SPATIO-TEMPORAL VARIATION IN CHILDLESSNESS AND ITS RELATION WITH FERTILITY IN INDIA: A DISTRICT LEVEL ANALYSIS

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ABSTRACT

❖Childlessness is an issue of global concern.
❖An essential feature of the population of the developed world
❖Situation is altogether different in developing country like India.
❖Census of India 1981, 1991, 2001 and 2011 data used
❖Spatial analysis of childlessness at district level in India and its association with fertility.
❖High-high association of childlessness in the southern states and low-low association in the districts of the north- western and northern states.
❖Spatial error model and fixed effect model indicates that there is an inverse relation of childlessness and TFR.
Key Words: *Childlessness, Infertility, Spatial analysis, spatial error model, fixed effect model*

INTRODUCTION

❖India is a country, where pronatalist norm leads to a higher fertility and the infertile couples especially the women is regarded as a curse to the society
❖ Childlessness impacts society as it determines the future needs of various services like housing, education
❖ICPD (1994) issued prevention and treatment of infertility as a part of the reproductive health service
❖ Childlessness cannot be differentiated from fertility
❖It may be correct to say that fertility levels of any population are very much influenced by childlessness
❖Thus, it plays a major role in determining fertility
❖There is a dearth of studies in India exploring the dynamics of childlessness and its relation to fertility.
❖ A district-level analysis of childlessness and its relation with fertility is essential to explain the factors affecting childlessness.

OBJECTIVE

❖To examine the level, trend and the spatial clustering of childlessness at the district level
❖To analyse the association between childlessness and fertility using spatial technique

DATA SOURCE AND METHODOLOGY

Data Source:
Census of India 2001 and 2011
Description of the variables
Childlessness rate: L/P
Where, L represents ever married women with no surviving children; P represents total number of ever married women in reproductive age group.
✓ Here, Childlessness rates have been computed for women in the age-group of 45-49 years, and hence referred to as completed childlessness rates.
✓ The advantage of using this is the potential for restricting the analysis to a specific cohort of ever married women who have completed the child-bearing ages.
TFR= B/P
Where, B is the total number of births in the preceding year and P is the total number of women in the age group of 15-49 years.
✓ The values obtained in this way to some extent may be under-estimated.
✓ To compensate for potential underestimation, we will be adjusting the district-level estimated TFRs by adopting the method suggested by Bhat et al., (1984) and outlined by Vosti and Lipton (1991).
✓ This involves computing an inflation factor that takes into account the age structure of the childbearing population and child mortality. For a given district,
Inflation Factor (I) = 0N5/Σ ((5Wa × 5fad × 5L0/5*l0) ×5)
Where, 0N5 is the number of children age 0-5 years in the district, 5Wa is the number of women per five-year age group in the childbearing ages in the district, 5fad is the district-level age-specific fertility rate, and 5L0/5*l0 is the district-level childhood survival probability
Methodology:
➤ Spatial techniques using ArcGIS and GeoDa software
➤ Univariate and Bivariate LISA maps generated
➤ Fixed effect OLS regression has also been done after forming a panel data for the two decades. The equation for the model is
Yit = β1Xit + αi + uit
Where
– αi (i=1….n) is the unknown intercept for each entity (n entity-specific intercepts).
– Yit is the dependent variable (DV) where i = entity and t = time.
– Xit represents one independent variable (IV),
– β1 is the coefficient for that IV,
– uit is the error term

