

Working Paper No.: WP 122

The 3-E Challenge: Education, Employability, and Employment

Bornali Bhandari

May 2021



This Working Paper has been made possible by a generous grant from the New Skills at Work programme of the J.P. Morgan.



About NCAER

NCAER, the National Council of Applied Economic Research, is India's oldest and largest independent economic think-tank, set up in 1956 to inform policy choices for both governments and industry. For more than six decades, NCAER has served the nation with its rich offering of applied policy research, unique data sets, evaluations and policy inputs to central and state governments, corporate India, the media and informed citizens. It is one of a few think-tanks world-wide that combine rigorous analysis and policy outreach with deep data collection capabilities, especially for large-scale household surveys.

© 2021 National Council of Applied Economic Research/NCAER

This working paper was last revised in July 2018.

This working paper is a product of the research staff of NCAER. The findings, interpretations and conclusions expressed herein do not necessarily represent the views of NCAER or those of its Governing Body.

National Council of Applied Economic Research
11, Indraprastha Estate
New Delhi -110002, India
Telephone: +91-11- 2345-2657, 6120-2698
Email: info@ncaer.org
www.ncaer.org

J.P.Morgan

About the New Skills at Work–India Programme

The J.P. Morgan New Skills at Work–India programme seeks to focus on the three critical elements of employment, employability and education; engage key stakeholders from government, industry and skill training providers; and as a research programme meaningfully contribute both to policy as well as practice pertaining to employability, labour markets and the skilling supply chain.

About JPMorgan Chase & Co.

JPMorgan Chase & Co. (NYSE: JPM) is a leading global financial services firm with assets of US\$ 2.5 trillion and operations worldwide. The firm is a leader in investment banking, financial services for consumers and small businesses, commercial banking, financial transaction processing, and asset management. A component of the Dow Jones Industrial Average, JPMorgan Chase & Co. serves millions of customers in the United States and many of the world's most prominent corporate, institutional and government clients under its J.P. Morgan and Chase brands. For more information about JPMorgan Chase & Co., visit www.jpmorganchase.com.

While this report has been supported by J.P. Morgan, the content and opinions are those of authors alone and do not reflect the views of J.P. Morgan, JPMorgan Chase & Co. or any of its affiliates.

THE 3–E CHALLENGE: EDUCATION, EMPLOYABILITY, AND EMPLOYMENT

NCAER Skilling India Working Paper

Bornali Bhandari*

Abstract Demographic transition, economic uncertainty and technological changes have come together to create a concoction in India that has the potential to boil over economically and socially, if not skilfully managed. One path that could steady the future of India is to both create jobs that will absorb the burgeoning population and make the population work ready so that they can be absorbed in those same jobs. The three basic questions in economics contextualised within India's skills market boils down to the following. What skills should we equip the workforce with? How should we equip them? For whom should we equip them? These questions are examined in the historical context to serve a dual purpose – first, to understand how they were answered in the past to derive lessons, if any, therefrom, and second, to understand why we are what we are today in terms of the education, employability and employment (3–E) challenge. The same questions are examined for the post-Independence era. While overall, skills as measured by education show a positive association with economic growth, drilling down shows several inconsistencies. Given the shortage of skilled workers and high demand for them, there is a high premium for skills, i.e., tertiary education. Prospective employees aspire for education that will enable them to get a secure job. However, a majority falter in the path and the ones who are able to get the education, still do not have the skills to get the aspirational job. With other channels of human capital investment limited, general educational attainment continues to present the only sustainable path. India is not addressing the micro distortions in terms of incentives and signals to employees (prospective or otherwise) and firms who make choices of about investments in education, on-the-job training, migration, creation of jobs, technologies to adopt, which in turn result in not addressing the above mentioned macro issues, thereby creating a vicious cycle.

Keywords: Education, Employability, Employment, Skills, Vocational Skills, India

JEL Codes: J24

* Senior Fellow, National Council of Applied Economic Research, New Delhi. Email: bbhandari@ncaer.org.

Disclaimer: The NCAER Working Paper Series has been developed in the interest of disseminating on-going work undertaken by NCAER staff, consultants and invited papers and presentations. Research presented here is work-in progress that has not received external scrutiny and may be less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the National Council of Applied Economic Research or those its Governing Body members.

1. Introduction

Skilling India, framed as a 3-E (Education, Employability and Employment) challenge has to be understood within the context of the long-run challenges of demographic transition and technological changes, medium-run challenge of economic uncertainty and specific characteristics of the Indian labour market (for example, low female labour force participation rate). Demographic transition has meant that a large workforce is available and is going to be available for work (Box 1.1). Bloom, Canning and Sevilla (2003) recommends more education and labour market flexibility as one of the key policy interventions for nations to realise its demographic dividend. In the context of India, both Mehrotra (2016) and Sharma (2016) have identified key areas of intervention including education, family planning, health, nutrition, water and sanitation to achieve sustainable inclusive economic growth and human development.

This report focuses on the key policy intervention of education and labour markets, amongst other interventions mentioned in literature to address the demographic challenge. The implication is that the working age population needs to be equipped with the knowledge, necessary training, and experience or, in other words, skills that are needed to meet the present and future demand of firms. On the other hand, enough jobs have to be created, which will absorb the labour force. This means that there has to be a match between skills being supplied by households and those that are demanded by firms, and career pathways for people whose skills do not match the current or future needs of employers¹.

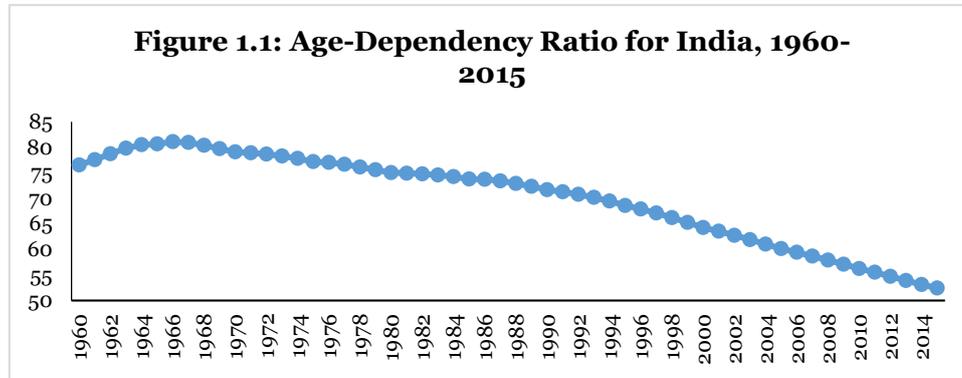
The three basic questions in economics contextualised within India's skills market boils down to the following. What skills should we equip the workforce with? How should we equip them? For whom should we equip them? These questions are not new, first propositioned by Mitra (2002). We seek the answers to these questions in two parts.

In this working paper we explore how the three basic questions have been answered in the Indian economy over time, from ancient history to the present. The combination of culturally inherited perceptions about work, structural change from agricultural to services at a relatively low per capita income and the high returns to tertiary education, while most workers are educated only up to the primary level or below, signal to average workers the investment that they need to make in themselves in terms of education, migration and job search. The goal is to get the highest paying job which offers job security. The problem arises when investment in education does not pay off in terms of ensuring high paying, secure jobs. The education that an individual gets does not equip them with the skills that employers are seeking. On-the-job training is another route of investment in human capital but those decisions are made by firms. The empirical evidence on the role of on-the-job training and the returns from it are fairly limited in India.

¹ "A Career Pathway is a collective look at education and training, wage and outlook information for related occupations. These pathways offer an overview of the various career options along with education and training that can begin as early as grade 7. Whether a student is interested in going to college, getting a certificate or working right after high school, career pathways can be customised for any ambition or plan". Department of Education, Ohio, USA website. <http://education.ohio.gov/Topics/Career-Tech/Career-Connections/Career-Pathways>.

Box 1.1 Demographic Opportunity

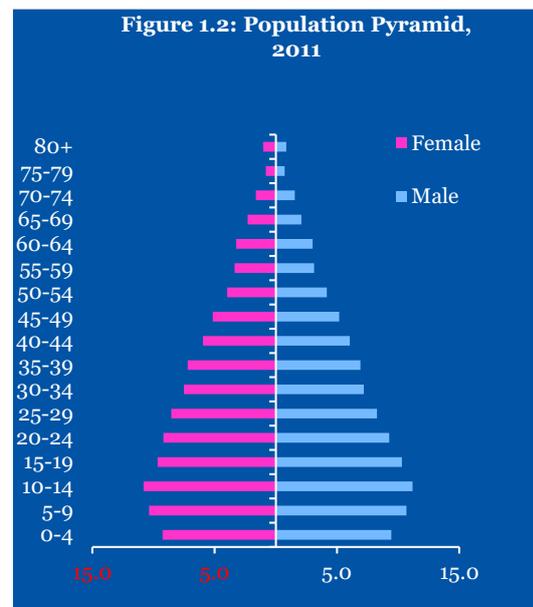
India began its transition in the early 1980s (Mehrotra, 2014). The country is moving away from the middle transitional to the late transitional stage of demographic transition (Kulkarni, 2014). The middle transitional stage is when decline in birth rates and continuing decline in death rates are witnessed (Kulkarni, 2014). The late transitional stage is when continuing decline in birth rates is accompanied by a slowdown in the fall in death rates. (Kulkarni, 2014).



Source: WDI.

Age dependency ratio is the percentage ratio of dependents, people younger than 15 or older than 64 to the working-age population – those aged between 15 and 64 (WDI). The age dependency ratio in India has declined at a slow rate from 76.6 in 1960 to 52.4 in 2015 at compound annual growth rate (CAGR) of (-)0.54 per cent (Figure 1.1). This ratio is expected to trough around 2030 (Sharma, 2016) to the end of 2030s (Mehrotra, 2014). The latest Economic Survey 2016–17 adds that “India’s share of working age to non-working age population will peak later and at a lower level than that for other countries but last longer. The peak of the growth boost due to the demographic dividend is fast approaching, with peninsular states peaking soon and the hinterland states peaking much later”. According to the US Census Bureau estimate, India will have a surplus of approximately 47 million people in the age group of 19–59 in 2022 (MSDE, 2015).

Theory, intuition and the experience of other countries suggest that the demographic transition offers policymakers a window of opportunity, which, if used optimally, can be vital to the economic and social development of their countries (Bloom, Canning and Sevilla, 2003). Ideally, India too should benefit from the transition if the extra labour can be absorbed productively in the market. The added productivity from that group is what one calls the demographic dividend (Bloom, Canning and Sevilla, 2003). The Population Pyramid for 2011 is exhibited in Figure 1.2.



Source: Census 2011 website.

Sources: Bloom, Canning and Sevilla (2003), Government of India (2017), Kulkarni (2014), Mehrotra (2014), MSDE (2015) and Sharma (2016).

A third form of investment in human capital is migration; the numbers indicate relatively slow rates of migration from 1961 to 2001. In the formal sector, job search is through exams, interviews, advertisements etc. Since a majority of the jobs are of the casual wage type, investment in networks is a more important channel for job searches. With weak channels of human capital investment either through on-the-job training, job search and migration, the only avenue left for a worker to get a coveted job is general education as a signal to the job market and to the firm for hiring purposes. Based on anecdotal evidence, vocational education is perceived as a secondary or complementary option to the mainstream option. Institutionally too, general and vocational education have been treated as parallel paths of educational

attainment (until as recently as last year. A distorted labour market (secure government jobs, preference for white-collar jobs etc.), also shapes aspirations and occupational choices.

Further, there are specific Indian labour market peculiarities like low female labour participation rate and socio-cultural backgrounds like caste affecting hiring choices and wage rates. India is also characterised by a large share of the workforce being employed in the informal sector. The formal sector is not creating enough jobs especially in the high productivity and high growth sectors. Account also needs to be taken of the country's heterogeneous nature and regional differences to ensure better policymaking.

The skill mismatch in terms of the skills possessed by those passing out of the educational system and those that firms want has meant that India has not been able to productively employ its large labour and reap the potential demographic dividend. Consequently, the individual decisions about human capital investment of firms and workers do not necessarily ensure the macro direction that policymakers want the economy to take. Through this exercise, we highlight the signals that an average worker and individual firms get from the market, which affects decision making about human capital, whether from the supply or demand side.

The rest of the paper is divided in the following sub-sections. Section 2 discusses the historical evolution of the Indian education systems and its links with the overall economy. Section 3 discusses returns to investment in human capital in the context of the national economy, state economies and at the individual level. Section 4 looks at the 3-E challenge within the national and regional economy. Section 5 discusses the evolution of the skilling challenge from the Eleventh Five-year Plan onwards. Section 6 presents the key conclusions.

2. Historical Evolution of Addressing What Skills, How to train and For Whom to train? Ancient times to 2007

“You have to know the past to understand the present.”

Carl Sagan²

We assess historical evidence to understand how people over the centuries have tried to address the issue of passing on required knowledge, training and employment to the next generation and matching that with the jobs available. The answers to the questions of what, how and for whom (skills) lies in the intertwining of the composition of the economy, political economy and the educational system. Further remnants of inherited systems mix with new economic structures of the economy, urbanisation and technological trends to create pathways of education, employability and employment, which may not lead to either efficient or equitable outcomes

As shown in Appendix A1.1, the largely agricultural state of Ancient India (pre-1400 B.C.) met its employability needs through the *varna* system (Darian, 1985 and Mahapatra, 2012). The Vedic system of education that prevailed in that time focused

² Goodreads website. <http://www.goodreads.com/quotes/194992-you-have-to-know-the-past-to-understand-the-present>.

on the all round development of the individual (Sharma and Sharma, 2004). Between 1400 B.C. and 600 B.C., the post-Vedic education system was focused on intellectual and spiritual development (Sharma and Sharma, 2004). Several methods of teaching were developed during those times like question-answer, dialectical (discussions and symposiums) and synthetic (synthesising various points) etc. (Sharma and Sharma, 2004). Cultivation and taking care of animals were also taught (Sharma and Sharma, 2004). This was important as the economy continued to be largely agricultural in nature (Dwivedi, 1994). However, it became more restrictive towards lower castes and women.

After 600 B.C. (Appendix A1.1), the increased complexity of the economy complexity with the increased role of industry, trade, commerce, technological changes and specialisation (Darian, 1985) led to the growth of guilds with apprentice training for various trades and vocations (Mahapatra, 2012). Agriculture, of course continued to be important but guilds became an important source of revenue for the state and in some periods also acted as courts of law (Mahapatra, 2012). Two systems of education evolved simultaneously in that period– the Buddhist and Brahmanic one (Sharma and Sharma, 2004). They were complementary in nature but the former included elements of vocational and technical education in many trades (Dwivedi, 1994 and Sharma and Sharma, 2004), whereas the latter emphasised theoretical education (Sharma and Sharma, 2004). The Buddhist system included university education (Dwivedi, 1994 and Sharma and Sharma, 2004). Further, the Buddhists taught in local languages and emphasised logic (Sharma and Sharma, 2004). Along with oral skills, teaching methods placed importance on discussions, providing evidence and tours etc. The Brahmanic education system emphasised oral and rote skills but it also taught life skills, i.e., how to survive life's challenges (Sharma and Sharma, 2014). Brahmanic education was relatively more restrictive towards the lower castes and women.

After the fall of the Gupta Empire after 600 A.D., with increased political upheaval and uncertainty, a decline in trade, the rise of the landed aristocracy and the increased competition between temples and guilds, the latter lost their economic importance and meshed themselves into the sub-caste system (Habib and Raychaudhari, 2008 and Mahapatra, 2012).

The Buddhist and Brahmanic systems of education continued into the early medieval era (Sharma and Sharma, 2004). The Buddhist system of education had started declining by the 7th and 8th centuries and disappeared by the 12th century (Joshi, 1977). Both systems of education had acquired elements of each other and had become virtually indistinguishable. It is the elements of the Brahmanic educational system that survived and has continued to do so in India today with its emphasis on oral and rote skills focusing on abstract concepts. Elements such as teaching life skills, and the focus on vocational and technical skills were left out in the evolution of the education system in India.

In the interests of space, we are clubbing two periods of Medieval India – 1200 AD to 1500 AD and 1500 AD to 1750 AD. After 1200 A.D., important economic activities in India were agriculture including horticulture, textiles production, building industry, mining and goods produced for royal use (Habib and Raychaudhari, 2008). The authors point out that land revenue was the key source of revenue for rulers in

Medieval India, set up in an extraction mode to ensure supply of food grains and revenue to the rulers.

It is not surprising, that the focus of development, if any, would be in urban areas. Education during that period, labelled as Muslim system of education, could touch only the urban parts of India, focusing on basics of reading, writing and arithmetic (Sharma and Sharma, 2004). Higher education included teaching Arabic literature, grammar, history, philosophy, mathematics, geography, politics, economics, Greek language and agriculture etc. (Jayapalan, 2005). There was interest in other subjects like drawing and music. However, there was no universal education (Jayapalan, 2005). Other than agriculture, evidence on the teaching of vocational and life skills is missing.

Apprentice training in factories producing goods for royal use existed but it was focused in urban areas after 1500 A.D. (Roy, 2008). Besides, there was licensing, which forbade or restricted participation of rural craftsmen in urban areas in that period (Roy, 2008). Elements of the rural-urban divide in terms of education and vocational training continue till today in India.

Overall, there was a great deal of emphasis on religious education in each type of system mentioned before. The advent of British changed that by making education secular in nature (Jayapalan, 2005). However, although they recognised the problem of poor quality of education and the need for public primary education, their attempts at reforms were half-hearted, resulting in limited change, if any (Jayapalan, 2005). The two major changes were the introduction of English education in India in 1835 based on the recommendations of Lord Macaulay (Ghosh, 1995). However, it was the Hunter Commission in 1882, which systematically changed education in India (Jayapalan, 2005). It encouraged primary education, privatisation of secondary education, higher education in colleges (encouraging private colleges too), grant-in-aid for indigenous schools, emphasis on secular and physical education and education of women & other socio-economic groups. It recognised that education of weaker socio-economic groups like the aboriginals and hill tribes (Scheduled Tribes) could not be left to the private sector and free government education was to be provided to them. The school education system as we know it survives till today.

The British followed a filter model, where they believed that they would teach the upper classes and they, in turn, would pass the knowledge on to others (University of Mumbai website). Little attention was paid to, scaling up technical and vocational education (TVET) by the British, although it was introduced in India in a limited manner way back in 1794 (Sen, 1989). It was mostly aimed at training middle-level managers. Roy (2008) shows the continued existence of informal vocational education in a parallel fashion in various types of guild-like organisations that continued to exist in British India.

The turning point for TVET in India came in 1944–47, with the establishment of the Department of Planning and Development (Sen, 1989). That aimed to promote scientific and technical education in India. The Council of Scientific and Industrial Research, All India Council of Technical Education and an advisory committee on technical training were all established in this period, setting the path for development of TVET.

After the Indian Independence in 1947, there were only a limited number of institutions that offered technical education (Sen, 1989). While the need for technical education was high, until the 1960s, little attention was paid to quality (Sen, 1989). In the mid-1960s, there was a slump in domestic demand for technically educated personnel, which led to their unemployment and migration out of the country (Sen, 1989). While reforms were carried out afterwards, the share of population with vocational or technical education continues to be relatively low in India (as shown in later sections). Amongst other reasons, Sen (1989) discusses the lack of direction in industrial policy, the lack of a policy on technology, lack of provision of funds for technical education at the higher education level, etc.

General school education evolved into a 10+2 mode (Box 1.2). Although attainment has increased over time, the quality has deteriorated (discussed later in the paper). Banerjee (2006) notes that there was a policy to emphasise tertiary over primary education. However, engineers, who were taught at public expense, ended up working either in multinationals as bank officers/sales representatives or as minor functionaries in public sector units or migrated abroad permanently (Banerjee, 2006). The 1990s witnessed a greater demand for people with higher education (secondary education and above) (Azam (2009)). Anecdotally, one would presume that the software and business services industries would need more technically educated people. This would have raised the demand for technical education. Banerjee and Muley (2008) showed that the total intake of engineering students grew at the CAGR of 9.1 per cent between 1990 and 2001, while the intake for computer and IT grew by 17.8 per cent. The corresponding number for civil engineering was 0.2 per cent. Intake of technical students grew but for particular types of engineering. However, the quality of education remained poor. The key message from Appendix 1.1 is that throughout the centuries, India has pursued a system of educating and training workers, which imparted knowledge and training as per the needs of the type of economy prevailing at that period of time. In general, all-round personality development has been the emphasis of the education systems of Ancient India. The Buddhist system of education was relatively more well-rounded and well-blended, with elements of general and vocational skills being taught but could not survive in India.³ Cultivation and animal husbandry were skills taught in largely agricultural economies. In the medieval period, military education was emphasised because of the then prevailing political economy. In British India, education and training was done in a limited fashion, i.e., the type and quantity were both as per the needs of the British Empire.

³While we may criticise the oral and rote nature of Brahmanic education today, it is that nature of education that probably saved it from being annihilated in the face of invaders from Central Asia unlike the Buddhists.

Box 1.2: Description of the Education System in India

There are three main types of education in India (Appendix A1.2). General education covers school education from classes one to twelve. Passing class five is termed as attaining primary education (five years of education), passing class eight as attaining middle school education (three years of education), passing class ten as attaining secondary education (two years) and passing class twelve (two years) as attaining higher secondary education. Therefore, somebody who has completed higher secondary would have twelve years of school (Figure 1.3). State level variations may exist.

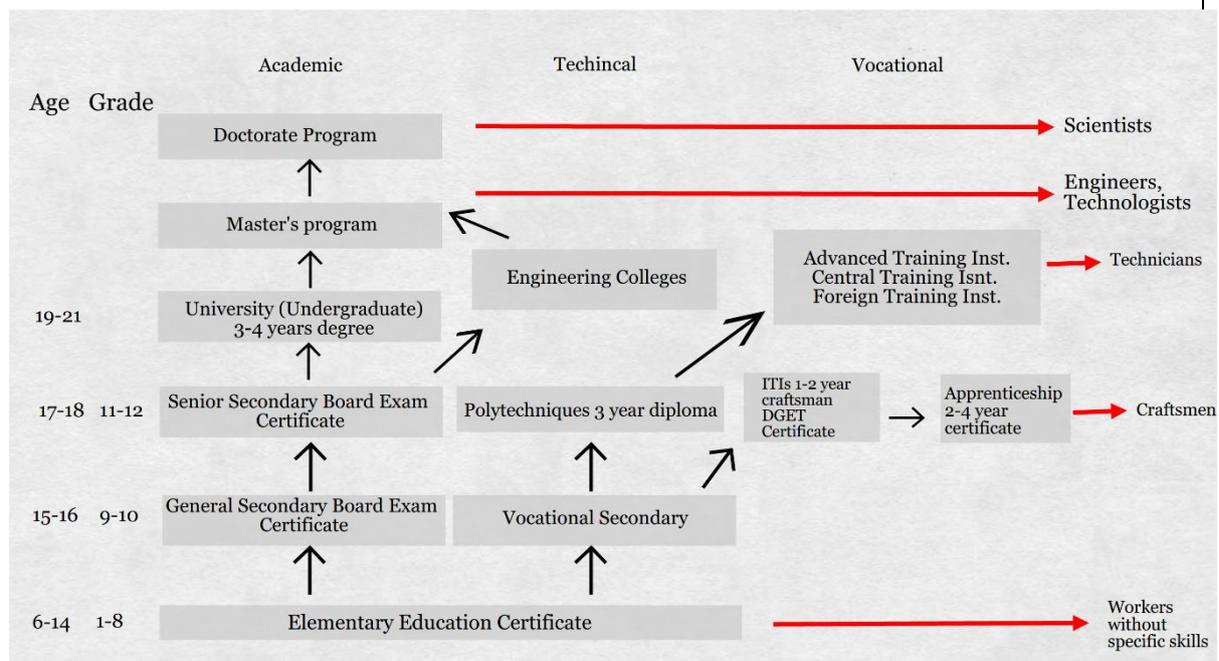
If one goes to college after school, then it is an additional three-year degree. Engineers and doctors have four-year courses and architects have a five-year course. This is considered a graduate degree. Anything beyond that is considered as post-graduate. In the NSSO, there is an additional category of diploma/certificate holders. Although the definition implies that it may include vocational and technical education, the numbers show that this is not the case.

The formal vocational education covers, as detailed in Appendix A1.2, training in some specific occupation-related skill with hands-on-training. This may be informally attained through hereditary or other means (historical processes described above).

Technical education covers technical education below or above the graduate level. It can be in a range of fields. However, data from the National Sample Survey Organisation (NSSO) shows that there are no students below the higher secondary level who have attained technical education below the graduate level.

