268.2	58.9	5.6				
1993/94	579.4	329.6	56.9	7.5	56.9	329.9	0.4	0.1
1999/00	665.2	371.0	55.8	8.2	56.3	374.3	3.2	0.9
2004/05	741.7	419.2	56.5	8.6	55.4	410.6	-8.6	2.0
2009/10	818.1	429.5	52.5	11.0	54.1	442.6	13.2	3.1
2011/12	848.3	428.6	50.5	11.8	51.7	438.4	9.7	2.3
2013/14	878.3	440.0	50.1	13.2	49.1	431.7	-8.3	1.9
2014/15	893.2	428.2	47.9	14.0	49.3	440.5	12.3	2.9
2017/18*	937.3	444.2	47.4	14.5	47.4	444.2	0.0	0.0

Source: NSS Employment-Unemployment surveys, 1983 to 2011/12; Labour Bureau survey no. 4 (2013/14) and no. 5 (2014/15)
*Notes: 1. * highlights all numbers are predicted, other than population and total enrollment*
2. Pop is abbreviated for Population
3. Emp is abbreviated for Employment

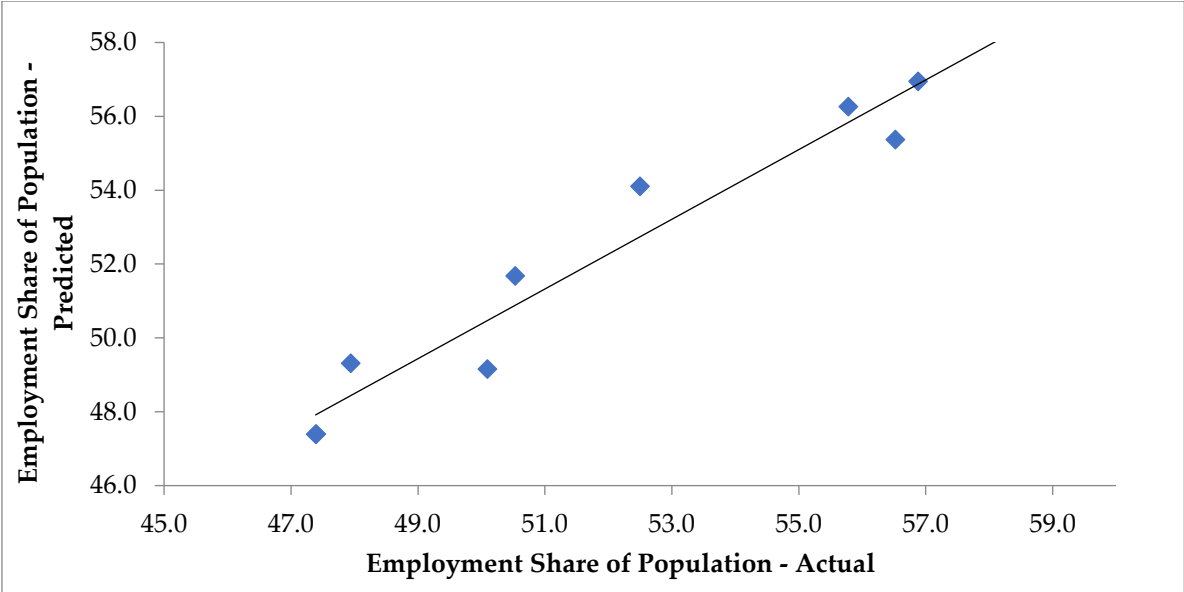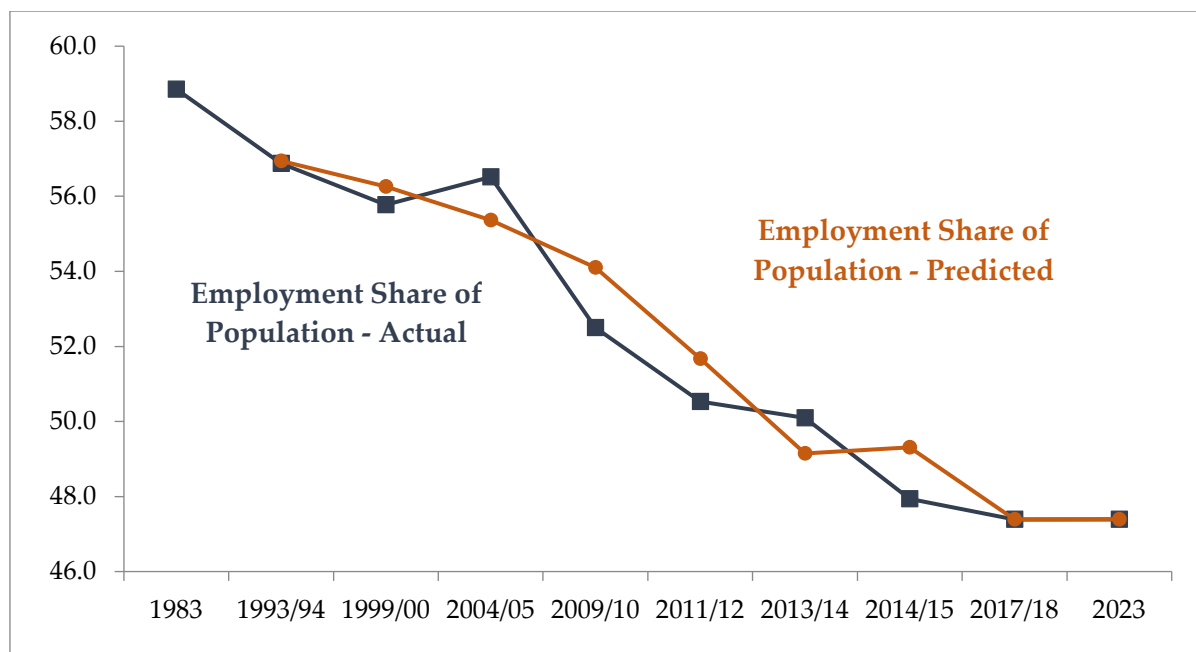*Figure 2: The Relationship between actual and model predicted employment is a close fit*

