Does splitting states into smaller ones help to improve the welfare of rural households? An empirical investigation[1]

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Introduction

Demand for provincial autonomy or smaller states has led to socio-political movements in India, and the issue of separate statehood is still alive. Whether dividing larger states into smaller ones can promote rural development or not, remains an important research question. We aim to contribute to the literature and policy debate by finding an answer to that query, by taking up the cases of Chhattisgarh and Jharkhand. These two new states came into existence in November 2000.

Bihar and Madhya Pradesh consistently rank below the national average on many developmental indicators. The states of Chhattisgarh and Jharkhand were created by carving out 7 of the 45 districts of Madhya Pradesh, and 18 of the 52 districts of Bihar respectively to encourage fast-paced development in those districts. Table 1 and 2 below show the state wise GSDP growth rate pre and post 2000 for the state pairs Jharkhand (JH) - Bihar (BR) and Chhattisgarh (CG) - Madhya Pradesh (MP). The average growth numbers show that CG lagged behind MP before 2000, but has observed higher growth as compared to MP for the years after 2000. However, the numbers for JH-BR show that while JH has shown better growth post-2000, it has not performed significantly better than BR.

Table 1: Pre 2000 GSDP growth (%)

	State Pair 1		State Pair 2	
	JH	BR	CG	MP
1994-1995	4.2	10.9	1.3	2.9
1995-1996	2.7	-13.9	3.1	6.1
1996-1997	-4.1	23.8	4.2	6.5
1997-1998	26.3	-3.8	3.1	5.0
1998-1999	5.7	7.6	5.3	6.6
1999-2000	-2.7	3.7	0.2	10.5
2000-2001	-9.8	16.0	-5.2	-6.9
Average growth	3.2	6.3	1.7	4.4

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Table 2: Post 2000 GSDP growth (%)

	State Pair 1		State Pair 2	
	JH	BR	CG	MP
2001-02	6.8	-4.7	13.2	7.1
2002-03	2.5	11.8	-0.06	-3.9
2003-04	8.0	-5.1	16.5	11.4
2004-05	15.2	12.1	5.5	3.0
2005-06	-3.2	-1.7	3.2	5.3
2006-07	2.4	16.1	18.6	9.2
2007-08	20.5	5.5	8.6	4.7
2008-09	-1.7	14.5	8.4	12.5
2009-10	10.1	5.3	3.4	9.6
2010-11	15.9	15.0	10.6	6.3
2011-12	4.5	10.3	5.7	8.5
Average growth	7.4	7.2	8.5	6.7

This paper looks into this growth story empirically by investigating how successful this state separation policy has been in improving the welfare of people living in the carved out districts. We focus on poverty among households in the rural areas and use reduction in poverty as the welfare indicator. The analysis involves computation of Multidimensional Poverty Index (MPI), proposed by Alkire and Foster (2011), using the household survey data for all districts in the new states and their respective mother states for pre- and post-separation years and further application of Difference in Differences method to estimate the impact of state separation. In the construction of MPI three dimensions have been considered: health and sanitation; education; and living standards. The data used in the computation of MPI come from the household consumption expenditure surveys (CES) conducted by the National Sample Survey (NSS) Office, of Ministry of Statistics and Programme Implementation, for the years 1995, 1998, 2004, and 2012.

This particular question has not been addressed previously in the literature, and to the best of our knowledge this is the first study to have used multidimensional poverty index as a metric to evaluate the effect of secession on separated districts; thus we contribute to the field by exploring a socio-political issue using economic tools.

Literature Review

Alkire and Foster (2011) use a counting based method to identify the poor by employing two forms of cutoffs, the first being the traditional dimension-specific cutoff, which determines whether a person is deprived in that dimension. The second describes how widely deprived a person must be to be considered poor. The benchmark procedure uses a methodology in which the second cutoff is the minimum number of dimensions of deprivation. Foster's dual cutoff identification allows priority to those suffering multiple

deprivations and adapts well to a system with many dimensions. Decomposability is an essential property for policy, which allows the index to be broken down by population subgroup to reflect the characteristics of multidimensional poverty for each group. In addition, it can be analysed to show the dimensional deprivations contributing most to poverty for any given group, which cannot be achieved by the standard headcount ratio and is therefore useful for policy. The authors illustrate multidimensional poverty measurement using examples from USA and Indonesia.