People choose combinations of the above three education systems, with a majority only pursuing general education. However, it is not clear whether people pursue various types of education simultaneously. Most of the research work in India has concentrated on using general education as a measure of skills. Vocational education has been analysed in recent literature.

Figure 1.3: Education and Training System in India



Source: Author's own conceptualisation from literature review.
Adapted from World Bank (2008).

The change in objectives towards universal education has been the hallmark of the Indian education after Independence. In totality, the present Indian education system, including general, vocational and technical education (Appendix A1.2), has elements of the Brahmanic, British and Muslim systems of education, which emphasise on a structured curriculum that focused heavily on imparting verbal and rote skills. The focus is on abstract mathematical knowledge (Kapur, 2002) versus

more hands-on-skills (Naik, 1979). The key points below summarise the advantages and disadvantages of the present educational system versus the past ones:

- Universal education is the stated policy of the current education system and in contrast to previous education systems.
- Unlike in the past, the objectives of education and their alignment with the structural composition of the economy with a long-run perspective have not been recognised in policymaking. This changed in the Eleventh Five-year Plan, as discussed in the fifth section.
- The rural-urban divide between labour with knowledge, training and job opportunities continued to be skewed in favour of urban areas.
- Systematic discrimination against women and backward socio-economic groups over centuries meant that they have lagged behind terms of knowledge and training and, therefore, jobs. The prevalent attitude of married women retreating from the job market also affects the labour market significantly (Tsujita, 2014). Unfortunately, to this day, gender and caste identities matter, as empirical evidence presented in the next section shows. Roy (2008) writing on guilds in British India wrote that the identity of birth has always trumped the identity of profession.
- There is a greater emphasis on curriculum versus methods of teaching which will impart skills that will prepare them either for the job market and/or for life. Oral and rote methods of learning, question-answer methods are emphasised over logic, reasoning, discussions etc. The post-Vedic and Buddhist systems of education emphasised a variety of teaching methods and not just one.
- Emphasis is placed more on theory and little on practice in the mainstream educational systems. Life skills, practical and vocational skills are not taught as part of mainstream education. Ancient Indian education systems focused on that.
- The introduction of formal vocational education by the British and existing traditional Indian vocational education systems created a dual system in this area, which continues till today (Roy, 2008). Traditional vocational systems have been relegated to being classified as informal. Further, even in formal technical education, Banerjee and Muley (2008) note the lack of interest among engineering students in the hands-on component of engineering components/systems.
- The education systems are not in sync with the modern economic needs of the 21st century.

At the dawn of independence, the only measure of human capital stock that we had for India was the crude literacy rate or CDR (Table 1.1). The literacy rate taking into account the total population in the denominator is defined as 'crude literacy rate'.⁴ Literacy rates stagnated until the 1930s, picking up speed after that. India made double digit progress between 1991 and 2001.

⁴ Education for All in India: Sarva Shiksha Abhiyaan website.
<http://www.educationforallindia.com/chapter6-state-of-literacy-2011-census.pdf>.

Table 1.1: Crude Literacy Rate, 1901 to 2011

Census Year	Crude Literacy Rate			Decadal Change in per cent Points		
	Persons	Males	Females	Persons	Males	Females
1901	5.35	9.83	0.6	–	–	–
1911	5.92	10.56	1.05	0.57	0.73	0.45
1921	7.16	12.21	1.81	1.24	1.65	0.76
1931	9.5	15.59	2.93	2.34	3.38	1.12
1941	16.1	24.9	7.3	6.6	9.31	4.37
1951	16.67	24.95	7.93	0.57	0.05	0.63
1961	24.02	34.44	12.95	7.35	9.49	5.02
1971	29.45	39.45	18.69	5.43	5.01	5.74
1981	36.23	46.89	24.82	6.78	7.44	6.13
1991	42.84	52.74	32.17	6.61	5.85	7.35
2001	54.51	63.24	45.15	11.67	10.5	12.98
2011	64.32	71.22	56.99	9.81	7.81	11.84

Notes:

1. Figures up to 1941 are for undivided India.
2. Figures for 1981 exclude Assam as the 1981 Census could not be conducted in the state due to disturbed conditions.
3. Figures for the 1991 census do not include Jammu & Kashmir, as no census was held in the state

Source: Education for All in India: Sarva Shiksha Abhiyaan website.

<http://www.educationforallindia.com/chapter6–state-of-literacy–2011–census.pdf>.

3. It pays off to invest in Human Capital: Macro and Micro Evidence

Theoretically and empirically, growth models over the years have modelled the impact of human capital on economic growth. Specifically, Romer (1990) theoretically showed that an economy with a larger stock of human capital will experience faster economic growth.

Given the progress made in the attainment of human capital in India, has India reaped any benefits from it as suggested by economic theory? Empirical evidence for India is examined using macro and micro data in this section.

3.1. Macro Relationship between Human Capital and Economic Growth

3.1.1. National Data

The role of human capital in explaining economic growth has been examined rigorously in the literature both theoretically and empirically using cross country data and they are predicted to have an endogenous relationship (Pelinescua, 2015). Human capital stock has traditionally been measured by literacy rates, enrolment ratios and educational attainment for primary, secondary and higher education.

However, these are proxy measures of human capital for what is a complex set of attributes and educational indicators capture only a portion of human capital stock obtained at school/college (Barro and Lee, 2000). As Box 1.3 shows, human capital may also be acquired by other means.

Box 1.3: Key Theoretical Concepts about Attainment of Human Capital and its relation to earnings

Modern labour economics came into being in the 1960s and several labour concepts have been developed since then. Skills form an intrinsic part of labour economics because employees offer these skills on the market, which the employer is willing to pay for. While it is not possible to summarise all the theories of labour economics here nor is this the intent of this report, there are certain stylised theoretical components presented here, relevant to the discussion in this paper.

- Labour faces indirect demand as it is a factor of production that is used to produce goods or services (Kaufman and Hotchkiss, 2006).
- It is embodied in the seller and as a service is inseparable from the person providing it (Kaufman and Hotchkiss, 2006).
- In normal times, both employers and employees prefer to maintain a long-term relationship. This is because the former has invested in the workers through hiring and then training and experience. Employees prefer to remain with one employer for a relatively long time, especially when they are beyond their teens and 20s (Kaufman and Hotchkiss, 2006).
- Workers and jobs are characterised by diversity. (Kaufman and Hotchkiss, 2006).
- Multiplicity of markets exists in terms of geography (state-level, national, international), occupations, sectors, skills, etc. (Kaufman and Hotchkiss, 2006).
- The theory of human capital conceptualises that workers embody a set of skills that can be “rented” out to employers (Ehrenburg and Smith, 2005). The dictionary meaning of the word skill means the special ability to do a task.⁵ As Becker (1975) says, since “human capital is any activity that entails a cost in the current period and raises productivity in the future”, how much an individual will invest will depend not only on current wages and working conditions but also include a life-cycle perspective (Ehrenburg and Smith, 2005). “Essentially there are three types of investments an employee can make – education and training, migration and search for new jobs. The knowledge and skills a worker possesses, comes from education, training, including the learning that experience yields. It generates a certain stock of productive capital. The value of this productive capital is derived from how much this can earn in the labour market. Job search and migration are activities that increase the value of one’s human capital by increasing the price (wage) received for a given stock of capital” (Ehrenburg and Smith, 2005, p. 275). Human capital theory predicts that people value the present more than the future while making investment decisions; younger people are more likely to invest in human capital because they have a longer work life remaining ahead of them with a greater probability of increasing earnings; the higher the costs of investments, lower is the investment; and demand for education is positively related to the increase in lifetime earnings (Ehrenburg and Smith, 2005).
- Becker (1962) introduced the concepts of general training and firm-specific training, which would lead to general and firm-specific skills respectively. General skills would be useful to other employers. Firms have little incentive to pay for general training but would be willing to pay for firm-specific training. Turnovers will be low in that case because firms will not want to lose a trained worker and employees may not find another job with high firm-specific skills. However, Acemoglu and Pischke (1998, 1999) show that this may not necessarily hold in imperfect labour markets. Firms may be willing to pay for general skills that are specific to the industry.
- Riley (1979) argues that education may play an informational role when it signals to the potential employer of the employee’s ability. The role of education as ‘information’ may be relatively more important in some occupations than others.
- Mincer (1981) pointed out that human capital is complementary to physical capital. Specifically, Mincer (1981) says that “it not only involves the transmission and embodiment

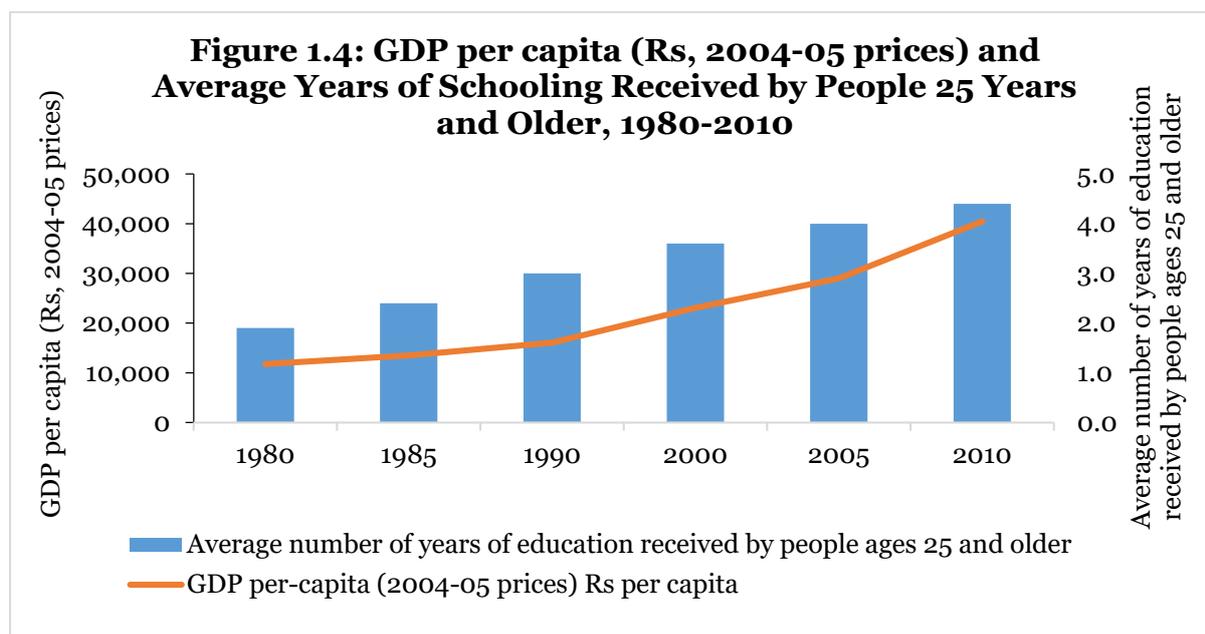
⁵ Dictionary.com website. <http://www.dictionary.com/browse/skill>.

in people of available knowledge but also the production of new knowledge, which is the source of innovation and of technical change which propels all factors of production”.

- Pilz and Wilmshöfer (2015) discusses three types of learning which are especially relevant in the context of a developing country:
 - “(i) Formal learning, which takes place in education and training institutions, leading to recognised diplomas and qualifications;
 - (ii) Non-formal learning does not typically lead to formalised certificates. Non-formal learning may be provided in the workplace and through the activities of civil society organisations and groups (such as in youth organisations, trades unions and political parties). It may also be provided through organisations or services that have been set up to complement formal systems (such as arts, music and sports classes or private tutoring to prepare for examinations) and;
 - (iii) Informal learning is a natural accompaniment to everyday life. Unlike formal and non-formal learning, informal learning is not necessarily intentional learning and so may well not be recognised even by individuals themselves as contributing to their knowledge and skills.”

Sources: Acemoglu and Pischke (1998, 1999), Becker (1962, 1975), Ehrenburg and Smith (2005), Kaufman and Hotchkiss (2006), Mincer (1981), Pilz and Wilmshöfer (2015) and Riley (1979).

Human capital stock is measured by the average number of years of education received by people aged 25 and older, converted from education attainment levels using official durations of each level.⁶ It was 4.4 in 2012 for India versus 12.6 in Norway and 7.5 in China.⁷ The Indian aggregate number hides significant variations. For instance, the mean years of schooling for males were 6.31 for men in 2004–05 and 2.95 for women (Rani, 2014).



Notes: 1. The gross domestic product is available for financial year but the HDR and population data are for the calendar year. Therefore, we estimate a weighted GDP for the calendar year from two financial years. 2. The population data are available only for the census years, i.e., every ten years – 1981, 1991, 2001 and 2011. Using the CAGR, we interpolate the data for the intermediate years. Sources: Author’s conceptualisation from Central Statistical Organisation, Registrar General of India and Human Development Reports (<http://hdr.undp.org>).

⁶ United Nations Development Programme: Human Development Reports. <http://hdr.undp.org/en/content/mean-years-schooling-adults-years>.

⁷ Most Indian literature uses the human development index (HDI) and tries to draw a relationship between economic growth and human capital. For the purpose of this report, using HDI is challenging as the focus of this report is on educational attainment and skills.

Using national-level macro data, graphical analysis over time indicates that there is positive correlation between constant gross domestic product (GDP) per capita (2004–05 prices) and average number of years of education received by people aged 25 and older. The correlation between the two is 0.93 for the period between 1980 and 2010 (Figure 1.4). However, the correlation of the CAGR of the two indicators is -0.6 .

Self and Grabowski (2004) has examined the impact of education on economic growth at all levels including primary, secondary and tertiary for the time period 1966–1996 for India. The authors find that primary education has had a causal impact on economic growth (per capita GDP growth) and secondary education had a limited impact. Education is measured by gross enrolment ratios at the primary, secondary and tertiary levels. It is also measured by a measure of human capital stock, that is, the average years of a particular level of education of the population aged 15 and above. Interestingly, at all levels using both indicators, one finds that both the measures of female education exhibit a significant impact on economic growth.

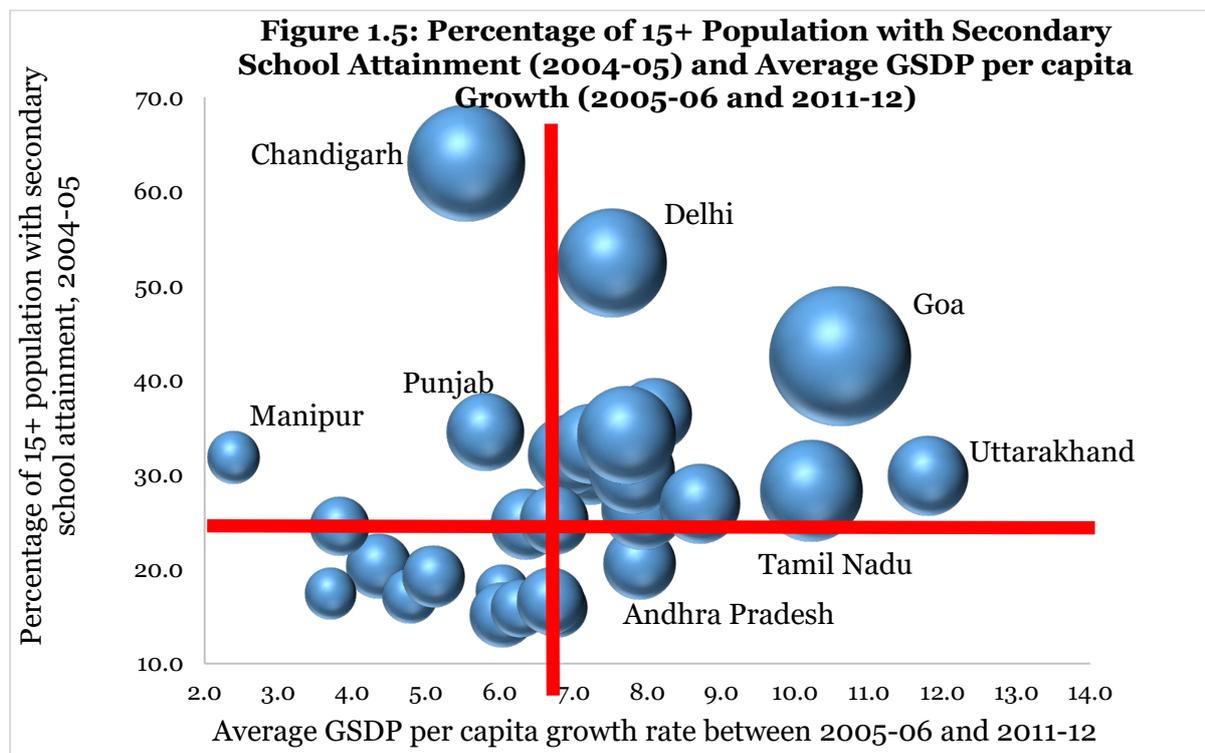
Ojha and Pradhan (2006) use the Computable General Equilibrium (CGE) model to assess the impact of increased public education expenditure to build human capital and finds that is possible to do so and reap benefits in terms of faster economic growth and a better income distribution. In a follow-up work, Ojha, Pradhan and Ghosh (2013) suggest that there should be an integrated policy to boost investments in physical as well as human capital and this must be closely bound to technological progress for growth to be inclusive. Ojha and Ghosh's (2014) policy simulations suggest that reducing allocations for secondary education and spending more on higher education may not necessarily lead to higher growth and equity if the latter is not well-integrated with technological innovation systems.

3.1.2. State Level Data

Another way to assess the relationship between knowledge and training and economic growth regionally is using state level-data. Most papers have followed the Barro and Sala-i-Martin (1995) literature to test for convergence of growth amongst states. Further, some authors have gone beyond the convergence/divergence story to understand what explains growth dynamics. Amongst the explanatory variables, human capital is used as one of them. Using state level panel data for the years 1970–1994, Nagraj, Varoudakis and Véganzonès (1999) show that education as measured by primary school enrolment (age 6–11, in percentage of the age-group) has a statistically insignificant impact on economic growth. Besides, evidence indicates that the social returns to education increases with the increase in the educational level of the community. Using principal components analysis, the authors find that adult literacy has a major impact on steady-state income. Rao, Shand and Kaliranjan (1999) show that literacy rate representing human capital has a negative and significant impact on the average annual growth rate of per capita state domestic product for the period 1965–1994 in 14 major states. However, literacy has a positive impact on growth for the period 1990 to 1994. Ghosh (2006) finds that human capital and economic growth affect each other using state level data. Karnik and Lalvani (2012) find that the contribution of educational attainment to growth is

larger than the contribution of physical capital. This analysis has been done for 19 states for the period 1981-82 to 2004-05.

Departing from the above literature in terms of methodology, Bandyopadhyay (2011) uses the distributional dynamics approach to analyse state level data for 1965 to 1997 and finds the formation of two convergence clubs, one at a higher end of the income distribution than the other. There is conditional convergence within the upper club and education expenditure is associated with it.



Notes: 1. The size of the bubble is proportional to the GSDP per capita for 2011–12. 2. Andhra Pradesh and Telangana are clubbed together because the education data are not available separately. 3. Sikkim, Daman and Diu, Dadra and Nagar Haveli and Lakshadweep are not included in the analysis. 4. The red line shows the average of percentage of 15+ population with secondary educational attainment (27.6 per cent) and average GSDP growth rate of 6.8 per cent.

Sources: Author’s conceptualisation from Central Statistical Organisation and Registrar General of India.

Using the latest available data, we assess graphically what has happened between 2004–05 and 2011–12. Figure 1.5 plots the percentage of the 15 plus population that has attained at least secondary school education against the average growth rate (2005–06 to 2011–12) of Gross State Domestic Product (GSDP) per capita at constant (2004–05) prices. It shows a positive and upward relationship but the correlation is 0.26. We use educational attainment data of 2004–05 instead of 2011–12 to assess if the initial level of higher human capital is associated with the states’ higher growth path over the next five years. Of course, in a graphical analysis, we are ignoring a host of other factors. Manipur and Uttarakhand are cases in contrast. Both had similar human capital attainment in 2004–05 but different growth paths.

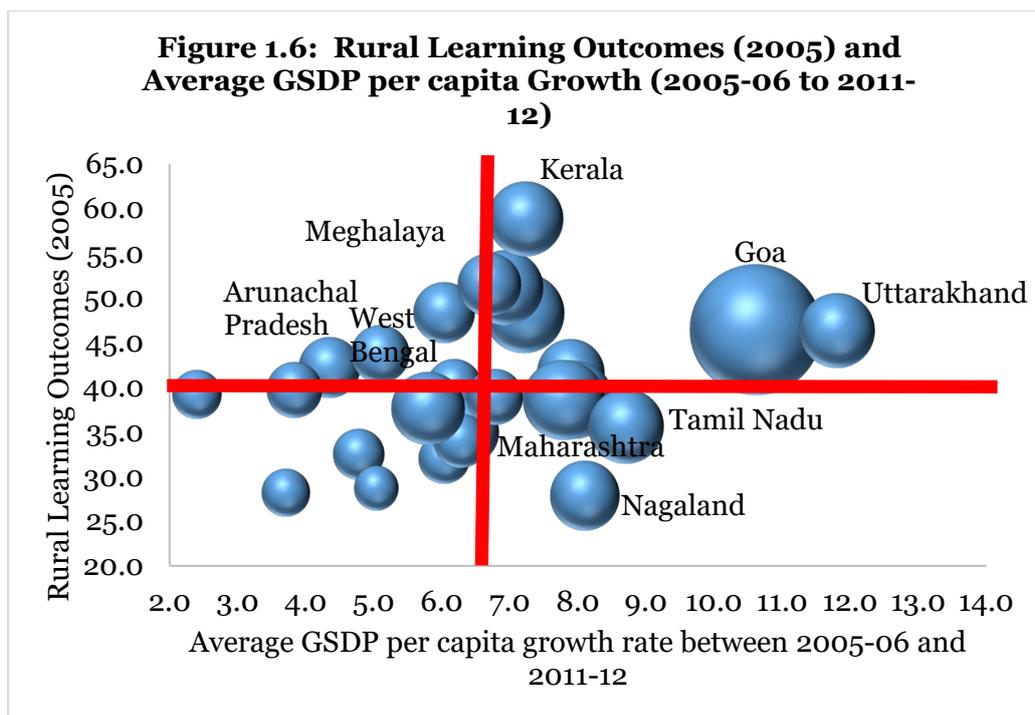
Hanushek and Woessmann (2008) and Hanushek (2013) emphasise that educational attainment represents an incomplete picture of human capital. Although used

synonymously in most academic literature, education and skills are two different concepts. Educational attainment refers to the highest level of schooling that a person has reached. “Skills are personal qualities with three key features – (i) productive: using skills at work are productive of value; (ii) expandable: skills are enhanced by training and development and; (iii) social: skills are socially determined” (Green, 2013). Education is one channel of skill acquisition as mentioned in Box 1.3, but if that falters, acquisition of skills becomes challenging.

Cognitive skills are learning skills that, when applied to economics, include any activity which requires thinking including reading, writing, problem-solving, numeracy, information technology (IT), learning new skills etc. (Green, 2013). Using standard growth equations, Hanushek and Woessmann (2008) and Hanushek (2013) show that cognitive skills have better explanatory power in explaining cross-country growth. Balasubramanian (2016) also computed a measure of regional cognitive skills using district-wise data on occupational distribution of employment (from the Census of India) along with the skill content of occupations (from a US-based dataset called O-NET). The author found a positive relationship between cognitive skills and employment growth but no such statistical relationship was found between educational attainment and employment growth.

For India, the Annual Status of Education Report (ASER) learning outcomes give us state-level cognitive skills for reading and numeracy using rural primary school data (ASER, 2006). This data has limitations in terms of drawing an association with economic growth because the data are focused on rural schools. The urban based UTs are left out of the analysis. Moreover, these cognitive skills are for children in grades one to eight, who may or may not be part of the labour force. Last but not the least, there are significant differences between returns to education depending on whether they are located in rural or urban areas and this, in turn, affects educational attainment. With these caveats, we have analysed the data to assess if there is any association between economic growth and cognitive skills. We derive a measure of “cognitive skills” – by averaging the percentage of students (classes one to eight) who know how to read a story and the percentage of students who know how to divide. Compared to Figure (1.5), we replace the educational attainment data with the ASER learning outcomes to analyse the association between human capital and economic growth (Figure 1.6).