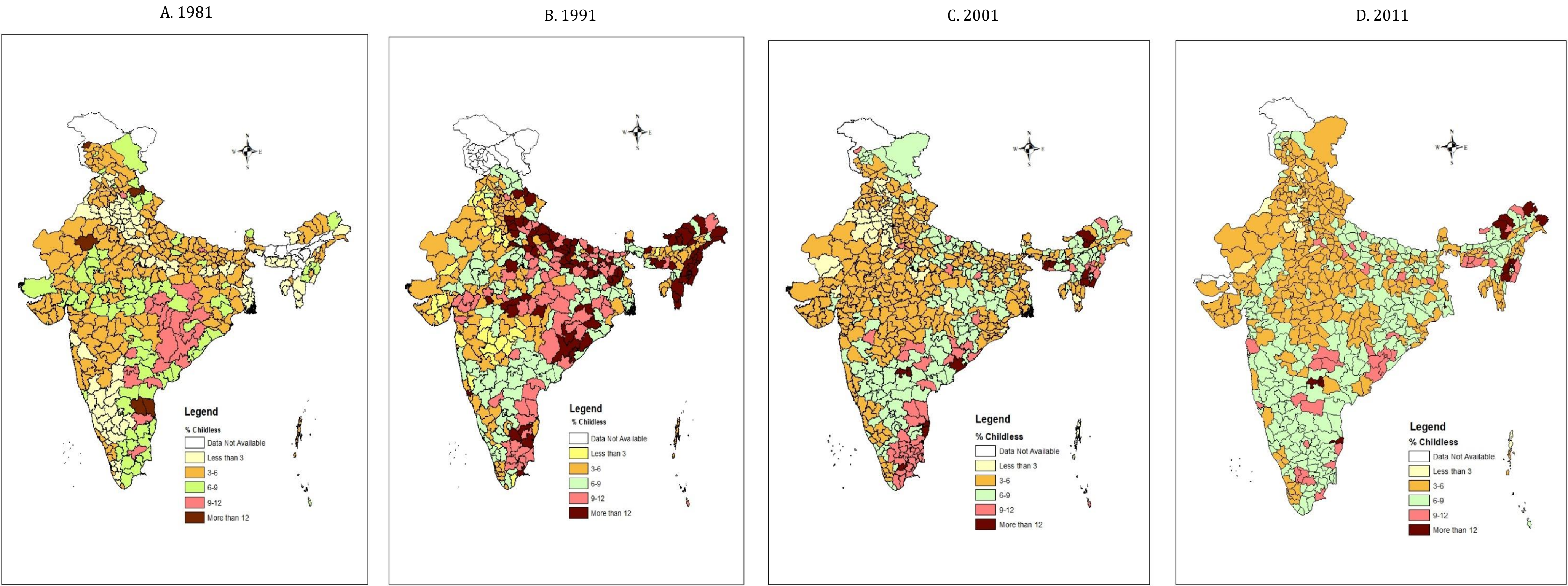## RESULTS

Fig 1A-D: Childlessness across districts of India, 1981-2011

A. 1981   B. 1991   C. 2001   D. 2011

Fig2A-G: Univariate LISA Cluster and Significance Map for Childlessness, 1981-2011

