CHAPTER 4

ESTIMATION OF PARITY PROGRESSION RATIO

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4.1 Introduction

In the previous chapter a reasonably large fertility differentials among the Hindu and Muslim is noticed. Due to rampant prevalence of child marriage, illiteracy and other factors, the rate of fertility among the Muslim women of Assam is much higher than the Hindus. Precisely for this reason, the fertility rate will be a major indicator to understand the Parity Progression Ratio (PPR) for the studied period.

Parity Progression Ratio is the probability of having another child given that mother has reached certain parity. It is based on birth statistics and data on fertility. The Parity Progression Ratio is one of the measurements of fertility analysis [66]. From the analysis of Chapter 2, it has come to the light that due to the higher rate of CBR and TFR for Muslim community, we have witnessed an increase of the Muslim population in the total share of state population. It has also been observed that despite the rise of Hindu population in last decade (2001-2011), their shares in the total population of Assam have decreased. In different estimation it has been argued that due to illegal influx of Muslim population from Bangladesh, a shift in demography of Assam has occurred [7,55]. However, for a holistic understanding of these phenomena, an analysis on PPR is essential. In Assam, attention is drawn by Parity Progression Ratio for each district based on the census data of 2011. In this chapter we are trying to evaluate the relationship between PPR and Complete Fertility Rate (CFR) of the Hindu and Muslim communities. The CFR of women is also computed [14] for each district of Assam with separation of rural and urban population.

The PPR is obtained with the following procedures –
- tabulating the women on the basis of parity,
- obtaining the number of women who have reached parity by cumulating the figure from bottom to top,
- and dividing adjacent figure to obtain the probability.

In these procedures PPR is computed as ratio of the number of births of adjusted orders in the evaluated year.

The procedure is formulated by taking the following equation-

$$a_i = B_{i+1} / B_i$$

where, B_i represents birth of a given order in a year and B_{i+1} represents the birth of next higher order in the same year. In a more refined form, PPR may be computed for birth cohorts and may make grant for marriage. In another form, the rates are based on the proportions of married women who have had children of a particular order and above. The PPR a_i would then be defined as

$$a_o = m_{1+} \tag{4.1}$$
$$a_1 = m_{2+} / m_{1+} \tag{4.2}$$
$$a_i = m_{i+1} / m_{i+} \tag{4.3}$$

where $m_{1+}, m_{2+}, \ldots, m_{i+}$ are the percent of married women in a given year who have had 1 or more, 2 or more, …, i+1 or more children and where a_0, a_1, …, a_i are the PPR of the families 0 with no child, 1 with one child, and so on. The probabilities are calculated only for associates of women who have reached the end of the child bearing period [23, 37].

4.2 Computation of Complete Fertility Rate (CFR)

Parity Progression Ratio (PPR) is a sensitive indicator of family building patterns. The ratio is also a very useful for the study of the reproductive strategies followed by the population. The Complete Fertility Rate for the birth cohort (1961-1965) of women is computed by PPR for each district of Assam based on 2011 census data. In the calculations of PPR the women are tabulated first by parity. These figures are then cumulated from the bottom to give the number of women with at least 'n' children ever born. Lastly, adjacent figures are divided to give the probabilities. The CFR of a cohort, which is equivalent of TFR in the period measure, can be expressed as an arithmetic series of products of PPRs.

The average number of children ever born to women in a birth cohort may be expressed as

$$CFR = a(0) + a(0)a(1) + a(0)a(1)a(2) + a(0)a(1)a(2)a(3) + \ldots + a(0)a(1)\ldots a(n) \tag{4.4}$$

where, a(0) is just the proportion of women in the cohort who become mothers.

4.3 Analysis and Results

We have worked out the PPR and CFR for Hindus and Muslims using the Census data, government of India, 2011.The equation (4.4) has been used to work out the Complete Fertility Rate. The estimated PPR and CFR of Hindu and Muslim population have been shown in Table 4.1 and Table 4.2 respectively.