As reflected in international evidence, Figure 1.6 illustrates a positive association between basic cognitive skills and economic growth. The correlation between the indicators is 0.29. While a number of states show that initial better school quality in 2005 is associated with higher average growth rate between 2005–06 and 2011–12, there are significant exceptions too. Despite low initial cognitive skills, Maharashtra, Tamil Nadu and Nagaland have displayed high rates of average growth. On the reverse side, Arunachal Pradesh, West Bengal and Meghalaya exhibit better learning outcomes but lower average growth rates. Therefore, despite the limited data, the correlation is higher. There is a direct policy implication that improvement in school quality could motivate higher regional macro growth, which may be reflected in national growth too. There is also a need to move to capture human capital by attributes the individual embodies versus degrees they possess. We return to this point, when we propose an alternative way of looking at human capital.



Notes: 1. The percentage of students (classes one to eight) knowing how to read a story and percentage of students knowing how to divide are averaged for each state in 2005 to get a composite number for learning or “cognitive skills”. 2. The size of the bubble is proportion to the GSDP per-capita for 2011–12. 3. The GSDP of Andhra Pradesh and Telangana are summed together because the education data are not available separately. 4. Andaman and Nicobar Islands, Chandigarh, Daman and Diu, Dadra and Nagar Haveli, Delhi, Lakshadweep, Mizoram, Puducherry and Sikkim are not included in the analysis because of data unavailability. 5. The red line shows the average learning outcomes, rounded off to 40 per cent and average GSDP growth rate of 6.8 per cent. This average growth rate differs here because the sample is smaller than what is included in Figure 1.2.

Sources: Author’s conceptualisation from Central Statistical Organisation and ASER 2006.

3.2. Micro Analysis: Human Capital, Occupational Choices and Earnings

The value of human capital is derived from how much these skills can earn in the labour market (Box 1.3). To empirically test for the returns to human capital, household data are used. We return to using educational attainment as a proxy measure of skills/human capital, given the lack of data as discussed before. There are three types of education in India defined by data sources – general education, vocational education and technical education (Box 1.3 contains a summary of the types of education).

The National Sample Survey Organisation (NSSO) is the source for data on educational attainment by levels of all types of education (Appendix A1.2 contains a full description of the NSSO data). In addition, the India Human Development Survey (IHDS), a joint collaboration of NCAER and the University of Maryland, has also collected general educational attainment data for households. This is available for 2004-05 and 2011-12. The IHDS also collected data on ability to speak English. The IHDS and NSSO are the two main sources for nationally representative data. Broadly, the results using IHDS and NSSO data show similar results for returns to general education.

3.2.1. Returns to Education

It pays to invest in human capital. However, how much to invest depends on gender, socio-economic background, location and demand factors. The key evidence on the returns to education are presented here⁸:

- *Temporal Differences*: The returns to the level of education has changed over the decades from 1970s to the present with primary education giving the highest returns in the 1970s, secondary education in the 1980s to early 1990s and graduation from the 1990s till 2004–05 (Singhari and Madeshwaran, 2016; Rani, 2014; Duraisamy, 2002; Blaug, 1972; and Tilak, 1987). The World Bank (2009) shows that the returns to secondary education fell in 2004–05 versus 2000 but returns to higher secondary education and tertiary education kept on increasing.
- *Vocational Education*: Agrawal (2012a) shows that daily wages are higher for those with vocational educational training than those with general secondary education irrespective of the nature of their employment. This analysis was done using NSS 2004-05 data for ages 15 to 29.
- *Formal Sector Experience Matters*: Additionally, Saha and Sarkar (1999) find for males working in the corporate sector that years of formal sector experience can explain earnings of low-education workers.
- *Ability to Speak English*: Both Azam, Chin and Prakash (2011) and Rani (2014) show that everything else being constant, being able to speak in English fluently pays off more in the labour market.
- *Rural-Urban*: Rani (2014) finds that the returns to education are higher if one is located in an urban area.
- *Type of Worker*: Singhari and Madeshwaran (2016) show that overall rates of return differ by type of worker. For “regular workers”, rates of return to education are the highest for diploma holders (refer to Appendix A1.2 for definitions), followed by graduates and those with higher degrees, or those with secondary education; the returns to higher secondary, graduation and higher degrees are rising, but to primary education is falling over the years; rates of return to education are increasing across the age cohorts. Between 2004–05 and 2011–12, rates of return to graduate education and above fell for regular workers. For casual workers, overall returns to primary and middle education are positive, while returns to secondary and higher secondary education are negative. Tsujita (2014) shows in a slum survey conducted in Delhi from November 2007 to March 2008 that returns to primary and middle school education are higher than to secondary school. Further, Azam (2012) shows that there is a wage premium if one is working in the public sector.
- *Gender*: The World Bank (2009) shows that the returns to girls’ education have been consistently higher than those for boys and returns to girls’ senior secondary and tertiary education increased much faster than the returns to boys’ education. Overall, Rani (2014) finds that rates of return to education are lower for women versus men using IHDS data from 2004–05. Singhari and Madeshwaran (2016) finds results similar to Rani’s (2014) for regular workers 2011–12. However, when it comes to casual workers, the rates of

⁸ There is a large body of literature through the decades on this subject. In the interests of space, only the literature with the latest available evidence is covered here.

returns to education from higher secondary, diploma, “graduate and above” are higher for women versus men. Agrawal (2014) shows that there are large unexplained wage differentials between males and females in India using IHDS 2004–05 data and the author attributes it to discrimination based on empirical evidence.

- *Socio-economic background*: Indian literature is replete with empirical evidence that wage discrimination based on socio-religious background continues to exist in India (Duraishamy and Duraishamy, 2017). Even urban India exhibits these trends (Madheswaran and Attewell, 2007) as does the public and private sector (Axmann, Swanson and Contreras, 2016). However, evidence of convergence has also been found (Hnatkowska, Lahiri, and Paul, 2012). Agrawal (2014), using IHDS for 2004-05, finds that the wage differential between social groups is driven by differences in endowments. A small corollary and probably more worrisome issue is that biases are deep-rooted in India. Atewell and Thorat (2007) find that discrimination starts at the first stage of the job application process in private sector enterprises in India.
- *Migrants*: Kundu and Saraswati (2012) document the falling trend of migration between 1961 and 2001, especially of men between the ages 15–59. The authors argue that there is a screening process in place, which is that only males from the higher socio-economic category are migrating. The authors argue that the decline in the share of migrants moving in search of employment and an increase in business and study-related mobility further confirms the proposition. However, the latest Economic Survey 2016 (Government of India, 2017) demonstrates that the annual rate of growth of migration has doubled between 2001 and 2011 (4.5 per cent per annum) as compared to the period between 1991 and 2001 (2.5 per cent per annum). The survey also documents the significant rise in female migration due to economic reasons. If migration is an investment in human capital, clearly the returns have increased over costs between 2001 and 2011 (Box 1.3). Agrawal and Chandrasekhar (2015) find that short-term migrants are more likely to earn lower-wages than non-short term migrants using NSS data for 2007-08. Duraishamy and Narasimhan (1997) had found evidence of wage differentials between migrants and non-migrants in the informal labour markets of Madurai, keeping education, experience, training and industry constant. A significant share of the wage differential, i.e., the non-migrants earning more than migrants, was explained by labour market discrimination.
- *Job search*: Economic theory says that this is another form of human capital investment. Banerjee (1991) found that, amongst rural migrants to Delhi, the probability of a migrant having a pre-arranged job was higher if they were educated, older and seeking jobs in the non-manual labour category.
- *On-the-job training*: There is very limited data for on-the-job training for younger workers. However, there are some data on in-service training from Tan and Schavenko (2005) (via World Bank, 2008), which suggests under-investment in this particular area.⁹ Indian manufacturing establishments in India provide less in-service formal training than the average for Europe, East Asia, Latin America and other countries in South Asia. Firms that use more sophisticated technologies are more likely to train their workers.

⁹Tan and Savchenko (2005) via World Bank (2008).

Educational attainment and ability: Agrawal (2012b) and Singhari and Madeshwaran (2016) show that the contribution of education to earnings is more significant at the upper end of the wage distribution. Both the papers infer that this relates to unobserved “ability”, to which education is complementary. Azam (2012) finds similar results but contends that wage inequality may further increase with attainment of higher education. Does this suggest that education is playing more the role of “information” as to ability of the employee versus actual pay-off to human capital as suggested by Riley (1979)? Typically, one needs longitudinal data across occupations to test the theory empirically.

A set of papers have shown that interventions that change the returns to education may in turn affect choices of how much to invest in school. Using NSSO data from 1993-94 and 1999-2000, Kingdon and Theopold (2008) show that increased economic returns to education in the local labour market is positively associated with school attainment of girls and non-poor boys but negatively associated for poor boys. Foster and Rosenzweig (2004) find that in rural India, at the height of the green revolution, between 1968 and 1982, rural innovation had a differential impact on schooling investment in the case of children with and without land. Ones with land increased their schooling investment and ones without, did not. This gap may be reduced by building more schools. Kochar (2004) shows that urban returns to education affect the choice of how much to invest in school. Oster and Millett (2010) find that introducing new information technology enabled services (ITeS) centre causes an increase in the number of children enrolled in primary school, although this effect is localised to within a few kilometres. This effect is driven by English language schools. Jensen (2010) finds that providing young unmarried women in randomly selected villages three years of recruiting services to help them get jobs in the business process outsourcing industry caused them to stay longer in school.

3.2.2. Occupational Choices

Aggarwal et al. (2010) using NSS data from 1983 to 2004–05 finds that schooling raises the probability of people choosing non-manual work.¹⁰ It also raises the probability of people choosing to continue in school or people choosing neither to work nor to continue in school. Preferences are changing towards school over time. Parental backgrounds also matter in making choices.

Further, religious backgrounds affect occupational choices. This is confirmed by another paper (Tsujita, 2014), which finds that caste backgrounds affect occupational choices through a slum survey conducted in Delhi from November 2007 to March 2008. Anecdotal evidence also confirms this. An implementer of vocational skill programmes spoke about the difficulty of implementing the programme in a non-metro city in North India. One of them was the challenge of women who may not sign up for courses like assistant hair stylist (Beauty and Wellness Sector Skill Council) because her caste forbids her from cutting hair.¹¹

¹⁰ Using 2004–05 data from the *National Data Survey on Savings Patterns of Indians* (NDSSPI), Bhandari and Bordoloi (2006) find that greater education improves the likelihood of being employed. Returns from elementary education (primary and middle) were quite low.

¹¹ Beauty and Wellness Sector Skill Council.
http://bwssc.in/download/Qualifications%20Pack%20and%20NOS%20%20Assistant%20Hair%20Stylist_NSQC%20cleared.pdf.

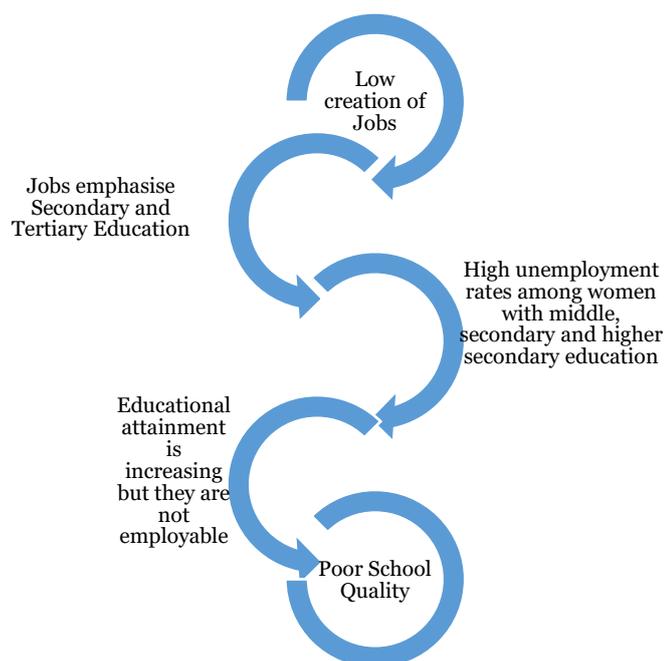
3.3 Summary

Broadly, national macro data suggests a positive association between human capital and economic growth, whether the former is measured by attainment or education expenditure. The evidence discussed above suggests that female education has a prominent role to play in this regard. Evidence using state level data suggests a similar positive association between human capital and economic growth. Lastly, the extensive literature discussed above, which has used micro, i.e., household or individual data, suggests that, over the years, the return to the level of education has changed over time. Earlier, returns were the highest for primary education, then secondary and now it is graduates. Returns may differ according to gender, religion, caste and spatial backgrounds.

4. Indian Labour Markets: Employment, Employability and Education

The labour market is an indirect market as mentioned earlier in the theoretical section (Box 1.3). To understand the demand and supply challenges of skilling, analyse the patterns of economic development in terms of growth rates, composition of the economy, labour markets and educational attainment.

Figure 1.7: Distorted Labour Markets



Source: Author's conceptualisation.

In India, the economic structure of the economy is not in sync with labour markets, whether at the national or regional level, leading to misallocation of labour resources. This synchronisation has not happened because of both demand and supply side issues. On the demand side, not enough jobs are being created and there is a bias towards high-skilled jobs in employment generation (Figure 1.7). The empirical literature focusing on India typically measures skills by general educational attainment and high-skilled education, in general translates to people having secondary educational attainment and above. On the supply side, while educational

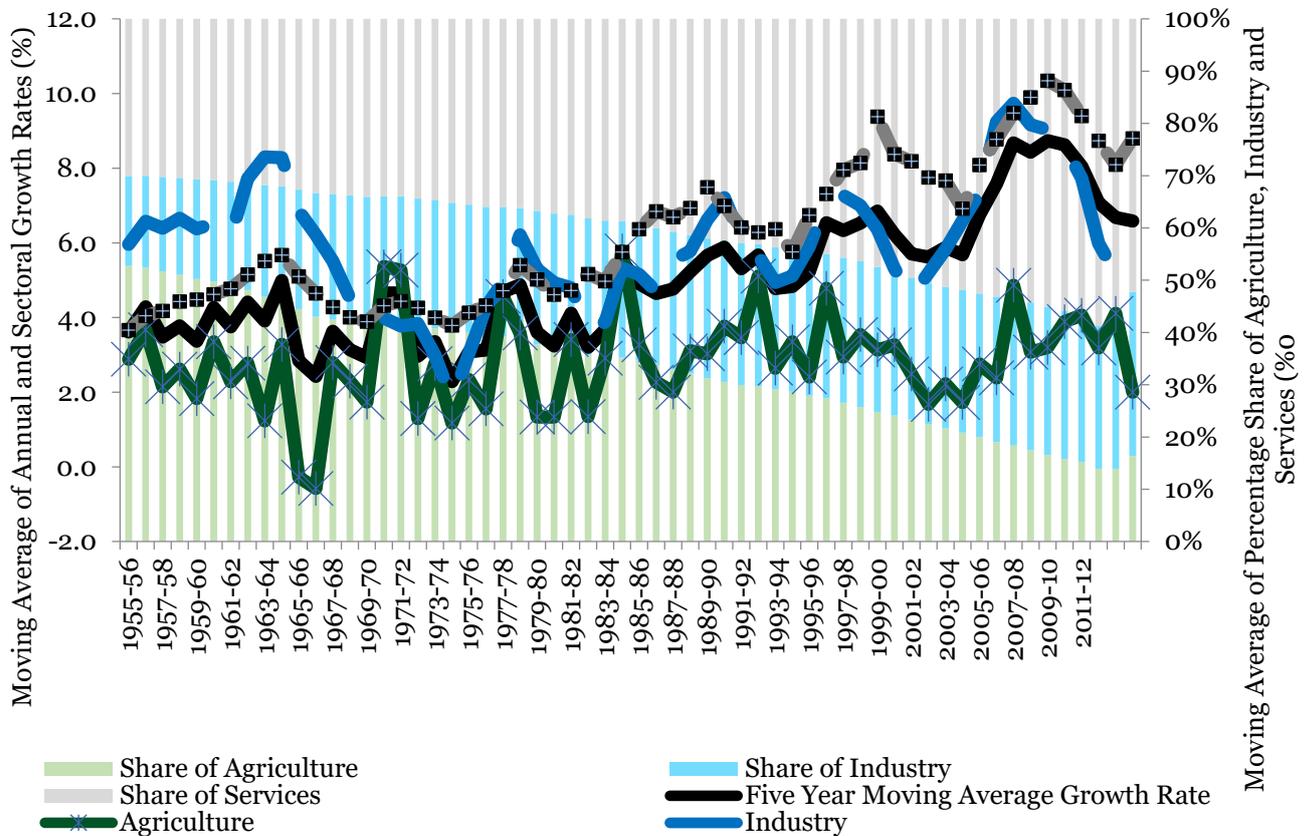
attainment of the general population is increasing there are significant challenges to employability of the educated youth. It is highlighted by high unemployment rates among youth and women. Further, vocational education is unable to adequately address the issue of employability. Plus, poor school quality translates to poor learning outcomes among school children resulting in inadequately prepared youth for the labour market. Despite the policy interventions mentioned in the next section, India continues to suffer from labour market failure at multiple levels.

4.1 *Macro Distortion: National Economy and National Labour Markets not in sync with each other*

Unlike international historical patterns, India has transformed from an agricultural economy to a services one. Other countries went from dominance of the agriculture sector to the industrial sector and then to the services sector. In contrast, in India, the services sector has outpaced the growth of the agriculture and industry sectors since the mid-1970s (Figure 1.8). Industry, especially manufacturing has shown relatively slow growth and its size in GDP has expanded relatively slowly. Broadberry and Gupta (2010) show that historically also, the services sector was always the dynamic sector in India. Appendix A1.1 also shows that trade and commerce have long historical roots in India.

In contrast, the agriculture sector continues to be the largest employer (Figure 1.9) and services the smallest.

Figure 1.8: Five-Year Moving Average of Growth Rate of GDP factor cost (constant 2004-05 prices) and Structural Composition(%), 1955-56 to 2016-17



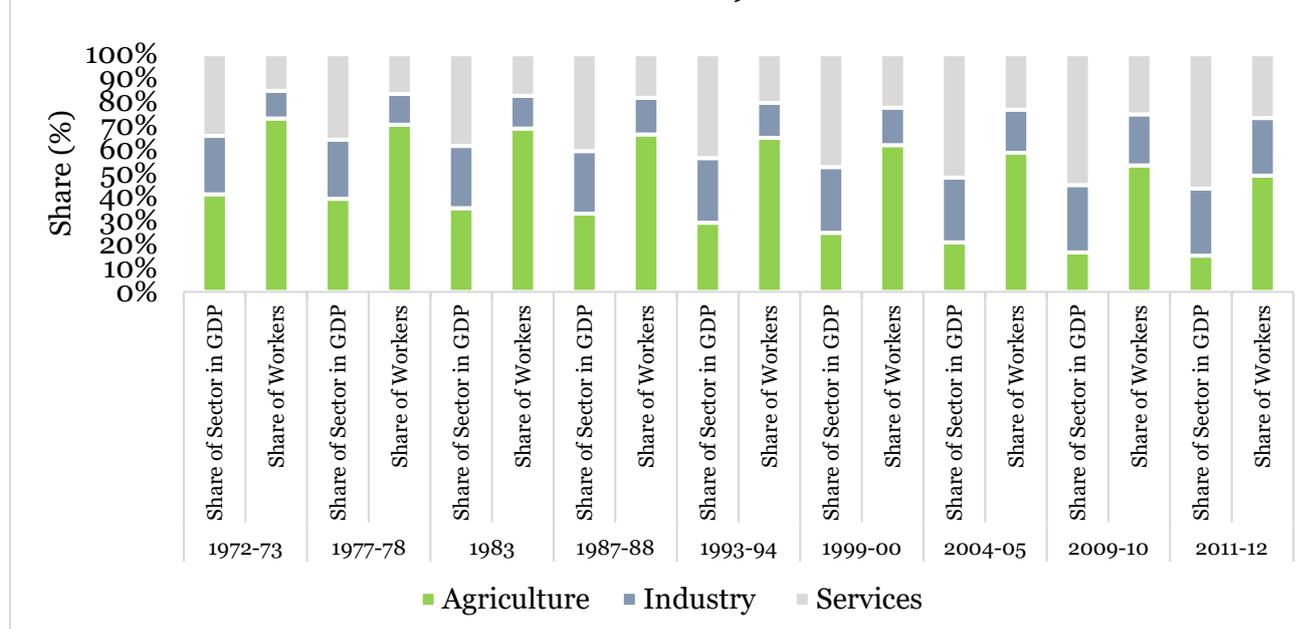
Notes:

1. The 2016–17 five–year moving average growth rate is the growth rate of gross value added (GVA) at basic prices for the years 2012–13 to 2016–17. 2014–15 is first revised estimate. The sectoral shares of GDP are also moving averages. GDP value added at basic prices for 2015–16 is the provisional estimate and for 2016–17, the advanced estimate. The construction of GDP changed post 2011-12 from GDP factor cost to GVA at Basic Prices. The moving average of GDP 2016–17 shows the moving average GVA at Basic Prices (2011–12) from 2012–13 to 2016–17. The same holds true for the percentage sectoral shares in 2016–17.

2. The agriculture sector consists of agriculture, forestry and fishing. Industry consists of manufacturing, mining, construction, electricity gas and water. The service sector mainly consists of trade, hotels and restaurants, transport, storage and communication, financing, insurance, real estate and business services and community, social and personal services.

Source: Author’s computations from MoSPI.

Figure 1.9: Share of Workers Sector-wise (principal plus subsidiary workers) and Share of Sectors in GDP (1972-73 to 2011-12)



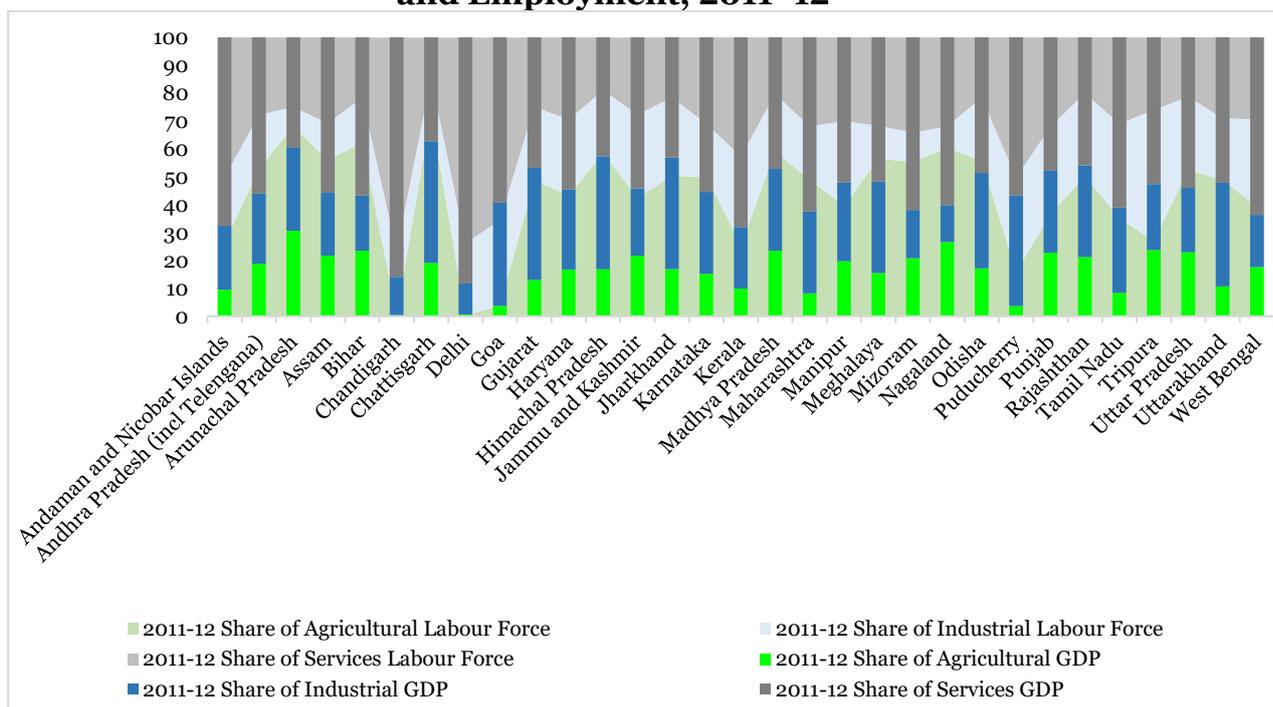
Notes:

1. The sectoral shares of GDP are also moving averages.
2. The agriculture sector consists of agriculture, forestry and fishing. Industry consists of manufacturing, mining, construction, electricity gas and water. The service sector mainly consists of trade, hotels and restaurants, transport, storage and communication, financing, insurance, real estate and business services and community, social and personal services.

Source: Author’s computations from MoSPI and NSSO.

