An Analysis of the Effects of Institutional, Infrastructure, and Economic Factors on Growth, Poverty, and the Environment

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ABSTRACT

According to the United Nations, the first goal to attain by 2030 is to "End poverty in all its forms everywhere," which serves as the motivation for this study. The purpose of this research is to investigate the impact of FDI inflows over poverty by undertaking several other economic and institutional variables. The study employs panel data for Indian states for the period 2000-2019. The empirical evidences are based on panel data analysis methods. Principal component analysis has also been employed for several institutional environment indicators in order to examine the holistic view for the analysis. The independent variables taken in the study are control of corruption, education expenditure, FDI inflows, gross fixed capital formation, crime, infrastructure, workers engaged and industrial disputes. The study undertakes three models to find out the impact of various variables on poverty, growth and environment and confirms that FDI inflows, corruption control, education expenditure, andworkers engaged are important factors for poverty alleviation and for improving growth at state level in India. Also FDI plays an important role in improving health infrastructure at state level in India. This paper also suggests numerous policy recommendations to the policymakers, such as need for robust infrastructure, effective crimeand law enforcement at the state level in India is an essential step towards poverty reduction.

Keywords: Poverty, FDI Inflows, Institutional Environment, Enforcement of Law, Infrastructure, Education Expenditure.

Introduction

The first goal of United Nation is to end poverty in all its forms is the major inspiration for the current study. Achieving this goal can lead to a sustainable future through transfer of resources from affluent to emerging countries. Also establishing efficient policy measures that invest in poverty eradication is a critical step towards achieving sustainable development.To achieve this aim at the national level, it is necessary to achieve it at the state or the provincial level, which will eventually lead to the goal of no poverty and sustainability. Also, we must grasp the factors that drive poverty, such as what they are and how to quantify poverty at the state level.
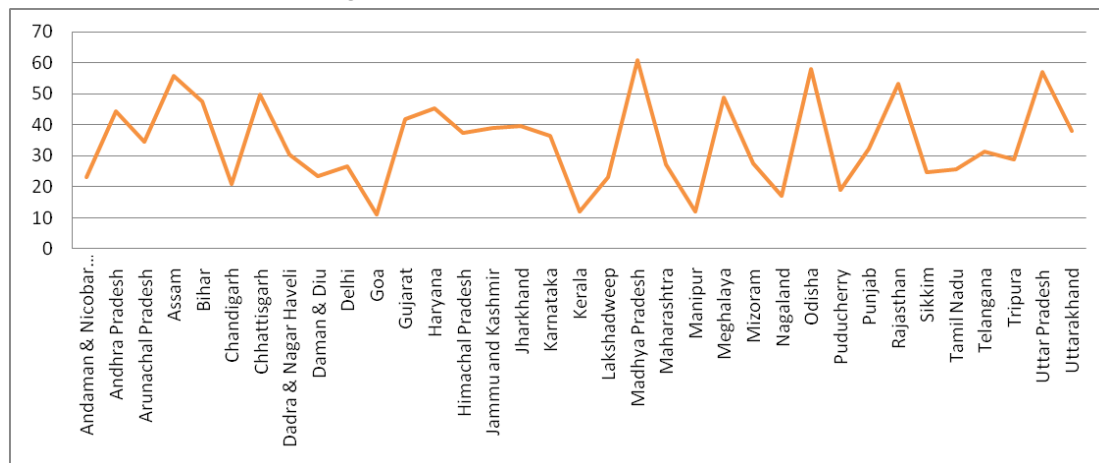
There are multiple studies available that quantify poverty using various parameters (D'Attoma and Matteucci, 2024; Saddiqueet al., 2023; Ravallion and Chen, 2019;Birn et al., 2009; Figini and Santarelli, 2003).Variety of studies exists that use various proxies for the assessment of povertyfor instance, assets based poverty, education based poverty, health based poverty, consumption and expenditure based poverty, housing based poverty, housing poverty, social- demographic poverty and financial poverty (see Table 1.A in the appendix). Some studies also employ the headcount poverty indicator (Figini and Santarelli, 2003), but others employ proxies such as household consumption expenditure and life expectancy (Magombeyi and Odhiambo, 2017). Due to variances in nations' poverty