Mishra and Ray (2013) use both the National Sample Survey (NSS) and National Family Health Survey (NFHS) data sets to study deprivation in Indian states during the period of economic reforms. The deprivation dimensions range from expenditure to non-expenditure dimensions such as access to fuel and drinking water, and to health dimensions such as mother's BMI. Using decomposable measures helps in identification of socio-economic groups, regions and dimensions that are contributing to total deprivation more than others. Multidimensional poverty index computation has also been explored in Jayaraj and Subramanian (2010), Alkire and Santos (2014), Bhuiya, Abbas, et al. (2007), Alkire and Seth (2008), and Udaya Wagle (2005), for developing countries including India, Nepal and Bangladesh.

Methodology

The Multidimensional Poverty Index (MPI) has been calculated district-wise before and after the formation of separate states, i.e. before and after the year 2000. Therefore the districts that were earlier a part of either BR or MP and are now part of JH or CG are the treatment group, and the other districts that still belong to BR or MP are the control group. The MPI has been calculated for rural areas of the treatment and control group districts, and the dimensions and threshold levels for identifying a household as poor or non-poor have been decided accordingly in the context of rural households (therefore variables such as ownership of car and furniture expenditure have not been taken into account for measuring MPI, as they are not a necessity for rural areas).

The study uses data from NSS consumption expenditure surveys (Schedule Type 1), with a recall period of 365 days for clothing expenditure and 30 days for food items consumed. Alongside expenditure data, CES provide other variables that have been used to compute MPI. The household characteristic variables that are available with the dataset are household size, principal industry (NIC code), principal occupation (NCO code), household type (sector-wise: rural & urban), religion, social group, land possessed as on date of survey, type of dwelling, covered area, primary source of energy for cooking, primary source of energy for lighting, whether ceremony performed by household during the last 30 days, and type of ration card. The demographic variables of sex, age, marital status, general educational level, and the number of meals taken during the last 30 days, comprise the individual level data.

Table 3: Characteristic variables of NSS Consumption Expenditure Survey data

Household characteristic variables		Individual characteristic variables	
Provided in survey	Used for MPI computation	Provided in survey	Used for MPI computation
Household size Principal occupation Household type Type of dwelling Covered area Religion Social group Land possessed Energy source - cooking Energy source - lighting Ceremonies performed	Household size Household type Energy source - cooking	Age Sex Marital status Education Number of meals taken	Age Education

Building on Alkire and Foster (2011) on multidimensional poverty, three major dimensions have been considered: Health and Sanitation; Education; and Living Standards. Health and Sanitation further comprises nutrition (calorie consumption), and sanitation expenditure. The indicator for Education is the highest educational attainment in the household. Living Standard has three indicators: type of cooking fuel used, access to electricity, and clothing expenditure. The weights have been distributed equally based on the number of branches in each dimension, as can be seen in Figure 1 below. A household is considered deprived in the respective indicator if the calorie consumption is less than 2400 Kcal per person per day, if the highest educational qualification is below primary schooling, if it doesn't have access to LPG/Kerosene for cooking, and if it doesn't have access to electricity. For the two household expenditure indicators (per capita sanitation and clothing expenditure), the cutoff is half of the median value of household per capita expenditure for the state pair in that year, as proposed by Mishra and Ray (2013). A household is identified as poor if the level of overall deprivation, calculated by summation of weights of indicators in which it is deprived, is more than 33%, and then the district level measure of multidimensional poverty is given by the product of proportion of poor households in the district and average deprivation of those poor households. The index, as developed by the Oxford Poverty & Human Development Initiative (OPHI) and the United Nations Development Programme, has been computed for each district as described by Equation (1) below.