State-level analysis exhibits similar pattern of economic development and labour allocation (Figure 1.10). Significant exceptions are Delhi, Chandigarh, Tamil Nadu and Tripura. While the first two are urban areas with little agriculture, Tripura has a lower share of industry in GSDP (23.6 per cent) but a higher share of employment (46.9 per cent). In Tamil Nadu, the share of industry in GSDP (30.6 per cent) is almost equal to the share of labour force in industry (33.9 per cent). Kerala and West Bengal are cases where the share of industry in GSDP is significantly smaller than the share of the labour force in industry. The reverse holds true for Jharkhand and Gujarat.

Figure 1.10: Share of Gross State Domestic Product (2004–05 Prices) and Employment, 2011–12



Note: The agriculture sector consists of agriculture, forestry and fishing. Industry consists of manufacturing, mining, construction, electricity gas and water. The service sector mainly consists of trade, hotels and restaurants, transport, storage and communication, financing, insurance, real estate and business services and community, social and personal services.

Sources: Author’s computations from MoSPI and NSSO.

4.1.1 Misallocation of Resources and Productivity

Using NSS data for the period between 1972–73 and 2011–12, Aggarwal (2014) decomposes the sources of GDP per capita growth into employment and labour productivity growth. The author finds that growth per capita has been driven by labour productivity growth to a large extent. Employment effects have been small. Increase in labour productivity was largely due to the increased capital-labour ratio and improvement in total factor productivity. However, inter-sectoral shifts, in which workers move from low productivity to high productivity sectors, have declined over time. Amirapu and Subramanian (2015) find that the effect of structural change in contributing to productivity growth was muted but, if one leaves out agriculture, then there is no impact between 1984 and 2005.¹² The authors show that correlation between productivity growth and unemployment growth is negative for registered manufacturing, transport, storage and communications, financial services and insurance, real estate and business services, public administration and construction sectors. These sectors are the high productivity sectors, which are skill-intensive (secondary educational attainment) and absorption of labour is low. Essentially the authors point out that India is a low-skilled labour abundant country. Production of

¹²Hsieh and Klenow (2009) show that there is clear case of capital misallocation in Indian organised manufacturing. If capital were re-allocated to match United States efficiency levels, Indian total factor productivity would go up by 40 to 60 per cent. “Total Factor Productivity (TFP) is the portion of output not explained by the amount of inputs used in production. As such, its level is determined by how efficiently and intensely the inputs are utilized in production” (Comin, 2006).

goods and services should use more of that but India's high productivity sectors use skill-intensive labour.

Why is the labour movement slow from low-productivity sectors to high-productivity ones? The responses lie both on the demand and supply side. Supply side issues are examined through the lenses of education and employability.

4.2 Demand Side Distortions

4.2.1 Slow Job Creation

“Growth of demand for labour skills is a function of capital accumulation and of technological changes which put a premium on labour skills” (Mincer, 1996). There are two basic points from the demand side relevant to this report.

The first is that job creation has been relatively slow. Aggregate employment-output elasticity has fluctuated over time but overall, between 1977 and 2011–12, it shows a downward trend (Misra and Suresh, 2014 and Basu and Das, 2015). In India, the agricultural sector was the key determinant of both the level of and change in aggregate elasticity until the early 2000s (Basu and Das, 2015). However, it showed negative elasticity between 2004–05 and 2011–12 (Misra and Suresh, 2014). Misra and Suresh (2014) estimate the aggregate elasticity to be around 0.2 for the period 1999–2000 to 2011–12. However, it can be sub-divided in two periods – between 1999–2000 and 2004–05 and between 2004–05 and 2011–12, with the earlier period showing higher elasticity (0.5) than the latter 0.06 (Misra and Suresh, 2014). Sectoral elasticities also differ. Construction and utilities were the only sectors exhibiting elasticity greater than one between 2004–05 and 2011–12 (Misra and Suresh, 2014). The role of the public sector in creating jobs has been slowing down since the 1990s (Azam, 2012).

After the financial recession of 2008, global and hence, India's growth prospects have been subject to uncertainty and will continue face uncertainty in the near future (Figure 1.8). This would have affected the labour market except that we do not have detailed data for it. Preliminary data suggest that the job market has been weak. The Indian economy added 1.35 lakh jobs in 2015 (calendar year) across eight major sectors, as per the 28th Round Quarterly Employment-Unemployment Survey. The sectors had added 4.21 lakh jobs in 2014 and 4.19 lakh jobs in 2013. The eight sectors are textiles and apparels, leather, metals, automobiles, gems and jewellery, transport, IT/BPO, and handloom/powerloom.

4.2.2 Shift towards Skill-intensive Jobs (i.e. jobs demand secondary education or above)

There has been a shift towards jobs which are skill-intensive, thereby increasing the returns to skills, i.e., people with secondary or tertiary education since the 1990s (Kijima, 2006; Kochhar, 2006, Azam, 2009 & 2012 and; Amirapu and Subramanian, 2015). The operational Indian education system was in sync for the skill set required in the high growth sectors of telecommunication, computer industry and financial industry in the 1990s. More importantly, the skill set embodied in these degrees are knowledge, especially mathematical abstraction (Kapur, 2002), a key outcome of the Indian education system.

This also resulted in increasing wage inequality (Kijima, 2006 and Karan and Selvaraj, 2008) because demand for skilled workers increased.¹³ Amirapu and Subramanian (2015) have noted that the manufacturing and service sub-sectors, which display high productivity and domestic convergence in productivity, are the ones which are skill intensive and not aligned with India's comparative advantage of unskilled labour. Azam (2012) shows that while the textile industry paid a wage higher than the average industry wage in 1993, which reversed in 2004, paying a significant negative premium. The author found that capital-intensive industries in manufacturing and skill-intensive industries paid a positive premium.

4.2.3 Characteristic of Labour Markets in India: Self-Employed and Casual Workforce

Karan and Selvaraj (2008) document that there has been increased casualisation of labour after 1991. Out of the 47.8 per cent of workers who are employees in India (the rest are self-employed), 62.5 per cent were casual wage labourers in 2011–12 (Appendix A1.2). These numbers differ across states and UTs. In Goa, share of employees is 72 per cent and share of regular employees is 83.8 per cent. Overall, UTs show higher share of regular employees.

4.3 Supply Side Distortions

4.3.1 Issues of Employability

The key issues are:

1. *Under-representation of workers with higher secondary educational attainment:* The first issue is of students with higher secondary education. Figure 1.11 shows that the share of workforce with 'graduates and above' degree is higher than the share of workforce with higher secondary education for both urban males and females. Appendix A1.4 shows general educational attainment of 15+ usually employed labour force between 1983 and 2011–12 and it shows similar phenomenon over the years. Further, Appendix A1.5 shows that the average wage rate of a worker with vocational education is higher than a person who has received higher secondary education. Besides, the average wage rate of a worker with a combination of secondary education and formal vocational education is higher than the average wage rate of worker with (only) either secondary or higher secondary education (extending Agrawal, 2012a),^{14, 15} This problem remains constant throughout the life-cycle.

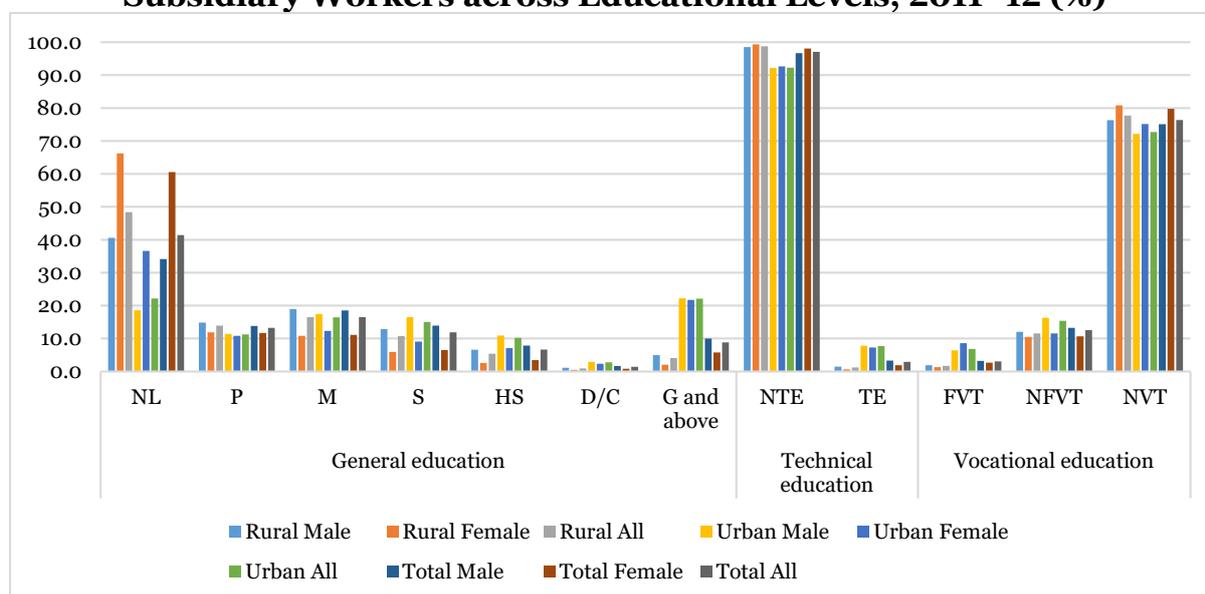
¹³In the initial stages of the Information Technology (IT) boom in the 1990s, India was doing simple IT tasks at a very low cost (Economist, 2013). Feenstra and Hanson (1997) has illustrated that an activity that uses relatively large amounts of unskilled labour from a developed country's perspective may be using skilled labour from a developing country's perspective. An outcome of this type of economic growth witnessed in India was high wage premium for skilled labour, creating wage inequality in the 1990s.

¹⁴The percentage of workers in the age group 15 and above who have attained secondary school education only in 2011–12 was 14 per cent. About three per cent of the workers have formal vocational training. For the same period, two per cent of workers had secondary education plus vocational education.

¹⁵ Many of the students during our visit to the IL&FS Training Centre in Okhla, New Delhi, said that they are pursuing dual types of education. To quote one of them, "the degree provides me a

This leads to the question of whether higher secondary has failed or is failing to impart skills that are needed/useful or relevant in the labour market.

Figure 1.11: Distribution of Workforce including Principal plus Subsidiary Workers across Educational Levels, 2011–12 (%)



Notes: NL stands for Not-literate up to Below Primary; P stands for from literate up to Primary school; M stands for middle school, S stands for secondary school; HS stands for higher secondary school; D/C stands for diploma/certificate, G and above stands for graduate degree and above. NTE stands for no technical education; TE stands for attainment of technical education including technical degree in agriculture/engineering/medicine, below graduate level and graduate and above level in technical education. FVT includes formal vocational training whether receiving or received. NFVT stands for non-formal vocational education and NVT stands for no vocational education.

Source: Author's computations from NSSO 2011–12.

2. **High Educated Youth Unemployment:** The second issue is of employability of educated youth. The unemployment rate of youth goes up with higher education (Appendix A1.6).¹⁶ This is particularly problematic for the age groups 25 to 35. Why are there so many people with degrees not able to find jobs? Anecdotal evidence suggests that people may be studying for exams to get a government job or they are not satisfied with their jobs in the urban areas and return back to their

qualification and this training gets me a job". Getting multiple types of education to boost their job prospects may be more common and needs to be investigated especially as vocational training received a boost after 2007. It is also probably going to be more common as one finds that vocational education requires a minimum general educational attainment for many job roles.

¹⁶ This point was first mentioned in Neemrana (2014) in a closed door seminar by Abhijit Banerjee on discussing and presenting the challenge of skilling.

Prof Pilz of University of Cologne also pointed out at an internal NCAER seminar that youth unemployment is high in almost all countries around the world with the possible exception of Germany. A reason for this is that students after completing their compulsory education have to attend three years of part time vocational school if they are not enrolled in school full-time. OECD (2010) shows higher rates of unemployment among 20–24 year olds as compared to adults (25–64).

native land.¹⁷ Interesting, youth unemployment rates were high even for people with vocational education. As Hanushek and Woessmann (2008 and 2012), Hanushek (2013) and Balasubramanian (2016) have found that the answer perhaps lies not in the degrees and certificates obtained but in the skills that the workers embody. However, those skills may or may not come from the education system, although that is important.

Labour market outcomes of youth with either secondary, higher secondary or vocational education were generally poor. In a study done in Karnataka, labour market outcomes of three categories of students who had passed Class X, Class XII and ones who had passed Industrial Training Institutes (ITIs) in 1998 were tracked over the next four years (World Bank (2002) via World Bank (2008)). The outcome after three years in 2001 was that all three categories showed similar poor labour market outcomes with 60 per cent of them unemployed. Further, students who had followed the traditional school systems were more likely to go further than the ITI graduates because education options for the latter were limited. Despite that, ITI students experienced, on the margin, better labour market outcomes. Further, the firms hiring ITI graduates found their training to be inadequate.

3. *High Female Unemployment:* Unemployment rates among women are higher than among men (Appendix A1.7). Unemployment among women tends to increase with higher education (Appendix A1.7). Despite this, we see unemployment rates of graduate women falling between 2004–05 and 2011–12. Urban female unemployment rates are higher than rural employment rates. However, in the case of men, no such difference is found except in the case of urban men with graduate and above degree. In that category, the unemployment rate of urban men is higher.
4. *TVET and Employability are not necessarily equivalent:* Unemployment rates of workers within the age group of 15 to 35 with TVET are relatively higher than those with no vocational education (Appendix A1.6). Therefore, acquiring TVET does not necessarily address the issues of employability. Despite expectations of higher average wage, limited job prospects in the critical 15 to 35 age group may be limiting aspirations for this stream of education.

Anecdotal evidence also confirms this. In our interviews across various industries, training implementation partners and evaluators, and international consultants, one consistent comment is that employability is not just about vocational skills. Soft skills like attitude to work, discipline, how to carry oneself and interact in a diverse environment are all skills that matter. Almost all training implementation providers have included English communication skills and anger management as a part of their overall training and vocational skilling curriculum.

5. *Employability improves in urban areas with higher secondary education and above:* Figure 1.11 shows that the distribution of workers by educational attainment does not differ from the primary to secondary education level for rural

¹⁷ i-Saksham Foundation is an NGO that runs tutor service for educated people in areas of Bihar who are sitting at home preparing for examinations. The interview suggested that almost 80 per cent of the youth who left the villages came back in one year.

and urban areas. The divergence appears after secondary education with various categories of the urban workforce – male, female and all having higher shares of workers with higher secondary education, graduation, technical education and formal vocational education. This may imply that the probability of finding a job is higher in urban areas with educational background above secondary education or TVET.

6. *Improving Employability by pursuing education and employment simultaneously*: Appendix A1.8 shows that people are pursuing different paths to transition from school to work. About 1.3 per cent of 15–35 rural population and 0.9 per cent of urban population are employed and pursuing education simultaneously. The numbers are relatively higher for males. The census adjusted numbers show that 8.4 million people (15 + age group) are pursuing education and present in the labour force (2011–12) simultaneously.

This points the need to understand more carefully the choices – pursue general education only, pursue two types of degree and diploma simultaneously or pursue education and employment simultaneously – that people are making about investing in human capital than the current data set allows.

4.3.2 Falling Labour Force Participation Rate while Educational Attainment of Population is Increasing

Both males and females LFPR have decreased across educational categories between 1999–2000 and 2011–12. (Appendix A1.9). The puzzle is that Appendix A1.10 shows educational attainment of the 15+ population is going up over time. The most likely reason for falling LFPR is that people are choosing to spend more time acquiring education rather than joining the labour force, something we have discussed previously, in the context of employability.

4.3.3 Low Female LFPR

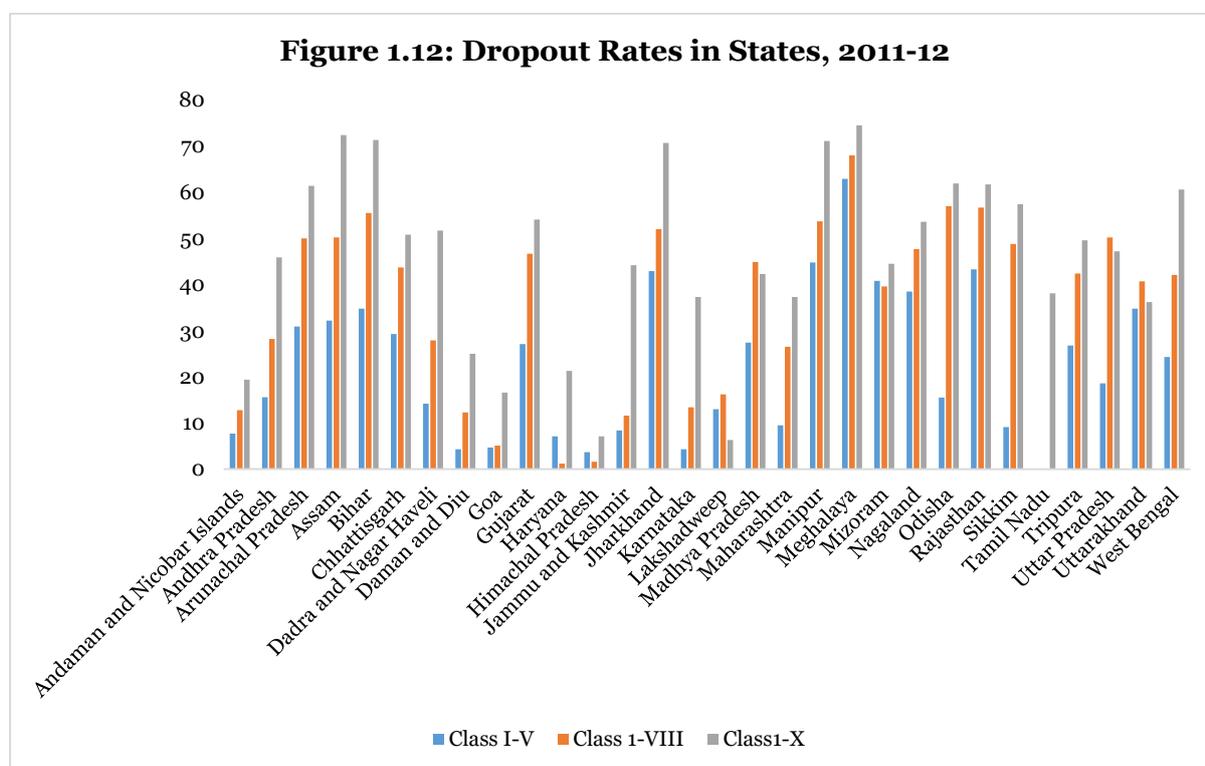
Appendix A1.8 shows that female LFPR in urban areas is barely 20.5 per cent in urban areas and 35.8 per cent in rural areas in 2011–12 for 15 plus population. By education category, the urban female LFPR of middle, secondary and higher secondary is quite low (Appendix A1.9). Appendix A1.7 shows the high rates of unemployment among women with secondary and higher secondary education. Appendix A1.8 shows more than 50 per cent of rural and urban females are neither part of the labour force nor pursuing education in the age group 15–35. Are females dropping out of the labour force in this category because job prospects for urban women with these education attainment levels are diminishing? The issue of transition from educational attainment to labour force for women cannot only be explained by educational attainment.

Plus, there are significant variations in the female LFPR across states (Appendix A1.10). Himachal Pradesh, followed by Sikkim, Chhattisgarh and Meghalaya show the best female LFPR. Bihar exhibits the worst female LFPR.

4.3.4 Improvement in Educational Attainment but Quality Remains Poor

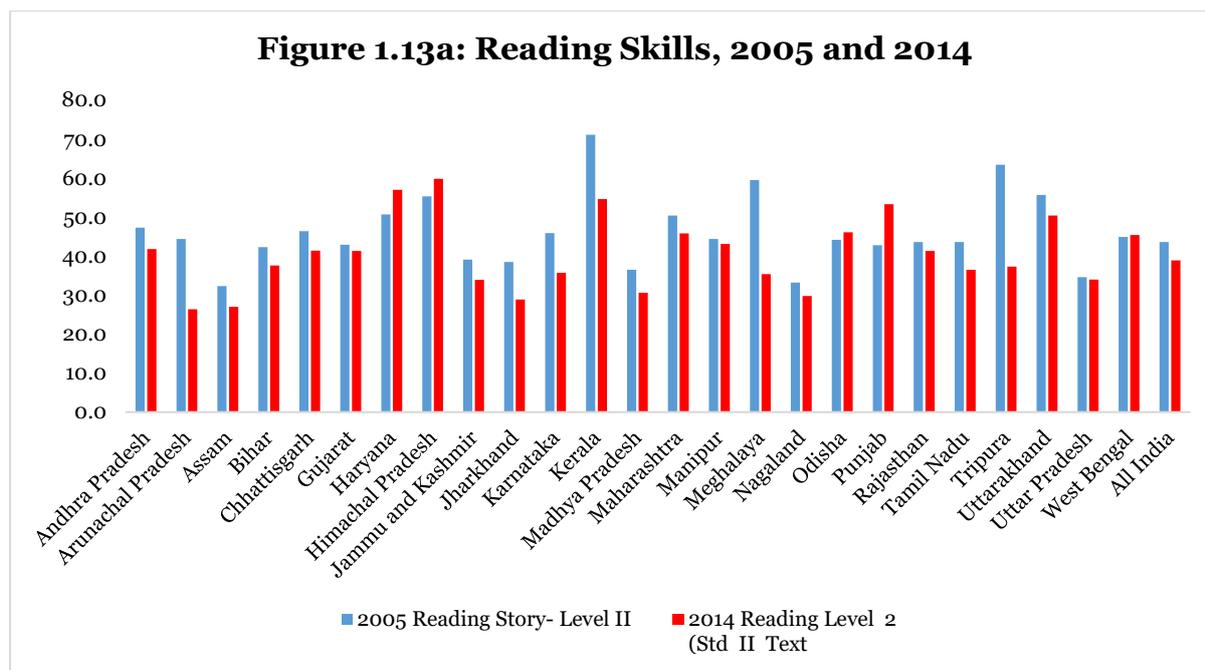
Appendix A1.11 shows that educational attainment has improved over the years for 15 plus population. Appendix A1.12 shows the state-level variation across the three categories of general, technical and vocational.

First focusing on general education, one finds that drop-out rates remain high especially for classes one to eight (Figure 1.12) reflecting on the quality of schooling. The quality of schooling affects the skills of the workforce, affecting economic growth. Figures 1.13(a) and 1.13(b) show falling rural school quality over the decade. Although, Haryana, Himachal Pradesh and Punjab show improvement they are significant exceptions in overall trend of falling reading skills. If Kerala was the leader in reading skills in 2005, Himachal Pradesh was the best in 2014. When one looks at division, Madhya Pradesh is the exception to the overall trend, which shows improving quality. In numeracy skills, Himachal Pradesh was the leader in 2005 but Haryana took over in 2014. The latest report shows marginal improvement in quality in 2016 (ASER 2017).



Source: EPW Research Foundation.<http://www.epwrf.res.in/>.

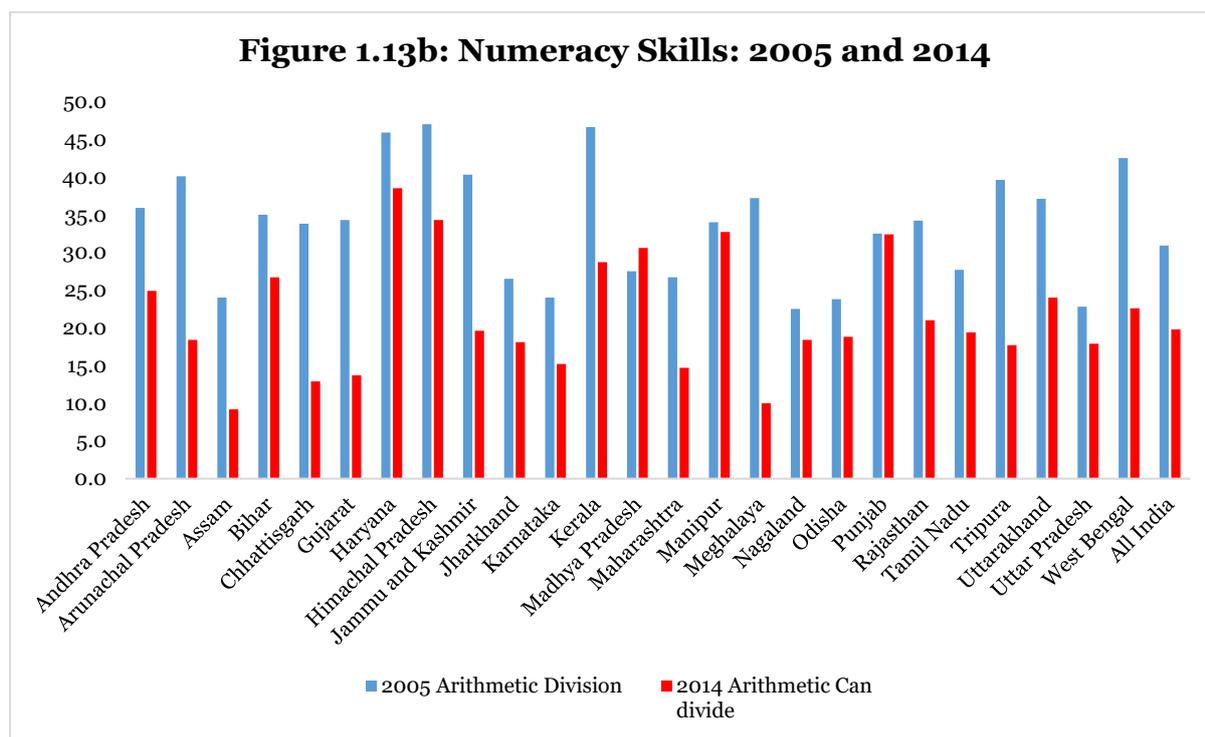
Figure 1.13a: Reading Skills, 2005 and 2014



Note: Percentage children (Class I–VIII) by state and learning outcomes (all schools 2005) for rural only.