proxy measures and econometric approaches, existing research does not arrive at a consensus on poverty measurement which results in the inconsistency in the results, cross country analysis and policy evaluation. Although many institutes provide poverty data for countries at global level such as UNDP, World Bank etc. But in India a single index is not readily available for assessing the poverty at state level, thus in present study we are trying to examine the impact of various variables on the poverty. Even though Niti Aayog has started supplying data for the Multidimensional Poverty Index (MPI) for Indian states, the index does not adequately provide data for a longer period of time. Therefore, in accordance with the literature currently in publication, poverty has been assessed using a number of factors, such as the infant mortality rate,

In recent years, India's poverty rate decreasing significantly, as per the Global multidimensional poverty Index (MPI), a total of 171 million people moved out of the extreme poverty in past 10 years from 2011-12 to 2022-23. According the World Bank,poverty rate in India was 16.2% in 2011-12 which is 2.3 % in 2022-23 (World Bank, 2025). Also around 9.89 per cent multidimensional poor declined from the year 2015-16 to 2019-21 (MPI, 2023). Here, it can be seen that though a huge number of people came out of poverty, yet a big number of people are still living a life under poverty. India at national level growing at a good pace as IMF (International Monetary Fund) projected 6.6per cent growth rate for year 2025(IMF, 2025). The MPI prepared by Niti Aayog (Niti Aayog, 2023), shows that poverty level in India varies in different states, around six states show low MPI while more than 12 states show high level of poverty in India. MPI index is based on three dimensions; health, education and standard of living, and shows 14.96% of total population ismultidimensional poor (Niti Aayog, 2021).

As per the literature IMR (Infant mortality rate) is one of the variables to assess poverty, and the big gap in IMR amongst states is another area of concern in a vast country like India, with diversified socio-economic and political instances of problems and prospective growth. IMRis different in Indian states such as Bihar, Madhya Pradesh, Uttar Pradesh, Rajasthan and Odisha evince a high IMR, while in Delhi and Kerala, IMR is low. In figure 1 average IMR for the period 2000-2019 in Indian states is presented in order to understand the level of poverty at state level in India. It can be seen in the figure that various states show high IMR in India.

Figure 1: IMR in Indian States (2000-2019)

Source: Author Compilation using data from Reserve Bank of India Handbook of statistics on Indian States, 2021

Following, review of literature, we discovered that, while there are numerous studies that examine the relationship between poverty and variety of variables in several developed and developing countries, as well as for India, but none of the study examined the relationship between FDI, institutions, and poverty at the state level in India. Hence, we recognised a study gap in the literature and attempted to investigate this relationship at the state level in India.

In present paper we focus on analysing the impact of FDI inflow, institutional environment, education and economic factors on poverty in Indian states. IMR has been taken as the proxy for poverty and GSDP per capita income has been taken as the proxy of growth. FDI inflows, education expenses, Gross fixed capital formation (GFCF), institutional variables like corruption and legal environment, FDI

inflows, employment and infrastructure have been taken as the independent variables for the analysis in order to understand the relationship. This study is fundamentally different from other studies in four ways; first, this study investigates the impact of various variables on poverty as well as growth by taking two proxies IMR (poverty) and GSDP per capita (growth) to understand the situation of poverty and growth in Indian states and trying to examine the relationship with FDI, institutional and economic variables. Second, it analyses this relationship at sub-national level in India. Third, to increase the robustness of the studynumbers of variables are included where index is not readily available. Hence many variables have been arrived by using PCA (principal component analysis) and further used in analysis.Fourth, this study uses two models to examine the holistic relationship with poverty as well as growth.

Literature Review and Hypothesis Development

- **FDI Inflows**

Large numbers of studies are available examining the impact of FDI inflows on poverty reduction. Majority of studies found a positive role of FDI inflows in reducing poverty at a location (Magombeyi and Odhiambo, 2017; Kolster, 2015). But many studies also established a negative or no impact of FDI inflows in reducing poverty (Mencinger, 2003; Anetor et al., 2020; Huanget al., 2010) due to the lack of skill or income distribution inequality (Herzer and Nunnenkamp, 2011). Considering India is a developing country, FDI is expected to significantly alleviate poverty in the country.