The weights of the 6 indicators are denoted by w_i, i=1 to 6. D_{ih} is a variable equal to 1 if the household h fails to meet the cutoff for indicator i, thus being deprived in that indicator, and D_{ih}= 0 if h meets the cutoff. The total deprivation of the household h is therefore $\Sigma w_i D_{ih}$. If $\Sigma w_i D_{ih} > 0.33$, then the variable I_h takes the value 1, implying that the household h is poor. If $\Sigma w_i D_{ih} < 0.33$, then I_h takes the value 0. Let there be k total number of households in the district for which MPI is being calculated.

$$MPI = \frac{\sum_{h=1}^{k} I_h}{k} * \frac{\sum_{h=1}^{k} I_h \sum_{i=1}^{6} D_{ih} w_i}{\sum_{h=1}^{k} I_h} \quad (1)$$

The number of members in each household, used for calculating the per capita values, is decided as per the OECD equivalence scale: assigning a value of 1 to the first household member, 0.7 to each additional adult and 0.5 to each child.

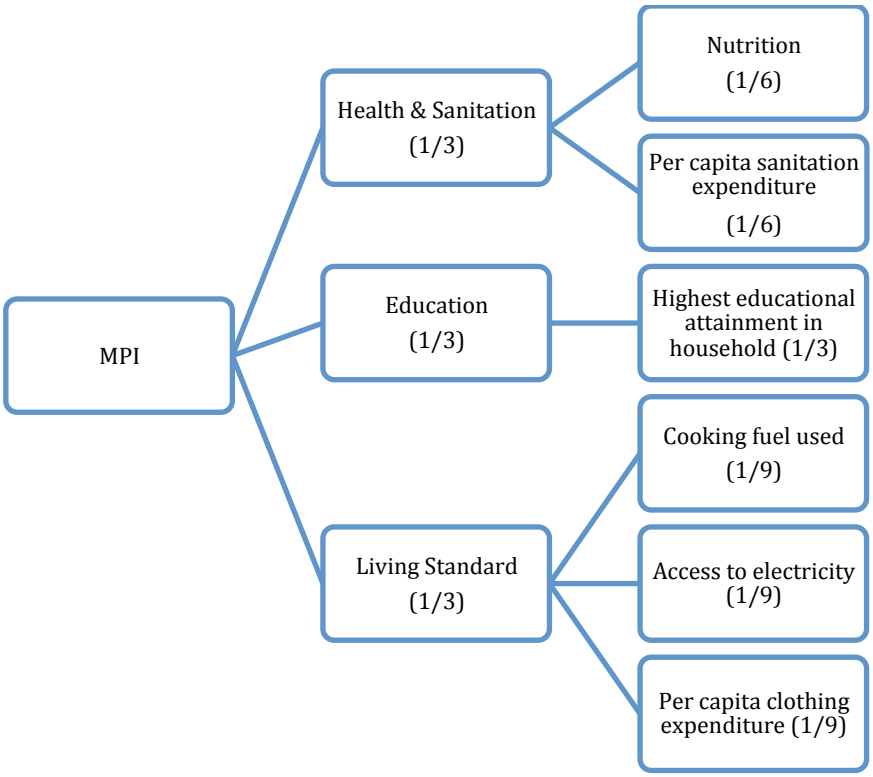


Figure 1: Weight distribution for the poverty measure

The Difference in Differences (DID) method is applied to the computed MPI for rural areas, in two separate panel regressions for the state pairs JH-BR and CG-MP, demonstrated by the following equation.

$$MPI_{i,t} = \alpha + \beta Treat_i + \gamma Time_t + \delta TreatTime_{it} + \rho_1 DummyYear1_t + \rho_2 DummyYear2_t + \rho_3 DummyYear3_t + \mu_i + \epsilon_{it} \quad (2)$$

