Assessment of Female Activities in Harnessing the Demographic Dividend in the North-eastern States of India

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Abstract

The study attempts to present a picture of the opportunities and challenges of the demographic dividend in the states of northeast India. It examines the disparities in male and female working age participation in light of the changing population structure. It also aims to demonstrate demographically dependent and other types of more nuanced alternative dependency rates, as well as the associated gender disparities. The census single-age data and working data for the states of northeast India from 1991, 2001, and 2011 were used for analysis. More precise and alternative metrics for dependent ratios such as activity-based dependency rate, employment-based dependency rate, and activity-based economic dependency rate have been used in the analysis. The study found that the female work participation rate (WAP) in the states of northeast India surpassed the all-India level. Thus, the higher female work participation rate (WAP) in the northeast states contributes to a lower employment based dependency rate (EbDR) in each state in the region corresponding to the national level. Reducing the gender gaps in education and the job market, breaching the contextual patriarchal society, or improving employment opportunities for female WAP may enable to grasp the demographic dividend and achieving gender equality of the Sustainable Development Goal target 5.

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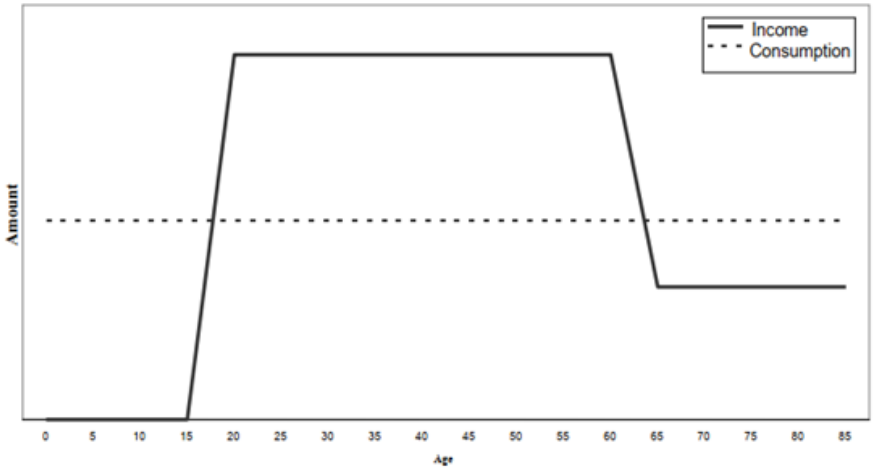
Introduction

While examining the relationship between population and economic growth, economists are conventionally categorized into two groups based on the classical debate between Marx and Malthus.Population "pessimists" contend that rapid population growth hinders development by lowering capital per worker and limiting productivity (Coale and Hoover, 1958). Population "optimists" assert that rapidly growing populations may generate more human and intellectual assets while providing larger markets, resulting in economic growth (Kuznets, 1967; Mankiw *et al*., 1992;Kelley and Schmidt 1996). A third approach "neutralist" has emerged in recent years, arguing that population composition is more important than population size. Based on the experiences of East Asian economies, this line of research contends that fertility decline reduces the number of children while increasing the worker-to-nonworker ratio for a few decades.

During the demographic transition process, the population's age structure changes. This shift in population distribution across age groups, as well as its implications for economic growth, is now widely recognized as an emerging issue for developing countries (Bloom and Williamson, 1998 a ; Mason, 2005). However, the demographic transition process began when the situation of high mortality and high fertility changed to one of low fertility and low mortality. As a result, developing countries are going through demographic transitions at different stages in terms of fertility and mortality rates.

Figure 1: Life Cycle Income and Consumption



Source: Adapted from Bloom et al. (2001).

Over time, as fertility rates have declined, developing countries have seen a decrease in the number of young dependent age groups and an increase in the working-age population. This increased working-age population creates a potential opportunity for rapid economic growth, known as the demographic dividend (Bloom *et al*., 2002; Gribble and Bremner, 2012). The life cycle income and consumption model advocates that the different age groups in a population have their economic implications. The

young age group, 0-14, needs investment for their health and education. The adults or the workable population age group enter the labour force, generate income, and save for their future. At the same time, the old-age group needs retirement income and investments for their health. A schematic representation of the life cycle income and consumption that embedded the impact of the economic behaviour for the different age groups is shown in Figure. 1.

Given the definition of the demographic dividend, the demographic dividend is delivered through the interplay of interconnected mechanisms of labour supply, savings, and human capital (Bloom *et al.,* 2001 a).

Labour Supply

With the decline in mortality rate, morebaby boomers enter the working-aged group, resulting in a decline in the ratio of dependents to non-dependent. Thus, providing an effective and efficient labour market can absorb a more significantnumber of workers per-capita increases. Again, with the decline in family size, women are more likely to be educated and enter the workforce. This increases their productivity and makes them a more robust workforce.

Savings

The demographic transition also promotes the growth of a country's savings. It outlines the country's investment and growth prospects. The young and old consume more than they produce, while working-age people have higher economic outputs and savings (Higgins, 1998). So, when more baby boomers enter the working age group, the country will tend to have higher savings.

Human Capital

In the process of demographic transition, significant effects exist on the investment in human capital. The mortality rate changes,resulting in a society's population living longer and healthier. Thus, a longer life expectancy for a society causes fundamental changes like attitudes to education, family size, retirement, the role of women, and the workforce. Jamison*et al.* (1996) expressed the changein parental choice to educate their children to a more advanced level on account of the increases in life expectancy. Again,Bloom *et al*.(2001 b) expressed that parents with fewer children, devoting more time to invest in each child, know there is a good chance that each child will benefit from investing in their education over a more extended period.Thus, the labour force as a whole can be more productive and can also promote higher wages.