Table 4.1: PPR and CFR for Hindu population

Districts	CEB (Hindu)						CFR
	0	**1**	**2**	**3**	**4**	**6+**	
Kokrajhar	0.806	0.724	0.586	0.531	0.475	0.464	2.06
Dhuburi	0.848	0.704	0.546	0.496	0.464	0.461	2.04
Goalpara	0.841	0.714	0.557	0.51	0.483	0.473	2.08
Barpeta	0.838	0.705	0.507	0.441	0.423	0.504	1.94
Morigaon	0.825	0.74	0.582	0.508	0.468	0.49	2.09
Nagaon	0.828	0.708	0.547	0.505	0.468	0.471	2.01
Sonitpur	0.85	0.799	0.74	0.704	0.66	0.589	2.76
Lakhimpur	0.861	0.75	0.588	0.525	0.482	0.474	2.23
Dhemaji	0.858	0.775	0.637	0.555	0.498	0.468	2.35
Tinsukia	0.844	0.757	0.605	0.51	0.455	0.461	2.2
Dibrugarh	0.823	0.73	0.553	0.472	0.437	0.467	2.01
Sibsagar	0.823	0.7	0.54	0.486	0.457	0.471	1.96
Jorhat	0.815	0.708	0.509	0.469	0.439	0.468	1.91
Golaghat	0.831	0.722	0.552	0.511	0.479	0.492	2.05
Karbi-Anglong	0.836	0.794	0.695	0.633	0.565	0.493	2.5
DimaHasao	0.836	0.762	0.656	0.623	0.566	0.479	2.4
Cachar	0.804	0.724	0.595	0.541	0.476	0.434	2.05
Karimganj	0.808	0.737	0.618	0.578	0.514	0.471	2.15
Hailakandi	0.813	0.749	0.637	0.59	0.532	0.477	2.22
Bongaigaon	0.824	0.683	0.517	0.493	0.466	0.472	1.92
Chirang	0.828	0.735	0.615	0.555	0.498	0.457	2.17
Kamrup	0.838	0.744	0.525	0.416	0.384	0.464	2.01

Kamrup (M)	0.792	0.646	0.411	0.395	0.393	0.561	2
Nalbari	0.84	0.725	0.514	0.426	0.37	0.44	1.97
Baksa	0.825	0.754	0.573	0.481	0.432	0.472	2.01
Darrang	0.831	0.713	0.488	0.431	0.414	0.484	1.91
Udalguri	0.828	0.754	0.607	0.517	0.467	0.466	2.16

Source: Census Report of India, Government of India, 2011

From the table it is seen that the CFR for Hindu is highest in Sonitpur district (2.76) and lowest in Jorhat and Darrang district (1.91) respectively.

Table 4.2: PPR and CFR for Muslim population

Districts	CEB(Muslim)						CFR
	0	**1**	**2**	**3**	**4**	**6+**	
Kokrajhar	0.837	0.783	0.722	0.677	0.632	0.569	2.68
Dhuburi	0.952	0.95	0.947	0.948	0.945	0.943	5.02
Goalpara	0.856	0.779	0.719	0.682	0.651	0.593	2.67
Barpeta	0.871	0.793	0.719	0.666	0.619	0.565	2.71
Morigaon	0.849	0.796	0.742	0.714	0.673	0.612	2.77
Nagaon	0.941	0.939	0.935	0.931	0.922	0.922	4.78
Sonitpur	0.848	0.783	0.712	0.682	0.644	0.574	2.63
Lakhimpur	0.864	0.794	0.715	0.68	0.623	0.564	2.7
Dhemaji	0.852	0.808	0.702	0.65	0.562	0.444	2.59
Tinsukia	0.833	0.76	0.629	0.572	0.51	0.46	2.26
Dibrugarh	0.815	0.721	0.555	0.512	0.445	0.439	2
Sibsagar	0.813	0.667	0.51	0.48	0.461	0.46	1.85
Jorhat	0.792	0.688	0.517	0.48	0.453	0.466	1.84
Golaghat	0.833	0.726	0.595	0.577	0.577	0.58	2.19
Karbi-Anglong	0.824	0.8	0.703	0.654	0.589	0.521	2.52
DimaHasao	0.813	0.798	0.664	0.619	0.538	0.467	2.37
Cachar	0.828	0.814	0.738	0.682	0.607	0.489	2.65
Karimganj	0.833	0.833	0.791	0.747	0.684	0.561	2.92
Hailakandi	0.846	0.824	0.762	0.706	0.643	0.525	2.82

Bongaigaon	0.858	0.787	0.729	0.703	0.659	0.598	2.74
Chirang	0.841	0.803	0.742	0.702	0.656	0.588	2.74
Kamrup	0.852	0.791	0.696	0.636	0.587	0.542	2.56
Kamrup (M)	0.786	0.708	0.523	0.487	0.479	0.423	1.87
Nalbari	0.853	0.799	0.695	0.622	0.565	0.508	2.55
Baksa	0.861	0.807	0.726	0.668	0.623	0.59	2.73
Darrang	0.846	0.794	0.73	0.702	0.675	0.613	2.72
Udalguri	0.85	0.802	0.742	0.72	0.664	0.579	2.78