Here i and t denote district and time respectively. t ranges from 1 to 4 for both regressions, representing the years 1995, 1998, 2004 and 2012. In the first regression, i ranges from 1 to 60, representing the 22 districts of JH (treatment group) and 38 districts of BR (control group). In the second regression, i ranges from 1 to 68, for the 18 districts of CG (treatment group) and 50 districts of MP (control group). The variable *Treat* is a dummy taking value 1 for the treatment group and 0 for the control group. *Time* is a dummy taking value 1 for t=3 and t=4, and 0 for t=1 and t=2. *TreatTime* is the interaction of *Treat* and *Time*, and its coefficient δ is the Diff in Diff estimate, the primary coefficient of interest. *DummyYear1* is the dummy variable equal to 1 for t=1. Similarly, *DummyYear2* and *DummyYear3* are equal to 1 for t=2 and t=3 respectively. α denotes the constant term.

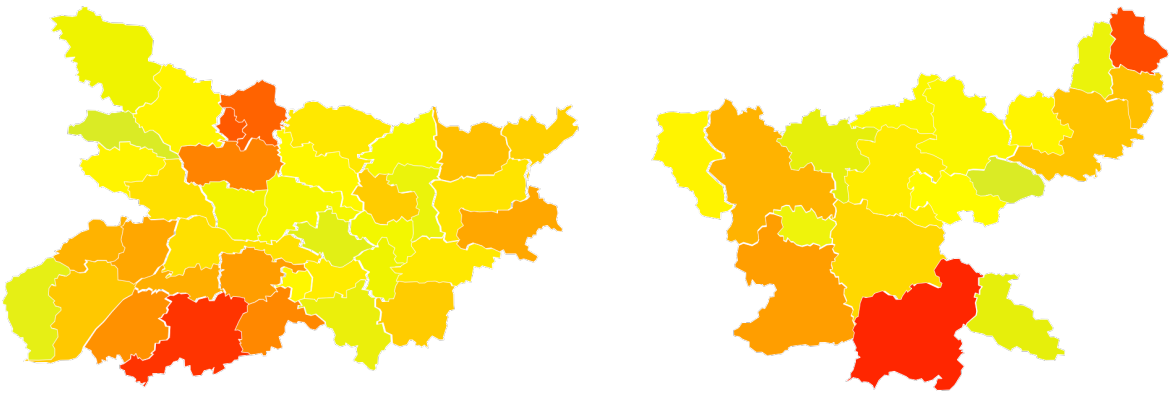
Empirical Results

The tabulation of MPI (Table 4) for the mother states (control group) and separated states (treatment group) shows that while CG has performed better in terms of decline in poverty as compared to MP, JH and BR have seen the same decrease in MPI over the timespan 1995-2012. Heat maps plotted using district wise MPI results for the treatment group and the control group (Figure 2 and Figure 3) depict the variation in poverty level change from 1995 to 2012 within the states.