Section 6: Employment Generation Reforms since 2014

The previous section documented that the number of employed in India (principal status method) was expected to be around 448 million. If this is the estimate obtained from the PLFS survey for 2017/18, then one can conclude that the pace of job creation was sufficient to maintain unemployment rates at the 2011/12 level, the last time an NSSO survey was conducted. A number significantly above 448 mil would mean that the Indian economy has generated more jobs than expected; a number significantly less than that would imply an inadequate job creation over the years.

The pace of job creation should be about 30 mil jobs over six years or 5.1 mil jobs a year between 2011/12 and 2017/18. In contrast, between 2004/5 and 2011/12, the total number of jobs created was only 9.4 mil, or just 1.3 mil a year. Whether the job creation during 2011/12 and 2017/18 was as per the "expectation" of 30 mil jobs will only be known after the release of the PLFS data. Until then, the best one can do is anticipate the magnitude of job creation via a discussion of the job-creation policies enacted during this period, and their effect on additional job creation.

Policies linked to job creation over the last several years

Reform of Labor Market

In recent years, the central government has introduced a number of structural reforms to ensure a smooth functioning of the labor market. Among these, labor law reforms are the most prominent. Reforms that aim to enhance workers' rights[8] can potentially raise workers' productivity. Similarly, the reforms that restrict child labor[9] can raise productive capacity of the future workforce. The introduction of Skill-India project is another reform that aims to enhance productive capacity of the future workforce through human capital investments.

The government has also introduced a number of business centric amendments to facilitate "ease of doing business".[10] These steps incentivize entrepreneurship by lowering transactional costs, and thereby raises the possibility of more investment. The recent move upward in the World Bank Ease of Doing Business ranking (from 134 to 70) in the last year augurs well for job-creation in 2017/18.

In the FY19 Budget, the government proposed to contribute 12 percent of employees' contribution towards their Employee Provident Fund; *this applies to all new employees.* The scheme (Pradhan Mantri Rojgar Protsahan Yojana (PMRPY) Scheme was started in April 2016 with the government committing to payment of 8.33 %; this has now been expanded to the entire 12 % contribution that is required.

This social security initiative may have profound implications for work efforts and savings behavior of the workforce. Even though each of these initiatives differs from the others, and aims to achieve different goals, in totality they can potentially improve the labor market functioning by benefitting the stakeholders, that is the employers and the employees. The government's target is to add 10 million jobs by March 2019 under this scheme. However, not all of the jobs, under this scheme or others, are necessarily new jobs; they may mean an increased formalization rather than (net) employment generation.

