Religious Tourism and Environmental Externalities in India: A Comparative Panel Data Analysis

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Abstract

The religious tourism sector contributes significantly to the GDP of India. However, it creates pressure on environment which requires special attention and location specific policy measures. This study examines whether religious tourism destinations experience greater negative externalities than non-religious tourist hubs. A balanced panel of 12 (6 religious and 6 non-religious) Indian tourism hubs for 2018–2021 is used to construct a Composite Negative Externalities Index (CNEI) from PM10, BOD and tourism pressure. Panel regressions with year effects show that religious hubs have higher CNEI, with the difference primarily associated with significantly higher tourism pressure. However, religious status is not significantly associated with PM10 or BOD. The findings are important for internalising the negative externality arising from religious tourism. Tourism pressure is identified as the key factor associated with higher negative externalities in religious destinations. This calls for sustainable management of pilgrimage-related visitor pressure.

Keywords: Economics of Religion, Religious Tourism, Negative Externalities, Tourism pressure, PM10, BOD, India

1. Introduction

In India, faith moves more than people; it moves economies. It determines allocation of resource, shapes consumption patterns, investment, generates employment and shape the landscape of a city. The findings from the NSSO data showed that the annual spendings on pilgrimages by Hindus is Rs 4.74 lakh crore while the broader temple economy is valued at Rs 3.02 lakh crores which accounts for 2.32 percent of the GDP of India (Kulkarni, 2026). The opening of Ram Temple in Ayodhya in January 2024 transformed a city that had seen roughly 1.7 lakh annual visitors into one receiving more than 11 crore visitors within six months. This 647 folds increase in tourist footfall resulting from construction of a temple in Ayodhya shows the importance of religious institutions in India. Similarly, in 2024, 1.5 million pilgrims attended Rath Yatra while in 2025, around 66 crore individuals visited the Maha Kumbh Mela in (Nandakumar, 2026). While these visits bring positivity in the attendee's life, but it creates negative externality because of enormous environmental pressure on the visiting site.

The pressure from religious travels generates costs for residents and public authorities that are not fully reflected in the private cost. Thus, it creates a divergence between marginal private cost and marginal social cost indicating a negative externality. However, highly visited non-religious destinations can also experience similar pressures because of large tourist footfall. The relevant economic question is therefore whether the religious character of a destination is associated with higher negative externalities than comparable non-religious tourism destinations. This study fills that gap by constructing a Composite Negative Externalities Index (CNEI) from air pollution (PM10), water pollution (BOD), and tourism pressure indicators using panel data from 12 hubs (2018–2021) and regression analysis with year effects. The findings from this study provide empirical evidence for policymakers to design targeted interventions that sustain pilgrimage benefits without sacrificing environmental quality.

2. Review of literature

Researchers have already recognised that religious tourism has both positive and negative effects through economics and environmental impacts (Khoiriyah et al., 2025). A review of the literature on religious tourism shows that the sector has benefits when sustainability principles are embraced. However, when such principles are disregarded environment is degraded. Existing research indicates that tourism can contribute to generation of income and employment reduction of poverty particularly in rural and relatively less-developed areas

(Qader et al., 2026). This positive contribution provides an important reason to examine religious tourism carefully to understand how its benefits can be sustained.

Belucio et al. (2023) showed that with the increase in per capita income religious tourism increases both in short run and long run. Further, international departures have positive impact on such visits in the long run. The increase in the number of visitors raise demand for resources. The tourists consume local infrastructure and generate waste and congestion (Gurung et al. 2025). Therefore, the marginal social cost of tourism-related activity exceeds the marginal private cost. This issue is particularly relevant for religious destinations because the demand generated by religious institutions produce large concentrations of visitors around particular sites and events. This clearly shows that there are significant economic costs associated with religious tourisms.

Religious visits have inelastic demand. This is because the demand for religious visits strictly increases during times of hardship and uncertainty (Shinde & Olsen, 2022). Further, these are backed by beliefs and superstitions. Additionally, the authors found that religious places are exempted from blame when environmental concerns are discussed. However, these hubs contribute to the emission of greenhouse gases and waste accumulation just like any other places of gatherings.