Table 4: Multidimensional Poverty Index for the four states

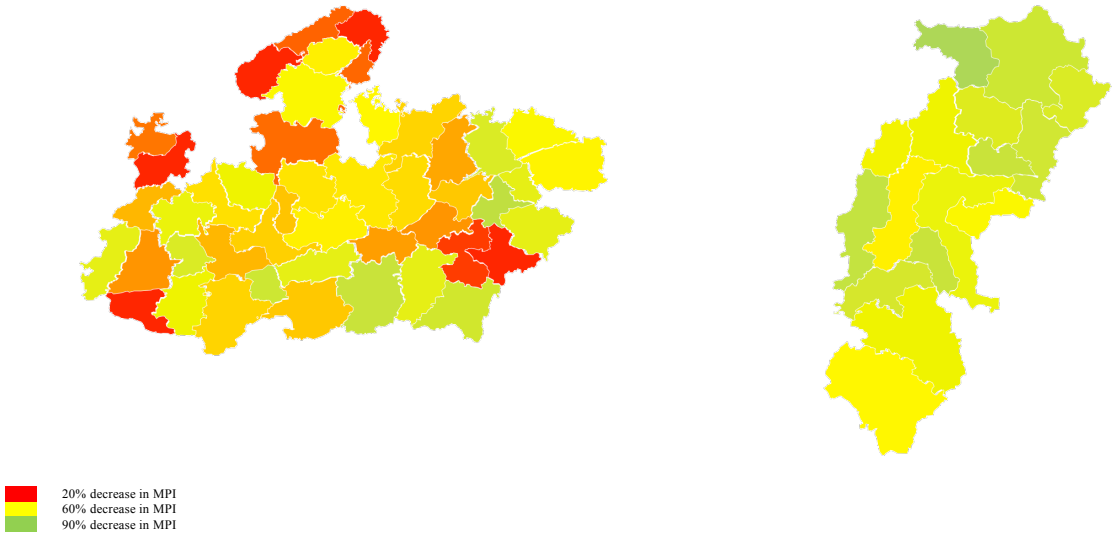
	MPI in 1995 (%)	MPI in 1998 (%)	MPI in 2004 (%)	MPI in 2012 (%)	% Total change (1995-2012)
JH	50.8	52.1	26.7	18.7	-63
BR	53.5	54.9	26.9	19.8	-63
CG	39.5	35.4	19.5	8.3	-79
MP	38.1	41.6	18.8	14.8	-61

Figure 2: Total % change in MPI for districts of BR (left) and JH (right)



Note: The total number of districts in a state is taken as per the number in 2012. If a particular district was in existence in 2012 but not in a previous year, its MPI for that year is considered equal to the MPI of the district from which it was created. For example, Dantewada (CG) was created from Bastar (CG) in 1998, so the MPI of Dantewada in 1995 and 1998 is taken equal to the MPI of Bastar in those years.

Figure 3: Total % change in MPI for districts of MP (left) and CG (right)



(The colour scale ranges from red to green: red indicating districts with the lowest decline in MPI and green the highest). We observe that in CG there has been a notable decrease in MPI relative to MP but in JH the results are similar to BR. The Appendix contains detailed results on district wise MPI and the number of households surveyed (Figure 4-7 and Table 6-9). The following table shows results from the estimation of Equation (2).

Table 5: Regression Results

	CG_MP	JH_BR
Time	-24.590***	-32.560***
	(1.735)	(1.607)
Diff in Diff	**-5.023***	**1.664**
(Time*Treatment)	**(2.835)**	**(2.245)**
Dummy for year 2	1.725	1.11
	(1.813)	(1.219)
Dummy for year 3	6.972***	7.780***
	(1.653)	(1.467)
Intercept	39.693***	51.088***
	(0.964)	(0.800)
N	272	240

Standard errors in parentheses
* p<.10, ** p<.05, *** p<.01

The Diff in Diff coefficient obtained is insignificant for the regression on Jharkhand-Bihar districts. However, it is significantly negative at 10% level for the regression on Chhattisgarh-Madhya Pradesh, implying that the policy has had a significant positive impact on decreasing MPI in those districts.

Concluding Remarks and Future Plan

The descriptive analysis shows that while there has been a higher decline in rural poverty in CG as compared to its mother state MP, JH shows the same decrease in MPI as BR over the timespan of two decades. The results obtained through regression indicate that the creation of small states has had mixed results as seen through the Diff in Diff coefficient which comes out to be insignificant for the pair Jharkhand-Bihar but significant for Chhattisgarh-Madhya Pradesh. One reason for this contrast could be the difference in political governance between Jharkhand and Chhattisgarh.

There are certain caveats to the results derived in this study. The first is that there is limited district wise data available for both pre and post-separation years and thus the variables used in the computation of MPI are restricted in scope. NSSO surveys do have pre and post-2000 data, but they are more suited for state level estimates rather than district level estimates. Secondly, for a sharper assessment of what worked and what didn't, a longer time horizon is required. We plan to add one more round of Household Consumption Expenditure Survey (2014-15) to the analysis to work with more number of observations and obtain more robust results. Also, the research question needs to be explored further using other measures of district growth and welfare indices over the years. We will be applying the stochastic dominance technique, as proposed by Sarkar (2012) to evaluate the performance of districts.