Available literature also suggests that FDI is an essential vehicle for economic growth and ultimately responsible for poverty alleviation; many studies support a positive impact of FDI on poverty reduction. The prominent studies among them are (Ahmed *et al*., 2023; Muturi, 2023; Chindengwike, 2022; Do *et al*., 2021; Gunby *et al*., 2017; Shamim *et al*., 2014; Almfraji*et al*., 2014; Fowowe and Shuaibu, 2014; Dollar *et al*., 2013; Gohou and Soumare, 2012; Zaman *et al*., 2012; Adams, 2009; Hsiao and Hsiao, 2006; Akinlo, 2004, Greenaway *et al*., 2002; Jalilian and Weiss, 2002; Kumar and Pradhan, 2005; Alfaro *et al*., 2004; Romer, 1986). Although some other studies support the FDI dependency theory (the risks of depending excessively on foreign technology and funds) as well as demonstrate that FDI increases poverty (Maduku and Zerihun, 2023; Anetor et al., 2020; Magombeyi and Odhiambo, 2017; Lee and Hwang, 2014, Ali et al., 2010; Huang et al., 2010), certain other research findings also support the idea that FDI increases income disparities (Kim, 2022; Josifidis*et al*., 2020).However, numerous studies have revealed no substantial association between the two (Akinmulegun, 2012; Gohou and Soumare, 2012; Tsai and Huang, 2007). As a result, there is no consensus among the existing literature on whether FDI inflows have a beneficial or negative influence on poverty. At the same time, the impact of institutional determinants on poverty has gotten little attention in the research. Hence, here in this paper we hypothesize a positive impact of FDI inflows on poverty reduction.

Model 1: Hypothesis 1 (H1): State-wise FDI Inflows is negatively associated with state-level poverty.

Model 2: Hypothesis 1 (H1): State-wise FDI Inflows is positively associated with state-wise growth.

- **Control of Corruption**

Corruption impedes a country's development and growth. Bukhari et al. (2022) also discovered that corruption impedes economic progress by decreasing the efficiency of the system. Many studies have demonstrated a positive association between corruption and poverty; an increase in corruption increases poverty (Salahuddin et al., 2020; Fokuoh, 2008). Enofe et al.(2016) found a positive relationship between corruption and poverty. The negative repercussions of corruption on economic growth are also evinced by many researchers (Goswami and Goswami, 2023; Aidt, 2009; Blackburn and Forgues-Puccio, 2009;Blackburn and Forgues-Puccio, 2009; Shleifer and Vishny, 1993). Hence in view of above discussion current study makes an attempt to fill the research gap by analysing this relationship and postulates the hypothesis as under:-

Model 1: Hypothesis 2 (H2): State-wise control of corruption is negatively associated with state-level poverty.

Model 2: Hypothesis 2 (H2): State-wise control of corruption is positively associated with state-wise growth.

- **Education**

According to established research, education level reduces poverty in a country (Liu et al., 2021). It proves to be the most important tool for the development of any country. As it enhancesthe productivity and creativity, which raises the employability and ultimately raises the standard of living

(Iqbal et al., 2019). Many authors used government expenditure on education to measure the education variable (Omari and Muturi, 2016; Sasmal and Sasmal, 2016; Dahmardeh and Tabor, 2013; Mehmoob and Sadiq, 2010) and examined the relationship of education and poverty. Relationship between education and GSDP (Gross State Domestic Product) in practical terms also needs to be scrutinized. Education level is inevitably intertwined with moral, social, legal, political and economic development of a country. Researchers have derived an insignificant contribution of the education levels in the developing countries to the rise in GDP (Gross Domestic Product) or capital production in developing countries (Mehrara and Musai, 2013). Gregorio and Lee (2002) investigated the relationship between education and income distribution. They found that education factors play a significant role in making income distribution more equal.Hence it is hypothesized here that education and IMR has a negative relationship while for model 2 the hypothesis is education and GSDP per capita has positive relationship.