Source: Census Report of India, Government of India, 2011

In the Table4.2, it is perceived that the CFR for Muslim is highest in Dhuburi district (5.02) while it is lowest in Jorhat district (1.84) respectively. It is also observed that the PPR for higher birth for Hindu women is lesser than the Muslim women[14]. On the other hand, in most of the districts, the CFR for Muslim is higher than Hindu. The PPR against Children Ever Born (CEB) is evaluating for the two religions and for rural and urban area. The plots of PPR versus CEB have been illustrated in Fig4.1 to Fig.4.10.These are evaluated for selected districts of Assam and based on religions for rural and urban population.

Fig. 4.1: PPR and CEB for Kokrajhar
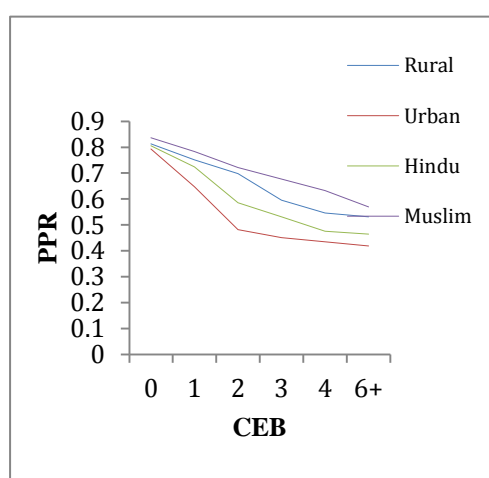
Fig. 4.2: PPR and CEB for Morigaon
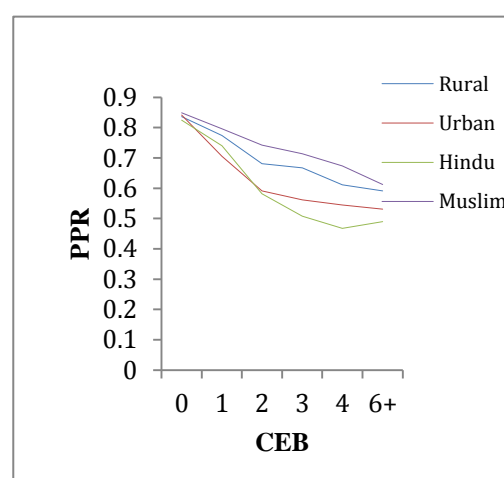
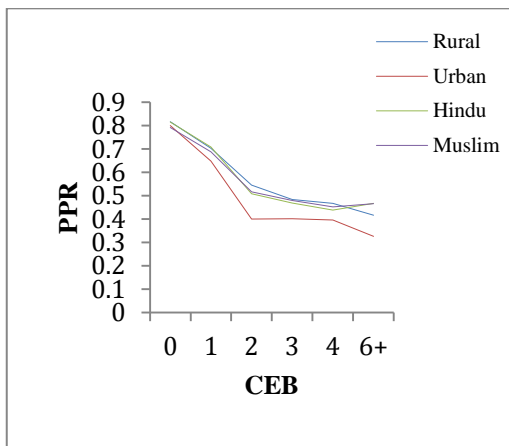**Fig. 4.3**: PPR and CEB for Jorhat