Creation of new administrative units by splitting large states into smaller states has been a policy supported by many political parties of India. The separation of Chhattisgarh, Jharkhand and Uttarakhand from the BIMARU big three, and recently Telangana from Andhra Pradesh, has also led to rising demand for new states in other areas, particularly in Vidarbha (Maharashtra) and Gorkhaland (West Bengal), among others. Secession of states is an attempt to create a union of well-governed states through restructuring, but whether it has proved to be an effective policy is an open and significant question, which this study attempts to find an answer to.

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Appendix

Table 6: Households surveyed in JH in NSS rounds

District	1995	1998	2004	2012
Garhwa		12	17	96
Palamu	64	24	24	96
Chatra		8	6	64
Hazaribagh	64	16	16	96
Kodarma		8	8	64
Giridih	48	16	16	96
Deoghar	32	16	16	96
Godda	16	12	16	95
Sahibganj	32	8	10	64
Pakaur		8	8	64
Dumka	48	16	24	96
Dhanbad	44	12	16	96
Bokaro		12	16	96
Ranchi	48	20	24	96
Lohardaga	16	4	8	64
Gumla	48	12	16	63
Pashchimi Singhbhum	32	8	24	96
Purbi Singhbhum	48	20	16	63
Latehar				64
Simdega				64
Jamtara				64
Seraikela-kharsawan				64
Total	540	232	281	1757

Table 7: Households surveyed in CG in NSS rounds

District	1995	1998	2004	2012
Koriya			2	32
Surguja	32	28	22	160
Jashpur			8	64
Raigarh	32	24	16	88
Korba			4	64
Janjgir-Champa			16	96
Bilaspur	48	48	24	120
Kawardha			8	63
Rajnandgaon	16	16	10	96
Durg	16	20	24	160

Raipur	48	44	26	159
Mahasamund			6	64
Dhamtari			16	55
Kanker			10	64
Bastar	16	28	9	94
Dantewada			11	32
Narayanpur				16
Bijapur				8
Total	208	208	212	1435

Table 8: Households surveyed in BR in NSS rounds

District	1995	1998	2004	2012
Pashchim Champaran	48	40	24	96
Purba Champaran	48	28	34	128
Sheohar			8	64
Sitamarhi	48	24	28	96
Madhubani	60	32	32	128
Supaul		16	12	64
Araria	16	20	18	96
Kishanganj	16	12	8	64
Purnia	32	20	16	88
Katihar	48	20	16	88
Madhepura	16	12	18	64
Saharsa	32	12	16	64
Darbhanga	32	28	34	128
Muzaffarpur	44	40	32	128
Gopalganj	32	20	16	96
Siwan	48	28	24	96
Saran	32	28	32	128
Vaishali	48	24	24	96
Samastipur	64	28	32	128
Begusarai	28	16	16	96
Khagaria	16	12	10	64
Bhagalpur	72	15	22	96
Banka		16	16	64
Munger	32	20	8	64
Lakhisarai			2	64
Sheikhpura			8	64
Nalanda	16	20	16	96
Patna	44	24	31	96
Bhojpur	28	20	16	96
Buxar		12	8	64
Kaimur(Bhabua)		16	16	64

Rohtas	60	20	16	96
Jehanabad	16	12	16	64
Aurangabad	32	16	16	64
Gaya	48	28	31	128
Nawada	16	16	18	64
Jamui		16	16	64
Arwal				64
Total	1072	711	706	3312