Source: ASER (2006 and 2015).

Figure 1.13b: Numeracy Skills: 2005 and 2014



Note: Percentage children (Class I–VIII) by state and learning outcomes (all schools 2005) for rural only.

Source: ASER (2006 and 2015).

4.3.5 Dominance of non-formal vocational education

Although majority of the population is not pursuing vocational education, a significant share is acquired by non-formal means (Appendix A1.12). This emphasises the role for recognition of prior learning (RPL). RPL can help bring skills

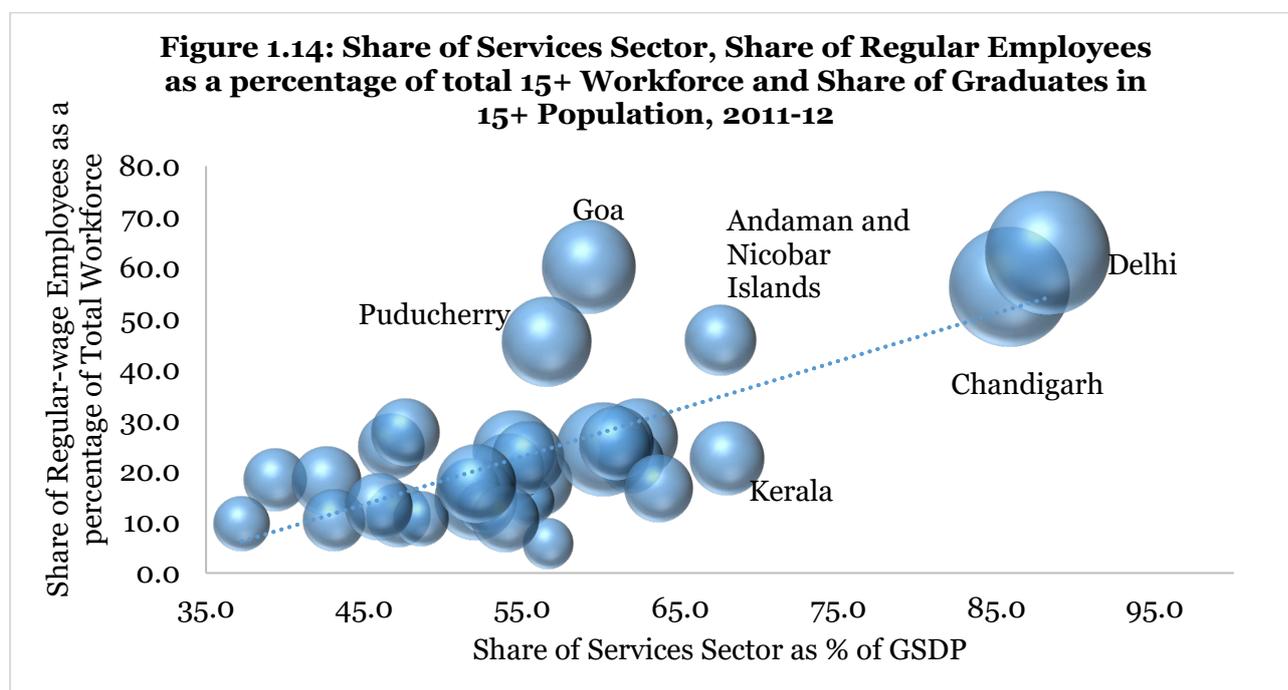
acquired through non-formal and informal means to the formal space and help mobility.

4.3.6 Regional variations in attainment of technical and vocational education

There is great degree of regional variation in attainment of technical vocational education. Daman and Diu shows high attainment of technical/diploma course below graduation (Appendix A1.12).¹⁸ Goa, Kerala, Lakshadweep, Puducherry are states with relatively high presence of formal vocational education. Daman and Diu, Chhattisgarh and Punjab show high presence of non-formal education amongst the 15+ population.

4.4 Analysis of Education, Employability and Employment

The three markets of education, employability and employment have to be examined in an integrated fashion. For example, Figure 1.14 shows that the higher the share of services sector and regular employees, the higher is the number of graduates within the population regionally. If the average worker wants a regular salaried job, it may be more likely in the services sector. How does one get a job in the services sector as a regular salaried person? The answer lies in pursuing attainment of general education. Whether the person gets the job or not is a different story, but aspirations, perceptions and signals from the markets shape individual choices investment in human capital.



Notes: The size of the bubble represent the percentage share of educational attainment of 15+ population who have a graduate degree.

Sources: CSO and NSSO.

¹⁸From an unpublished report of NCAER on computation for Daman and Diu, we know that this is correlated with the high presence of registered manufacturing in the Union Territory.

Goa is a state with the lowest drop-out rate, highest per-capita GSDP, relatively high shares of industry and services and a significant share of population who have attained formal vocational education (Appendix A1.12). Except the female LFPR, there is the suggestion of an alignment of economies with labour markets and education systems.

In *conclusion*, India has created an unsustainable situation for itself. The demand for skilled labour is identified in literature as people with secondary education or more. The supply of skilled labour, i.e., people with secondary education, is going up over time. However, this is not necessarily translating into jobs in the formal sector for people because there are not enough jobs being created. The attainment of degrees is not necessarily translating into attributes that can be used by the firms because of poor quality of education. To overcome the challenge of equipping themselves with skills that firms require, the younger cohorts have made themselves available for work while completing their education or they are signing up for multiple types of education. Unfortunately, pursuing education only or jobs only are the two dominant choices. The employment market is hollow in the middle, i.e., there is little representation of workforce with “higher secondary education” attainment.¹⁹ On the other hand, workforce with the educational attainment from “not literate” to “secondary” and “graduates” are represented.

5. The Challenge of Skilling: A Critical Analysis of the Paradigm Shift from the 11th Five-Year Plan (EFYP) Onwards

“As our economy booms, and as our industry grows, I hear the pressing complaint about an imminent shortage of skilled employees. As a country endowed with huge human resources, we can’t let this be a constraint. We are planning to launch a Mission on Vocational Education so that the skill deficit in our economy is addressed”.

Prime Minister Manmohan Singh, 2006, Independence Day Speech
Planning Commission (2007)

“Millions of youth should acquire the skills that could contribute towards making India a modern country”

Prime Minister Narendra Modi at the Launch of Skill India Mission, 2015²⁰

Within the span of a decade, two Prime Ministers from two different political parties emphasising vocational skills implies that the time has finally come for TVET to take central place in India’s efforts at improving the employability of its workforce after centuries of giving it secondary position to general educational attainment (Appendix A1.1). Will this address the questions regarding what, how and for whom skills in the 21st century with ever changing technology? The answer, as detailed below, remains unclear.

The Report of the Taskforce in Skill Development (Planning Commission, 2007 p. 3–4) recognised three major challenges for skill development and states the central paradox:

¹⁹Prof Pilz of University of Cologne, in his seminar has pointed out that lack of intermediate skills is a worldwide phenomenon. And lack of representation of higher secondary education graduates in the Indian workforce is perhaps an indication of that.

²⁰Times of India (2015)

1. *“Large-scale skill development is an imminent imperative.*
2. *Responding to this challenge is urgently required to keep the economy growing*
3. *Skill development needs to widen its focus. It must include non-manufacturing skills, apart from the more traditional organised sector manufacturing skills.”*

The central paradox of the Indian economy, the problem of an army of ‘educated’ unemployed (and mainly unemployable) persons on the one hand, and an acute shortage of skilled people on the other”.

The EFYP marked a shift in Indian perception towards the word “skilled” (Planning Commission, 2008).²¹ It recognised that before (between post-Independence and EFYP), skill development was largely associated with development of shop floor or manual skills. However, with the country making strides towards becoming a knowledge economy, new India needed different skill sets that could range from professional, conceptual, managerial, operational, and behavioural to interpersonal skills and inter-domain skills. Box 1.3 elaborates on the concept of a knowledge economy (KE).

Box 1.4: Knowledge Economy and Skills

A knowledge economy is one that utilises knowledge as the key engine of competitive growth. It is an economy where knowledge is acquired, created, disseminated and used effectively to enhance economic development.

Transitioning from a traditional economy to a knowledge economy requires long-term investments in education, innovation and ICT, in addition to an appropriate economic and institutional regime that allows for efficient mobilisation and allocation of resources. Innovation in technology, as well as products and business processes, boosts productivity.

While education has always been a key component of innovation and technological advance, the complexity and speed of the interplay between education, knowledge, technology and skills require far-reaching adjustments in education systems. Knowledge-enabled economies are able to constantly modernise their education systems in line with changes in economic policies. These changes have been both systemic and deep, affecting the nature of teaching and learning.

Performance in the market place is driven by the quality, skills and flexibility of labour and management. In addition to traditional ‘hard’ skills and ICT competencies, a knowledge economies require a new set of ‘soft’ skills such as a spirit of enquiry, adaptability, problem-solving, communication skills, self-learning, knowledge discovery, cultural sensitivity, social empathy, and motivation for work. Countries need to develop teaching and learning environments that nurture these skills.

Source: Excerpts from UNESCO (2010).

²¹The Eleventh Five Year Plan was for the period from 2007 to 2012.

India decided to forge ahead on a dual path in the EFYP – one of expanding higher education, i.e., tertiary education, which would meet challenges of the KE and mass-scale skill development in different trades through special training modules delivered by ITIs, polytechnics, vocational schools, etc., which would address the issue of employability or educated unemployment. Focusing especially on underprivileged youth. It proposed to launch the Skill Development Mission, with an outlay of ₹22,800 crore, which would bring about the paradigm change. The National Skill Development Mission was launched on 15 July 2015 (Box 1.4).

Box 1.5: National Skills Development Mission

The National Skill Development Mission was approved by the Union Cabinet on 01.07.2015, and officially launched by the Hon'ble Prime Minister on 15.07.2015 on the occasion of World Youth Skills Day. The Mission has been developed to create convergence across sectors and States in terms of skill training activities. Further, to achieve the vision of 'Skilled India', the National Skill Development Mission would not only consolidate and coordinate skilling efforts, but also expedite decision making across sectors to achieve skilling at scale with speed and standards. It will be implemented through a streamlined institutional mechanism driven by Ministry of Skill Development and Entrepreneurship (MSDE). Key institutional mechanisms for achieving the objectives of the Mission have been divided into three tiers, which will consist of a Governing Council for policy guidance at apex level, a Steering Committee and a Mission Directorate (along with an Executive Committee) as the executive arm of the Mission. Mission Directorate will be supported by three other institutions: National Skill Development Agency (NSDA), National Skill Development Corporation (NSDC), and Directorate General of Training (DGT) – all of which will have horizontal linkages with Mission Directorate to facilitate smooth functioning of the national institutional mechanism. Seven sub-missions have been proposed initially to act as building blocks for achieving overall objectives of the Mission. They are: (i) Institutional Training, (ii) Infrastructure, (iii) Convergence, (iv) Trainers, (v) Overseas Employment, (vi) Sustainable Livelihoods, (vii) Leveraging Public Infrastructure.

Source: Directly quoted from National Skill Development Mission website.

The 12th Five-year Plan continues with the same paradigm (Planning Commission, 2013) and, therefore, takes care of King's (2012) criticism that change cannot take place in a traditional five-year cycle.

While we know from evidence presented in earlier sections that not much had changed on the ground until 2011–12, i.e., percentage of population either received or receiving formal vocational education and technical education remained at three and 2.4 per cent respectively. After the national elections in 2014, vocational education experienced a further boost. The jury is still out on the impact with mostly anecdotal evidence from the ground as the initiatives are still being implemented as India transitions and transforms in this space. The point is that in India, employability has become equivalent to vocational education. At the time of writing of the report, technical education is still outside the purview of the skilling schema but that may change soon.

We list a few key summary points on the new paradigm (Planning Commission, 2006, 2007 and 2008):

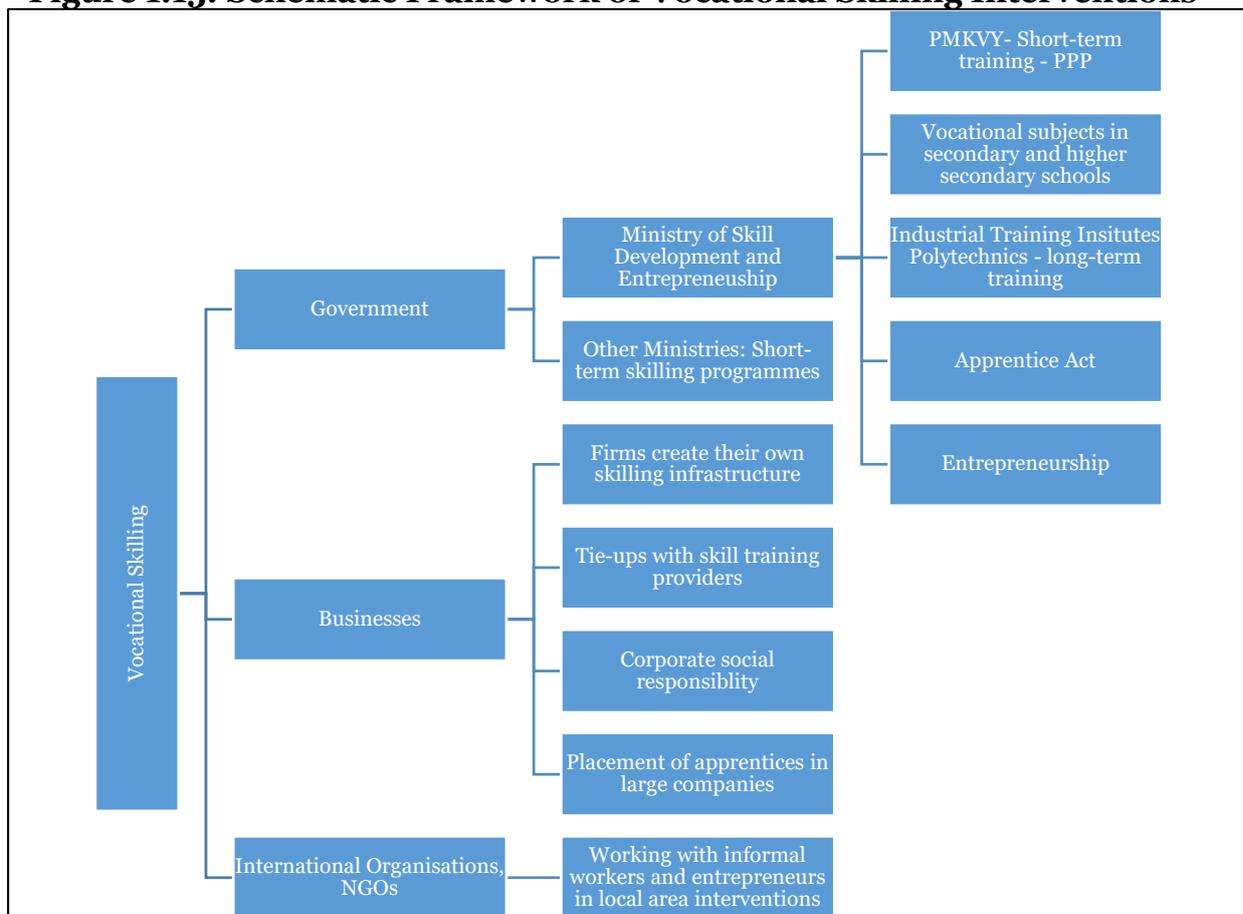
- The EFYP target aimed at enhancing training opportunities for new entrants to the labour force from the existing 2.5 million in the non-agricultural sector to 10 million per year.
- The Ministry of Skill Development and Entrepreneurship (2015) estimates that they will need to skill 402.87 million people until 2022, which would include skilling of fresh entrants, RPL, upskilling and reskilling.
- Training will be demand driven rather than supply driven as was historically true of India since Independence. Training will cater to local needs.
- Partnership with industry was deemed important and a public-private partnership (PPP) model was proposed to expand skilling.
- Modular employer skills (identification of 'minimum skill set' which is sufficient to get employment): These will be short-term training courses. The modules grouped together would lead to a certification. Multiple entry and exit points will be allowed and it will be credit based.
- Flexible delivery mechanisms (part time, weekends, full time modular programmes) will be used to deliver the courses.
- Target groups were less educated/out-of-school youth/unemployed/persons with employable skills; workers who have acquired skills informally and ITI graduates.
- Different levels of programmes (level 1 to level 3) to meet demands of various target groups
- Flexibility to ITIs to conduct a combination of long-term and short-term training courses by optimally utilising available infrastructure to make training cost effective.
- The services of existing or retired faculty or guest faculty to be utilised
- Curriculum will be vetted by an expert committee
- Involvement of employer organisations in the design and implementation of this scheme.
- Actual training could be done by NGOs or industry but curricula, learning materials, training of trainers and assessors will be provided by the government.
- Testing will be done by independent assessment bodies.
- A web-based management information system (MIS) will be developed.
- Training course will be self-financing and self-sustainable. Recurring training cost to be recovered from fees/job work

India has developed a fairly complex eco-system with institutions, curriculum, schemes, courses etc. in the last decade. There is a National Skill Development Mission in place. A whole new ministry has been created to encourage vocational education. A National Skill Policy was drafted twice, once in 2009 and then in 2015. The Apprentices Act was reformed. Linkages between vocational education and general schooling have been established. Vocational education is being encouraged in classes 9 to 12. Further, the National Skills Quality Framework (NSQF) was developed. *“The NSQF is a competency-based framework that organises all qualifications according to a series of levels of knowledge, skills and aptitude. These levels, graded from one to ten, are defined in terms of learning outcomes which the*

learner must possess regardless of whether they are obtained through formal, non-formal or informal learning. NSQF in India was notified on 27th December 2013. All other frameworks, including the NVEQF (National Vocational Educational Qualification Framework) released by the Ministry of HRD, stand superseded by the NSQF” (NSQF website). Considering how slowly India typically changes, the speed at which the eco-system for vocational skilling was created is remarkable.

The *Pradhan Mantri Kaushal Vikas Yojana* (PMKVY) is the flagship scheme of the Ministry of Skill Development & Entrepreneurship (MSDE), focused on short-term training as envisioned by the EFYP.²² Figure 1.15 shows the range of interventions in the vocational skilling space.

Figure 1.15: Schematic Framework of Vocational Skilling Interventions



Source: Author’s own conceptualisation from literature review.

The significance of vocational education as an important pathway of human capital investment cannot be overemphasised. Further, given the stage of economic development and demographic transition, short-term training to get jobs is a very useful way to connect employees and employers. With relatively high school drop-outs, imparting vocational skills to connect to the markets was imperative. In the process of experimentation, India is also trying to find a right fit in the Indian context.

²² Ministry of Skill Development and Entrepreneurship website. <http://www.msde.gov.in/index.html>.

However, there are significant challenges in oversimplifying the concept of employability and focusing on one particular definition of employability. The reasons are listed below:

1. **21st Century labour market needs:** Krueger and Kumar (2002) note that the European model of specialised vocational education worked during the 1960s and 1970s when technology changed slowly. In the information age of the 1980s and 1990s, technology changed far more rapidly. Even the EFYP acknowledged that India is moving towards a knowledge economy. The World Economic Forum 2016 predicts that the fourth industrial revolution will increase demand for job families including “computer and mathematical” and “architecture and engineering.” In some other job families, prospects remain flat. Jobs are falling in areas such as “manufacturing and production” and “office and administrative”. The use of artificial intelligence in production, especially manufacturing, has worried policymakers. It is unlikely that India is not going to be affected by this and, given our current state of affairs, we might even see further imbalances in our labour market. Therefore, the question that all countries are grappling with is whether to emphasise general educational attainment or more specialised vocational educational attainment. The OECD (2010, p. 14) states that in the 21st century, those entering the job market need both immediate job skills and “a range of career and cognitive competencies that would enable them to change jobs and career contexts and to sustain their learning capacity”. Specialisation needs to be balanced with general academic skills and soft skills. The above short-term, modular technical and vocational skilling programme is not going to address India’s medium-term or long-term needs.
2. “Career flux means that one-to-one relationships between initial training and a single life-cycle occupation have become rarer than ever, questioning the relevance of initial VET training in that form” (OECD, 2010, p. 25). The school system that trains for both immediate job needs and creates pathways for higher education is needed. The OECD (2010) shows, using examples from various countries, that students graduating from upper secondary vocational education may choose to go for tertiary education. A singular focus on vocational education may foreclose options to pursue further schooling. It is not just whether one can sit and clear an examination but a deeper question about competencies when leaving school. In this context, the school based vocational education that India is attempting, where vocational subjects are offered as a choice, is a far better option for the medium-term and long-term needs of India.
3. **Historical hangover:** Vocational education is given low status by students and the general population around the world (OECD, 2010 and McGrath, 2012). In India, the problem goes deeper. Vocation is associated with caste in India as has been discussed in the earlier sections. While caste may affect occupational choices, especially in the non-metro areas of India, vocational education might not be aspirational for younger people in cities for historical and economic reasons. As Kalra (2015) says, the perception is that it is “class reinforcement of vocational streams”.

“The push towards vocational courses in government schools has the teacher worried. He perceives a dangerous offshoot to imparting skills at school level: in India, where work has historically been linked to caste, teaching vocational subjects to a particular set of students has an ominous ring to it, a “plumber-ka-beta-security guard” push by schools which are meant to lift students out of class and caste pigeonholes.”

Kalra (2015)

And therein lies the problems of school based vocational education in India. It is viewed as a pathway for the “others”. OECD (2010) mentions that the US has re-named its vocational and technical education as “career and technical education (CTE)”. It is focused on a career rather than a single occupation. Indian vocational programs need to evolve to address medium-term issues.

4. **Basic skills:** Strong generic basic skills like literacy and numeracy are associated with better labour market outcomes. At low-skilled jobs, they may not be necessary but for mobility, it is needed (OECD, 2010). In India, the perception is the following:

“since government schools teach badly, proved by levels of learning recorded in successive Annual Status of Education Reports, vocational courses may be the answer to ensuring jobs for those whose options are anyway limited.”

Kalra (2015)

International evidence suggests the reverse. “Skills beget skills through a multiplier process”, (Cunha et. 2006; page 698 via Hanushek and Woessmann, 2012). In India, with vocational education directed towards either school drop-outs or students with relatively weak academic achievements, short-term vocational programmes may have a limited impact. Ideally, school quality needs to be improve or vocational schools need to address those basic skill development needs (OECD, 2010). Vocational education is not a replacement for poor basic skills.

5. **Industry connect** is important both for learning of skills on a real time basis in a job and for placement. OECD (2010) says that the apprentice system offers a blend of theoretical and practical learning. In the United States, however, people do internships to explore career opportunities. Based on anecdotal evidence, the recent reform of the Apprentice Act is appreciated by large companies or industrial organisations like the Confederation of Indian Industry but the medium-small and micro enterprises find little value in hiring apprentices.
6. **Life-cycle perspective:** In our interviews with various stakeholders of vocational education, a common complaint often heard is that a low starting salary is a disincentive for people to take up vocational education and it is not particularly aspirational for the youth. However, as Appendix A1.5 has illustrated, the average wage rate of a worker with vocational education improves over a life-cycle. Further, the wage gap between a worker with only secondary education and worker with secondary and vocational education widens over the age profile. An intervention, therefore, is necessary to educate the fresh entrants of a life-cycle perspective. Career counselling and

mentoring are important pathways to channel people towards different types of education as has been recently started by Self-Employed Women's Association (SEWA).²³ This is true for not only the younger cohorts but also for older cohorts who are already employed. Badrinath (2016) cited a study that showed that mentoring including coaching, facilitating, counselling and networking have becoming important tools for human resource management in corporates too. In one company, employee attrition rates and administrative errors came down significantly due to the mentoring efforts.