A. 1981   C. 1991   E. 2001   F. 2011
B. 1981   D. 1991   F. 2001   G. 2011
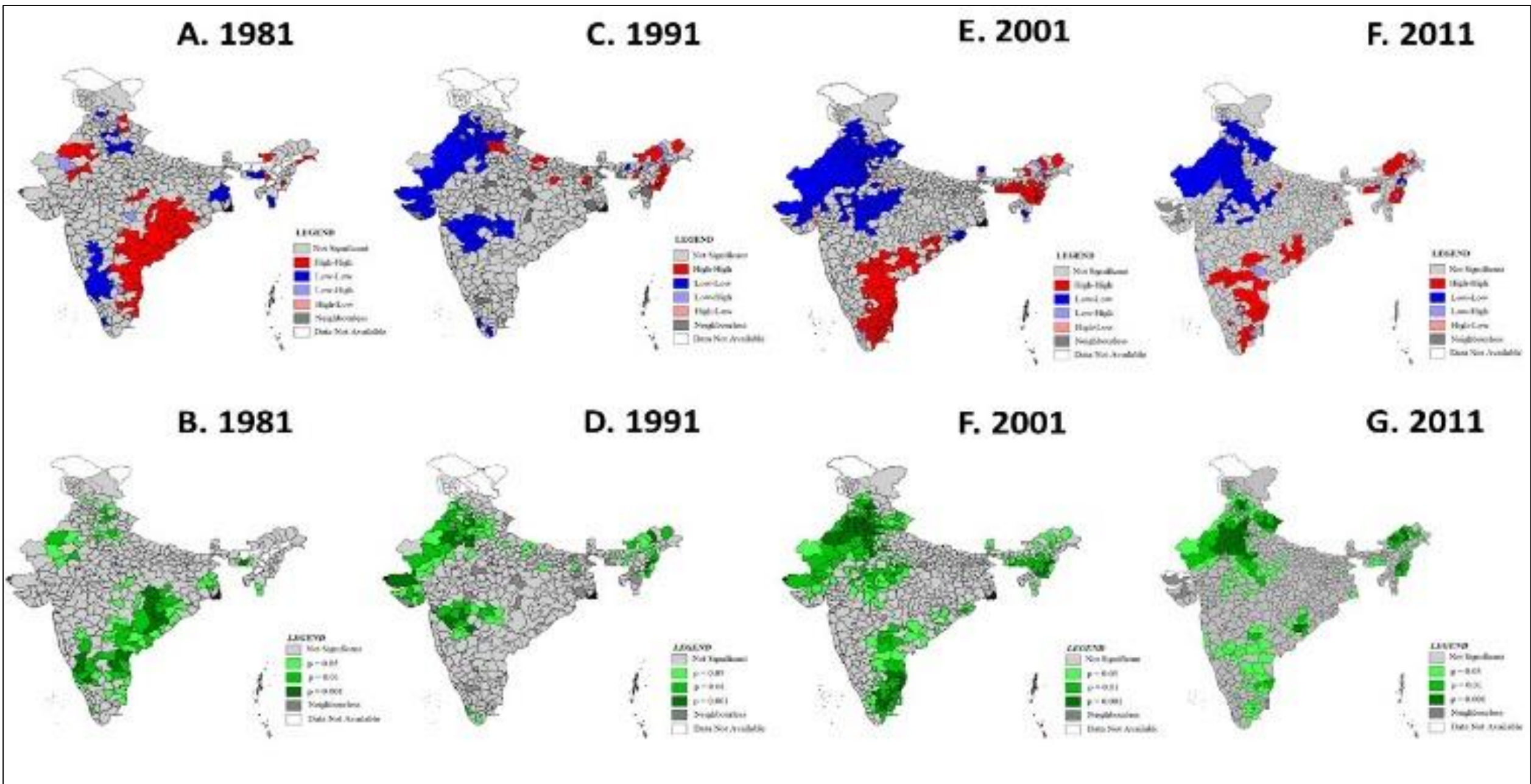
Fig3A-G: Bi-variate LISA Cluster and Significance Map for Childlessness and TFR, 1981-2011

A. 1981   C. 1991   E. 2001   F. 2011
B. 1981   D. 1991   F. 2001   G. 2011

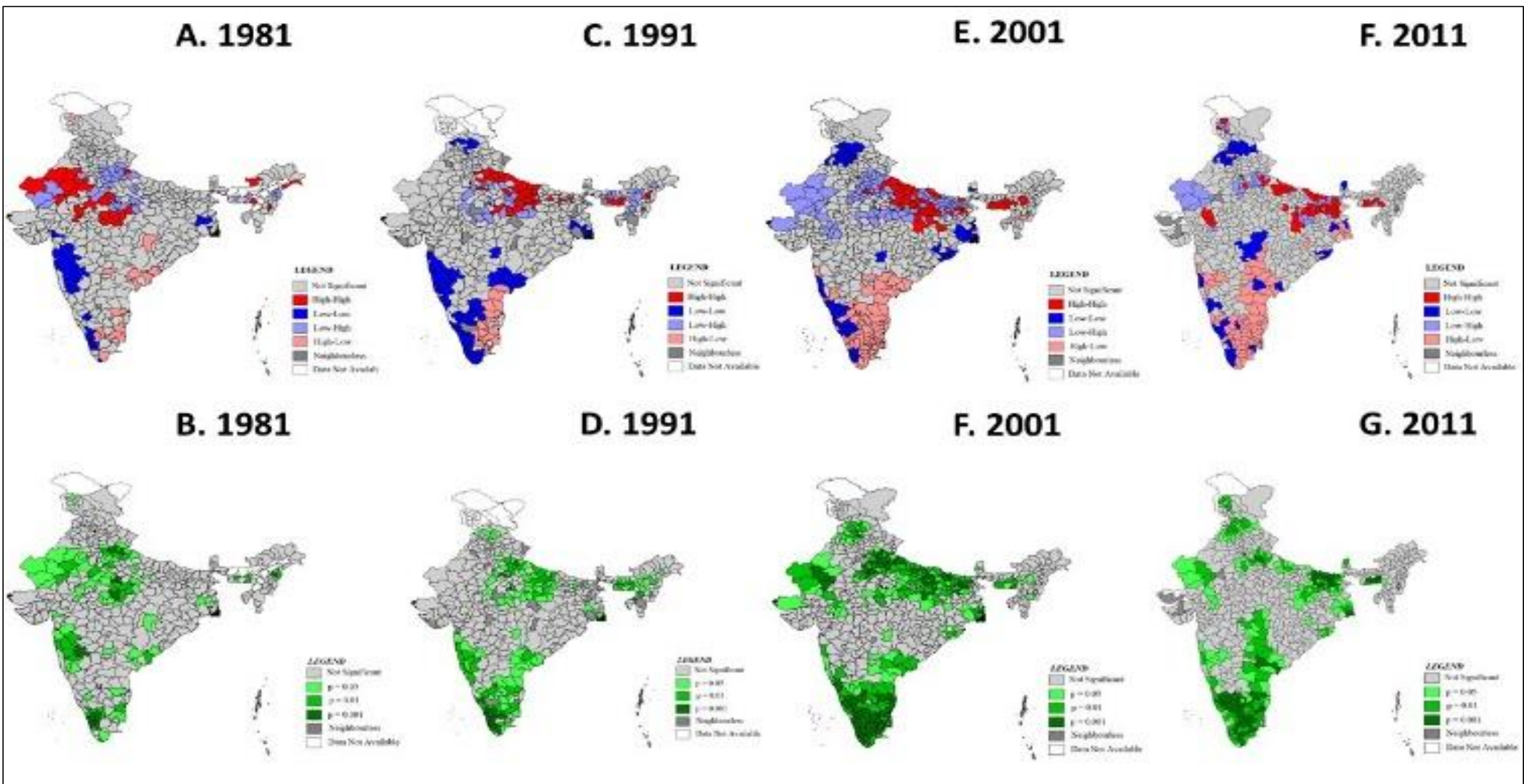### Table 1: Results of Spatial Error Model for Total fertility rate at the district level in India