Model 1: Hypothesis 3 (H3): State-wise education expenditure is negatively associated with state-level poverty.

Model 2: Hypothesis 3(H3): State-wise education expenditure is positively associated with state-wise growth.

- **GFCF (Gross Fixed Capital Formation)**

Many authors found that GFCF has a positive impact on the economic growth of a country and ultimately reduces poverty (Akobeng, 2017). Hence here in our study we try to find out the impact of GFCF on poverty reduction at state level in India and hypothesize a positive impact of GFCF on poverty reduction.

Model 1: Hypothesis 4 (H4): State-wise GFCF is negatively associated with state-level poverty.

Model 2: Hypothesis 4 (H4): State-wise GFCF is positively associated with state-wise growth.

- **Crime**

Crime has a negative impact on the economic growth and development of a country and according to the literature there is a positive relationship between crime and poverty (Lo and Jiang, 2006). Menezes et al. (2013) found positive association between income disparity and crime. Some other studies also found an association between crime and poverty (Jamaliah, 2022; Zaman, 2018). Relationship between IMR and the crime has been understood in terms of the legal system's capacity to implement a robust and transparent mandatory child welfare, immunization, and fulfilment of children's nutritional needs. Legal system needs to effectively enforce good health governance via a clear cut model of government transparency and accountability (Dingake, 2017)in alliance with the onus of civil society in taking care of the future citizens of the nation. Conversely, poorly designed, implemented or enforced laws can harm marginalised populations and entrench stigma and discrimination (Gostin *et al.*, 2019). Hence in view of the above arguments, here we hypothesize a positive impact of crime on IMR and a negative relationship between crime and GSDP per capita.

Model 1: Hypothesis 5 (H5): State-wise crime is positively associated with state-level poverty.

Model 2: Hypothesis 5 (H5): State-wise crime is negatively associated with state-wise growth.

- **Infrastructure**

Many studies demonstrated a positive impact of infrastructure on poverty reduction. It is being argued by the authors that better infrastructure provides better prospects of employment and ultimately improves the income of the citizens of the country (Aggarwal, 2018). Here in our study we are examining the same for Indian states and try to find out the impact of infrastructure on IMR and GSDP per capita.

Model 1: Hypothesis 6 (H6): State-wise infrastructure is negatively associated with state-level poverty.

Model 2: Hypothesis 6 (H6): State-wise infrastructure is positively associated with state-wise growth.

- **Workers Engaged**

Available literature shows a positive relationship between employment and poverty reduction (Murti and Kurniawan, 2020; Sen, 1996). Here in present paper we tried to establish a link between total workers engaged with state level poverty and per capita.

Model 1: Hypothesis 7 (H7): State-wise numberof workers engaged is negatively associated with state-level poverty.

Model 2: Hypothesis 7 (H7): State-wise number of workers engaged is positively associated with state-wise growth.

- **GSDP per Capita**

Many studies established a negative relationship between per capita GSDP and poverty (Putra et al., 2020; Datt and Ravallion, 2002; Dev and Ravi, 2007).In this study we try to examine the relationship of GSDP per capita and poverty and hypothesize a negativeimpact of GSDP per capita on poverty in Indian states.

Model 1 Hypothesis 8 (H8): State-wise growth is negatively associated with state-level poverty (Pov1).

Methods and Measurement

To capture the impact of FDI and other institutional variables on poverty, study uses panel data from 2000-2019.Data for some variables is not available for recent years hence the above period has been taken in the study. The dependent variables taken in the study are IMR (Poverty) calculated using the number of infant deaths at the state level in India for the period and GSDP per capita (growth) while the explanatory variables include FDI inflows, corruption, crime, education expenditure, workers engaged,GFCF, and infrastructure etc. The data has been obtained from the annual reports of RBI (Reserve Bank of India) and other databases,details shown in Table 1 with the expected sign of the variables.