Table 9: Households surveyed in MP in NSS rounds

District	1995	1998	2004	2012
Sheopur			2	32
Morena	16	20	14	64
Bhind	12	12	16	64
Gwalior	16	8	8	32
Datia	16		8	32
Shivpuri	16	12	16	64
Guna	16	20	18	32
Tikamgarh	16	12	8	64
Chhatarpur	16	12	8	64
Panna	16	12	8	32
Sagar	91	16	16	96
Damoh	64	16	8	64
Satna	32	16	14	96
Rewa	16	25	17	96
Umaria				32
Shahdol	16	20	16	32
Sidhi	32	24	16	64
Neemuch			2	32
Mandsaur	16	16	14	56
Ratlam	12	8	8	64
Ujjain	16	12	8	64
Shajapur	28	12	8	64
Dewas	16	12	8	64
Jhabua	16	16	16	32
Dhar	12	16	15	96
Indore	16	8	9	32
West Nimar	32	28	12	64
Barwani			4	64
East Nimar	16	19	16	56
Rajgarh	16	16	8	64
Vidisha	16	19	8	64
Bhopal	16	4	8	32

Sehore	12	16	8	64
Raisen	16	12	8	64
Betul	48	12	16	64
Harda			6	32
Hoshangabad	16	12	2	32
Katni			2	64
Jabalpur	64	23	14	64
Narsimhapur	44	8	8	64
Dindori			6	32
Mandla	32	18	10	64
Chhindwara	28	16	16	96
Seoni	16	12	8	64
Balaghat	47	16	16	64
Ashoknagar				32
Anuppur				32
Burhanpur				32
Alirajpur				32
Singrauli				32
Total	942	556	457	2736

Note: The blanks in the table indicate that the district came into existence after that survey round was conducted. In that case, the MPI for that district is taken to be equal to the MPI of its parent district in that year.