However, the Asian Development Bank (2011 a) observed that the demographic dividend is not an automatic consequence of demographic change. It is a condition of how the economy productively accesses its changing working age group- the East Asian Miracle is an example.Harnessing the working-age group and reaping the potential demographic dividend become a concern for a populous and diverse country like India.

Related Literature

Most empirical research attempts to measure the effects of the demographic transition on economic growth. It emphasizes the decline in dependency ratios and its subsequent rise in the ratio of the working age to non-working age for a given population (Bloom and Williamson 1998 b; Bloom, Canning, and Malaney 2000; Bloom, Canning, and Sevilla 2002; Bloom and Canning 2005; Cai and Wang 2005; Bloom *et al*., 2007 a).

Total fertility rates (TFR) in India were 3.4, 2.9, and 2.7, respectively, according to the National Family Health Survey (NFHS)-1 (1992-93), NFHS-2 (1998-99), and NFHS-3 (2005-06). However, in the NFHS-3, many large populous states such as Bihar, Madhya Pradesh, Rajasthan, and Uttar Pradesh had more than three (3) children per woman. As a result of the disparity in fertility levels, the rate of demographic transition varies across India's states (Kumar, 2014). It allows Indian states to benefit from demographic dividends in their capacity. James (2008) also revealed that India will continue to reap the benefits of the demographic dividend for several decades. This is because the southern and western states and West Bengal of India had attained the early fertility transition, and the northern states were still yet to reach the demographic dividend. India's 'window of demographic opportunity' has been passing through since the 1980s (Aiyer and Modi, 2013; Mitra and Nagaranjan, 2005). The first demographic dividend for India will prevail up to 2035 onwards, and afterward, it will shrink, and the second demographic dividend will prevail up to 2070 (Ladusingh and Narayana, 2012). According to the Asia Development Bank (2011 b), India was still in the early stages of demographic transition. She had 7.7% of old-aged dependency in 2010 and was projected to rise to 9.4% in 2020 and 12.2% in 2030.As a result of the demographic change, India could increase prospective future real per capita income in the next two decades (Goley and Tyres, 2012).

India has come to enjoy a distinct advantage in the labour market compared to most developed and less developed countries due to the fast-changing age distribution of the population. These fast-changing age distributions need total absorption in the employment scenario. Rural people with variations in their attributes has the problem of boom or boon given by the demographic transition. Loichinger*et. al*. (2017 a) measured the demographic dependency ratio, economic dependency ratio based on labour market participation, economic-based dependency ratio based on income, consumption, and asset-based reallocation (NTA dependency ratio), and public sector dependency ratio. Thus, they suggest that there could be an increase in the employment levels among the working-age population.

Analysing the reasons for the decline in the rural married female labour force, Afridi *et al*. (2015) concluded that their education and the education attained by their male partners contributed to the decline of female labour force participation. The rising male incomes and the education attained by both males and females on the supply side and the changing sectoral structure of employment scenarios on the demand side constitute a reduction in the female labour force participation by Indian women (Klasen and Pieters, 2015; Kapos *et al*., 2014 a). Kapos *et al*. (2014 b) further exclaimed that

the long-term lack of employment opportunities for women and measurement issues regarding the differentiating between domestic duties and the contributing family work (from the rounds of NSSO) constitute the factors in declining the women labour force in India. Desai and Joshi (2019) express that India must prioritize increasing female labour force participation and reducing disadvantages in the labour market.Arif and Chaudhry (2008) show the gap in labour force participation between urban and rural and between male and female labour force participation. However, higher education attained by the women in urban areas tincreased the attainment of the labour force. So, the rising youth shares in the total population were less converted to developing the human capital and productive absorption in the labour force. Lau and Tsui (2020), comparing the economic-demographic dependency ratio (EDDR) with the conventional demographic dependency ratio (DDR) of the USA over the period 2010 to 2060, found that the expected increase of EDDR by 0.015 and the conventional DDR by 0.105 which was 86% over projected.

The paper explored the nature of the changing age structure for the north-eastern states of India. It gives a clear picture of the actual working population and how those working-age populations were engaged. It also explored whether the states of north-eastern states have the potential to reap the demographic dividend through work participation. Further, it also analysed the work participation of men and women since the equity in work participation by both males and females has been a prerequisite not only for harvesting the demographic dividend but also for achieving gender equality of the Sustainable Development Goals target 5.

Study Area

The states of North East India comprise Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. These states together covered a land area of about 2.6 lakh sq. km. which is about 7.9% of the total geographical area of the Indian subcontinent (Registrar General of India). This region is extraordinarily diverse, distinct, and indeed distinguished by its nature of topography and demography. Topographically, except for the Assam Valley, the region is hilly, covering70% of the entire landscape. However, the population distribution is highly skewed and primarily accommodated in the valley areas. The region, however, is characterized by the heterogeneity of its inhabitants. The hill tribes, the plains tribes, and the non-tribal population are the major inhabitants. Based on the Indian census (2011),the northeast region has a 27.2% scheduled tribe (ST) and 6.6% scheduled caste (SC) population compared to the national average of 8.6% ST and 16.6% SC population, respectively. Among the eight states, Arunachal Pradesh, Meghalaya, Mizoram, and Nagaland have a predominantly tribal population, ranging from almost 69%in Arunachal Pradesh to 95% in Mizoram. The northeast region hasasex ratio of 956 per 1000 males and a literacy rate of 74.48% compared to India's average of 940 and 74.04%, respectively(Census, India 2011). The northeast region is economically the least developed region of the Indian subcontinent,with a per capita income of Rs. 49,959 at the current price against Rs. 68,747 for the all-India average (2013-14) (NEDFi Data Bank).