 In April 2016, this scheme was launched enhancing the previous housing scheme for the poor, Indira

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[8] Maternity Benefit Amendment Act, 2017, The Employee Compensation Act, 2017 etc.

[9] Child Labor Amendment Act, 2016.

[10] For instance, the amendments such as Ease of *Compliance to maintain Registers under various Labour Laws Rules (2017)***,** Model Shops and Establishments (RE&CS) Bill (2016), Rationalization of Forms and Reports under Certain Labour Laws Rules (2017).

Awaas Yojana. According to an NIPFP study (2018), this scheme is expected to have added between 6.3 mil and 9.3 mil over two years.

Micro Units Development & Refinance Agency (MUDRA)

On April 8 2015, Government of India announced the creation of MUDRA (Micro Units Development & Refinance Agency). The primary objective of this scheme is to bring small or micro enterprises into the financial system and thereby boost employment generation. It is essentially a refinancing initiative where MUDRA helps various commercial banks, small finance banks, co-operative banks and other lending institutions to finance small or micro business units. Any non-corporate, non-firm, small or micro enterprises may participate in this scheme and seek a loan of 10 lacs or less to develop its business.

The total amount sanctioned for the scheme (it started in 2015-16) has averaged Rs. 1.9 lakh crore. For purposes of this paper, we are concerned most with the level of employment (not the change) in 2017/18, and in 2017/18 the expenditure was Rs. 2.53 lakh crore. The total beneficiaries in the scheme numbered 48.1 million in 2017/18 (having averaged 37.5 million in the previous two years). What is not known is the extent to which MUDRA loans substituted for other loans – it is only the net addition that can be expected to create additional employment.

Taken at face value, each of the 48 million recipients received an average of Rs. 52,000 a year, or a little more than Rs. 4000 a month. The average unskilled ploughman's wages in 2017/18 was Rs. 300 per day. This will add some employment to the daily and weekly measures of employment (in the off-season) but is unlikely to add any employment to the principal status definition. It is an open question as to how much an aggregate of Rs. 2.53 lakh crores of MUDRA loans disbursed in 2017/18 would have added to employment in 2017/18. Once the new quarterly periodic labor force survey is in place, the short-term employment gains (and losses) due to policy measures can be estimated.

Construction - Road

There is yet another policy which may have had a meaningful contribution to employment generation – road construction. Construction of roads and rural roads in particular comes with a lot of positive externalities. Khandker et al. (2009) show that in Bangladesh the rehabilitation of rural roads has reduced poverty by raising agricultural production, wages, output prices and by lowering input and

transportation costs. The study also finds that rural roads also lead to higher girls' and boys' schooling and further states road investments are pro-poor, meaning the gains are proportionately higher for the poor than for the non-poor.

More recently and pertaining to the Indian context, Aggarwal (2017) analyses the impact of Prime Minister's Rural Road Scheme between the years 2001 and 2010 and finds that road construction lowers prices paid by rural households for goods produced in urban areas; increases availability of non-local goods, and increases the labor force participation rate of prime-aged women.

Total (surfaced) road length in India was 2.14 million km as of March 31st 2009, which increased to 3.04 m km by March 2014. This represents a robust growth of 7.4 % a year. By March 2016, surfaced road length had increased to 3.32 m km.

Between March 2009 and March 2014, construction of highways increased from 70934 km to 91287 km, or an increase of 20353 km over 5 years, or an average building rate of 11.2 km a day. In FY17, per day construction of highways averaged 22.6 km a year and FY18 topped 27.3 km/day. A 21 % increase in the pace of highway road construction in FY18 is likely to have added jobs in FY18.

Highway road construction between 2009/10 and 2011/12 increased from a rate of 70934 km to 76818 km – an increase of 8.3 %. According to the NSSO surveys (for occupational category 931 – road construction) jobs increased from 21.2 million in 2009/10 to 22.4 million in 2011/12 – an increase of 1.2 million jobs associated with an 8.3 percent increase in road construction.

An alternate calculation of jobs in construction: Surface road construction, as shown above, increased by 21 % in 2017/18. *If the 2009/10 to 2011/12 relationship holds (8.3 per cent increase in road construction means 1.2 million jobs), this means that (1.2*2.5) or 3 million jobs were added via road construction alone in 2017/18.*

Construction - Aggregate

An RBI Working Paper by Misra-Suresh, *Estimating Employment Elasticity of Growth for the Indian Economy*, 2014, documents that construction has the highest employment elasticity of all the sectors, 1.13, compared to an average of 0.19 for the entire economy. In the 2011/12 NSSO survey, the share of employment in

construction was 10.6 %; in 2009/10 the share was 9.6 %. On a base of 450 million, jobs in construction increased by 4.5 million between 2009/10 and 2011/12.