In conclusion, there are limited literature exploring the environmental consequences of this religious tourism economy. The religious institution often increases the divergence between marginal private cost and the marginal social cost of religious visits. This is because the sacred character of these sites constrains effective environmental regulation. Additionally, the inelasticity of religious tourism reduces the effectiveness of price-based management mechanisms. This leaves an opportunity to develop a comparative framework that examines whether religious destinations have greater overall negative externalities than non-religious tourism destinations.

Therefore, an important empirical question remains. Are these externalities greater at religious destinations? Or, are they simply a feature of highly popular tourism destinations irrespective of their religious character?

3. Research gap

The literature on the economics of religion has examined how religious beliefs shape individual economic behaviour. Studies show religious tourism reduces poverty and has broader economic development when supported by inclusive policies and complementary investments in

infrastructure, education and local capacity (Qader et al., 2026). However, it has ignored the externalities generated by religious institutions as economic actors. This study addresses this gap by empirically quantifying whether religious tourism hubs systematically produce higher pollution and congestion than comparable non-religious destination.

This study is not intended to diminish the spiritual or economic value of the religious sites, Instead, our research on the quantification of the environmental cost associated with religious tourism is to shed light and equip the policymakers and urban planners with actionable data to design sustainable pilgrimage models. We should not be trading off spiritual sanctity for environmental quality. Understanding these externalities is the first step toward transforming India's religious tourism into a model of sustainable sacred travel.

4. Research Question and Hypothesis

The preceding discussion highlights the under-researched area in the economics of religion literature. The economic benefits of religious tourism are well-documented but the environmental costs remain underexplored. For the analysis, air pollution, water pollution and tourism pressure is combined into a Composite Negative Externalities Index and then compared for religious and non-religious destinations.

Against this background, the study examines:

Do religious tourist destinations in India exhibit higher negative externalities than non-religious tourist destinations?

The findings can have significant implications for welfare economics and sustainable pilgrimage policy in India. The policy makers and planers can according plan on the development of Pigouvian pilgrimage levies to fund green infrastructure and prevent acute pollution spikes along with collaborative governance frameworks.

5. Data and Methodology

5.1 Data

This study uses secondary data for analysis of religious and non-religious tourist hubs. The analysis uses a balanced panel dataset covering 12 tourism hubs over the period 2018–2021.Destinations were selected based on six criteria: established tourism importance, primary identity as religious or non-religious, and availability of tourism, water-quality, air-quality, and population data. To preserve the data quality, the data for this study was sourced entirely from official government datasets and reports. It was noticed that, water pollution data was available

from 2018 to 2021 in National Water Data Portal. Therefore, the timeframe used in this study is selected based on the data availability.

Tourist arrival data are collected from the Ministry of Tourism and respective State Tourism Departments. Water-quality data, measured through Biochemical Oxygen Demand (BOD), are obtained from the Nation Water Informatics Centre. Air-quality data, measured through annual PM10 concentration, are obtained from the CPCB's National Ambient Air Quality Monitoring Programme. Population data for 2001 and 2011 are obtained from the Census of India. Where multiple monitoring stations exist within a destination, observations are aggregated to obtain a representative annual value. Missing observations are treated as missing values and are not replaced with zero.

5.2 Variable Construction

5.2.1 Population Projection

Since the latest available Census population figures are from 2011, destination-level population for 2018–2021 is estimated using the compound annual growth rate calculated from the 2001 and 2011 Census populations.

The annual population growth rate for destination i is calculated as:

$$r_i = \left(\frac{Pop_{i,2011}}{Pop_{i,2001}}\right)^{1/10} - 1$$

The estimated population for year t is then:

$$Pop_{it} = Pop_{i,2011}(1 + r_i)^{(t-2011)}$$

The resulting figures represent estimated rather than observed population values.

5.2.2 Tourism Pressure

Tourism pressure is used as a proxy for the intensity of tourism relative to the resident population and the potential pressure placed on local infrastructure.

$$Tourism\ Pressure_{it} = \frac{TouristVisits_{it}}{ProjectedPopulation_{it}}$$

Higher values indicate greater tourism pressure.