Material & Method

Data Source

The secondary data particularly the Indian census data of 1991, 2001, and 2011 available publicly from the Registrar General of India's official website were used for the present study. Further, single-age datasets such as single-age data, B-1 and B-10 for 1991 series data and B-13 series data for the 2001 and 2011 census year were also used for the analysis.

Statistical Analysis

All of the working-age population (15-59 years) were not part of the workforce or were seeking some job (labour force). Some may still be students, some may not take to work for various reasons, or some may be differently abled. Again, some of the population below 15 years and above 60 years old may also be workers. As a concern for these problems, the study measured some alternative, dependent ratios at par with the definitions from Harasty and Ostermeier (2020 a). The conventional measures of working age population rate and demographic dependent ratio were shown in the paper to highlight how far the broad distribution of the population had been subsumed in addressing the demographic transition. In short, those engaged in economic activities, irrespective of age, are used to calculate the work participation rate.

Accordingly, two alternative dependent ratios proposed by Harasty and Ostermeier (2020 b)- Activity-based Dependency Rate and Employment-based Dependency Rate and Employment-based Economic Dependency Rate (Loichinger *et al*., 2017 b) were employed. Here,

Activity-based Dependency Rate (AbDR) =

$$\frac{[(0-14)Population + (15-59)Nonworking\ Population + 60and\ above\ \ Population]}{Labour\ Force} * 100$$

Employment-based Dependency Rate (EbDR) =

$$\frac{[(0-4)Population + (5\ \&\ above)NonWorking\ Population}{Work\ Force} * 100$$

Activity-based Economic Dependency Rate (AbEDR) =

$$\frac{(Number\ of\ Students\ +\ Household\ duties +\ Dependents\ +\ others) * 100}{Total\ Workers}$$

Here,

Labour Force indicates the number of workers and seeking for work from the persons of WAP.

Work Force indicates the number of workers from the WAP

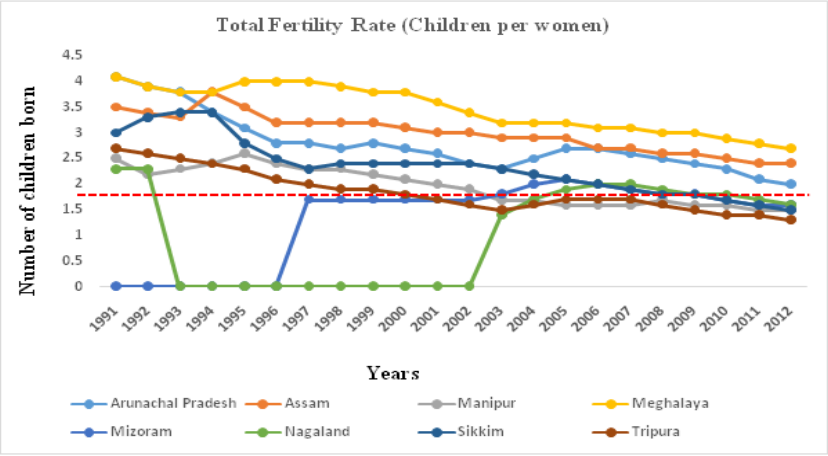
And, Total Workers indicates the total number of workers irrespective of age.

As per the Census of India's definition, household duties include daily household chores such as cooking, cleaning utensils, caring for children, fetching water, and so on. They are not helping in the unpaid work on the family farm or cultivation or mulching. Dependents are those infantsor elderly persons not included in the worker category. Others comprise pensioners, beggars, vagrants, and others. Pensioners refer to individuals who receive a pension after retiring and are not involved in any economic activity. Beggars, vagrants, prostitutes, and people with unspecified forms of income and subsistence who were not involved in any economically productive work during the studied period. Furthermore, Others are non-workers who do not fall into one of the groups listed above, such as rentiers, people living on remittances, agricultural or non-agricultural royalty, convicts in jails, or inmates of penal, mental, or charitable institutions doing no paid or unpaid work, and persons who are seeking/available for work.

Results

Demographic Structure and Work Participation

Figure 2: Total Fertility Rate in the States of Northeast India



Source:Computed from the Compendium of India's Fertility and Mortality Indicators 1971-2013, SRS, Registrar General of India.

Note(s).

1. 1991,1992,1993,1994, 1995 & 1996 data for Mizoram were unavailable.

2. 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001 & 2002 data for Nagaland were unavailable.

3. Data for all the states except Assam were adjusted from the three-year moving average of fertility indicators.

Figure 2 depicted the trend in the number of children born per woman (TFR) during her reproductive years. Based on the graph, Meghalaya and Arunachal Pradesh had more than four children born per woman of reproductive age in 1990, and all states of northeast India were above the replacement level TFR of 2.1 children per woman. The least was Nagaland, which experienced a significant shift with TFR 1 in 1997. However, in 2013, Tripura received the greatest benefit, with 1.3 children per woman. Manipur, Mizoram, Nagaland, and Tripura, on the other hand, achieved the replacement level TFR of 2.1 children per woman in the 2000s. Assam and Meghalaya had yet to reach their replacement level. The primary source of concern is the rapid decline in TFR in all of the states of northeast India.