GDP data for FY18 is also very revealing and indicative of solid job creation in the construction sector in FY18. In 2011/12, GDP growth in construction averaged 5.8 %. Since then, *FY18 is not only the first year in which construction growth has topped 4 %, but it is also the first year in which construction growth has matched the 5.8 % average of 2011/12.* Incidentally, as far as *acceleration* in construction growth is concerned, acceleration of 4.4 ppt (1.4 to 5.8) in 2018 *is the highest in the last twenty years.*

This increase in GDP growth (in construction) is likely to have had a very handsome effect on employment growth in FY18. How much impact? As noted above, the elasticity is close to 1.13 i.e. a rough calculation would be that increase in construction jobs in 2018, if past elasticities hold, would be close to 5.7 percentage points. *On a base of 10 % of total non-farm jobs in construction (or 35 million), a 5.7 ppt increase means an additional 2.0 million jobs.*

Adding it all up (road construction, MUDRA loans, pension fund contributions) *a 3-5 million additional job creation* from these schemes alone in 2017/18 seems a reasonable, and conservative, estimate. In the next section, we summarize all the available evidence with regard to job creation in 2017/18.

 Section 7 – Employment Estimates post 2015

In this section, we turn our attention towards estimates of employment in the post 2015 period. This is the first year in the last four-year when Indian economy has not suffered from shocks. In the past 3 years, the first two years were severe drought years; the third year - 2016/17 – contained a demonetization shock (November 2016). Hence, agricultural NSSO year 2017/18, starting July 2017, is the first "clean" year to understand employment (and GDP) trends in the economy.

Estimates of job growth in 2017/18 (July to June)

   A. *Quarterly Economic Survey Estimates of Employment*

Since 2016, the government has been conducting a Quarterly Economic Survey (QES). While used by many as an indicator of employment (e.g. *"Stagnant Employment Growth"* EPW, Vol. 52, Issue No. 38, 23 Sep, 2017.), *it* **is *not* a valid indicator of employment for the entire economy**. The QES covers only the

non-agricultural sector and within this sector, only firms which are part of 8 non-farm sectors i.e. Manufacturing, Construction, Trade, Transport, Education, Health, Accommodation & Restaurant and IT/BPO. The basis of the QES is the Sixth Economic Census (SEC) of 2013/14, "according to which 58.5 million establishments were found to be in operation employing 131.29 million persons….the aforesaid 8 sectors constitute approximately 15 % of the total employment (131.29 million persons) as per 6th EC (Ministry of Labour, 2018, p1). Hence, the QES coverage is approximately 20 million workers (equal to .15*131.3).

Several questions arise with respect to the use of the QES survey. First, the extent to which the number of jobs of the 20 million covered in the QES (more than 10 workers in a firm) matches the growth in the *remainder* of the establishments not covered by the QES (131 million minus 20 million covered by QES). Second, the extent to which knowledge about 131 million workers helps predict job growth in the rest of the non-farmer economy (220 million workers; the farmer population has stayed constant at around 90-100 million for the last decade). Third, to what extent are QES workers substituting for previous, non-QES employment. Given these uncertainties, it is very difficult to assess net job creation on the basis of the QES.

EPFO data for 2017--2018

The employee provident fund data is now being released to the public. This sector covers only the formal sector, and within the formal sector, only those establishments with a firm size of 20 employees or more. According to the Economic Survey (Chapter 2: *"A New, Exciting Bird's-Eye View of the Indian Economy Through the GST"*), these firms accounted for 0.68 per cent of total enterprises (4.9 lakh out of a total 712.9 lakh firms), and 60 million workers out of a total of 220 million working in establishments of all sizes.

Ghosh and Ghosh (2018) have used the EPFO data to estimate employment growth in 2017/18. Their methodology relies on total number of newly created provident fund accounts, especially by workers belonging to the 18-25 year age group. After adjusting for possible duplications, they find that the formal sector accounts for about 91.9 million jobs as on March 2017. Based on this and other estimates they claim that about 0.6 million formal sector jobs were added to the economy every month or 7 million formal, non-farm jobs were added during 2017/18. For the informal sector for the year 2017-18, they estimate job growth of 3 million.