5.2.3 Religious Destination Dummy

A binary variable is used to distinguish religious and non-religious tourism hubs:

$$Religious\ Dummy_i = \begin{cases} 1 & if\ destination\ i\ is\ religious \\ 0 & if\ destination\ i\ is\ non-religious \end{cases}$$

The variable is time-invariant because the classification of destinations does not change during the study period.

5.2.4 Composite Negative Externalities Index (CNEI)

The study constructs a Composite Negative Externalities Index (CNEI) to capture the multidimensional nature of negative externalities associated with tourism activity. The index combines three indicators: air pollution (PM10), water pollution (BOD), and tourism pressure. Since these indicators are measured in different units, each variable is normalised using min-max normalisation:

$$X_{it}^{norm} = \frac{X_{it} - X_{min}}{X_{max} - X_{min}}$$

Each normalised indicator ranges from 0 to 1, with higher values representing greater negative externality. The CNEI is constructed using equal weights:

$$CNEI_{it} = \frac{BOD_{it}^{norm} + PM10_{it}^{norm} + TourismPressure_{it}^{norm}}{3} \times 100$$

The resulting index has values from 0 to 100, where a higher score indicates greater negative externalities relative to the sample.

5.3 Methodology

The empirical strategy is designed to examine whether religious destinations are systematically associated with higher negative externalities than non-religious destinations. The analysis is interpreted as an assessment of association rather than a definitive causal estimate.

The baseline regression estimates the difference in negative externalities between religious and non-religious destinations:

$$CNEI_{it} = \alpha + \beta ReligiousDummy_i + \epsilon_{it}$$

where $CNEI_{it}$represents the Composite Negative Externalities Index for destination i in year t, and $ReligiousDummy_i$ indicates whether the destination is religious. The coefficient β captures the average difference in CNEI between religious and non-religious destinations.

A second specification introduces year fixed effects:

$$CNEI_{it} = \alpha + \beta ReligiousDummy_i + y_t + \epsilon_{it}$$

where y_t represents year fixed effects that capture common shocks affecting all destinations in a particular year, including the disruption associated with the COVID-19 pandemic.

The religious destination status is time-invariant, destination fixed effects cannot be used to estimate its coefficient, as the religious dummy would be absorbed by destination fixed effects. Therefore, the coefficient on religious status is identified from differences across destinations rather than from changes within destinations over time.

The analysis is repeated separately for each component of the CNEI:

$$PM10_{it} = \alpha + \beta ReligiousDummy_i + y_t + \epsilon_{it}$$

$$BOD_{it} = \alpha + \beta ReligiousDummy_i + y_t + \epsilon_{it}$$

$$TourismPressure_{it} = \alpha + \beta ReligiousDummy_i + y_t + \epsilon_{it}$$

These component-level regressions identify whether any observed difference in the overall CNEI is primarily associated with air pollution, water pollution or tourism pressure.

To test whether the two groups have significantly different average CNEI, a Welch two-sample t-test is used. The test hypotheses are:

$$H_0: \mu_{religious} = \mu_{non-religious}$$

$$H_1: \mu_{religious} \neq \mu_{non-religious}$$

A supplementary analysis, random-effects panel model, is also included in this study. Since, religious destination status is a time-invariant variable, it would be absorbed by a fixed-effects model. A random-effects model would include unobserved random hub-specific variables such as geographical location, urbanization degree, environmental characteristics and so on. The model specifications are:

$$CNEI_{it} = \alpha + \beta ReligiousDummy_i + y_t + u_i + \epsilon_{it}$$

$$PM10_{it} = \alpha + \beta ReligiousDummy_i + y_t + u_i + \epsilon_{it}$$

$$BOD_{it} = \alpha + \beta ReligiousDummy_i + y_t + u_i + \epsilon_{it}$$

$$TourismPressure_{it} = \alpha + \beta ReligiousDummy_i + y_t + u_i + \epsilon_{it}$$

Where, u_i is the hub-specific random effects.

Instead of primary identification strategy, the random-effects model provides robustness to the analyses.

6. Results

6.1 Descriptive Statistics

The descriptive statistics of BOD, PM10, Tourism Pressure, and Composite Negative Externalities Index are presented in the table below.