Using international empirical evidence, Hampf and Woessmann (2016) and Hanushek et al. (2015) show that while vocational education (versus general education) helps youth transition from school to work relatively easily, it turns to a disadvantage later in life. The later paper specifically shows that the age of 50 marks a turning point. While evidence from India does not suggest that, India needs to approach the problem based on a life-cycle/career perspective.

7. The assumption is that people who have degrees are “employable” but we know from the Indian job market that they are not (Blom and Saeki, 2011; Wheebox, 2015 and 2016)! Engineers, in particular, have been researched and have been found lacking in employable skills.
8. Soft skills: Heckmann and Kautz (2012, 2013) show that soft skills or non-cognitive skills are also important for economic and social success. Box 1.3 shows that they are required for the knowledge economy. Short-term programmes or even general education do not teach soft skills and they can be taught, right from early childhood!
9. False trade-off between manufacturing and services: While evidence indicates that the services sector has been the engine of growth of the Indian economy, domestic policymakers continue to believe that manufacturing is important (Planning Commission, 2007). Amirapu and Subramanian (2015) pose the question that is haunting policymakers – should we train our workforce for manufacturing or services? The authors have shown that higher productivity sectors employed lesser people, whether manufacturing or services. Irrespective of sectors, basic cognitive skills and non-cognitive skills are needed and will be needed. In our interviews with employers, they talk about the unpreparedness of their attitude towards work i.e. work for eight hours in a day. Channels for training have to be created.
10. Quality of short-term vocational education – This is based on anecdotal evidence. The common refrain we hear from employers is the demand that they be provided with people who are willing to work eight hours a day, who know how to listen, walk and talk with colleagues; employers appeared to be willing to take care of the remaining skill sets required. The quality of vocational programmes, especially the short-term ones, is uncertain.

²³UNDP website.

<http://www.in.undp.org/content/india/en/home/presscenter/pressreleases/2016/03/14/career-guidance-counselling-centres-launched-in-delhi-ncr-to-imp.html>

11. Rural-urban/language/food and cultural issues: In India, the rural and non-metro youth are being targeted for training and then pathways are set up to enable them to migrate. However, turnover rates are very high. One reason is that the low salary is not worth it and there are cultural issues of adjustment like language, food etc.
12. High turnover: Both empirical (World Bank, 2015) and anecdotal evidence, indicate very high the drop-out rates from the vocational skilling programmes in rural areas. After training, migrants who are able to access the job market also drop-out. This is despite illustration from various examples around the country that training programmes help in getting formal sector jobs. Based on these experiences, one of the government agencies involved in implanting skill programmes in rural areas is now thinking of extending skill programmes up to one year.
13. Learning patterns and informal workers: Pilz and Wilmshöfer (2015) and Pilz, Uma and Venkatram (2015) emphasise that targeted programmes directed towards the occupation of local population in non-formal settings may help in recognition and certification of casual workers. Since India is mainly characterised by casual workers, recognition of non-formal and informal learning methods may improve the upskilling and, therefore, the productivity of occupational groups like street vendors in Delhi and fishermen in the Chilika lagoon of Odisha.

In addition, the current vocational education programmes fail to recognise that some of the younger cohorts, especially women, pursue education and are part of the labour force simultaneously. Recognising them would address issues of employability more fully.

14. Technological vulnerability: Workers are typically trained on one machine. Technological shocks in the future may make the workers vulnerable to job losses, a point made earlier.
15. Vocational education is not aspirational in India: Other than the universal attitude towards vocational education and caste and class issues in India mentioned above, there are other issues which make it non-aspirational. There have not been many takers for vocational education in India at the school level (Kalra, 2015). The reason is that the scores from vocational education are not counted towards admission in colleges and universities. Colleges and universities possibly do not perceive attainment of vocational education as a rigorous test of the ability of the students to join tertiary education. Kalra (2015) reported that there were hardly any takers for the vocational subject of entrepreneurship in a school in the National Capital Region of Delhi. In contrast, the NGO, Going2School.com has developed courseware for the rural students of Bihar. Through graphical stories of a heroine, the NGO teaches entrepreneurship to 9th graders once a week. Besides, there is also increasing recognition of experiential learning, combining theory with practice. One may be able to teach vocational skills within the context of a general education.

16. Implementation issues: At the NCAER- JP Morgan conference on 5th October, 2016 on the 3–E challenges of India, Mr. Raj Gilda of Lend-a-Hand India and Mr. Abhishek Gupta, working as a Consultant for the Delhi Government, discussed implementation issues regarding the introduction of vocational courses in secondary education. The first issue was the age at which children choose their specific vocation – it was felt that the 9th grade was too early for such a choice to be made. OECD (2010) discusses this issue of age and the answer depends on the country. Facilities for practical training and school timings were also issues associated with implementation.

The current system is not able to address the “What, How, For Whom” questions in an efficient and equitable manner. At this point, India cannot afford a trade-off between general education and vocational education. It needs a combination of both. However, imposing a dual system on an already segmented labour and education market is going to have limited impact; worse still, it will not have much of an impact on the incentives associated with educational attainment for an average individual aspiring to make decisions about investing in education or using it as a signal for a potential employer. Micro distortions mean that macro distortions remain. India needs to think about its labour market, institutions, technology and socio-cultural background while framing the skilling policy. India needs to look at general education and TVET in an integrated fashion, and offer flexibility and pathways in the system for people to move across the education system according to their needs and aspirations.

6. Summing Up

The demographic transition, economic uncertainty and technological changes have come together to create a concoction in India that has the potential to boil over if it is not skilfully managed. One path that could steady the future of India is to both create jobs that will absorb the burgeoning population and make the population work ready so that they can be absorbed in those jobs. The three basic questions in economics contextualised within India’s skills market boils down to the following: What skills should we equip the workforce with? How should we equip them? For whom should we equip them? These questions are examined in the historical context to serve a dual purpose – first to understand how they were answered in the past to derive lessons from them, if any, and second to understand why we are what we are today in terms of the education, employability and employment (3–E) challenge. At the dawn of independence, India inherited an education systems which focuses on transmitting oral and abstract mathematical skills versus more usable hands-on-skills in the job market. This system has continued until the present and favoured India during the software and business services driven growth of the 1990s. However, as this kind of growth combined with an unchanging educational system, the underlying 3–E problems remained unresolved. Extensive data analysis, combined with literature review and anecdotal evidence, suggests that despite the best of intent on the part of Indian policy makers, there is extensive market failure in the labour markets. Correctly interpreting the signals from the market that indicated that average returns to education are the highest if one is a regular wage employee with tertiary education living in an urban area, the prospective workforce sets out to acquire those attributes. Most falter in the path. First, they are not able to acquire enough education. Second the investment in education does not necessarily always

pay off because the system is not transmitting the requisite skills required to get the elusive job, especially in a perpetually changing economic and technological environment. Third, formal on-the-job training is limited in India. Fourth, migration rates have been declining until the last decade. Therefore, general educational attainment is the only sustainable path available to the prospective workforce. However, it does not guarantee a job. Not enough jobs are being created especially in those sectors that have the highest productivity. This has its own consequences in the labour market. The Eleventh Five-year Plan suggested a dual path of mass vocational education and higher education to address the 3-E challenge. The evolving model of mass vocational education that is being currently implemented in the country does not address the distortions, either on part of the prospective employees or employers. The turnover rates of short-term vocationally trained workers are extremely high and the employers find that re-training is needed. Most importantly, vocational education is neither aspirational (partly because of historical reasons) nor the first option as a career move. It perhaps serves as a short-cut to the first job or to the marriage market. There is little recognition of medium-run and long-run issues on the part of policymakers. Focusing on the short-term objective of connecting the youth with the job market has meant that life-cycle perspectives with a focus on careers are ignored, creating a vicious cycle of aspirations, education, employability and employment. Further, with evolving technological changes, structural changes could result in those acquiring short-run vocational skills redundant in the long run. Higher education continues in the traditional style making even those with tertiary education unemployable. Essentially, India is not addressing the micro distortions in terms of incentives and signals to employees (prospective or otherwise) and firms who make choices about investments in education, on-the-job training, migration, creation of jobs, technologies to adopt, which in turn result in not addressing macro issues.

Bibliography

- Acemoglou, D. and J. Pischke. 1998. "Why do Firms Train: Theory and Evidence." *The Quarterly Journal of Economics*. 113(1): 79–119. February.
- Acemoglou, D. and J. Pischke. 1999. "Beyond Becker: Training in Imperfect Labour Markets." *The Economic Journal*. 109(453): F112–F42. February.
- Aggarwal, A. 2014. "New Insights into the Relationship between Employment and Economic Growth in India." *Working Paper 002 Wadhvani Policy Foundation Research Centre*, New Delhi, India.
- Aggarwal, A., Freguglia, R., Johnes, G. and G. Spricigo. 2010. "Education and Labour Market Outcomes: Evidence from India". <http://ssrn.com/abstract=1744058>.
- Agrawal, T. 2012a. "Vocational education and training in India: challenges, status and labour market outcomes." *Journal of Vocational Education & Training*. 64(4):453–474. December.
- Agrawal, T. 2012b. "Returns to Education in India: Some Recent Evidence". *Journal of Quantitative Economics*. 10(2):131–151. July.
- Agrawal, T. 2014. "Gender and caste-based wage discrimination in India: some recent evidence". *Journal of Labour Market Research*. 47:329–340.
- Agrawal, T. and Chandrasekhar. 2015. Labour Market Outcomes of Itinerant Workers in Rural India. *Journal of International Development*. 28(8). 14 July.
- Amirapu, A. and A. Subramanian. 2015. "Manufacturing or Services? An Indian Illustration of a Development Dilemma". *Working Paper No. 405*. Centre for Global Development. June.
- Annual Status of Education Report (ASER). 2006: [ASER 2005 Rural](http://www.asercentre.org/p/85.html). <http://www.asercentre.org/p/85.html>.
- Annual Status of Education Report (ASER). 2015: [ASER 2014 Rural](http://www.asercentre.org/Keywords/p/234.html). <http://www.asercentre.org/Keywords/p/234.html>. January 13.
- Annual Status of Education Report (ASER). 2017: [ASER 2016 Rural](http://www.asercentre.org/Keywords/p/234.html). <http://www.asercentre.org/Keywords/p/234.html>.
- Atewell, P. and S. Thorat. 2007. "The Legacy of Social Inclusion". *Economic and Political Weekly*. 42(41). October 13.
- Axmann, N., Swanson, K. and Contreras, V.C. 2016. "Caste and Religion-Based Wage Discrimination in the Indian Private Sector: Evidence from the Indian Human Development Survey." *Review of Black Political Economy*. 43:165–175.
- Azam, M. 2009. "India's Increasing Skill Premium: Role of Demand and Supply". *IZA Discussion Paper No. 3968*. IZA, Bonn, Germany.

- Azam, M. 2012. "Changes in Wage Structure in Urban India, 1983–2004: A Quantile Regression Decomposition". *World Development*. 40(6): 1135–1150.
- Azam, M., Chin, A. and N. Prakash. 2011. "The Returns to English-Language Skills in India". http://www.uh.edu/~achin/research/azam_chin_prakash.pdf. April.
- Badrinath, V. 2016. "Further Education and Training, Retraining: Skilful India – A Dream or Reality". In Pilz, M. (ed.), *India: Preparation for the World of Work*, Springer.
- Balasubramanian, I. 2016. "Local skill concentrations and district employment growth: a simultaneous equation approach for India". *The Annals of Regional Science: An International Journal of Urban, Regional and Environmental Research and Policy*. 56(2): 491–511.
- Bandyopadhyay, S. 2011. "Convergence Club Empirics: Evidence from Indian States". <http://personal.lse.ac.uk/BANDYOPS/CCEfin.pdf>. April.
- Banerjee, A.V. 2006. "Discussion: The paradox of Indian growth: A comment on Kochhar et al.". *Journal of Monetary Economics*. 53: 1021–1026.
- Banerjee, B. 1991. "The determinants of migrating with a pre-arranged job and of the initial duration of urban unemployment: An analysis based on Indian data on rural-to-urban migrants. *Journal of Development Economics*. 36(2): 337–351.
- Banerjee, R. and V.P. Muley. 2008. "Engineering Education in India". Department of Energy Science and Engineering, Indian Institute of Technology Bombay, Powai, Mumbai.
- Barro, R.J. and J. Lee. 2000. "International Data on Educational Updates and Implications". http://www.development.wne.uw.edu.pl/uploads/Courses/DW_Barro_Lee_update.pdf. August.
- Barro, R.J. and J. Lee. 2011. "A New Dataset of Educational Attainment in the World, 1950–2010". http://www.barrolee.com/papers/Barro_Lee_Human_Capital_Update_2011Nov.pdf. November.
- Barro RJ, Sala-i-Martin X. 1995. *Economic Growth*. McGraw Hill, New York. Beauty and Wellness Sector Skill Council. http://bwssc.in/download/Qualifications%20Pack%20and%20NOS%20%20Assistant%20Hair%20Stylist_NSQC%20cleared.pdf.
- Basu, D. and D. Das. 2015. "Employment Elasticity in India and the US, 1977–2011". *Economic and Political Weekly*. 51(1):51–59. March 10.
- Becker G.S. 1962. "Investment in Human Capital: A Theoretical Analysis". *Journal of Political Economy*. 70(5: Part 2): 9–49. October.

Becker, G.S. 1975. Human Capital. National Bureau of Economic Research, New York.

Bhandari, L. and M. Bordoloi. 2006. "Income differentials and returns to education". *Economic and Political Weekly*. 41(36): 3893–3900.

Blaug, M. 1972. "Educated unemployment in Asia: A contrast between India and the Philippines". *The Philippine Economic Journal*. 11:33–35.

Blom, A. and H. Saeki. 2011. "Employability and Skill Set of Newly Graduated Engineers in India". *Policy Research Working Paper No. 5640*. World Bank, South Asian Region, Education Team. April.

Broadberry, S. N. and B. Gupta. 2010. *The historical roots of India's service-led development: a sectoral analysis of Anglo-Indian productivity differences, 1870–2000*. In: Conference on Economic Change Around the Indian Ocean in the Very Long Run, University of Warwick, Venice, Italy, 22–24 Jul 2008. Published in: *Explorations in Economic History*, Vol.47 (No.3). pp 264–278.

Cohen, D. and M. Soto, 2007. "Growth and human capital: good data, good results". *Journal of Economic Growth*. Springer, 12(1):51–76. March.

Comin, D. 2006. "Total Factor Productivity". <http://www.people.hbs.edu/dcomin/def.pdf>. November.

Cunha, F., Heckman, J. J., Lochner, L., & Masterov, D. V. (2006). Interpreting the evidence on life cycle skill formation. In E. A. Hanushek & F. Welch (Eds.), *Handbook of the Economics of Education*. (pp 697–812). Amsterdam: Elsevier.

Darian, J.C. 1985. "Marketing and Economic Development: A Case Study from Classical India". *Journal of Macromarketing*. Spring. 14–26.

Das Gupta, A. 2001. The World of the Indian Ocean Merchant, 1500–1800: Collected Essays of Ashin Das Gupta. New Delhi. p. 131.

Department of Education, Ohio, USA website.
<http://education.ohio.gov/Topics/Career-Tech/Career-Connections/Career-Pathways>.

Dictionary.com website. <http://www.dictionary.com/browse/skill>.

Duraisamy, P. 2002. "Changes in returns to education in India, 1983–94: by gender, age-cohort and location". *Economics of Education Review*. 21:609–622.

Duraisamy, P. and M. Duraisamy. 2017. "Social Identity and Wage Discrimination in the Indian Labour Market". *Economic and Political Weekly*. 52(4): 51–60. January 28.

Duraisamy, P. and S. Narasimhan. 1997. "Wage Differentials between Migrants and Non-Migrants and Discrimination in Urban Informal Sector in India". *The Indian Journal of Labour Economics*. 40(2): 223–235.

Dwivedi, B.L. 1994. Evolution of Educational Thought in India. Northern Book Centre, New Delhi.

Economist, 2013. "India's Outsourcing Business: On the Turn".
<http://www.economist.com/news/special-report/21569571-india-no-longer-automatic-choice-it-services-and-back-office-work-turn>. January 19.

Education for All in India: Sarva Shiksha Abhiyaan website.
<http://www.educationforallindia.com/chapter6-state-of-literacy-2011-census.pdf>.

Ehrenburg, R.G. and R.S. Smith. 2005. Modern Labour Economics: Theory and Public Policy. 9th Edition, Pearson Education, USA.

EPW Research Foundation. <http://www.epwrf.res.in/>.

Feenstra, R.C. and G.H. Hanson. 1997. "Foreign Direct Investment and Relative Wages: Evidence from Mexico's Maquiladoras". *Journal of International Economics*. 42(3-4): 371-393.

Foster, A.D. and Rosenzeig, M.R. 2004. "Technological change and the distribution of schooling: evidence from green-revolution India." *Journal of Development Economics*. 74(1): 87-111.

Suresh Chandra Ghosh. 1995. "Bentinck, Macaulay and the introduction of English education in India". *History of Education*. 24:1, 17-24, DOI: 10.1080/0046760950240102.

Ghosh, M. 2006. "Economic Growth and Human Development in Indian States". *Economic and Political Weekly*. 41(30):3321-3329. 29 July.

Green, F. 2013. Skills and Skilled Work: An Economic and Social Analysis. Oxford University Press, United Kingdom.

Goodreads website. <http://www.goodreads.com/quotes/194992-you-have-to-know-the-past-to-understand-the-present>.

Government of India, Ministry of Finance, Department of Economic Affairs, Economic Division. 2017. Economic Survey 2016-17.
<http://indiabudget.nic.in/survey.asp>. January.

Gupta, R. 2017. "Skilling India: The Role of Pedagogy in Developing Life Skills". *Forthcoming NCAER Working Paper*.

Habib, I. and T. Raychaudhari (eds.). 2008. *The Cambridge Economic History of India: Volume 1 – 1200 A.D. -1750 A.D.* Cambridge University Press, Cambridge, United Kingdom.

Halli, C.S. and S.M. Mullal. 2016. "Status of Women in India": Status of Ancient, Mediaeval And Modern". *Imperial Journal of Interdisciplinary Research (IJIR)*. 2(2): 297–300.

Hampf, F. and Ludger Woessmann. 2016. "Vocational vs. General Education and Employment over the Life-Cycle: New Evidence from PIAAC". *Centre for Vocational Education Paper Research Paper No. 003*. November.

Hanushek, E.A. 2013. "Economic Growth in Developing Countries: The Role of Human Capital". *Economics of Education Review*. 37: 204–212.

Hanushek, E.A. and L. Woessmann. 2008. "The Role of Cognitive Skills in Economic Development". *Journal of Economic Literature*. 46 (3): 607–668.

Hanushek, E.A. and L. Woessmann. 2012. "Do better schools lead to more growth? Cognitive skills, economic outcomes, and causation". *Journal of Economic Growth*. 17: 267–231.

Hanushek, E.A., Schwerdt, G., Woessmann, L. and L. Zhang. 2015. "General Education, Vocational Education, and Labor-Market Outcomes over the Life-Cycle". Forthcoming in *Journal of Human Resources*, Winter 2017.

Heckman, J.D. and T.D. Kautz. 2012. "Hard Evidence on Soft Skills". *Working Paper No. 18121*. <http://www.nber.org/papers/w18121>. National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138. June.

Heckman, J.D. and T.D. Kautz. 2013. "Fostering and Measuring Skills: Interventions That Improve Character and Cognition". *Working Paper No. 19656*. <http://www.nber.org/papers/w19656>. National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138. June.

Hnatkovska, V., Lahiri, A. and S. Paul. 2012. "Castes and Labour Mobility". *American Economic Journal: Applied Economics*. <http://dx.doi.org/10.1257/app.4.2.274>. 4(2): 274–307.

Hsieh, C. and P.J. Klenow. 2009. "Misallocation and Manufacturing TFP in China and India". *The Quarterly Journal of Economics*. 124(4). November.

Jayapalan, N. 2005. History of Education in India. Atlantic Publishers and Distributors, New Delhi 110027.

Jensen, R.T. 2010. "Economic Opportunities and Gender Differences in Human Capital: Experimental Evidence for India". *NBER Working Paper No. 16021*. <http://www.nber.org/papers/w16021.pdf>. National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138. May.

Joshi. L.M. 1977. Studies in the Buddhistic Culture of India during the Seventh and Eighth Centuries A.D. Narendra Prakash Jain for Motilal Banarasidass, Delhi 110007.

- Kalra, A. "Why government schools in Delhi are pushing students to become beauticians and mechanics". *Scroll.in*. <https://scroll.in/article/746214/why-government-schools-in-delhi-are-pushing-students-to-become-beauticians-and-mechanics>. August 22.
- Kapur, D. 2002. "The Causes and Consequences of India's IT Boom". *India Review*. 1(2): 91–110. April.
- Karan, A.K. and S. Selvaraj. 2008. Trends in Wages and Earnings in India: Increasing Wage Differentials in a Segmented Labour Market. *ILO Asia-Pacific Working Paper Series*. International Labour Organisation, New Delhi.
- Karnik, A. and M. Lalwani. 2012. "Growth performance of Indian States". *Empirical Economics*. 42:235–259.
- Kaufman, B.E. and J.L. Hotchkiss. 2006. *The Economics of Labour Markets*. Seventh Edition. Thomson Higher Education, USA.
- Kijima, Y. 2006. "Why did wage inequality increase? Evidence from urban India 1983–99". *Journal of Development Economics*. 81(1): 97–117.
- King, K. 2012. "The geopolitics and meanings of India's massive skills development ambitions". *International Journal of Educational Development*. 32:665–673.
- Kingdon, G. and N. Theopold. 2008. "Do returns to education matter to schooling participation?" *Education Economics*. 16(4): 329–350.
- Kochar, A. 2004. "Urban Influences of Rural Schooling in India." *Journal of Development Economics*. 74(1): 113–136.
- Kochhar, K., Kumar, U., Rajan, R., Subramanian, A. and I. Tokatlidis, I. 2006. "India's Pattern of Development: What Happened, What Follows". *International Monetary Fund Working Paper WP/06/22*. <http://www.imf.org/external/pubs/ft/wp/2006/wp0622.pdf>.
- Krueger, D. and K.B. Kumar. 2002. "Skill Specific Rather Than General Education: A Reason for US-Europe Growth Differences?" *NBER Working Paper No. 9408*. <http://www.nber.org/papers/w9408>. National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138. December.
- Kulkarni, P.M. 2014. "Demographic Transition in India". Office of Registrar General of India. <http://www.censusindia.gov.in/2011Census/Presentation/Demographic-Transition-in-India.pdf>.
- Kundu, A. and L.R. Saraswati. 2012. "Migration and Exclusionary Urbanisation in India". *Economic and Political Weekly*. 47(26 and 27): 219–227. June 30.
- Madheswaran, S. and P. Attewell. 2007. "Caste Discrimination in the Indian Urban Labour Market: Evidence from the National Sample Survey". *Economic and Political Weekly*. 42(41): 4146–4153. October 13.

Mahapatra, S. 2012. “Guild, the Institutional Economic Base of Ancient India”. *International Journal of Social Science and Interdisciplinary Research*. 1(9): 165–174.

Mehrotra, S. 2014. “From 5 million to 20 million a year: The challenge of scale, quality and relevance in India’s TVET”. *Prospects*. 44:267–277.

Mehrotra, S. 2016. Realising the Demographic Dividend: Policies to Achieve Inclusive Growth in India. Cambridge University Press, New Delhi, India.

Mincer J. 1981. “Human Capital and Economic Growth”. *NBER Working Paper No. 803*. <http://www.nber.org/papers/w803>. National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138. June.

Mincer, J. 1996. “Economic Development, Growth of Human Capital, and the Dynamics of the Wage Structure.” *Journal of Economic Growth*. 1(1): 29–48. March.

Ministry of Skill Development and Entrepreneurship (MSDE). 2015. National Policy for Skill Development and Entrepreneurship 2015. <http://www.msde.gov.in/National-Policy-2015.html>.