Figure 3 illustrated the age distribution of the population of states in India's northeast by broad age group from 1991 to 2011. In 1991, the percentage of the population in these states comprised of young people (0-14 years old) was very high. Except for Manipur, other states exceeded the national level of 37.24 % constituting nearly 40 % and more in 1991. It had decreased slightly between the census years 1991 and 2011. Between 1991 and 2011, Sikkim and Tripura observed a significant decrease, accounting for more than 10% of the total. During this period, the working-age population (15-59 years) had increased significantly in both Sikkim and Tripura while the state of Manipur (57.57%, 60.46% & 62.55%) had consistently increased at a steady rate surpassing all India level (55.43%, 56.93% & 60.29%) throughout the three census years. Further, except for Meghalaya, the working-age population contributed nearly 60% or more of the total population in all the states of northeast India.

Table 1. Percentage of Male and Female Working Age Population (WAP) for the States of NE India in 1991, 2001 & 2011.

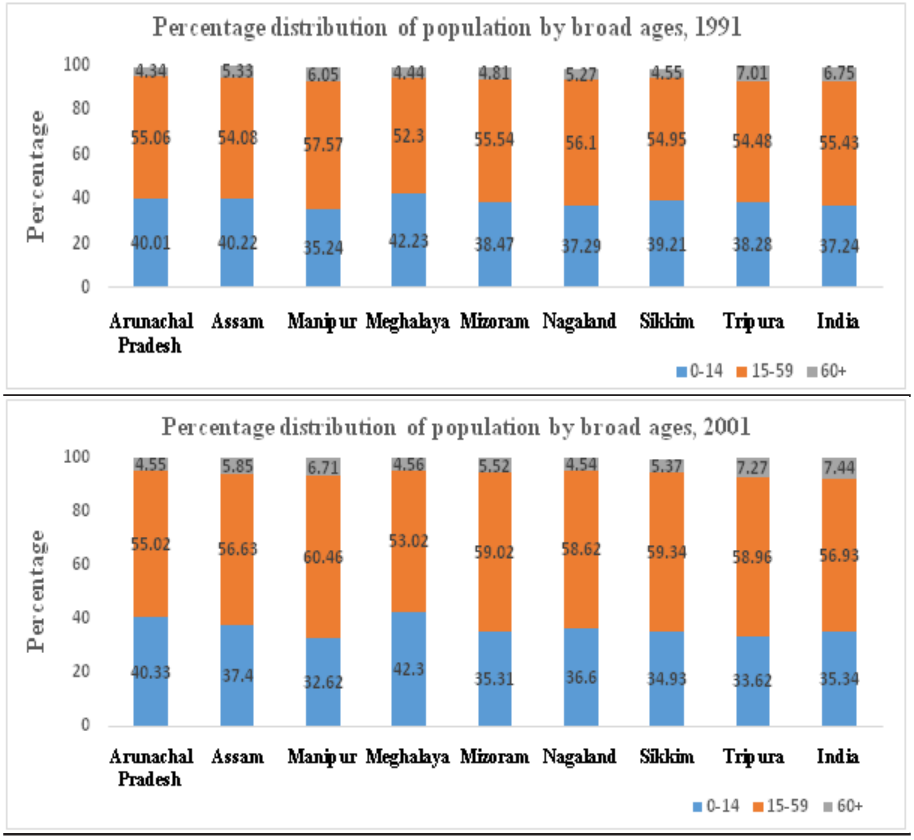
	1991		2001		2011	
State	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Arunachal Pradesh	56.94	52.88	56.39	53.49	60.27	58.96
Assam	54.67	53.44	57.08	56.16	60.50	60.36
Manipur	57.65	57.64	60.16	60.77	61.90	63.21
Meghalaya	52.64	51.94	53.02	52.99	55.28	55.56
Mizoram	56.89	54.07	59.75	58.38	61.16	61.32
Nagaland	57.10	54.99	58.98	58.22	60.30	60.54
Sikkim	56.44	53.25	60.69	57.80	66.74	65.07
Tripura	54.97	53.96	59.55	58.34	64.64	64.08
India	55.39	53.75	57.01	56.85	60.24	60.35

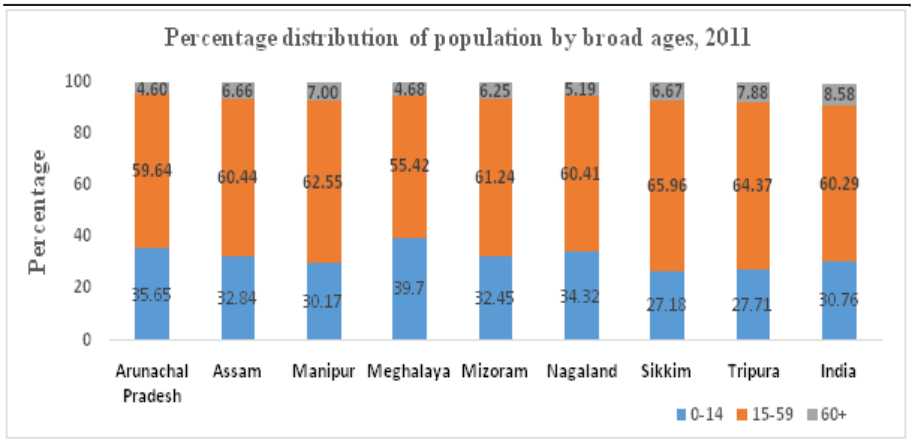
Source: Calculated from the Census Single Age Data

Table1 shows the percentage of male and female Working Age Population (WAP), i.e., people aged 15 to 59 years, in states of India's northeast from 1991 to 2011. During the three census periods, the working-age population in these states increased steadily. The majority of working-age males in all states reached 60% or higher in 2011, except

for Meghalaya. Sikkim and Tripura had surpassed the national level for both males and females, with a 10% increase. Meghalaya and Arunachal Pradesh had a female working-age population of less than 60%, indicating a younger non-working population.The working-age population (WAP) in eight states increased, indicating the potential for more opportunities and a larger labor force. In theory, an increase in the working-age population with the right educational background and skills could lead to more people entering the labor force, benefiting these states. However, the majority of the working-age population did not participate in the labor force. Table no.2 details the number of people who worked, remained unemployed, and dependent on others.