Table 1. Descriptive Statistics of Negative Externality Indicators

Variable	Observations	Mean	Std. Dev.	Median	Skewness	Minimum	Maximum
BOD (mg/L)	48	5.41	7.9	2.97	4.43	0.67	52.22
PM10 (µg/m³)	48	94.37	48.94	77.83	0.76	33.67	211
Tourism Pressure	48	25.3	37.27	6.16	2.05	0.72	154.85
CNEI (0–100)	48	19.79	13.21	17.96	0.54	1.89	54.36

The descriptive statistics in Table 1 covers 48 hub-year observations from 2018 to 2021 for 12 tourism hubs. Table 1 shows that the average BOD of the sample is 5.41 mg/L, and ranges from 0.6 to 52.22 mg/L. BOD has a skewness of 4.43. This suggests that a small number of observations have higher BOD levels. The average PM10 concentration across the sample is 94.37 µg/m^3, and it ranges from 33.67 to 211 µg/m^3. The standard deviation of PM10 is 48.94, which suggests a considerable variation across the sample. Further, the mean Tourism Pressure is 25.3 with a range of 0.72 to 154.85. The standard deviation of Tourism Pressure shows significant variation in tourist intensity across destinations. The mean CNEI is 19.79 on a scale of 0-100, and it ranges from 1.89 to 54.36.

6.2 Comparison by Destination Type

The indicators of this study are compared across religious and non-religious hubs in the table below.

Table 2: Descriptive Statistics (Religious vs Non-Religious)

Indicator	Non-religious	Religious
Observations	24	24
Mean BOD	5.4	5.42
SD BOD	4.66	10.3
Mean PM10	90.6	98.1
SD PM10	55	43
Mean Tourism Pressure	4.42	46.2
SD Tourism Pressure	3.81	43.8
Mean CNEI (1-100)	14.6	25
SD CNEI (1-100)	0.12	0.124

Table 2 shows that religious hubs have relatively higher CNEI compared to non-religious hubs. The mean Tourism Pressure have the highest difference between religious and non-religious hubs. Religious hubs have an average Tourist Pressure of 46.2, which is substantially higher than that of non-religious hubs, that is 4.42. The average PM10 is also higher among the religious hubs, which is 98.1 $\mu g/m^3$, while it is 90.6 $\mu g/m^3$ among non-religious hubs. The average BOD is almost identical among the religious and non-religious hubs.

6.3 Mean Comparison

The table below shows the results of a Welch two-sample t-test, which was conducted to see if the average CNEI difference across destination types is statistically significant.

Table 3: Welch Two-Sample t-Test of CNEI by Tourism Hub Type

Statistic	Result
Mean CNEI — Non-religious	14.5700
Mean CNEI — Religious	25.0100
Difference (Non-religious − Religious)	−10.45
t-statistic	−2.958
Degrees of freedom	45.9500
p-value	0.0049
95% CI	[−17.56, −3.34]

The results in Table 3 shows that the difference of average CNEI between non-religious and religious hubs is -10.45. A t-statistics of -2.958 with a p-value of 0.0049 indicates that religious hubs have significantly higher average CNEI than non-religious hubs, and the difference is statistically significant.

6.4 Destination-Level Variation

The table below shows the variation in mean values of each indicator for the selected tourism hubs.

Table 4. Average Negative Externalities by Tourism Hub, 2018–2021

Hub	Type	Avg. BOD	Avg. PM10	Avg. Tourism Pressure	Avg. CNEI
Agra	Non-religious	14.1	183	3.49	37.4
Amritsar	Religious	15.6	102	47.2	32.5
Darjeeling	Non-religious	3.54	53	4.09	6.22
Haridwar	Religious	2.98	120	53.5	29.1
Madurai	Religious	2.59	60.9	19.5	10.4
Panaji	Non-religious	2.02	71	3.65	8.53
Pondicherry	Non-religious	5.87	40.7	3.9	5.37
Puri	Religious	3.71	87.4	32.2	18.9
Shimla	Non-religious	4.59	55.2	9.57	8.51
Tirupati	Religious	1	51.2	116	28.5
Udaipur	Non-religious	2.28	141	1.81	21.4
Varanasi	Religious	6.66	167	8.28	30.6

Table 4 exhibits the significant heterogeneity even within destination category. Table 4 shows that four out of top five destinations, which have highest CNEI, are religious hubs. Moreover, the results show that, Agra, being a non-religious hub, has the highest CNEI due to high PM10 and BOD levels. On the contrary, Tirupati, being a religious hub, has substantially low CNEI due to low PM10 and BOD levels. The usefulness of a composite measure is highlighted by this compositional variation: different destinations produce negative externalities through various mechanisms.