Table 1: Description of Variables

Variable	Abbreviation	Description	Expected Sign for Poverty	Expected Sign for Growth	Sources
Poverty	Pov	Infant Mortality Rate	------	---------	www.rbi.org
Growth	GSDP	Gross State Domestic Product (GSDP Per Capita)	-/+	---------	www.rbi.org
Control of Corruption	Corrupt	Corruption case Registered	-	+	www.indiastat.com
Education	Education	Education Expenditure	-	+	www.rbi.org
FDI inflows	FDI	Log of FDI Inflows in Indian states	-	+	www.rbi.org
GFCF	GFCF	State-wise gross fixed capital formation	-	+	www.rbi.org
Legal Environment	LEGE	PCA (Table 2- 3A)	-	-	www.indiastat.com
Infrastructure	INFRA	PCA (Table 2- 3A)	-	+	www.indiastat.com
Workers Engaged	Workers Engaged	State-wise Total Person Engaged	-	+	www.rbi.org
Industrial Dispute	INDISP	Industrial Disputes at State level			www.indiastat.com

Models and Results

Three models have been used in the study to capture the impact of FDI and institutions on poverty and growth. Model 1 uses IMR as poverty (Pov) and Model 2 uses GSDP per capita (GSDP) to examine the impact of various variables on per capita income of the people in Indian states. Model 3 examines the relationship between poverty, FDI and environment.

Model 1: Impact of Institutional and Infrastructure variables on poverty

$$Pov_{it} = \alpha_{it} + \beta_1 + Corrupt_{it} + Education_{it} + FDI_{it} + GFCF_{it} +$$

$$Crime_{it} + Infrastructure_{it} + Workers\ Engaged_{it} + GSDP_{it} + u_{it}$$

Model 2: Impact of infrastructure and institutional Variables on Growth

$$GSDP_{it} = \alpha_{it} + \beta_1 + Corrupt_{it} + Education_{it} + FDI_{it} + GFCF_{it} +$$
$$Crime_{it} + Infrastructure_{it} + Workers\ Engaged_{it} + Industrial\ Disputes_{it}$$
$$+ u_{it}$$

Where,

Pov1	= Infant Mortality Rate
GSDP	= GSDP per capita
GFCF	= Gross Fixed Capital Formation
FDI	= Foreign Direct Investment Inflows

i and t represent states and time and u_{it} is the error term.

Model 3: Relationship between poverty and Environment

In third model relationship between poverty and environment has also been analysed for Indian states for the period 2000-2021. Granger causality test has been employed in the third model in an effort to comprehend the relationship between poverty and carbon emissions. Prior to testing Granger causality, the variables must be tested to test that weather the variables are stationary or not. Using the LLC method, it is discovered that carbon emissions is not stationary at level; therefore, first differencing was done to make the variable stationary, and it became stationary after differencing once. Table 2 displays the results at level zero and after differencing once.

Table 2: Panel Unit Root Tests

Variables	LLC Level I (0)	LLC Level I (1)
Carbon Emission	-0.2490	-7.1888***

Source(s): The authors*** p<.01, ** p<.05, * p<.1

The variables in Table 2 are non-stationary at level zero, but after one differencing, they become stationary, allowing for the testing of causality. In order to comprehend the connection between poverty and the environment, the Granger causality is examined here and results are shown in annexure Table 2.A. The results show that there is no granger causality between poverty and carbon emission at state level in India for the given period.

Table 2.A: Panel Granger Non-Causality Test

Statistic	Value	p-value
W-bar	1.0457	—
Z-bar	0.1332	.8941
Z-bar (tilde)	−0.1866	.8520

Source(s): The authors*** p<.01, ** p<.05, * p<.1

Further in order to test for the relationship between FDI, poverty and emission SEM has been used and results are shown in Annexure in Table 2.A.

Table 3.A: SEM Path Estimates for poverty, FDI and emission

Path	B	SE	β	p
FDI → IMR	−0.061	0.015	−0.24	< .001
Emissions → IMR	−0.030	0.039	−0.06	.437
IMR → FDI	−0.046	0.034	−0.12	.175
IMR → Emissions	0.001	0.024	0.00	.964
FDI → Emissions	−0.034	0.020	−0.09	.091

Source: The authors.