Figure 3: Broad Age Distribution in the States of Northest India 1991-2011





Source: Computed from Census Single Age Data

Table 2. Percentage of Work Participation Rate (WPR) for the NE states, Census of India, 1991, 2001, 2011.

	1991			2001			2011		
States	**Person**	**Male**	**Female**	**Person**	**Male**	**Female**	**Person**	**Male**	**Female**
Arunachal Pradesh	46.24	53.76	37.49	43.98	50.63	36.54	42.47	49.06	35.44
Assam	35.89	49.11	21.57	35.78	49.87	20.71	38.36	53.59	22.46
Manipur	42.18	45.27	38.96	43.62	48.12	39.02	45.68	51.40	39.88
Meghalaya	42.67	50.07	34.93	41.84	48.34	35.15	39.96	47.17	32.67
Mizoram	48.91	53.87	43.52	52.57	57.29	47.54	44.36	52.35	36.16
Nagaland	42.68	46.86	37.96	42.60	46.70	38.06	49.24	53.42	44.74
Sikkim	41.51	51.26	30.41	48.64	57.44	38.57	50.47	60.16	39.57
Tripura	31.14	47.33	12.68	36.25	50.62	21.08	40.00	55.77	23.57
India	37.46	51.55	22.25	39.10	51.68	25.63	39.80	53.26	25.52

Source: Calculation from the Census B-1 Series Data

Table 2 analyzed the work participation rate (WPR) in northeast (NE) India from 1991 to 2011. Work participation rates fell in Arunachal Pradesh, Meghalaya, and Mizoram, while they rose marginally in the other states; male WPR in Assam, Manipur, Nagaland, Sikkim, and Tripura rose marginally but not significantly. Female WPRs in Manipur, Nagaland, Sikkim, and Tripura have marginally increased. However, the WPRs in Arunachal Pradesh, Assam, Meghalaya, and Mizoram fluctuated. Generally, female WPR was lower than male WPR. The greatest WPR disparity was found in Assam and Tripura, with a margin of around 30%. In 1991 and 2011, male WPR in Tripura was 35 percentage points higher than female WPR by 32 points. In Assam, male WPR was 29% higher than female WPR, with a 31% difference. Subsequently, the table demonstrated that the number of female work participation was increasing.

The difference in the proportion of the working-age population and the work participation rate can be seen from the comparison between Table1 and Table2. Taking the proportion of workers from the WAP table, it can be seen that a good number of both the male and female working age population were not working. For example, Sikkim had 66.74% male and 65.07% female WAP, the highest WAP among the NE states of India in 2011,while 60.16% and 39.57%were male and female WPR respectively. Here, 6.59% of male and 25.50% of female were not working. Again, Meghalaya had the lowest WAP- 55.28% of male and 55.56% of female,with 47.17%of male and 32.67% of female WPR, respectively. Assam in 2011witnessed 37.91% of the female WAP were not working, the worst state among the NE states.

Table 3. Percentage of the Demographic Dependency Rate (DDR) for the NE States of India, Census of India 1991, 2001, and 2011.

	1991			2001			2011		
States	**TDR**	**CDR**	**ODR**	**TDR**	**CDR**	**ODR**	**TDR**	**CDR**	**ODR**
Arunachal Pradesh	80.6	72.7	7.9	81.6	73.3	8.3	67.5	59.8	7.7
Assam	84.2	74.4	9.9	76.34	66.1	10.3	65.4	54.3	11.0
Manipur	71.6	61.1	10.5	65.1	53.9	11.1	59.4	48.2	11.2
Meghalaya	89.2	80.8	8.5	88.4	79.8	8.6	80.1	71.6	8.5
Mizoram	77.9	69.3	8.7	69.1	59.8	9.3	63.2	53.0	10.2
Nagaland	75.9	66.45	9.4	70.2	62.4	7.7	65.4	56.8	8.6
Sikkim	79.7	71.4	8.3	67.9	58.9	9.1	51.3	41.2	10.1
Tripura	83.1	70.3	12.9	69.4	57.0	12.3	55.3	43.1	12.2
India	79.2	67.0	12.2	75.2	62.1	13.1	65.2	51.0	14.2

Source: Calculated from the Census Single Age Data

Table 3 shows the percentage of Demographic Dependency Rate (DDR). The Child Dependency Rate (CDR) revealed that the percentage of children under the age of 15 is determined by the Working Age Population (WAP), which includes people aged 15 to 59. The Old Aged Dependency Rate (ODR) was calculated as the percentage of people aged 60 and above out of 100 WAP. The Total Dependency Rate (TDR) is the total percentage of both children and elderly dependents on the 100 WAP. During these census periods, Sikkim and Tripura experienced the greatest change in TDR. Between 1991 and 2011, 79 to 51 and 83 to 55 people in Sikkim and Tripura, respectively, were economically dependent on 100 numbers of WAP. The high change in the TDR was attributed to a decline in the CDR from 71 to 41% in Sikkim and 70 to 43% in Tripura. This demonstrated that these two states had a greater potential for capitalizing on the demographic dividend. Meghalaya had the highest TDR between census years, with more than 80 people per 100 working-age people. This was due to the slow rate of change in the CDR, which went from 80 people in 1991 to 71 people in 2011. However, all states witnessed a faster decrease in TDR. The decline in CDR was far greater than the increase in ODR over census periods. As a result, lowering the CDR has resulted in a lower TDR. The change from 2001 to 2011 was greater than the change between

1991 and 2001. It indicated that the WAP's burden of supporting child education and pensions for the elderly was lessening.