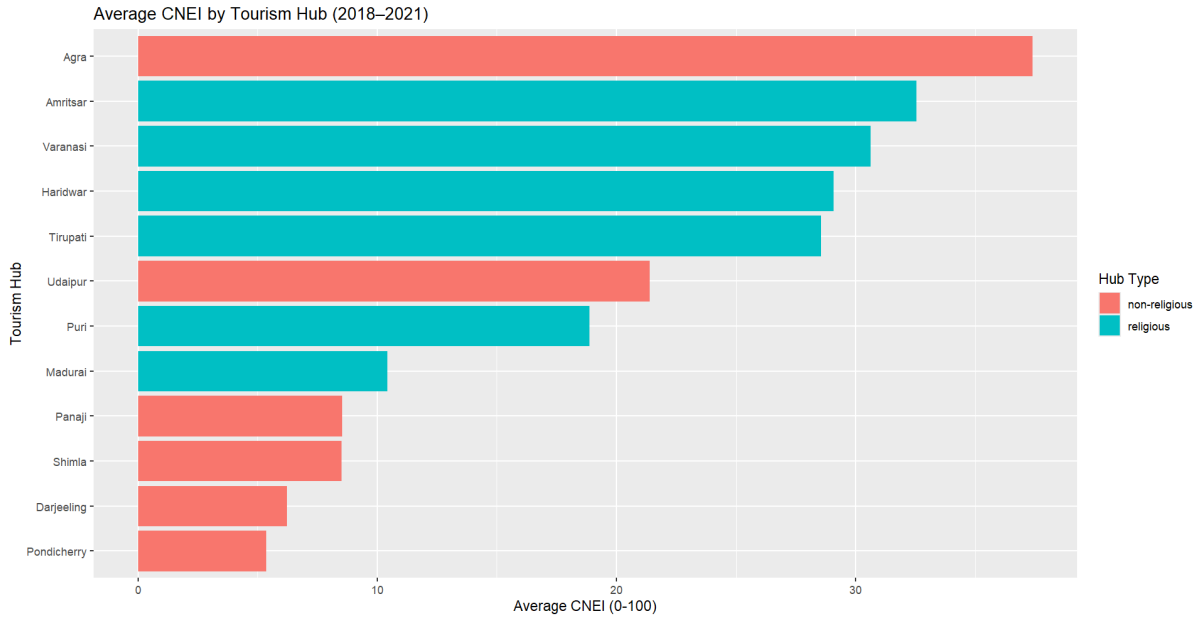


Figure 1: Hub-Level Average CNEI

Figure 1 shows the mean CNEI across different hubs, ordered from highest to lowest. The top-ranked cities are Agra (37.4), Amritsar (32.5), Varanasi (30.6), Haridwar (29.1), and Tirupati (28.5). Pondicherry (5.37), Darjeeling (6.22), Panaji (8.53), and Shimla (8.51) are some of the places with the lowest rankings. Interestingly, the lowest-ranked locations are all non-religious, whereas four of the top five locations are religious. High negative externalities are not just a result of religious tourism, though, as evidenced by the inclusion of Agra and Udaipur (21.4) among the higher-CNEI nonreligious places.

6.5 Temporal Patterns

The evolution of average CNEI across religious and non-religious hubs from 2018 to 2021, is shown in the table below.

Table 5: Average CNEI by Year and Tourism Hub Type

Year	Religious hubs	Non-religious hubs	Difference
2018	29.6	15.2	14.4
2019	29.5	15.9	13.6
2020	20.6	12.8	7.8
2021	20.2	14.4	5.8

This trend is visually represented by the figure below.