The results of SEM in Table 3.A show that keeping emission constant FDI reduces poverty by improving economy, health and infrastructure of the states. Also emission doesn't depict a significant relationship with poverty and the reverse impact of FDI and poverty is insignificant.

Results

Principal Component Analysis (PCA)

The principal component analysis has been used in the study to arrive at one index for some variables, where single index is not available. Table 3-5, depicts the results of PCA for crime and infrastructure (INFRA).

Table 3: Results of Bartlett's Test and KMO (Kaiser-Meyer-Olkin)

Variable	Bartlett's Test	KMO
Crime	1496.23 (.000)***	.598
INFRA	252.785 (.000)***	.519

Source(s): The authors*** p<.01, ** p<.05, * p<.1

Table 4: Rotated Component Matrix for Crime

Variables	Component		
	1	2	3
Crime Against Children	.819	-.089	-.074
Violent Crimes	.728	.209	-.170
SLL (Special and Local Laws) Crime	.662	.165	.242
Riots Person Arrested	.653	.189	.021
Copy Right Cases	.132	.982	.022
Person Arrested Copy Right	.177	.977	.007
Cases Foreigner Act	-.017	.012	.969
Table 5: Component Matrix for Infrastructure			
Roads	.873	--	---
Rail Route	.741	---	---
Per Capita Power Availability	.622	---	---

Source: The authors.

Since there isn't a single index or ranking for these variables, the PCA findings demonstrate that a variety of variables are added to include extra information. For example, three factors for infrastructure and seven components for crime are included to arrive at one factor, which further have been used in the panel data analysis to examine the relationship with poverty and economic growth.

- **Unit Root Test**

The results of unit root test for the variables used in model 1 and model 2 are shown in Table using various methods are shown in Table 6-8. Results of unit root tests show that some series are stationary at level i.e. I (0) and some are stationary at I (1) or I (2), this shows that our data series are a mixture of level, first difference and second difference series.

Table 6: Four Different Panel Unit Root Tests at Level I(0)

Variables	LLC	IPS	ADF	PP
CORRUP	1.86122**	-5.88134***	98.7722***	98.6442***
EDUCATION	-11.2235***	200.484***	200.484***	245.79***
INFRA	-16.5897	-1.41474*	52.1934*	5.77853
CRIME	36.2368	5.4989	35.8283	177.994***

Source(s): The authors*** p<.01, ** p<.05, * p<.1

Table 7: Unit Root Test after Differencing I (1)

Variables	First Difference			
	LLC	IPS	ADF	PP
FDI	-3.22234***	-8.28915***	240.746***	343.854***
GFCF	-12.278***	--7.62874***	144.154***	162.806***
GSDP	-16.3594***	-11.7443***	179.612***	179.604***
Workers Engaged	-16.9959***	-13.9408***	214.503***	245.273***

Source(s): The authors*** p<.01, ** p<.05, * p<.1

The PP method of unit root test shows that FDI, GFCF, GSDP per capita and workers engaged are stationary at level 1 (Table 7) and IMR are stationary at level 2 (Table 8) while all others series are stationary at level zero, shown in Table 6.

Table 8: Unit Root Test after Second Differencing

Variables	Second Difference			
	LLC	**IPS**	**ADF**	**PP**
IMR	13.2904 (1) NS	-3.35473 (0.0004)***	90.5051 (0.0000)***	128.944 (0.0000)***

Source(s): The authors*** p<.01, ** p<.05, * p<.1

Results of Model 1:Impact of FDI, Infrastructure and Institutional Variables on Poverty

Results of the panel data analysis are shown in Table 9, where it is evident that control over corruption, education, foreign direct investment (FDI) inflows, and workers engaged are all significantly and negatively correlated with poverty at the state level in India at one percent. This shows that greater control over corruption, higher education spending, FDI inflows, and a greater number of employed people all contribute to lowering IMR in Indian states and, consequently, poverty reduction. Results are consistent with available studies (Salahuddin et al.,2020, Amri et al., 2024) there is a negative correlation between corruption control and poverty. This suggests that higher levels of corruption lead to poverty.