Ministry of Skill Development and Entrepreneurship (MSDE) website. <http://www.msde.gov.in/index.html>

Misra, S. and A.K. Suresh. 2014. “Estimating Employment Elasticity of Growth for the Indian Economy.” *RBI Working Paper Series WPS (DEPR): 06/2014*. Department of Economic and Policy Research. June.

Mitra, A. 2002. “Training and skill formation for decent work in the informal sector: case studies from South India”. EMP/SKILLS Working Paper No. 8. http://www.ilo.org/skills/pubs/WCMS_104012/lang--en/index.htm.

Nagaraj, R., Varoudakis, A. and M. Végonzonès. 1998. “Long-Run Growth Trends and Convergence across Indian States”. *Working Paper No. 131*. <http://www.oecd.org/dev/1922509.pdf>. OECD Development Centre, Paris. January.

Naik, J.P. 1979. “Education, Quality and Quantity: The Elusive Triangle in Indian Education”. *International Review of Education*. 25:167–185.

Narendra Modi website. <http://www.narendramodi.in/pm-s-remarks-at-the-launch-of-skill-india--206106>.

National Skill Development Mission website. <http://www.skilldevelopment.gov.in/nationalskillmission.html>.

National Skills Quality Framework (NSQF) website. <http://www.skilldevelopment.gov.in/nsqf.html>.

OECD. 2010. Learning for Jobs. <https://www.oecd.org/edu/skills-beyond-school/Learning%20for%20Jobs%20book.pdf>.

Office of the Registrar General and Census Commissioner (Census 2011) website, India, Ministry of Home Affairs, Government of India.

Ojha, V. P., & Pradhan, B. K. 2006. "Human capital formation and economic growth in India". In paper presented at the second annual conference on economic growth and development, January 10–12, 2006, Indian Statistical Institute (ISI), New Delhi, India, www.isid.ac.in/~planning/O%20and%20P.pdf.

Ojha, V.P. and J. Ghosh. 2014. "Optimizing Public Expenditure Allocations between Secondary and Higher Education". *JNU Discussion Paper 14–02*. Centre for International Trade and Development School of International Studies, Jawaharlal Nehru University, India. http://www.jnu.ac.in/SIS/CITD/DiscussionPapers/DP02_2014.pdf.

Ojha, V.P., Pradhan, B.K. and J. Ghosh. 2013. "Growth, inequality and innovation: A CGE analysis of India". *Journal of Policy Modeling*. 25:909–927.

Oster, E. and B.M. Steinberg. 2013. "Do IT Service Centers Promote School Enrollment? Evidence from India". *Journal of Development Economics*. 104:123–135.

Pelinescua, E. 2015. The impact of human capital on economic growth. *Procedia Economics and Finance*. 22: 184–190.

Pilz M., Uma, G. and R. Venkatram. 2015. "Skills development in the informal sector in India: The case of street food vendors". *International Review of Education*. 61:191–209.

Pilz, M. and S. Wilmshöfer. 2015. "Formal, non-formal, and informal learning in rural India: The case of fishing families on the Chilika Lagoon". *Prospects: Quarterly Review of Comparative Education*. 45: 231. June.

Planning Commission, Government of India. 2006. Report of the Working Group on Skill Development and Training set up for preparation of XI plan. planningcommission.nic.in/aboutus/committee/wrkgrp11/wg11_rpskill.pdf.

Planning Commission, Government of India. 2007. Report of the Task Force on Skill Development. planningcommission.nic.in/aboutus/taskforce/tf_skilldev.pdf. May.

Planning Commission, Government of India. 2008. Eleventh Five Year Plan (2007–12) Inclusive Growth. Volume 1. Chapter 5: Skill Development and Training. <http://planningcommission.gov.in/plans/planrel/fiveyr/welcome.html>.

Planning Commission, Government of India. 2013. Twelfth Five Year Plan (2012–2017) Social Sectors. Volume III. http://planningcommission.gov.in/plans/planrel/fiveyr/12th/pdf/12fyp_vol3.pdf. Sage Publications, New Delhi, India.

Rani, P.G. 2014. "Disparities in earning and education in India". *Cogent Economics and Finance*. <http://dx.doi.org/10.1080/23322039.2014.941510>.

Rao, G.M., Shand R, T. and K.P. Kaliranjan. 1999. "Convergence of Incomes across Indian States A Divergent View". *Economic and Political Weekly*. 34(13): 769–778. 27 March.

Riley, J.G. 1979. "Testing the Educational Screening Hypothesis". *Journal of Political Economy*. 87(5: Part 2): S227–S252. October.

Romer, P.M. 1990. "Endogenous Technological Change". *Journal of Political Economy*. 98(5). Part 2: S71–S102.

Roy, T. 2008. "The Guild in Modern South Asia". *International Review of Social History*. 53(S16): 95–120.

Saha, B. and Sarkar, S. 1999. "Schooling, Informal Experience, and Formal Sector Earnings: A Study of Indian Workers". *Review of Development Economics*. 3: 187–199. doi:10.1111/1467-9361.00060.

Self, S. and R. Grabowski. 2004. "Does education at all levels cause growth? India, a case study". *Economics of Education Review*. 23:47–55. 2: 941510.

Sen, B. 1989. "Development of Technical Education in India and State Policy- A Historical Perspective". *Indian Journal of History of Science*. 24(4): 224–248.

Sharma, S (ed.). 2016. Demographic Challenges in India. Athen Academic, London, United Kingdom.

Sharma, R.N. and R.K. Sharma. 2004. History of Education in India. Atlantic Publishers and Distributors, New Delhi, India.

Singh, M. 2001. "Reflections on Colonial Legacy and Dependency in Indian Vocational Education and Training (VET): A societal and cultural perspective". *Journal of Education and Work*. 14:2, 209–225, DOI: 10.1080/13639080120056664.

Singhari, S. and S. Madheshwaran. 2016. "The Changing Rates of Return to Education in India: Evidence from NSS Data". *ISEC Working Paper No. 358*. <http://www.isec.ac.in/WP%20358%20-%20Smritirekha%20Singhari%20and%20S%20Madheswaran%20-%20Final.pdf>.

Tan, H. and Savchenko, Y. 2005. "In-Service Training in India: Evidence from the India Firm-Level Investment Climate Survey". *World Bank Working Paper*.

Tilak, J. G. 1987. The economics of inequality in education. New Delhi: Sage.

Times of India. 2015. "Skill India Mission: Highlights of PM Modi's speech". <http://timesofindia.indiatimes.com/india/Skill-India-Mission-Highlights-of-PM-Modis-speech/articleshow/48085324.cms>. July 15.

Tsujita, Y (ed.). 2014. “Education and Labour Market Outcomes: A Study of Delhi Slum Dwellers” in Tsujita, Y. (ed.), *Inclusive Growth and Development in India*”, IDE-JETRO, Palgrave MacMillan.

UNDP website.

<http://www.in.undp.org/content/india/en/home/presscenter/pressreleases/2016/03/14/career-guidance-counselling-centres-launched-in-delhi-ncr-to-imp.html>.

United Nations Development Programme: Human Development Reports.
<http://hdr.undp.org/en/content/mean-years-schooling-adults-years>.

UNESCO. 2010. Engineering: Issues, Challenges and Opportunities for Development. UNESCO Publishing. Paris, France. Page 153.

University of Mumbai website.

archive.mu.ac.in/myweb_test/ma%20edu/History%20of%20Edu..pdf.

Wheebox. India Skills Report

2015.<https://wheebox.com/logo/India%20Skills%20Report2015.pdf>

Wheebox. India Skills Report 2016.<https://wheebox.com/india-skills-report-2016.htm>.

World Bank. 2002. Karnataka: Secondary Education and the New Agenda for Economic Growth. A World Bank Grey Cover Report.

World Bank. 2008. “Skill Development in India: The Vocational Education and Training System”. *Discussion Paper No. 22*, South Asia Human Development Sector, World Bank.

World Bank. 2009. Secondary Education in India: Universalising Opportunity. <http://www.educationforallinindia.com/secondary-education-in-india-universalizing-opportunity-by-world-bank.pdf>. South Asian Division. January.

World Bank. 2015. “Skill Development Programs in India: Labor Market Impacts and Effectiveness Findings of an Evaluation Study”.

<https://openknowledge.worldbank.org/.../LabourMarketDevelopmentPrograms.pdf>. March 25.

World Development Indicators (WDI) website, World Bank, Washington D.C.
<http://data.worldbank.org/data-catalog/world-development-indicators>.

World Economic Forum. 2016. The Future of Jobs Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution. January.

AppendixA1.1: Historical Evolution of Education, Employability and Employment

<i>Period</i>	<i>Economic Structure</i>	<i>Technological Change</i>	<i>Education</i>	<i>Training for a particular job role</i>	<i>Women were allowed</i>	<i>Other Social Groups</i>	<i>Comments</i>
Ancient India (Post Harappan/ Indus Valley civilization and Pre-600 B.C.)	Agrarian	Bronze Age	Vedic Education - Focus on intellectual and spiritual development including character building, development of civic responsibilities and social values, personality development and preservation of culture; Commercial and Mathematics Education	Varna system based on occupational groups which gave way to more stringent caste groups	Yes; till about 500 B.C.	Open about 1400 B.C.	Oral Traditions
			Post-Vedic Education (1400 B.C.-600 B.C.): Including the above plus focus on history and grammar				
			Cultivation and Animal Husbandry				

Appendix 1.1 contd.							
Period	Economic Structure	Technological Change	Education	Training for a particular job role	Women were allowed	Other Social Groups	Comments
Ancient India 600 B.C.–400 A.D.	Agrarian, Industry, Artisans, Trade	Iron Age, Introduction of coins, writing	Post-Vedic education continued during the Mauryan period	Guilds (not necessarily caste-based) for apprentice training	Fall in Women’s Education but not necessarily restricted	The two lower castes were set aside	Guru was very important in education. Varna system gave way to caste.
			Cultivation and Animal Husbandry				
Ancient India, Gupta Period – 300 A.D. to 600 A.D. and Early Medieval Period – 600 A.D. to 1200 A.D.			Brahmanic System of Education focused on religious elements; character building; personality development; self-control; and also taught life skills	Guilds continued to do well, same as above	Restricted with arts and crafts education passed on to women	Restricted to the top two castes especially Brahmins	Theoretical education and in Sanskrit; divide between education and other job related training was set here
			Buddhism System of Education including theology, philosophy, logic, medicine, law, polity, music, astrology, astronomy, art,	Along with the existence of guilds mentioned above for training; Buddhist education system also included technical	Allowed but under stricter regulations	Caste no barrier but in practice, it was dominated by the higher castes	Federated institutions, language of instruction was in Pali or Prakrit; Foreign students visited these centres; writing was also taught; verbal education was also there,

Appendix 1.1 contd.							
Period	Economic Structure	Technological Change	Education	Training for a particular job role	Women were allowed	Other Social Groups	Comments
			comparative study of religions; 12 years of education with age of entry around 8 years old	education in many trades			discussions, presentation of evidence and logic was stressed
Medieval India post 1200 A.D.to 1750 A.D.	Agrarian including horticulture, textiles production, building industry, mining and producing goods for royal use		Buddhist, Brahmanic education survived but Muslim education also came along. The latter focused on urban education by endowing libraries and literary societies. Founded primary schools (<i>maktabs</i>) and secondary schools (<i>madradas</i>) to teach languages, writing, and arithmetic and	Apprentice training in factories producing goods for royal use; focused on urban areas	Segregation and women learned at home	Rural areas ignored both in general education and training or divide between urban and rural artisans; focus of education on one group	No universities and neglect of vernacular languages; military education was made compulsory; education was free but not universal; low status of teachers; defective curriculum with many subjects ignored; development of literature and writing of history in Mughal India along with development of

Appendix 1.1 contd.							
Period	Economic Structure	Technological Change	Education	Training for a particular job role	Women were allowed	Other Social Groups	Comments
			give religious education. Science, drawing, music were later encouraged too.				specialised institutions on astronomy and geography
British India - 18 th century to 1947	Agriculture to Services	Industrial Revolution	Focus on languages, mathematic and accountancy. Primary education recognised compulsory but slow in implementation. Examination based testing and high failure; colleges and universities opened; rote learning was a problem and teacher training schools were set up	Dual Models: Limited introduction of formal technical and vocational education by the British but Producer and trade collectives with sophisticated apprentice systems by Indians	Open	Open but basic philosophy was that teach upper classes and they will in turn teach the others	English was the medium of instruction; introduced concept of public and private schools; secularised schools
Post-1947 to 2007	Agriculture to Services	Desktop computers, internet, new	General structured education focusing on	Vocational and Technical Education;	Yes	Yes	Legacy of Brahmanic-British general education

Appendix 1.1 contd.							
<i>Period</i>	<i>Economic Structure</i>	<i>Technological Change</i>	<i>Education</i>	<i>Training for a particular job role</i>	<i>Women were allowed</i>	<i>Other Social Groups</i>	<i>Comments</i>
		communication systems	languages, arithmetic, science and social science	Apprenticeship Act			continues with uncertain quality but limited vocational and technical education, and worse, limited job opportunities for them
			Vocational Courses offered in secondary education; technical courses with University degrees				

Sources: Compiled from Darian (1985), Dwivedi (1994), Halli and Mullal (2016), Habib and Raychaudhari (2008), Jayapalan (2005), Mahapatra (2012), Roy (2008), Sen (1989), Sharma and Sharma (2004), Singh (2001) and University of Mumbai.

Appendix A1.2: Description of Education and Employment Data from the National Sample Survey Organisation, 2011–12²⁴

A1.2.1 Education Definition

1. “General educational level: A person who can both read and write a simple message with understanding in at least one language was considered as literate for the purpose of the survey. For all the individuals who were found to be literate, the general level of education was collected in terms of highest level of education successfully completed by him/her. Highest level of education successfully completed by each member of the household was decided by considering his/ her all general/ technical/ vocational educational level and was recorded in terms of 12 categories viz. (i) not literate, (ii) literate without formal schooling: (a) Education Guarantee Scheme (EGS)/Non-formal Education Courses (NFEC)/ Adult Literacy Centres (AEC), (b) Total Concepts and (c) others; (iii) literate but below primary, (iv) primary (v) middle, (vi) secondary, (vii) higher secondary, (viii) diploma/certificate course, (ix) graduate, and (x) postgraduate and above. The criterion for deciding primary, middle, secondary, etc. levels were the same as that has been followed in the concerned states/union territories. The category ‘diploma or certificate course’ meant diploma or certificate courses in general education, technical education or vocational education, which is below graduation level. Diploma or certificate courses in general education, technical education or vocational education, which is equivalent to graduation level, was considered under the category ‘graduate’. Similarly, diploma or certificate courses in general education, technical education or vocational education, which is equivalent to post-graduation level and above were considered under the category ‘post-graduate and above’.
2. Technical educational level: The highest level of technical education successfully completed by each member of the household was recorded in terms of 12 categories viz. (i) no technical education, (ii) technical degree in agriculture / engineering / technology / medicine etc. (iii) diploma or certificate below graduate level in: (a) agriculture, (b) engineering/technology, (c) medicine, (d) crafts, (e) other subjects, and (iv) diploma or certificate equivalent to graduate and above level in: (a) agriculture, (b) engineering/technology, (c) medicine, (d) crafts, (e) other subjects. Technical diploma or certificate in ‘other subjects’ included diploma or certificate in management, applied arts, etc.
3. Vocational training: The main objective of vocational education and training is to prepare persons, especially the youth, for the world of work and make them employable for a broad range of occupations in various industries and other economic sectors. It aims at imparting training to persons in very specific fields through providing significant ‘hands on’ experience in acquiring necessary skill in the specific vocation or trade, which make them employable or create for them opportunities of self-employment. A vocational training was broadly defined as a training, which prepared an individual for a specific vocation or occupation.

²⁴ Directly Reproduced from National Sample Survey Office, Ministry of Statistics and Programme Implementation, Government of India. 2014. Employment and Unemployment Situation in India: NSS 68th Round, July 2011 to June 2012. NSS Report No. 554(68/10/1). http://mospi.nic.in/sites/default/files/publication_reports/nss_report_554_31jan14.pdf.

- a. **Formal vocational training:** The vocational training that took place in educational and training institutions which followed a structured training programme and led to certificates, diplomas or degrees, recognised by State/Central Government, Public Sector and other reputed concerns was considered as formal vocational training. By structured training programme, it was meant that (i) the training programme had a definite title with prescribed syllabus and curriculum and a specified duration of the training, and (ii) the training had some entry level eligibility in terms of education and age.
- b. **Non-formal vocational training:** (a) **Hereditary:** The expertise in a vocation or trade is sometimes acquired by the succeeding generations from other members of the households, generally the ancestors, through gradual exposures to such works as are involved in carrying out the profession by their ancestors. The expertise gained through significant ‘hands-on’ experience enables the individual to take up activities in self-employment capacity or makes him employable. These were considered as non-formal vocational training acquired through ‘hereditary’ sources. (b) **Self-learning:** The expertise in a vocation or trade when acquired by a person through his/her own effort, without any training under any person or organisation, was considered as non-formal vocational training acquired through ‘self-learning’. (c) **Learning on the job:** The expertise acquired by a person while in employment (current and/or past), either through informal training by the employer or organisation or through the exposure to the type of job that he/she was performing, was considered as non-formal vocational training acquired through ‘learning on the job’. (d) **Other:** ‘Other’ sources included cases where the expertise for a vocation or trade was developed even from the household members or ancestors, provided the said vocation or trade was different from the one relating to their ancestors.”

A1.1.2 Employment Definitions

“A regular salaried wage/employee is a person working in other’s farm or nonfarm enterprises (both household and non-household) and getting in return salary or wages on a regular basis (and not on the basis of daily or periodic renewal of work contract). The category of salaried/wage employees includes not only salary and wage earners getting time wage but also those getting piece wage or salary and paid apprentices, both full-time and part-time.

A person casually engaged in other’s farm or non-farm enterprises (both household and non-household) and getting in return wages according to the terms of the daily or periodic work contract is treated as casual wage labour.”

**Appendix A1.3: Percentage Share of Regular and Casual Workers,
2011–12**

<i>State/UT</i>	<i>Share of employees (other than Self- Employed)</i>	<i>Share of Regular Workers within Employees</i>	<i>Share of Casual Workers within Employees</i>
Andaman and Nicobar Islands	63.5	72.1	27.9
Andhra Pradesh	55.5	32.5	67.5
Arunachal Pradesh	25.2	72.8	27.2
Assam	31.7	44.8	55.2
Bihar	47.4	12.2	87.8
Chandigarh	64.3	87.4	12.6
Chhattisgarh	46.1	21.1	78.9
Delhi	66.3	94.9	5.1
Goa	71.9	83.8	16.2
Gujarat	48.6	51.1	48.9
Haryana	44.3	54.0	46.0
Himachal Pradesh	32.4	56.1	43.9
Jammu & Kashmir	39.9	51.3	48.7
Jharkhand	36.2	28.6	71.4
Karnataka	52.2	43.4	56.6
Kerala	62.3	36.1	63.9
Madhya Pradesh	42.5	26.7	73.3
Maharashtra	53.2	50.0	50.0
Manipur	32.8	43.9	56.1
Meghalaya	34.6	48.0	52.0
Mizoram	30.1	73.4	26.6
Nagaland	26.2	92.8	7.2
Odisha	39.3	27.0	73.0
Puducherry	75.0	60.7	39.3
Punjab	48.7	56.6	43.4
Rajasthan	36.6	35.7	64.3
Tamil Nadu	68.3	37.4	62.6
Tripura	59.1	21.9	78.1
Uttar Pradesh	35.7	30.1	69.9
Uttarakhand	31.0	56.8	43.2
West Bengal	53.7	31.0	69.0
India	47.8	37.5	62.5

Note: Casual labour is defined in Appendix A1.2.

Source: NSSO 2011–12.

Appendix A1.4: Percentage Share of General Educational Attainment of 15+ Usually Employed Labour Force (Principal plus subsidiary workers), 1983 to 2011–12

<i>Rural / Urban</i>	<i>Educational Attainment</i>	<i>Male</i>						
		<i>1983</i>	<i>1987–88</i>	<i>1993–94</i>	<i>1999–2000</i>	<i>2004–05</i>	<i>2009–10</i>	<i>2011–12</i>
Rural	Not Literate	52.1	48.9	43.7	39.6	33.8	28	27.9
	Up to Primary	29.3	29.8	29.1	27.3	29.4	28.1	27.6
	Middle	10.9	11.4	13.7	16.3	18.1	19.8	19.0
	Secondary	6.3	8.0	7.5	9.3	9.3	12.6	12.9
	Higher Secondary	–	–	3.3	4.2	4.6	6.3	6.6
	Diploma/ Certificate*	–	–	–	–	1.0	0.9	1.1
	Graduate & above	1.4	1.9	2.6	3.3	3.8	4.4	5
Urban	Not Literate	22.3	20.3	18.4	16	13.1	11.4	11.2
	Up to Primary	30.4	30.9	25.8	21.9	22.7	18.3	18.8
	Middle	17.8	16	17.3	18.8	19.4	17.9	17.5
	Secondary	19.5	21.3	15.5	16.9	15	17.6	16.5
	Higher Secondary	–	–	8.7	9.4	9.2	10.8	10.9
	Diploma/ Certificate*	–	–	–	–	3.7	2.9	2.9
	Graduate & above	9.9	11.5	14.3	16.8	16.9	21.1	22.2
		<i>Female</i>						
Rural	Not Literate	85.1	82.9	78.5	73.9	66.4	57.8	56.3
	Up to Primary	11.2	12.1	14.2	15.5	18.4	22.6	21.8
	Middle	2.5	3.1	4.3	6.2	8.7	10.6	10.8
	Secondary	1.1	1.6	1.9	2.8	3.6	4.9	5.9
	Higher Secondary	–	–	0.6	0.9	1.4	2.1	2.6
	Diploma/ Certificate*	–	–	0	–	0.5	0.4	0.5
	Graduate & above	0.2	0.3	0.4	0.6	0.9	1.5	2.1
Urban	Not Literate	59.3	55.1	48.9	43.9	37.3	29.7	27.9
	Up to Primary	19.3	19.4	19.7	17.6	20.3	19.3	19.5
	Middle	6.5	6.4	8.4	10.3	11.9	12.9	12.3
	Secondary	9	10.7	7.6	8.8	7.3	8.4	9.1
	Higher Secondary	0	0	4.7	5.5	5.1	6.2	7.1
	Diploma/ Certificate*	0	0	0	–	3.4	2.8	2.3
	Graduate & above	5.8	8.5	10.6	13.9	14.7	20.7	21.8

Notes: 1. Before the 55th Round (1999–2000), there was no separate code for attainment of Diploma/Certificate and therefore data are available from 2004–05 only. 2. Usual status means employment status based on information collected for the whole year.

Source: Several Rounds of the NSSO.

Appendix A1.5: Average Wage Rate (per day in Rs) of Workforce (principal plus subsidiary workers) Across Educational Levels by Age Groups, 2011–12

Age Profile	General Education							Technical Education					Vocational Education					S+ RFT+ ReFT		
	NL	P	M	S	HS	D/C	G	PG	NTE	Subject	BG	AG	RFT	ReFT	NFH	NFSL	NF-LOJ		NFO	NVT
15–20	114	121	125	139	134	188	149		124	214	191	149	128	174	121	136	126	156	123	159
20–25	129	140	152	167	181	276	350	370	163	619	298	442	232	303	131	164	185	174	167	299
25–30	133	146	168	196	239	326	467	603	202	862	365	644	333	398	126	189	207	195	225	413
30–35	132	149	176	205	272	424	542	764	213	1,207	477	979	417	445	141	247	239	252	238	479
35–40	129	155	192	245	316	538	596	839	224	1,305	594	918	560	576	158	263	281	259	241	635
40–45	129	165	209	289	398	597	712	906	248	1,542	682	959	699	657	141	259	284	196	259	731
45–50	143	181	234	360	471	671	806	1,074	277	1,307	734	1,405	692	664	133	286	308	243	293	744
50–55	140	188	279	420	564	736	958	1,151	328	1,426	861	1,222	905	846	149	173	358	309	349	908
55–60	138	199	333	475	695	777	872	1,238	336	1,739	934	1,361	735	1,031	200	309	388	291	345	1,120
60–65	121	152	176	229	273	161	711	1,174	152	1,917	392	1,431								N.A.
65+	120	140	133	333	205	188	329	949	136	1,401	307	1,111								N.A.
All	132	155	183	247	317	453	613	834	224	1,129	502	900	483	515	141	225	238	217	244	553

Notes: NL stands for Not-literate up to Below Primary; P stands for up to Primary school; M stands for middle school, S stands for secondary school; HS stands for higher secondary school; D/C stands for diploma/certificate, G stands for graduate and; PG stands for Post-Graduate and above. NTE stands for no technical education; Subject stands for technical degree in agriculture/engineering/medicine; BG stands for Below Graduate Level and; AG stands for graduate and above level in technical education. RFT stands for receiving vocational education; ReFT stands for Received formal education; NFH stands for non-formal hereditary vocational education; NFSL stands for non-formal self-learning; NF-LOJ stands for non-formal vocational education learning on the job and; NVT stands for no vocational training.