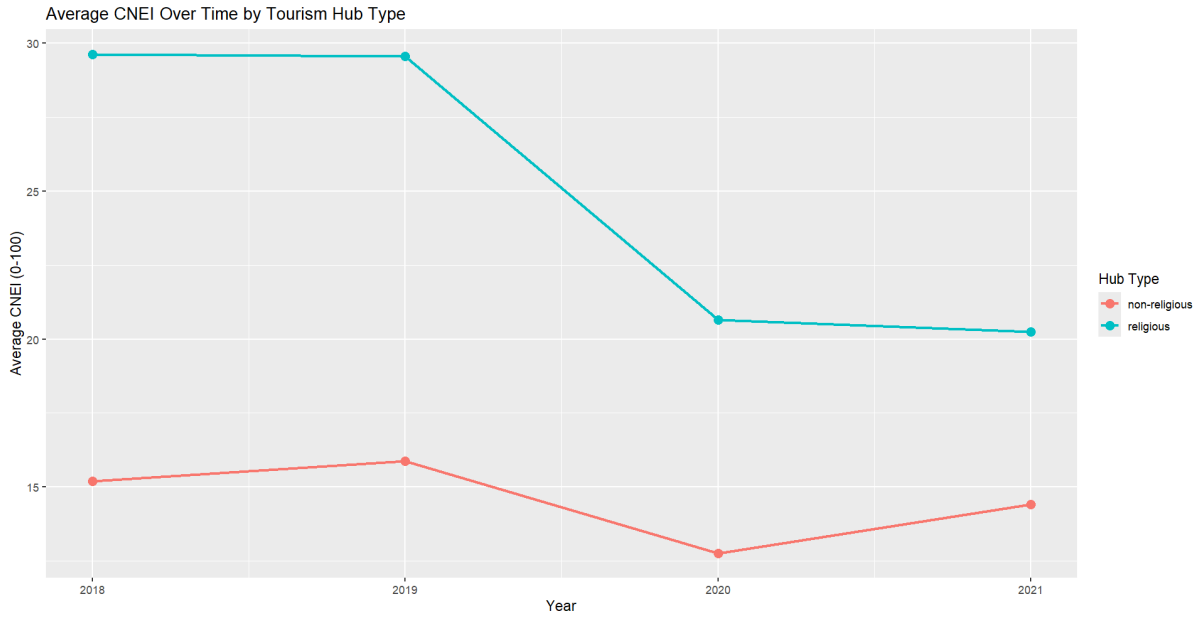


Figure 2: Evolution of Average CNEI Across Religious and Non-Religious Hubs

Figure 2 indicates that the average CNEI is consistently higher across religious hubs compared to that of non-religious hubs throughout the study period. Figure 2 shows that the difference of mean CNEI is the highest in 2018 (14.4). This difference decreased substantially in 2020 (7.8), and in 2021, the difference is the lowest (5.8). The COVID-19 pandemic caused a significant decrease in tourist pressure, which coincided with the rapid dip in 2020. This temporal trend indicates that tourism intensity, which was momentarily disturbed during the pandemic, is a significant driver of the variation in CNEI between destination types.

6.6 Visual Comparison of CNEI Distribution

The following figure illustrates the comparison of the distribution of CNEI across different destination types using boxplots.