Demographic Dependent and its Alternative Measures

Table 4 illustrated the percentage of dependency based on activity among various population groups, which was a more accurate measure of economic dependency than the Activity-based Dependency Rate (DDR). It comprised dependents such as children, nonworkers, and the elderly. Between 1991 and 2011, Arunachal Pradesh, Meghalaya, and Mizoram experienced an increase in dependents. Sikkim and Tripura experienced significant population declined, from 146 and 213 in 1991 to 111 and 128 in 2011. Female dependency outnumbered male dependency, indicating that a large number of women did not enter the labor force. Female dependency was greater in Assam and twice as high in Tripura.

Table 4. Activity-based Dependency Rate (AbDR)

	1991			2001			2011		
States	**Person**	**Male**	**Female**	**Person**	**Male**	**Female**	**Person**	**Male**	**Female**
Arunachal Pradesh	119.0	102.1	189.5	141.6	111.5	186.8	141.4	113.7	179.3
Assam	180.0	121.5	379.5	177.3	111.4	312.1	155.6	97.2	263.5
Manipur	145.9	144.6	170.3	136.4	119.3	156.9	125.4	105.8	149.1
Meghalaya	140.1	123.9	207.3	159.4	128.9	200.0	161.0	127.1	206.4
Mizoram	110.5	103.9	138.5	111.3	94.1	133.2	133.3	102.2	176.2
Nagaland	149.0	141.4	189.6	148.7	129.45	174.2	123.4	107.4	143.4
Sikkim	146.9	112.8	256.7	125.8	93.3	178.3	111.1	81.1	158.1
Tripura	213.0	126.8	536.1	158.1	103.8	251.2	128.5	85.3	191.9
India	174.6	112.6	370.3	167.7	108.4	284.0	161.7	103.3	273.1

Source: Calculated from the Census Single Age Data and B-1 Series Data

Table 5 gave a more detailed picture of the economically dependent population, focusing on the percentage of the population who relied on employed individuals. Economically dependent regions (EbDR) were more accurate as they incorporated the exact number of non-workers and workers of all ages. Arunachal Pradesh, Meghalaya, and Mizoram saw a surge in EbDR, with Assam experiencing the highest rate among the north-eastern states. In 2011, Assam had 200 people economically dependent on 100 employed people, resulting in two non-working people for every one working person. Other states had more than 100 people who relied on the 100 employed individuals. In 2011, EbDR was higher than AbDR in Arunachal Pradesh, Assam, Meghalaya, Mizoram, Tripura, and at the national level due to a lower number of WAP entering the labour force. A significant difference in EbDR was observed between males and females. Assam and Tripura saw more differences, with evidence indicating that there were more than three women dependent on each worker. Table 6 confirmed how this happened.

Table 5. Employment based Dependent Rate (EbDR).

	1991			2001			2011		
States	**Person**	**Male**	**Female**	**Person**	**Male**	**Female**	**Person**	**Male**	**Female**
Arunachal Pradesh	109.6	93.3	179.0	141.6	107.6	195.5	149.6	114.4	201.8
Assam	175.8	113.5	390.6	200.6	112.7	424.2	178.4	96.4	380.3
Manipur	136.0	133.3	162.5	146.3	123.0	175.3	133.8	106.7	168.9
Meghalaya	128.2	110.9	197.3	158.4	121.9	209.7	167.8	125.0	230.4
Mizoram	99.6	93.0	127.7	102.3	84.2	125.8	137.6	99.9	193.6
Nagaland	136.0	128.2	177.0	154.6	130.8	187.1	119.9	100.9	144.4
Sikkim	137.0	102.6	247.9	120.4	83.9	183.6	109.5	73.9	170.3
Tripura	224.6	122.4	677.7	195.2	108.4	413.3	163.8	86.8	351.8
India	168.0	103.2	377.2	174.5	104.6	326.0	170.1	98.5	328.8

Source: Calculated from the Census Single Age Data and B-1 Series Data

Table 6 and 7 depicted the percentages of male and female economic dependents in India's northeast states, with most transitioning from dependent to student during census years. States like Manipur, Mizoram, Nagaland, and Sikkim had a higher number of AbEDR engaged as students, while Arunachal Pradesh, Assam, Meghalaya, and Tripura had a higher proportion of non-working people engaged in dependent activities. These states had an advantage in receiving the demographic dividend, as their children were accumulating human capital. However, there was a large gender gap, with Assam, Sikkim, and Tripura having a larger gap among students who were dependent and engaged in household duties. Manipur, Mizoram, and Nagaland had a lower gender gap among student dependents and narrowed the gap between male and female engaged in household duties. In 2011, all north-eastern states increased their non-working dependent on students while decreasing non-working dependent activity on dependents. The higher the gender gap among students, the higher the gap between the dependents engaged in household duties.