Table 9: Panel data analysis for Poverty, FDI and Institutional Determinants

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.640912	0.120297	13.64051	(0.0000)***
Control of Corruption	-0.05258	0.018654	-2.81871	(0.0051)***
Education	-0.35932	0.056758	-6.33081	(0.0000)***
FDI	-0.00002	0.00000	-4.83357	(0.0000)***
GFCF	0.051331	0.015356	3.342622	(0.0009)***
Crime	0.053995	0.007072	7.635476	(0.0000)***
Infrastructure	0.017877	0.030873	0.57905	(0.563)
Workers Engaged	-0.08773	0.014796	-5.92957	(0.0000)***
GSDP Per Capita	0.064706	0.007113	9.09675	(0.0000)***
R-squared	0.874414	F-statistic		91.09531
Adjusted R-squared	0.864816	Prob(F-statistic)		0

Source(s): The authors*** p<.01, ** p<.05, * p<.1

The inverse association between education and IMR demonstrates that education helps in reducing poverty at the state level in India. FDI inflow is also negative and significant, showing that higher FDI receiving states have lower poverty. In long run, impact of FDI is detrimental since reliance on foreign capital has negative consequences such as unemployment and income inequality (Kentor, 1998). Other significant variables of the study are GFCF, Crime and GSDP per capita. Study also shows an association between crime and poverty (Jamaliah, 2022; Zaman, 2018). The positiverelationship betweencrime andpoverty shows that states with higher numbers of criminal cases are high in poverty.Results also show that GFCF and GSDP per capita are two variables that have positive relationship with poverty. The possible reason of the positive relationship may be due to the insufficient level of GFCF and GSDP per capita as they both are not sufficient to reduce poverty at state level in India.Also, if access to credit is restricted or inadequate distribution of capital mainly to the capital-intensive sectors, it doesn't help in poverty alleviation. Hence the distribution of the capital is important to reduce poverty in Indian states.The positive impact of GFCF and GSDP on IMR demonstrates that inequality leads to increased poverty.

Results of Model 2: Impact of FDI, Infrastructure and Institutional Variables on growth

Table 10 displays the findings of Model 2 using GSDP per capita as dependent variable and showsthe impact of various variables on growth in Indian states.The results of model 2 show that out of seven variables four are significant i.e. FDI Inflows, education, infrastructure and workers engagedwhile crime, control of corruption and GFCF do not confirm any relationship with growth at state level in India as per the panel data analysis.

Table 10: Panel data analysis for Growth, FDI and Institutional Determinants

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.36316	0.411531	-0.88246	(0.3782)
FDI	0.074557	1.665789	0.0968	(0.07455)*
Education	0.245832	0.021161	11.61707	(0.0000)***

Infrastructure	0.088405	2.042141	0.0420	(0.0884)*
Crime	-0.00839	0.054845	-0.15295	(0.8785)
Control of Corruption	0.124195	-0.82799	0.4083	(0.1241)
GFCF	0.142813	-0.03617	0.9712	(0.1428)
Workers Engaged	0.465804	0.123076	3.784688	(0.0002)***
Industrial Disputes	0.028657	0.155543	0.184237	0.8539
R-squared	0.711064	F-statistic		31.99261
Adjusted R-squared	0.688838	Prob (F-statistic)		0

Source(s): The authors*** p<.01, ** p<.05, * p<.1

FDI and Education both show a significant and positive impact on the state-wise growth. The positive impact of FDI on growth could be attributed to a variety of factors, including improved better infrastructure which is also proved by model 1 where FDI is helping in poverty alleviation.The other important variable is education expenditure, which has a positive impact on the GSDP per capita, which is consistent with several prior studies. Infrastructure and workers engaged both are important and significant variables and helping in improving the states' growth.