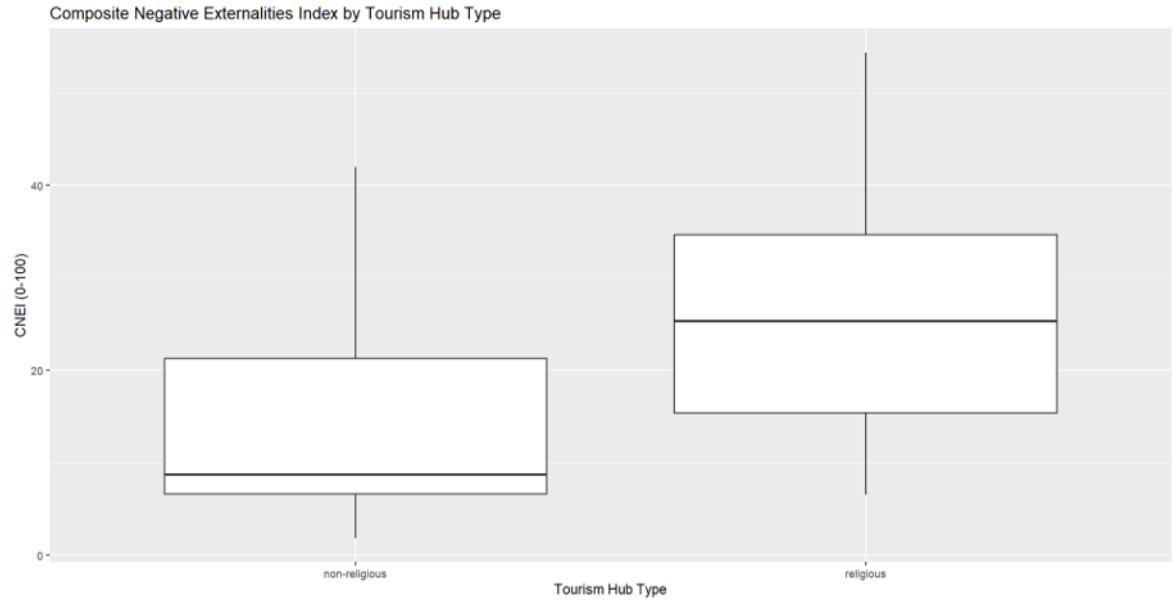


Figure 3: Distribution of CNEI (1-100) across Religious and Non-Religious Hubs

According to Figure 3, religious hubs have a median CNEI of about 25, whereas non-religious hubs have a median CNEI of about 8–9. The interquartile range for non-religious hubs is centred between 6 and 21, while for religious hubs, it is roughly between 15 and 35. It is evident that the overall distribution moved towards higher values for religious destinations, even though there is considerable overlap across the distributions (Agra, for example, adds high-CNEI data to the non-religious group). Although it does not prove statistical significance, this visual evidence is in line with the descriptive statistics.

6.7 Correlation Analysis

The following table shows the correlation matrix among religious destination status, the selected externalities components, and the CNEI.

Table 6: Pearson Correlation Matrix

Variable	Religious Dummy	Average BOD	Average PM10	Average Tourism Pressure	Average CNEI
Religious Dummy	1.000	0.002	0.081	**0.644****	0.469
Average BOD	0.002	1.000	0.479	-0.151	0.540
Average PM10	0.081	0.479	1.000	-0.223	**0.766*****
Average Tourism Pressure	**0.644****	-0.151	-0.223	1.000	0.415
Average CNEI	0.469	0.540	**0.766*****	0.415	1.000

According to Table 6, there is a moderately positive association between religious destination status and mean tourism pressure ($r = 0.644$, $p = 0.024$). This suggests that religious hubs are linked to noticeably higher tourist intensity. There is a weak correlation with mean PM10 ($r = 0.081$) and mean BOD ($r = 0.002$). There is a positive correlation with CNEI, however, the

correlation is not statistically significant (r = 0.469, p = 0.124). PM10 had the highest association (r = 0.766) with CNEI among the components, followed by BOD (r = 0.540).

6.8 Regression Results

The results of regression analysis are discussed in this section. The regression models examined the association between religious destination status and CNEI. Model 1 uses religious status as its only explanatory variable to estimate a baseline specification. Standard errors are grouped at the tourism-hub level in Model 2, which incorporates year fixed effects to account for common temporal shocks. The following table represents the results from these models.

Table 7: Regression Results: Religious Destination Status and CNEI

(Standard Errors are reported in Parentheses; *** p < 0.01, ** p < 0.05, * p < 0.10.)

Variable	Model 1	Model 2	Model 2 (Clustered SE)
Religious Dummy	10.446*** (3.532)	10.446*** (3.553)	10.446* (6.207)
2019	—	0.308 (5.025)	0.308 (1.375)
2020	—	-5.703 (5.025)	-5.703 (4.226)
2021	—	-5.083 (5.025)	-12.717666
Constant	14.568***	17.188***	17.188***
Observations	48	48	48
R^2	0.16	0.205	0.205
F-statistic	8.747**	2.775*	—

The relationship between religious destination status and CNEI is shown in Table 7. According to Model 1, average CNEI of religious hubs is roughly 10.45 index points higher than that of non-religious hubs (p = 0.005). Model 2 with year effect, produces the same coefficient. Nevertheless, the p-value rises to 0.100 when standard errors are aggregated at the hub level to account for repeated data. As a result, the positive correlation is statistically significant at the 10% level but not at the traditional 5% criteria. According to the year coefficients, average CNEI of religious hubs is roughly 5.08 points lower in 2021 than it was in 2018 (p = 0.048).