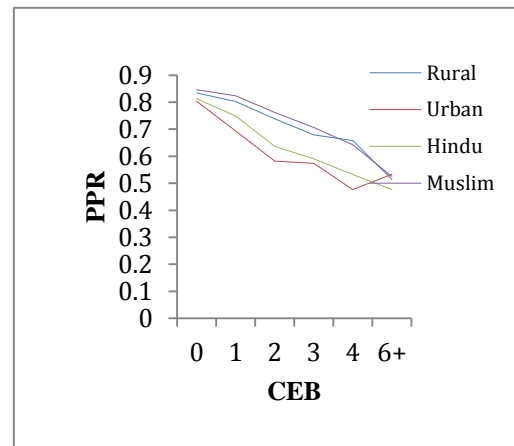**Fig. 4.4**: PPR and CEB for Hailakandi

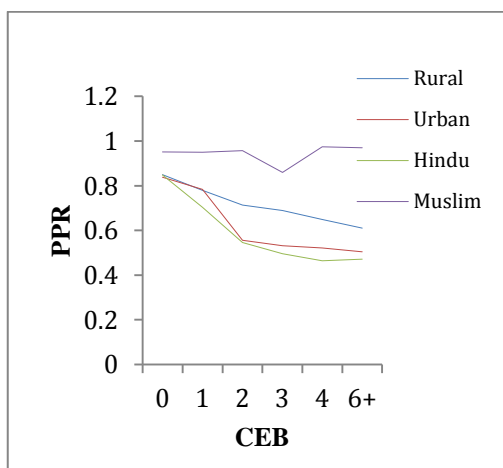**Fig. 4.5**: PPR and CEB for Dhuburi

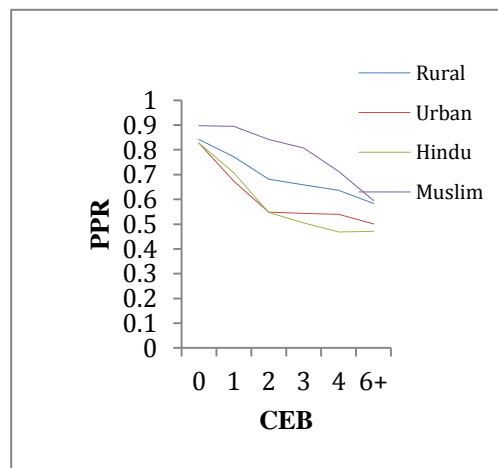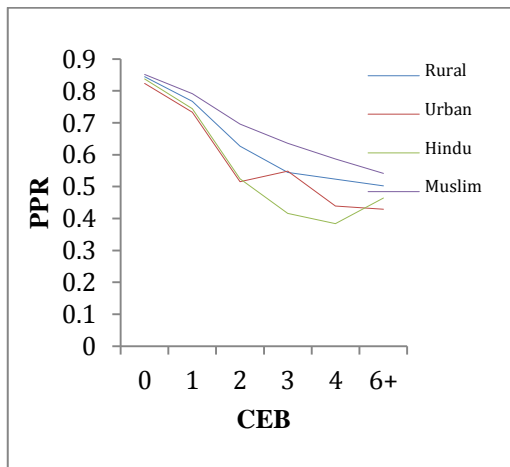**Fig. 4.6**: PPR and CEB for Nagaon

Fig. 4.7: PPR and CEB for Kamrup
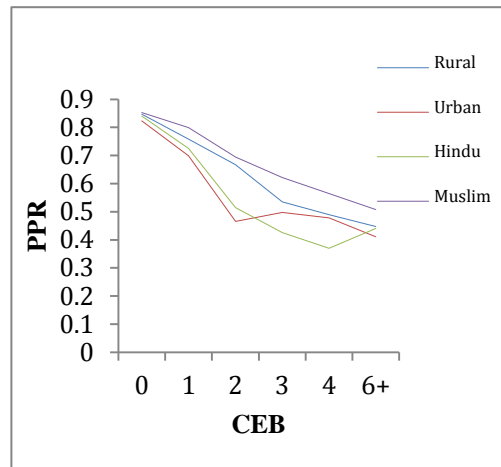
Fig. 4.8: PPR and CEB for Nalbari
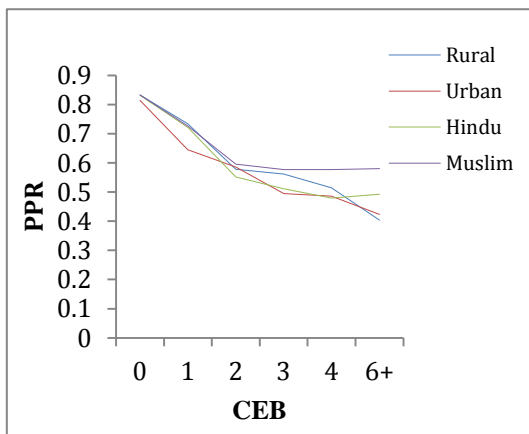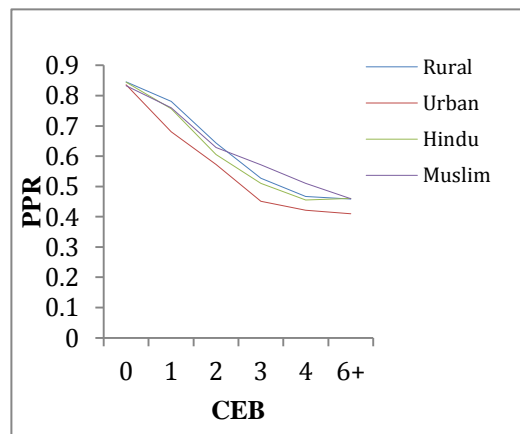
**Fig. 4.9**: PPR and CEB for Golaghat

Fig. 4.10: PPR and CEB for Tinsukia

In some selected districts of upper Assam, the PPR of Hindu is below than the Muslim community. In lower Assam, the PPR has higher value in Dhuburi district than the others. The Fig.4.11 shows the district wise variation of CFR for Hindu and Muslim in rural and urban populations.