Figure 4: District wise MPI (%) in JH

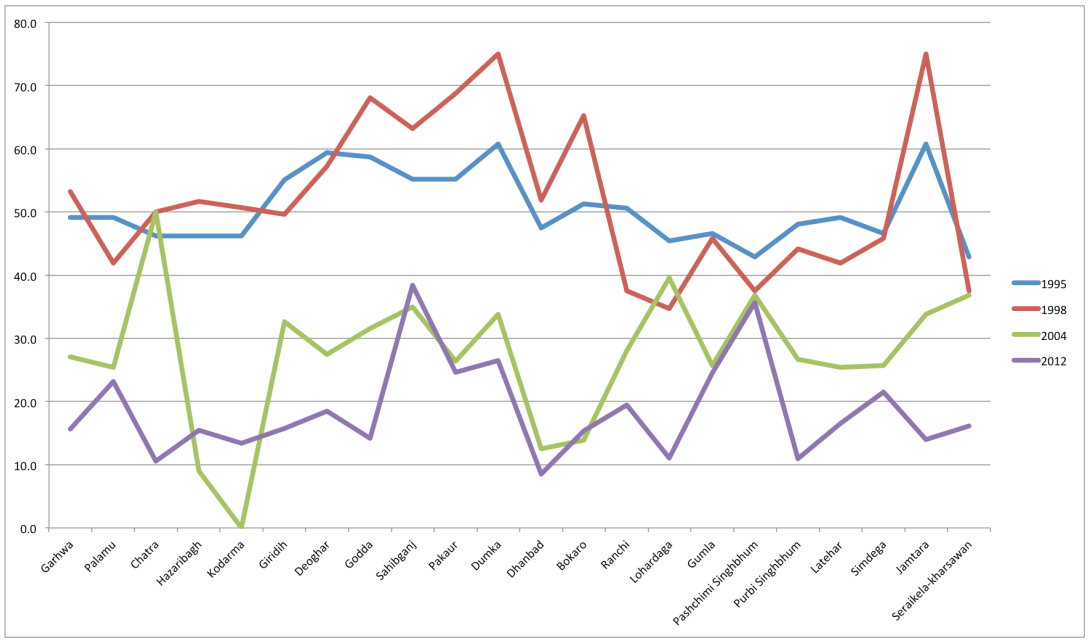

Figure 5: District wise MPI (%) in BR

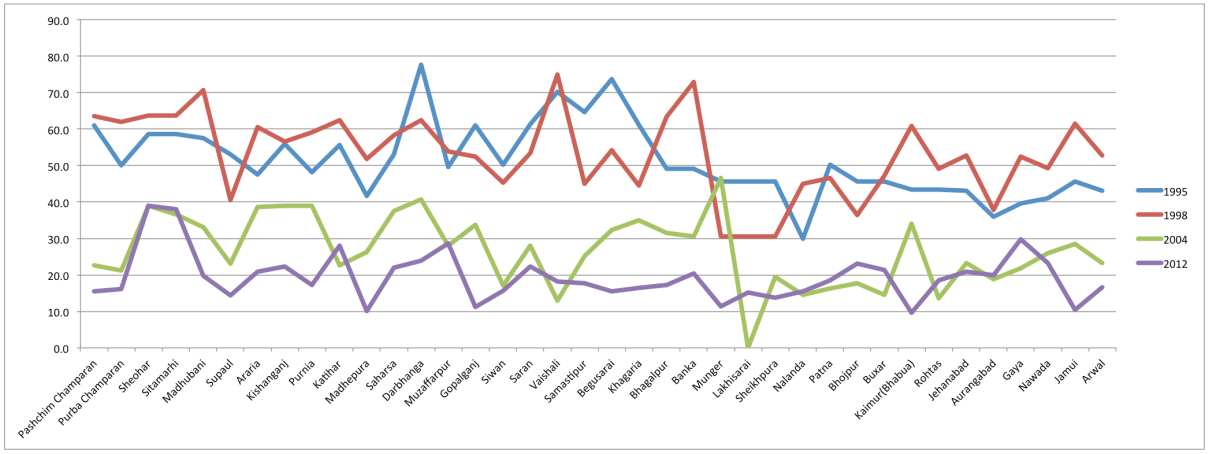

Figure 6: District wise MPI (%) in MP

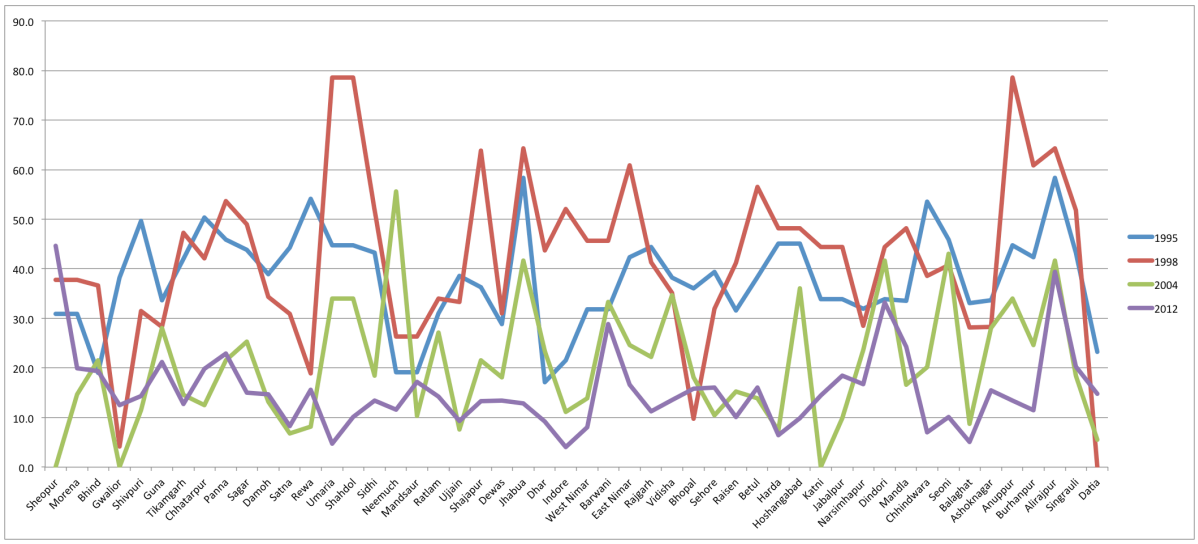

Figure 7: District wise MPI (%) in CG