6.9 Component-Level Analysis

Separate regression models were conducted for each component of the CNEI, adjusting for year effects using hub-clustered standard errors. This helped in determining which dimension of negative externalities is responsible for the observed link. The following table presents the results.

Table 8: Component-Level Regression Results

(*** p < 0.01, ** p < 0.05, * p < 0.10)

Variables	PM10	BOD	Tourism Pressure
Religious dummy	7.467	0.019	**41.757**
Clustered SE	-29.113	-2.833	-15.626
Clustered p-value	0.799	0.995	**0.011**
2019	3.889	-1.172	1.545
2020	-13.865*	3.017	-23.339*
2021	-9.257	-0.383	**-14.313** **
Observations	48	48	48
R^2	0.0273	0.0413	0.3987
Adjusted R^2	-0.0632	-0.0479	0.3428

A distinct and consistent pattern emerges from the component-level analysis. Table 8 shows that religious destination status is significantly correlated with tourist pressure ($\beta = 41.757$, $p = 0.011$). This means that, the average tourist pressure of religious hubs is higher than that of non-religious hubs by 41.757. Further, Table 8 shows that tourism pressure in religious hubs in 2021 is significantly lower than in 2018 by 14.313. However, the correlation between religious destination status and PM10 is not statistically significant ($\beta = 7.467$, $p = 0.799$). Similarly, the association between religious destination status and BOD is not statistically significant ($\beta = 0.019$, $p = 0.995$). Compared to the PM10 or BOD models, the tourism pressure model explains significantly more variation ($R^2 = 0.399$).

6.10 Supplementary Random-Effects Panel Analysis

In order to estimate the time-invariant religious status coefficient and account for hub-specific unobserved variability, random-effects panel models were used as a robustness check. The results are presented in the table below.

Table 9. Random-Effects Panel Regression Results

Variable	CNEI	PM10	BOD	Tourism Pressure
Religious dummy	**10.446***	7.467	0.019	**41.757*****
p-value	**0.093**	0.798	0.995	**0.008**
2019	0.308	3.889	-1.172	1.545
2020	**-5.703***	**-13.865****	3.017	**-23.339*****
2021	**-5.083***	-9.257	-0.383	**-14.313****
R^2	0.18	0.207	0.047	0.362
Observations	48	48	48	48

The primary conclusions are supported by the random-effects results. Religious status is not significantly correlate with either of PM10 or BOD. However, it is significantly correlated with CNEI ($\beta = 10.446$, $p = 0.093$) and tourism pressure ($\beta = 41.757$, $p = 0.008$). The robustness of the conclusion that tourism pressure is the primary driver of the religious–nonreligious difference in negative externalities is reinforced by the consistency across parameters.

9. Conclusion

The findings from this study shows that religious hubs have higher overall negative externalities. The average CNEI is approximately 10.45 points higher than that of non-religious hubs. However, religious destination status is strongly associated with tourism pressure, while its association with PM10 and BOD is not statistically significant. Thus, the observed difference in overall externalities suggests that the intensity and concentration of visitors relative to the resident population is responsible for higher CNEI value

These findings contribute to the economics of religion by highlighting an underexplored externality generated by religious economic activity. Religious institutions and pilgrimage destinations influence not only individual economic behaviour but also the spatial concentration of economic activity and demand for local public resources. When visitor numbers substantially exceed local infrastructure capacity the resulting costs are not fully reflected in individual pilgrimage decisions. Thus, this divergence between private and social costs must be addressed to reach the society's optimal.

The central implication is therefore not that religious tourism is inherently environmentally harmful. Rather, the evidence suggests that the economic benefits generated by religious activity is accompanied by external costs when visitor concentration exceeds the capacity of local infrastructure and public systems. To ensure that the economic and spiritual benefits of pilgrimage can be sustained over the long term, the negative externalities should be internalised. This can be done by assessing the carrying-capacity, visitor registration and crowd management. This will help reduce pressure on destinations. Additionally, environmental taxes or Pigouvian pilgrimage levies can complement these measures by financing necessary infrastructure.

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