Source: NSSO 2011–12.

Appendix A1.6: Unemployment at Various Age Groups by Educational Attainment, 2011–12

Age Profile	General Education								Technical Education				Vocational Education						
	NL	P	M	S	HS	D/C	G	PG	NTE	Subject	BG	AG	RFT	ReFT	NFH	NFSL	NF-LOJ	NFO	NVT
15–20	6.0	6.6	9.5	10.2	19.3	24.6	46.3	–	8.7	48.0	22.6	0.0	15.7	11.2	0.0	6.3	1.2	5.8	10.0
20–25	0.9	2.6	4.4	6.7	11.0	23.6	28.5	36.7	6.7	43.4	27.1	27.9	25.2	21.4	0.7	1.1	0.6	8.2	8.1
25–30	0.4	0.6	1.5	3.2	4.6	8.0	12.3	15.7	3.0	6.4	11.3	13.4	13.2	7.5	0.2	1.1	0.4	2.3	3.7
30–35	0.3	0.4	0.9	1.4	2.5	3.7	4.4	5.3	1.2	2.6	5.4	5.4	4.9	4.6	0.2	0.4	0.2	0.8	1.3
35–40	0.1	0.1	0.4	0.4	1.1	2.0	0.9	0.9	0.3	0.3	1.1	0.5	0.0	1.9	0.0	0.2	0.1	0.0	0.4
40–45	0.0	0.0	0.2	0.5	0.1	0.4	0.3	0.2	0.1	0.0	0.5	0.1	1.5	0.1	0.0	0.0	0.1	0.3	0.1
45–50	0.1	0.2	0.1	0.1	0.1	0.0	0.3	0.4	0.1	0.0	0.0	0.1	2.2	0.2	0.0	0.0	0.0	0.0	0.1
50–55	0.0	0.0	0.2	0.4	0.0	0.0	1.1	0.0	0.1	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.2
55–60	0.1	0.1	0.0	0.7	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
60–65	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–	–	–	–	–	–	–
65+	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	–	–	–	–	–	–	–
All	0.4	1.0	2.1	2.6	4.5	8.1	7.6	7.5	1.9	9.0	9.4	7.7	9.6	6.6	0.1	0.8	0.3	2.2	2.4

Notes: NL stands for not literate up to below primary; P stands for up to primary school; M stands for middle school, S stands for secondary school; HS stands for higher secondary school; D/C stands for diploma/certificate, G stands for graduate and; PG stands for post-graduate and above. NTE stands for no technical education; Subject stands for technical degree in agriculture/engineering/medicine; BG stands for below graduate level and; AG stands for graduate and above level in technical education. RFT stands for receiving vocational education; ReFT stands for received formal education; NFH stands for non-formal hereditary vocational education; NFSL stands for non-formal self-learning; NF-LOJ stands for non-formal vocational education learning on the job and; NVT stands for no vocational training.

Source: NSSO 2011–12

Appendix A1.7: Unemployment Rate by Educational Category, 1999–2000 to 2011–12 (15 and above age groups)

Category	Round	Year	NL	Primary	Middle	Secondary	Higher Secondary	Diploma/Certificate*	Graduate and Above	All
Rural All	55 th	1999–00	0.2	0.9	2.4	5.2	7.0	–	10.9	1.5
	61 st	2004–05	0.1	1.0	2.0	4.4	6.8	11.6	9.4	8.5
	66 th	2009–10	0.3	0.9	2.0	2.4	5.1	13.8	8.5	1.5
	68 th	2011–12	0.3	0.9	1.9	2.5	4.0	10.2	9.1	1.5
Rural Female	55 th	1999–00	0.0	0.5	3.0	9.8	14.2	–	30.0	1.1
	61 st	2004–05	0.4	1.3	3.4	9.5	17.1	23.2	27.5	15.5
	66 th	2009–10	0.2	0.8	2.3	4.7	15.3	33.1	20.4	1.6
	68 th	2011–12	0.2	0.6	2.5	5.5	8.8	19.2	18.7	1.7
Rural Male	55 th	1999–00	0.2	1.0	2.3	4.4	6.1	–	8.3	1.6
	61 st	2004–05	0.2	1.1	1.6	3.2	4.7	7.6	6.2	6.8
	66 th	2009–10	0.5	1.0	1.6	2.1	3.5	9.0	6.3	1.6
	68 th	2011–12	0.5	1.0	1.8	1.9	3.1	8.2	7.2	1.6
Urban All	55 th	1999–00	1.1	2.6	5.4	6.1	8.9	–	7.7	4.7
	61 st	2004–05	0.6	2.3	4.6	5.4	6.0	9.4	8.4	3.7
	66 th	2009–10	0.9	1.3	2.8	3.2	5.2	6.1	5.9	3.3
	68 th	2011–12	0.5	1.8	2.2	2.8	5.2	6.0	6.7	3.4
Urban Female	55 th	1999–00	0.7	2.2	7.9	11.4	16.2	–	14.7	5.7
	61 st	2004–05	0.3	2.9	8.0	13.4	15.7	15.3	17.0	0.0
	66 th	2009–10	0.4	0.5	4.3	11.8	11.3	9.4	12.7	5.7
	68 th	2011–12	0.8	1.3	3.7	6.8	9.2	10.2	12.7	4.9
Urban Male	55 th	1999–00	1.3	2.7	5.2	5.1	7.7	–	6.2	4.4
	61 st	2004–05	0.8	2.1	4.3	4.3	4.3	7.7	5.8	4.0
	66 th	2009–10	1.0	1.7	2.6	2.2	4.5	5.3	4.3	2.9
	68 th	2011–12	0.7	1.9	2.2	2.1	4.6	5.1	5.1	3.0

Notes: NL stands for not literate up to below primary; P stands for from literate up to primary school; M stands for middle school, S stands for secondary school; HS stands for higher secondary school; D/C stands for diploma/certificate, G stands for graduate and above. Source: Author's computations various rounds of NSSO.

Appendix A1.8: Population by Educational and Employment Category, 2011–12 (15 and above age groups)

	<i>Percentage of 15+ population</i>						<i>Percentage of 15–35 population</i>					
	<i>Rural</i>			<i>Urban</i>			<i>Rural</i>			<i>Urban</i>		
	<i>M</i>	<i>F</i>	<i>T</i>	<i>M</i>	<i>F</i>	<i>T</i>	<i>M</i>	<i>F</i>	<i>T</i>	<i>M</i>	<i>F</i>	<i>T</i>
Labour force	81.3	35.8	58.7	76.4	20.5	49.3	71.9	30.8	51.4	69.0	19.9	45.5
Workforce (Principal + Subsidiary Workers)	80.0	35.2	57.8	74.1	19.5	47.6	69.1	29.7	49.5	64.8	17.9	42.3
Only Employed	79.0	34.9	57.1	73.4	19.2	47.1	67.1	29.1	48.2	63.4	17.4	41.3
Employed plus currently pursuing either general or vocational education	1.0	0.3	0.6	0.7	0.2	0.5	2.0	0.6	1.3	1.4	0.5	0.9
Only currently pursuing either general or vocational education	12.5	8.6	10.5	14.6	12.1	13.4	25.7	17.6	21.7	28.7	24.4	26.6
Unemployed and currently neither pursuing general nor technical education	1.3	0.5	0.9	2.2	1.0	1.6	2.6	1.0	1.8	4.1	1.9	3.0
Unemployed and currently pursuing either general or technical education	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1
Neither pursuing general nor technical education and not in labour force	6.2	55.6	30.8	9.1	67.4	37.4	2.5	51.7	27.0	2.4	55.9	28.0

Note: M stands for males, F for females and T for total.

Source: Author's Computations from NSSO.

Appendix A1.9: Labour Force Participation Rate by Educational Category, 1999–2000 and 2011–12 (15 and above)

<i>Category</i>	<i>Round</i>	<i>Year</i>	<i>NL</i>	<i>Primary</i>	<i>Middle</i>	<i>Secondary</i>	<i>Higher Secondary</i>	<i>Diploma/Certificate*</i>	<i>Graduate and Above</i>	<i>All</i>
Rural All	55 th	1999–00	65.4	69.7	61.6	61.9	61.8	–	81.0	65.7
	61 st	2004–05	67.3	71.7	65.5	61.1	59.9	82.5	80.0	59.1
	66 th	2009–10	58.8	67.0	60.4	54.2	50.7	71.9	70.3	60.4
	68 th	2011–12	58.2	65.4	57.9	51.4	47.2	73.4	68.9	58.7
Rural Female	55 th	1999–00	51.3	40.5	29.9	28.5	24.0	–	44.3	45.7
	61 st	2004–05	55.2	45.5	38.4	33.7	30.4	68.1	47.6	23.9
	66 th	2009–10	43.3	38.7	30.1	23.3	21.6	50.7	37.4	37.8
	68 th	2011–12	41.9	36.3	28.3	23.5	19.3	50.5	36.5	35.8
Rural Male	55 th	1999–00	89.7	88.9	78.6	77.1	75.9	–	91.2	85.5
	61 st	2004–05	89.4	90.5	81.5	75.6	74.4	88.9	90.7	93.0
	66 th	2009–10	87.8	90.9	79.7	71.2	65.7	80.2	84.6	82.5
	68 th	2011–12	88.4	90.1	78.4	68.1	63.8	81.5	84.1	81.3
Urban All	55 th	1999–00	46.3	53.4	50.1	47.7	44.9	–	66.0	51.0
	61 st	2004–05	47.5	57.4	51.9	46.6	43.4	78.0	64.9	54.7
	66 th	2009–10	42.2	53.3	50.2	43.5	38.1	67.2	60.9	48.8
	68 th	2011–12	43.1	54.9	49.9	42.2	38.3	63.0	62.3	49.3
Urban Female	55 th	1999–00	27.3	18.1	14.0	14.0	14.8	–	32.0	20.9
	61 st	2004–05	30.5	24.1	17.5	14.2	15.3	57.4	34.9	14.0
	66 th	2009–10	23.2	20.7	16.1	11.0	10.6	43.4	29.6	19.4
	68 th	2011–12	24.2	22.6	16.4	11.8	11.9	38.3	31.9	20.5
Urban Male	55 th	1999–00	85.0	85.3	77.2	70.4	65.9	–	85.9	78.7
	61 st	2004–05	83.8	87.3	79.4	70.3	63.5	86.5	84.4	79.5
	66 th	2009–10	82.4	85.9	78.0	68.2	60.3	77.1	82.4	76.2
	68 th	2011–12	83.8	86.3	78.2	66.5	61.1	72.8	83.3	76.4

Notes: NL stands for not literate up to below primary; P stands for from literate up to primary school; M stands for middle school, S stands for secondary school; HS stands for higher secondary school; D/C stands for diploma/certificate, G stands for graduate and above.

Source: Author's Computations from various rounds of NSSO.

Appendix A1.10: Labour Force Participation Rate and Workforce Participation Rate for 15 and above, 2011–12 (principal and subsidiary status)

<i>State</i>	<i>Labour Force Participation Rate</i>			<i>Workforce Participation Rate</i>		
	<i>All</i>	<i>Male</i>	<i>Female</i>	<i>All</i>	<i>Male</i>	<i>Female</i>
Andaman and Nicobar Islands	58.5	81.2	35.9	54.7	79.1	30.5
Andhra Pradesh	63.3	80.4	47.0	62.1	78.5	46.4
Arunachal Pradesh	56.0	73.0	37.9	54.8	71.5	37.0
Assam	50.8	82.4	17.3	48.5	78.8	16.3
Bihar	44.7	77.1	8.7	43.3	75.0	8.0
Chandigarh	51.7	81.0	17.2	48.6	76.8	15.5
Chhattisgarh	68.8	81.9	55.3	67.8	80.5	54.8
Dadra and Nagar Haveli	51.7	79.5	21.3	51.7	79.5	21.3
Daman & Diu	56.6	89.3	11.6	56.5	89.3	11.4
Delhi	47.6	76.0	14.8	45.8	73.1	14.2
Goa	47.5	70.6	24.3	45.2	67.1	23.2
Gujarat	58.0	82.9	30.1	57.7	82.5	30.0
Haryana	48.8	74.9	19.5	47.4	72.7	19.0
Himachal Pradesh	69.6	76.5	63.3	68.8	75.6	62.5
Jammu & Kashmir	55.1	76.1	32.4	53.2	74.0	30.7
Jharkhand	54.2	82.5	25.4	52.8	80.5	24.6
Karnataka	57.0	80.7	32.7	56.1	79.5	32.2
Kerala	52.6	76.7	31.9	49.1	74.4	27.4
Lakshadweep	50.0	78.9	22.1	43.1	73.4	13.7
Madhya Pradesh	56.8	81.1	30.6	56.3	80.3	30.4
Maharashtra	58.4	77.5	38.1	57.6	76.5	37.6
Manipur	56.3	76.3	36.0	54.3	73.9	34.3
Meghalaya	66.5	78.2	54.8	66.0	77.6	54.4
Mizoram	65.1	81.4	48.8	63.1	79.4	46.7
Nagaland	59.2	76.9	41.2	48.7	64.5	32.6
Odisha	58.5	84.8	32.5	57.1	82.7	31.9
Puducherry	48.0	74.0	23.5	47.0	72.5	22.9
Punjab	53.8	78.8	26.8	52.6	77.0	26.3
Rajasthan	59.7	76.2	42.8	59.0	75.1	42.6
Sikkim	72.0	80.7	62.8	71.2	79.6	62.2
Tamil Nadu	59.5	79.9	40.0	58.2	78.3	38.9
Tripura	60.7	83.9	37.3	52.9	77.9	27.6
Uttar Pradesh	52.8	80.6	24.5	52.0	79.1	24.3
Uttarakhand	53.8	71.9	36.5	52.2	70.1	35.1
West Bengal	54.5	82.9	25.4	52.8	80.3	24.6

Note: Labour Force is the number of people who are employed or are seeking for jobs. The rate is the percentage of 15+ female population who are part of the labour force. Workforce Participation rate is the percentage of 15+ female population who are employed.

Source: NSSO.

Appendix A1.11: Educational Attainment of Population (%), 1983 to 2011–12

Category	Round	Year	All Persons				Persons of age 15 years and above			
			Not Literate	Primary	Middle	Secondary and Above	Not Literate	Primary	Middle	Secondary and Above
Rural male	38th	1983	55.0	31.2	8.5	5.2	49.8	28.5	12.7	8.9
	43rd	1987–88	51.6	32.5	9.0	6.9	46.3	28.9	13.3	11.5
	50th	1993–94	45.5	33.7	10.9	9.8	41.1	27.6	15.4	15.7
	55th	1999–2000	41.2	34.2	12.6	11.7	37.2	26.2	17.8	18.9
	61st	2004–05	36.4	36.1	14.0	13.4	32.0	27.7	19.1	21.1
	66th	2009–10	29.4	35.7	16.0	18.8	26.0	25.3	20.5	28.1
	68th	2011–12	28.4	35.5	15.5	20.5	25.3	24.7	19.7	30.3
Rural female	38th	1983	78.0	17.3	3.2	1.4	79.8	13.6	4.3	2.3
	43rd	1987–88	74.0	19.9	3.9	2.2	76.4	15.0	5.2	3.4
	50th	1993–94	67.9	23.0	5.6	3.4	70.8	16.6	7.3	5.3
	55th	1999–2000	61.5	26.0	7.5	5.0	65.2	17.4	9.6	7.7
	61st	2004–05	55.0	29.3	8.9	6.7	58.5	19.9	11.3	10.2
	66th	2009–10	46.7	31.8	11.1	10.3	49.8	21.9	13.5	14.8
	68th	2011–12	44.5	31.7	11.6	12.1	47.5	21.3	13.8	17.4
Urban male	38th	1983	30.5	34.4	14.5	20.4	20.2	28.0	19.7	32.1
	43rd	1987–88	27.7	35.7	13.3	22.9	18.1	28.3	18.0	35.5
	50th	1993–94	24.1	33.2	14.5	28.1	16.2	23.3	18.4	41.9
	55th	1999–2000	21.6	30.9	15.6	31.7	14.4	19.9	19.3	46.4
	61st	2004–05	19.5	30.0	16.0	34.5	12.1	20.2	19.4	48.3
	66th	2009–10	16.4	27.4	15.0	41.1	10.4	16.0	17.5	56.1
	68th	2011–12	15.8	27.9	14.6	41.6	9.9	16.5	16.9	56.6
Urban female	38th	1983	48.3	30.3	10.2	11.0	45.2	24.0	13.3	17.4
	43rd	1987–88	44.1	31.9	9.7	14.0	41.5	24.4	12.4	21.6
	50th	1993–94	38.4	31.0	11.8	18.7	36.3	21.6	14.3	27.7
	55th	1999–2000	34.3	29.9	13.2	22.5	31.8	19.5	15.7	32.8
	61st	2004–05	30.7	29.4	14.4	25.5	27.9	19.7	16.8	35.6

Appendix A1.11: Educational Attainment of Population (%), 1983 to 2011–12

<i>Category</i>	<i>Round</i>	<i>Year</i>	<i>All Persons</i>				<i>Persons of age 15 years and above</i>			
			<i>Not Literate</i>	<i>Primary</i>	<i>Middle</i>	<i>Secondary and Above</i>	<i>Not Literate</i>	<i>Primary</i>	<i>Middle</i>	<i>Secondary and Above</i>
	66th	2009–10	26.4	27.0	13.6	32.8	23.6	17.2	15.3	43.9
	68th	2011–12	25.3	27.1	13.5	34.0	22.6	17.0	15.1	45.3

Notes: Not Literate includes not literate up to below primary; Primary stands includes from literate up to primary school; Middle includes middle school, Secondary and above includes secondary education and above.

Source: Author's computations NSSO 2011–12.

Source: NSSO.

Appendix A1.12: Educational Attainment of 15+ Population, 2011–12

State	General Education						Technical Education				Vocational Education			
	NL	P	M	S	HS	DC	G	NTE	Subject	BG	AG	F	NFV	NVT
Andaman and Nicobar Islands	15.5	24.6	22.9	14.6	7.8	6.1	8.6	91.7	0.2	6.9	1.2	13.0	9.5	77.5
Andhra Pradesh	38.4	16.6	11.3	14.9	8.9	1.2	8.7	97.2	0.6	1.5	0.7	2.4	11.7	86.0
Arunachal Pradesh	27.6	20.7	20.1	13.7	10.7	0.6	6.7	98.7	0.2	0.7	0.5	0.8	2.5	96.7
Assam	17.5	31.8	24.3	14.9	7.1	0.3	4.1	99.2	0.1	0.6	0.1	1.3	3.6	95.1
Bihar	41.9	20.6	13.1	12.7	7.1	0.3	4.3	99.3	0.0	0.4	0.2	0.6	0.9	98.4
Chandigarh	16.0	14.3	13.8	15.1	15.3	0.8	24.7	97.0	0.4	1.4	1.2	4.4	3.6	92.0
Chhattisgarh	29.1	29.2	18.0	10.6	7.4	0.5	5.2	98.8	0.1	0.8	0.3	2.1	29.7	68.2
Dadra and Nagar Haveli	27.7	14.5	19.1	16.4	10.4	3.2	8.6	93.5	0.8	3.2	2.4	5.3	13.9	80.8
Daman & Diu	11.2	21.5	16.6	14.1	10.5	13.3	12.8	86.9	0.0	13.1	0.0	4.1	38.4	57.5
Delhi	12.9	13.8	11.7	16.8	16.4	1.7	26.8	93.6	1.0	3.2	2.2	1.9	1.9	96.3
Goa	13.8	13.8	14.8	22.6	15.6	4.5	15.0	93.7	0.5	4.8	1.0	8.8	2.0	89.2
Gujarat	26.5	24.8	17.1	14.3	8.4	1.6	7.3	98.0	0.2	1.4	0.4	2.7	13.1	84.2
Haryana	25.4	18.1	13.2	17.9	12.5	1.6	11.4	96.4	1.0	1.9	0.7	3.9	4.8	91.3
Himachal Pradesh	21.0	19.8	12.7	22.9	13.9	1.7	8.1	97.6	0.2	1.7	0.5	6.1	6.3	87.6
Jammu & Kashmir	31.6	14.7	19.8	14.8	9.9	0.5	8.7	98.6	0.3	0.9	0.3	1.7	8.1	90.2
Jharkhand	37.7	20.2	14.4	13.7	7.1	0.3	6.6	99.1	0.3	0.4	0.2	0.8	1.2	98.0
Karnataka	27.4	17.9	15.2	17.8	10.1	2.7	9.0	95.6	1.1	2.5	0.7	3.4	4.5	92.1
Kerala	6.4	21.3	29.5	19.2	9.7	4.6	9.3	93.6	0.5	4.8	1.1	12.8	8.9	78.3
Lakshadweep	11.9	25.2	23.7	18.8	8.9	7.8	3.7	93.1	0.3	6.5	0.2	10.6	5.6	83.8
Madhya Pradesh	33.5	24.9	16.0	9.8	8.4	0.4	7.0	98.6	0.4	0.6	0.5	2.3	9.1	88.6
Maharashtra	20.1	18.0	19.2	18.3	11.6	2.2	10.7	95.6	0.8	2.4	1.3	6.5	5.1	88.4
Manipur	15.4	13.0	23.8	20.7	15.1	0.4	11.5	99.3	0.1	0.3	0.2	1.3	6.9	91.8
Meghalaya	4.5	36.6	27.0	16.5	8.8	0.3	6.2	98.9	0.3	0.4	0.4	0.8	1.2	98.0
Mizoram	3.5	28.9	37.2	14.7	7.9	0.5	7.3	99.1	0.2	0.5	0.2	1.6	5.5	92.9
Nagaland	7.2	17.2	23.8	20.0	15.3	1.4	15.1	98.3	0.2	1.3	0.2	2.5	0.9	96.6
Odisha	31.8	23.5	23.2	10.2	5.8	0.4	5.1	99.1	0.1	0.5	0.3	1.6	19.0	79.4

Appendix A1.12: Educational Attainment of 15+ Population, 2011–12

State	General Education						Technical Education			Vocational Education				
	NL	P	M	S	HS	DC	G	NTE	Subject	BG	AG	F	NFV	NVT
Puducherry	10.1	19.1	17.5	22.1	12.5	5.0	13.6	92.6	0.7	5.5	1.3	19.8	3.4	76.8
Punjab	25.1	20.4	13.4	19.6	12.8	0.9	7.9	97.9	0.3	1.0	0.8	4.4	32.0	63.6
Rajasthan	41.1	19.7	14.2	10.3	6.6	0.6	7.5	98.8	0.2	0.8	0.2	1.3	8.3	90.4
Sikkim	15.0	43.3	16.7	12.6	7.3	0.2	4.9	99.3	0.2	0.3	0.2	1.5	3.7	94.8
Tamil Nadu	22.2	22.9	15.8	15.9	10.3	3.5	9.4	95.3	0.4	3.3	0.9	5.1	9.1	85.8
Tripura	17.7	37.8	26.9	9.0	3.9	0.1	4.5	99.5	0.2	0.1	0.1	0.9	1.6	97.5
Uttar Pradesh	39.9	17.0	15.7	11.0	8.2	0.4	7.7	98.7	0.2	0.6	0.5	1.1	6.8	92.1
Uttarakhand	23.3	19.9	18.9	14.8	12.1	0.5	10.6	98.3	0.3	0.6	0.8	3.8	4.0	92.1
India	30.2	21.1	16.6	13.9	8.8	1.3	8.1	97.6	0.4	1.4	0.6	3.0	8.6	88.4

Notes: NL includes educational categories from not literate up to below primary; P includes from literate up to primary school; M includes middle school educational attainment, S shows secondary school attainment; HS stands for higher secondary school attainment; D/C stands for diploma/certificate attainment, G stands for graduate and; PG stands for post-graduate and above educational attainment. NTE stands for no technical education; Subject stands for technical degree in agriculture/engineering/medicine; BG stands for below graduate level and; AG stands for graduate and above level in technical education. F stands for receiving or received vocational training. NF stands for non-formal vocational education and NVT stands for no vocational education. *Source:* Author's computations NSSO 2011–12.