Table 6. Percentage of Total Activity-based Economic Dependency Rate (AbEDR)

1991					
	AbEDR	**Components**			
States	**Total**	**Students**	**Household**	**Dependents**	**Others**
Arunachal Pradesh	116.3	35.5	15.7	64.3	0.7
Assam	177.1	53.9	41.3	77.6	4.2
Manipur	137.1	66.0	13.2	55.9	2.0
Meghalaya	134.3	40.5	16.7	76.1	1.0
Mizoram	104.5	48.3	11.4	43.3	1.5
Nagaland	134.3	65.5	11.2	56.1	1.5

Sikkim	140.9	58.8	23.2	56.8	2.1
Tripura	221.2	67.4	56.1	90.5	7.1
India	166.9	47.1	43.7	72.3	3.9
2001					
Arunachal Pradesh	127.4	51.2	13.5	58.1	4.5
Assam	179.4	59.9	37.6	68.5	13.4
Manipur	129.2	69.9	15.2	35.8	8.4
Meghalaya	139.0	56.6	15.0	62.5	4.9
Mizoram	90.2	43.3	9.6	33.8	3.5
Nagaland	134.7	71.8	12.6	42.9	7.4
Sikkim	105.6	52.9	15.1	33.1	4.5
Tripura	175.9	67.6	30.3	58.6	19.4
India	155.7	55.4	34.0	57.2	9.1
2011					
Arunachal Pradesh	135.5	72.4	14.4	41.1	7.5
Assam	160.7	61.3	35.7	47.6	16.0
Manipur	118.9	63.1	15.9	29.2	10.8
Meghalaya	150.0	75.6	18.0	49.8	6.9
Mizoram	125.4	62.8	20.3	34.0	8.3
Nagaland	103.1	56.9	10.0	28.6	7.6
Sikkim	98.2	55.9	16.3	18.9	7.1
Tripura	150.0	61.4	24.1	36.3	28.2
India	151.3	63.3	34.4	41.9	11.6

Source: Calculation using Census of India, B-1 and B-13.

Table 7. Percentage of Male and Female Activity-based Economic Dependency Rate (AbEDR)

1991										
State	**Total**		**Student**		**Household Duties**		**Dependent**		**Others**	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Arunachal Pradesh	86.0	166.7	33.8	38.3	1.1	40.1	50.1	88.0	1.0	0.3
Assam	102.2	362.7	42.2	82.7	3.7	134.8	52.2	140.7	4.1	4.5
Manipur	120.9	156.7	65.4	66.6	3.5	25.0	49.5	63.6	2.5	1.4
Meghalaya	99.7	186.3	34.4	49.8	1.7	39.1	62.5	96.6	1.1	0.9
Mizoram	85.6	129.8	44.30	54.1	2.7	23.0	37.3	51.4	1.6	1.3
Nagaland	113.4	163.4	61.6	71.0	1.9	24.2	48.0	67.2	1.9	0.9
Sikkim	95.1	228.8	48.5	78.5	1.9	64.0	42.2	84.8	2.5	1.5
Tripura	110.3	626.6	47.9	138.5	0.8	258.4	54.9	220.9	6.7	8.7

India	94.0	349.3	40.0	64.8	1.3	149.6	48.5	131.5	4.1	3.4
2001										
Arunachal Pradesh	97.5	173.7	46.7	58.3	1.3	32.4	45.8	77.3	3.7	5.7
Assam	100.5	382.8	44.1	100.8	3.1	126.5	43.7	132.4	9.6	23.1
Manipur	107.8	156.3	65.7	75.1	2.1	31.8	30.8	42.0	9.2	7.4
Meghalaya	106.9	184.5	48.2	68.5	1.7	34.0	52.4	76.7	4.5	5.4
Mizoram	74.6	110.4	39.7	48.0	1.4	20.1	29.8	39.0	3.6	3.2
Nagaland	114.2	162.8	66.6	78.9	1.9	27.2	37.2	50.7	8.5	6.0
Sikkim	74.1	159.3	43.0	69.8	1.4	38.4	25.6	45.8	4.1	5.3
Tripura	97.5	374.4	50.3	111.3	1.1	104.5	36.2	115.4	10.0	43.2
India	93.5	290.2	45.5	76.8	1.6	103.8	38.9	96.8	7.4	12.8
2011										
Arunachal Pradesh	103.8	182.2	63.0	86.3	1.5	33.4	33.0	53.1	6.3	9.4
Assam	86.6	345.3	43.9	104.8	2.5	118.4	31.0	88.9	9.1	33.3
Manipur	94.6	150.7	58.1	69.6	1.8	34.4	24.9	33.7	9.8	12.1
Meghalaya	112.0	206.1	63.1	93.7	1.7	41.9	41.5	62.0	5.7	8.6
Mizoram	91.0	176.5	54.0	76.0	2.0	47.6	28.1	42.7	6.9	10.3
Nagaland	87.2	123.5	52.4	62.7	1.3	21.2	25.7	32.3	7.8	7.3
Sikkim	66.2	152.7	44.6	75.4	1.5	41.5	14.3	26.7	5.9	9.1
Tripura	79.3	324.2	45.1	101.7	0.7	81.5	23.1	69.0	10.5	72.1
India	87.8	291.9	49.4	94.2	1.7	106.6	28.5	71.6	8.1	19.5

Source: Calculation using Census of India, B-1, and B-10 series Data for 1991 and B-13 series Data for 2001 and 2011.

In short, it revealed that in all states, the number of non-working dependents engaged in Dependent, Household duties was decreasing, while the number of dependents engaged as Students increased. More females were participating in student activities and fewer dependents performing household duties. It implied that the majority of the women had accumulated human capital. Again, there were fewer males than females who completed their education. Females were systematically excluded from non-working dependent ratios such as student and household responsibilities, and they aggressively entered the workforce.