There is a partial check or estimate to the GG method. *It is to take only the 18-21 age group from EPFO data and see how many such "new" employees are present*. For the twelve-month period Sept '17 thru August '18, 2.5 million new entrants were added to the payroll. It is likely that many of these jobs are first time jobs. Ghosh and Ghosh estimate for total job addition for all age groups in the formal sector was 7.3 m and for the 18-25 age-group it was 4.7 m.

Again, the issue of job substitution comes up i.e. the extent to which the 7.3 m are new employees (i.e. addition to the work-force) or old employees now entering the "formal" EPFO system. Once the quarterly PLFS data begin to get released, we will be able to answer this important question. For the moment, the debate centers around the percentage of new employees thought to be within the 18-25 age group. At age equal to 15, all the employees, by definition, are new workers. For the age-group 15-19 years, the Indian economy has been adding a decreasing number of workers; in 2013, there were 19.9 million such employees, almost half the level observed just a decade ago, and down 4 million from the 23.9 million observed in 2011/12. This is the education effect we have discussed earlier i.e. if you are in school, you are not counted as part of the labor force, let alone employment.

In 2011/12, workers in the 18-21 age-group numbered close to 30 million, of which approximately 7 million worked in the urban areas. Again, given the increase in schooling, a greater proportion of these workers will be first time workers.

Some guess-estimates of employment creation between 2011/12 and 2017/18

There are two relatively concrete estimates of job growth in 2017/18 alone. EPFO data suggesting around 7 million addition for all age-groups in the formal sector, and with the knowledge that around 2.5-3 million a year for the very young (18 to 21 years). Construction sector job addition, for all ages, is suggestive of around 2-3 million job addition in 2017/18. These data suggest that a net job addition of a minimum of 5 million a year since 2014/15 is conservative, and likely. Given the 2014/15 level of employment of 428 million, net addition of 5 mil a year for three years is an estimate of 443 mil in 2017/18, very close to our estimate, based on historical trends, of 448 mil workers in 2017/18.

We conclude, given all the evidence, that total principal status jobs in 2017/18 will most likely be in the range 445-455 million. At a 448 million estimate, this will mean a net job addition of 21 million jobs in six

years, 2011/12 to 2017/18, or an average per year job increase of 3.5 million a year. This is a significant improvement over the 2004/5 to 2011/12 experience, when just 1.4 mil jobs a year were added, although the educational enrolment accelerated during this period. This former period had also the advantage of faster growth, and only one out of seven years as drought years, while the 2014 to 2018 period witnessed 2 out of 4 years as severe drought years.

A summary of the available estimates of job growth (or job level) in 201/18 is as follows:

Ghosh-Ghosh: Based on EPFO data – 10 million jobs created in 2017/18 ; 7 million in formal and 3 million in informal sector.

CMIE: Based on own survey and definition of employment; claimed to be close to daily status definition; employment level of 403.5 mil, 404.9 and 400 mil in calendar years 2016, 2017 and 2018 respectively. The 2018 data are for January-August.

Nitin Desai, *Work and Welfare, December 2017*: Based on RBI-Klems data set on employment and production, reports average employment growth for 2003-4 to 2014-15 of 0.55 % a year; In 2004/5, employment level was 419 million which translated at a 0.55 % rate for 13 years yields an employment level of 450 million in 2017/18.

ILO *Decent Work – Employment and Environmental Sustainability Fact Sheet 2017* – In 2017 estimates employment/ratio to be 52 per cent. Working age population in 2017/18 is 937 million; hence ILO estimate of employment in 2017/18 is 0.52*937 or 487 million.

Bhalla-Das (2018) – 12.8 million jobs added in 2017/18; total jobs in 2017/18 (principal status) 448 million

Bhalla-Das (this paper): Job level in 2017/18 between 444 to 452 million with a mean estimate of 448 million. Rounding up, we obtain an estimate of 450 million in 2017/18 (directly comparable to principal status definition of NSSO data for 2017/18).