Fig. 4.11: Complete Fertility Rate for Assam
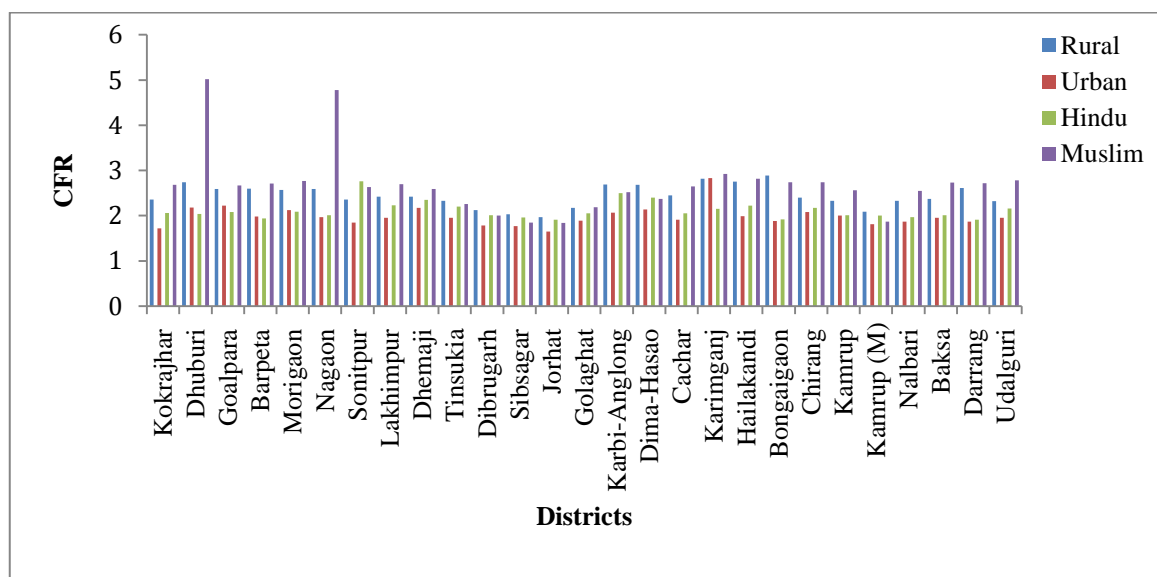
Source: Census Report of India, Government of India, 2011

It has been observed from Fig.4.11 that the complete fertility rate is highest in Dhuburi district and the second highest district is Nagaon.The districts where the Muslim growth is high, the CFR is also large for that districts. In most of the districts Muslim women fertility rates are higher than the Hindu women. It witnesses the higher value of parity for Muslim.

4.4 Conclusion

From the analysis in above it is observed that for higher order birth, the estimated PPR of Hindu is lower than the Muslim. It implies that PPR for Muslim women increases more rapidly than the Hindu women. Same result is found in the case of CFR for two communities. It has been observed that the computed CFR for Muslim is highest in Dhuburi district i.e. 5.02 whereas for Hindu it is 2.04. These are recorded in Table 4.2 and Table 4.1. Again, the average number of births a woman would have, TFR is evaluated in Chapter-2. Here, over a reproductive span of a woman how much children bear at each age is calculated. It is also being mentioned that the TFR for Muslim is high in some specific districts. We have drawn this inference from Fig.2.5. It has been seen that the TFR for Muslim is high in twenty three districts out of twenty seven selected districts at the rates observed in a

particular year or period. The current demographic explanation for decline in TFR is primarily attributed to an increase in delay in pregnancy. By observing cross-sectionally we can conclude that the PPR as well as the TFR and finally fertility changes is perceptible in Hindu and Muslim community. Findings from the current study suggest that new policy regarding the present child bearing situation of Hindu community in Assam will have important impact on the PPR. Further investigation using group measures may identify the relevant factors for better understanding.