Discussion

The changing fertility constituted a shift in population structure. The decline in fertility not only slows population growth but also increases the proportion of working-age people in the total population and increases female labour force participation (Bloom *et al*., 2007 b). These age-structure changes, which correspond to economic outcomes, result in a demographic dividend. According to Golley and Tyer (2013), India is moving forward with its demographic transition, and the country has declared its first demographic

dividend until 2035. However, the WAP demonstrated that the demographic transition did not result in a complete engagement in the workforce. Meghalaya and Assam remain the north-eastern states with higher TFR than the replacement level. In 2013, the TFRs for Meghalaya and Assam were 2.7 and 2.3, respectively. The high fertility rate has an impact on the number of WAP. Between 1991 and 2011, the WAP in Meghalaya rose from 52.3% to 55.42%. Sikkim and Tripura, which achieved replacement level fertility in the early 2000s, witnessed WAP rise dramatically from 54.95 and 54.48% in 1991 to 64.37 and 64.37% in 2011, respectively.

However, the work participation rate for Tripura in 1991 was the lowest among the 8 states of northeast India. This was due to the high gap in work participation between the male and the female. Nagaland attaining the replacement level in the early 2000's had observed the least gap between the male and female work participation among the states during the census years. As a result, higher fertility states like Assam and Meghalaya have a larger gender gap in terms of labour participation. Whenever the working-age population grows, the rate of work participation declines. These findings were consistent with ILO research conducted in 2008, which revealed that nearly half of women's productive capacity (48.4%) was unutilized, compared to 22.3% for men. Another finding by Kuhn (2019) was that female labour participation was 47.2% compared to 74.2% for males, resulting in a 27% disparity. Further similar finding of the most significant gender gap was also observed among the developing countries of Northern Africa, Southern Asia, and the Arab countries.

Women have significantly lower rates of work participation than men. This missing working-age population was a significant hurdle in realizing the demographic dividend potential. To benefit from the demographic dividend, equitable work participation is required. It is worth to remember Wodon *et al.,* (2020) "If women were earning as much as men, women's human capital wealth could increase by more than half globally…….". Women have historically played an important role in economic development. The greater the number of women in the labour force, the more developed an economy. Marone (2016) estimated that closing the gender gap in labor force participation contributed approximately 12.2% to CaboVarde's GDP. Hence, the level of work participation by women is critical in unlocking the demographic dividend for states in India's northeast. The existing patriarchal social setup has an impact on women's economic contributions since women, willing or unwilling, do not engage in gainful activities. On the other hand, there are no job vacancies for either men or women. The discouraged worker hypothesis may also apply in areas where women may sacrifice for their male counterparts due to long-held gender stereotypes. There is speculation that the additional worker hypothesis also applies in regions where women enter the labor force while their husbands are unemployed.

As the working-age population grows and the dependency ratio remains high, the question of how to address it persists. All of India's north-eastern states had WAP levels of more than 60%. However, many of them were unable to enter the workforce. This results in fewer WAP supports. This was demonstrated by the high fertility states of

Assam and Meghalaya, which had higher rates of EbDR. However, Tripura, despite having a lower fertility rate, had a higher EbDR. This was due to the lower rate of female work participation. This was evident from the wide disparity between the male and female EbDR. Moreover,the larger number of non-working females engaged in Student and Household duties constituted a higher difference in the dependent and work participation between the males and females.

The Indian government has implemented various skill development programs and employment generation initiatives to combat youth unemployment, including the Prime Minister's Employment Generation Programme (PMGEP), the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGA), Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU-GKY), and the National Urban Livelihoods Mission (NULM). Other measures include encouraging the private sector, increasing public expenditure on employment enhancement projects, and promoting sectors like manufacturing, tourism, and agro-based businesses.However, a lesser number of WAPs in India participated in the workforce. The reasons could be categorized into supply-side and demand-side factors. On the supply side (Parida and Madheswaran, 2023) revealed that as many young people—boys and girls alike—were pursuing higher education, stagnating real wages and the negative income effect brought on by rising living standards and a decline in the prevalence of income poverty—as well as other factors—may deter many young people from entering the workforce (Chauhan *et al*., 2016). Conversely, the lack of industrialization and the manufacturing sector's slow growth, the infrastructure sector's declining investment and output growth, skill mismatch issues (NSDC, 2013; Mitra, 2013; Mehrotra, 2014; Singh & Parida 2020), the growing mechanization and automation in agriculture (Mehrotra *et al*., 2014), etc., were some of the demand side factors were the policymaker face to un-accommodate the increasing number of young people entering into the workforce.

Conclusion

The population structure of states in Northeastern India has been changing.The results of this study revealed that the Indian states in the northeast are more likely to experience the demographic dividend. Their reliance was notable even though their WAP accounted for more than 60% of the population as a whole. WAP for women needs to increase, and there should be more avenues for women to pursue careers. Desai (2010) noted that without more job opportunities and fewer barriers to entry into the labour market, which may compel more women to enter the workforce, India's demographic dividend will not be fully realized. The only way to capitalize on the demographic dividend is to close the gender gap in dependents and pursue them into the labour force.Why housework should be reserved for "women" is a moot point. The marriage's relationship between housework among partners and income distribution among wives is consistent with economic exchange principles. The more financially dependent a husband is on his wife, the less housework she does. Economically dependent spouses appear to "do gender" less housework (Brines, 1994). The increase of this household domestic work for women due to the contextual patriarchal society, which makes women confined in the

household sphere or the changing economic system that women should not work outside of the limiting employment opportunities given to them must be restrained in getting the opportunity to grasp the demographic dividend. Gender equality/equity in education and job market, opening and effective implementation of start-ups or entrepreneurship to absorb the working age population irrespective of gender, women-specific avenues must be set up so that women can come out to manifest their contribution to reap the dividend.

Limitation

The paper's employment data were sourced solely from the Registrar General of India's most recent 2011 census. To measure the demographic dividend, the paper focused solely on measures of labour participation rather than economic growth. The study confirms gender disparities in work participation. It implies that increased economic growth would be possible if more workers emerged from the expanding working-age population.

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