Variables	1981		1991		2001		2011	
	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability
% of Childless women	-0.071	0.000	-0.016	0.007	-0.046	0.000	-0.009	0.000
Singulate Mean age at Marriage	0.012	0.230	-0.013	0.176	-0.100	0.000	-0.090	0.000
% of Urban Population	-0.003	0.237	-0.008	0.000	0.001	0.175	0.000	0.937
% of Muslim Population	-0.002	0.558	0.018	0.000	0.011	0.000	0.010	0.000
% of Schedule Caste	-0.004	0.570	-0.006	0.262	-0.007	0.000	-0.005	0.044
% of ScheduleTribe	0.006	0.006	0.008	0.000	0.006	0.000	0.005	0.000
Female Literacy Rate	-0.032	0.000	-0.018	0.000	-0.015	0.000	-0.018	0.000
Female Workforce Participation	-0.012	0.003	-0.007	0.254	0.005	0.058	0.000	0.584
% of Households with Electricity			-0.002	0.394	-0.007	0.000	-0.007	0.000
% of Households with Latrine			-0.001	0.736	-0.003	0.021	-0.001	0.664
Constant	6.292	0.000	5.532	0.000	6.323	0.000	5.927	0.000
Number of Observations	413		463		593		640	
Log Likelihood	-351.685		-382.330		-155.390		-166.990	
AIC	721.369		786.663		332.781		355.982	
R square	0.628		0.715		0.891		0.862	
Lag Coefficient (RHO/Lambda)	0.547		0.664		0.853	0.000	0.735	0.000

CONCLUSION

• The results of bi-variate maps suggest that with an increase in childlessness there is a decrease in TFR and vice-versa (Singh et.al, 2017).
• The significant lambda value in both the models indicate relationship between childlessness and independent variables at the macro-level (districts) may be misleading if spatial clustering is ignored.
• With limited study in spatial pattern of childlessness and its association with TFR, this study would shed some light in the area which needs some concern.

LIMITATIONS

✓Analysis restricts to zero parity children and does not classify into voluntary and involuntary childlessness.
✓With development childlessness has been increasing, but whether it is because of biological factors or involuntary causes has to be checked
✓A focus is also needed on regions that have a high-high association between childlessness and TFR i.e. observed in the state of Uttar Pradesh, Bihar (high-high) and Punjab, Himachal Pradesh (low-low)