 Section 8: Conclusions

First, that there is virtually no growth in population (between 2017 and 2023) for the 15-19 age group, and only a 2.3 million gain for the 20-24 age-group. Thus, for the 15-24 age-group, population growth will increase by a paltry 2.5 million. What happened to the demographic dividend? Fertility decline – for the

36

better part of a decade, fertility has been declining by approximately 0.1 percentage point a year and in 2017 is estimated to have reached the "constant population" rate of 2.1 births per woman. India's population growth rate has reduced to about 1.1 % per annum; it would have been lower if mortality rates had not declined at a fast rate.

Given this demographic-educational change, does this mean that one should not expect GDP growth to accelerate from the 7 to 7.5 % experienced over the last 15 years? No. The huge expansion in education over the last decade should have profound effects on productivity growth in the future. Indeed, productivity growth associated with the large increase in average educational attainment over the next decade should add at least 1 % a year to GDP growth i.e. the new normal for GDP growth in India should be 7.0 + 1.5 or 8.5 % a year.

Our study into the past (and partial present) has led us to re-examine some of the prevailing conclusions about the job market in India. The first "finding" is that it is incorrect to conclude, based on historical labor force participation trends, that India needs 12 million (range often mentioned is 8-14 million jobs) jobs a year. The reality is that the maximum per year increase in population ages 15 and above was 15.3 mil a year in the early 2000's. This increase is now down to 14.7 mil. While this decline is not much, it still means 0.6 million less jobs are needed, per year, *ceteris paribus*.

The much larger effect on job growth is of education, not demography. Since the early 2000s, increase in school enrollment is now *averaging* around 6 to 7 million a year. This means that 8.7 mil a year is the new norm for the increase in population net of education (compared to around 13 mil a year in the early 2000s). The adjusted labor force participation rate is not expected to be more than 65 %. This implies that the labor force available for jobs is increasing at less than 6 million a year, just half of the "popular" based estimates of 8-12 million a year.

Related to this result is the finding that the size of the young 15-24 age group is expected to increase by only 2.5 million over the next six years (from 236.2 million in 2017 to 238.7 million in 2023).

Both the demographic dividend and high population growth are now part of history. The national fertility rate is now at replacement levels (2.1 children per woman) and the population growth rate has declined to just 1.1 % a year, from a 1.8 % level two decades ago.

The second important result pertains to the rather robust expansion of educational enrollment. Between 2004/5 and 2011/12, about 40 million more went to school or college (age group >=15 years). Over the next six years, it is estimated that education enrollment increased from 100 million in 2011/12 to 136 million in 2017/18.

This result has implications for job growth. A person cannot be a full-time worker and a full-time student. If the two activities are considered as "working" then this adjusted definition of employment (working or full-time student) provides some clues about the changing labor and job market in India.

Our third important finding pertains to labor force participation rates for both women and men. Much has been discussed in the literature about the so-called precarious drop in female LFPR. We find that there has been an equal magnitude drop in LFPR rates for men! Further, the LFPR rate fall is exaggerated by the fact that educational expansion has occurred during the same time-period when the LFPR rate fall has been the greatest. Adjusting for educational enrolment, both men and women LFPR rates have declined by an equally small amount – about 1 ppt between 1999 and 2014 (for women) and 2 ppt for men. A separate paper on this subject is forthcoming, but the fact remains that LFPR rates have not faced a "precipitous" drop for either males or females.

There is little doubt that 2017/18 was a good year for employment growth. Using the newly released EPFO payroll reports, Ghosh and Ghosh estimate that 7 million jobs were added in 2017/18. Our estimate of the same EPFO data, *for the 18-21 age group where there is a minimum of error due to double counting*, indicates about 2.4 million jobs for just this four-year age group. Historically, this is a large job-addition for this age-group.

In our earlier paper, we had estimated job gain in 2017/18 to be 12.8 million over a 2016/17 estimate of 437.8 million i.e. our estimate of total jobs in 2017/18 was 448 million. Using a completely different methodology, *we arrive at exactly the same estimate for the level of jobs in 2017/18*. In this paper, we have not attempted to estimate job gains in any year post 2014/15; rather, the emphasis has been on estimating the total level of employment in 2017/18. The 2014/15 Labor Bureau estimate of number of jobs is 428 mil; over three years, we estimate that more than 7 mil jobs were added per year. This suggests that the unemployment rate is not expected to exceed the 2013/14 and 2014/15 level of 5 %. Now we await the results of the NSSO PLFS survey estimates to be released. The NSSO is the gold standard for discussions

about employment in India – we will revise this paper, and our estimates of job creation (if need be!), once the data are released.

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