Conclusion

Current study contributes to the literature in variety of ways, as it examines the impact of numerous variables on poverty and growth at the state level in India, offering a comprehensive picture of the factors influencing these two variables. To quantify poverty, infant mortality rate (IMR) is employed, while growth is represented by GSDP per capita. The study also uses PCA for some variables to make the best use of the available components and to assess the overall impact of these variables on poverty.Our empirical findings reveal that corruption control, FDI inflows and education expenditure are contributing in the poverty reduction in Indian states. Here, the impact of FDI on poverty is important, as results suggest that, FDI helps to alleviate poverty, and it is inferred that due to FDI, states' health infrastructure is improving. Hence to alleviate poverty and raise growth at the state level in India the government needs to work on the policies to raise FDI inflows in order to improve health related infrastructure in India. The negative relationship between the numbers of persons employed shows the insufficiency of the wages which ultimately is not sufficient for the poverty reduction. Hence, higher level of FDI inflows and education expenditure, good policies for corruption controls are required to reduce the poverty in Indian states. Crime, GFCF and high number of criminal cases tend to raise the poverty at state level in India. Capital expenditure and infrastructure are insufficient to reduce the poverty at state level in India due to the uneven distribution. Here, inclusive and even distribution of the employment opportunities and infrastructure should also be generated for the even growth of Indian states.

According to the results of second model, FDI inflows leaves a positive impact on state-wise GSDP per capita, and the findings are consistent with available literature (Le et al.,2024; Chizema, 2025). Impact of FDI inflows is same for the two models as resultsindicate that while FDI is required to improve the health infrastructure in Indian states, it is also helpful in improving growth of Indian states. Here, it's crucial to understand that because FDI inflow is crucial for nations with weaker capital, strategies like promoting more Greenfield investment and FDI in highly technical sectors should also be encouraged to enjoy more benefits from FDI inflows. Here, it is also clear that since the service sector currently receives the highest FDI in India, FDI in creative sectors has to be promoted. The other outcome of the second model also suggests that education expenditure is also showing a positive relationship with growth. Relationship between poverty and environment has also been examined using SEM analysis and it is found that emission doesn't have a significant relationship with poverty but FDI is an important factor that alleviates poverty at state level in India.

Discussions and Implications

We proposed three models and tested them against many hypotheses to explain how locational, economic, and institutional variables influence poverty at the subnational level. Our research contends that numerous factors influence poverty, including FDI, crime, worker engagement, infrastructure, education expenditure, and per capita income. Our findings imply that, rather than focussing solely on one or two issues, the government should consider a variety of factors in order to eliminate poverty. Both models demonstrate that FDI inflows, education and workers engagement are substantialfor alleviating poverty. More FDI promotes infrastructure development, which ultimately reduces IMR. As a result, the government should focus more on FDI inflows into the medical sector in order to strengthen medical facilities in various states. Workers engaged is another variable that has a negative influence on IMR but

a positive impact on growth, implying that a higher number of workers engaged reduces poverty and increases growth. The availability of employment possibilities is critical in this context, and both, the government and the private sector should collaborate to develop possibilities for employment. Another significant variables are education expenditure, infrastructure and crime. The enforcement of rule of law is required to reduce the impact of crime over poverty in Indian states. Infrastructure leaves a positive impact on growth.For future, various other forms of poverty can also be analysed such as energy poverty, time poverty and social-demographic poverty and the factors influence them can be determined.

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Annexure

List of Abbreviations

ADF	Augmented Dickey-Fuller
CORRUP	Corruption
FDI	Foreign Direct Investment
FEM	Fixed Effect Model
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
GSDP	Gross State Domestic Product
ICT	information and communications technology
IMF	International Monetary Fund
IMR	Infant Mortality Rate
INFRA	Infrastructure
IPS	Im-Pesaran-Shin
KMO	Kaiser-Meyer-Olkin
LLC	Levin-Lin-Chu
MPI	Multidimensional Poverty Index
PCA	Principal Component Analysis
PP	Phillips Perron
RBI	Reserve Bank of India
SEM	Structural Equation Modelling
SLL	Special and Local Laws

Table 1.A: Studies taken different poverty proxies

Poverty Proxy	Studies
Assets Based	Filmer & Pritchett (2001)
Education	Sen (1999)
Labour market	Fields (2011)
Housing	Henderson et al. (2012), Jean et al. (2016)
Social-demographic	Chaudhuri (2003)
Financial	Banerjee & Duflo (2011)
Consumption	Ravallion (1992)
Health	Birn et al. (2009) , Alkire & Foster (2011)

Source: The authors.

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