






Original Article


Tourism dependence and poverty alleviation thresholds in Chinese ethnic tourism

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Abstract: Questions persist on the relationship between tourism dependence and economic growth in ethnic tourism areas. This study addresses such gaps by constructing a threshold regression model based on socio-economic data from 2006 to 2019 for nine sites in Enshi Prefecture of central China. ArcGIS and other open-source data were also used to visualize changing tourism resources in the region. Findings suggest that tourism dependence (the ratio of tourism-based GDP to overall GDP) significantly promotes economic growth in ethnic minority areas. However, the positive influence of tourism dependence on economic growth appears dynamic and non-linear – rising at first before falling when tourism dependence exceeded a threshold of 34%, with effects varying by site and year. Methods and findings make crucial theoretical contributions to understanding tourism dependence and poverty alleviation linkages. This paper also highlights the importance of political support and balanced

investment in diverse industries to minimize decreasing returns beyond tourism dependence thresholds in destinations worldwide.

Keywords: Ethnic tourism; Tourism dependence; Economic growth; Threshold effects; Poverty alleviation; Threshold regression model

1 Introduction

International research theorizing tourism's relationship with economic growth indicates that tourism can promote multi-scalar development and reduce economic vulnerability in terms of employment creation, investment, and production (Canh and Thanh 2020). However, tourism's poverty alleviating potential remains open to debate. In particular, studies suggest that tourism's benefits for destinations follow a growth cycle over time, reaching possible inflection points at which over-reliance on

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tourism may actually become detrimental to myriad poverty alleviation measures, including economic growth (Butler 1980; Parrilla et al. 2007).

Economic measures of (absolute) poverty facilitate research into tourism-poverty dynamics in rural China (the focus of this study) and globally. According to state media, the 832 Chinese counties still considered 'poverty-stricken' in 2015 – many of them inhabited by ethnic minorities in rural areas – were lifted out of poverty by November of 2020 (Liu, 2020a). Studies suggest that tourism played a pivotal role in these poverty alleviation efforts (Khan et al. 2020; Nie et al. 2021; Wang et al. 2022), supporting a controversial but commonly-held notion that tourism combats poverty by contributing to economic growth.

Viewed in this way, China's investment in tourism holds considerable poverty alleviation potential, particularly for rural areas (Hu 2018). However, as tourism develops in such areas alongside other industries, marginalized groups like ethnic minorities can experience what might be called a bottleneck effect of economic growth, seeing diminishing returns from a more diversified (and often exclusionary) tourism economy (Li et al. 2020). Additionally, while rural areas may be rich in tourism and cultural resources, and officials have touted tourism's poverty alleviation potential for decades, many Chinese ethnic communities remain disinterested in – and even unsupportive of – tourism development in their midst (Gong et al. 2021).

A host of other factors can influence Chinese ethnic minority views and experiences associated with tourism's touted poverty alleviation potential. These include complex geological conditions, the frequency of natural disasters, ongoing livelihood instability, unproductive agricultural practices, and weak economic structures (Zhao et al. 2019). Such considerations collectively allude to the complex relationship characterizing whether and how poverty alleviation occurs via economic and tourism development in minority areas (Zhang 2020) – not only in an objective (positivistic) sense tied to a region's geography, resources, and income, but also in a subjective sense tied to resident thinking, behavior, and capabilities (Knight 2018).

That said, studies in China and elsewhere have analyzed relationships between tourism dependence and 'economic growth' (Deng et al. 2017; Gunduz and Hatemi 2005). Analyzing regional economic differences among Portuguese destinations, for

example, one study suggested that tourism development had a significant positive, balanced relationship with economic growth (Soukiazis and Proenca 2008). Another study on tourism in Fujian and Taiwan revealed that for every 1% increase in tourism revenues, there was an approximate 0.35% increase in overall economic growth (Yang et al. 2013). A study on tourism in Africa suggested that the positive relationship between tourism development and economic growth is stronger in poorer countries than in other regions (Fayissa et al. 2008). Still other studies focusing on China highlight a significant positive relationship between tourism, the transformation and upgrading of industrial infrastructure (Yang 2015; Liu 2020b), and high-quality development and multi-dimensional poverty alleviation in ethnic areas (Wu et al. 2020; Guo 2019).

In view of such research considering the apparent causal relationship between tourism dependence and economic growth, this paper puts forward the following hypothesis:

Hypothesis 1 (H1): *Tourism dependence in Enshi Prefecture positively influences economic growth.*

Undoubtedly, a growing number of Chinese ethnic communities are now involved in national poverty alleviation programs (e.g., China's 13th Five Year Plans for Poverty Alleviation/Tourism Development). Many of these programs follow decades of research into the role of tourism in poverty reduction, emphasizing macro-economic development and employment (Mitchell and Ashley 2009) alongside tourism industry overhauls to encourage poverty alleviation 'from within' (Yang and Wang 2019). While such policies and programs embrace a 'putative common sense of tourism and development', however – with ethnic minorities in rural China increasing their dependence on tourism for regional economic development (Puvaneswaran et al. 2017) – few studies have empirically analyzed the evolving impacts of such growing dependence on tourism (Knight et al. 2017; Antonakakis et al. 2017).

That said, some scholars suggest that tourism may in fact counteract poverty alleviation efforts (Sharpley and Naidoo 2010; Croes et al. 2021; Fahimi et al. 2018). Others suggest that ethnic communities may gain more from tourism early on before so-called bottlenecking effects either reduce or redirect the rate of those gains (Li et al. 2020). Additionally, studies on tourism in poor areas suggest that, when foreign capital is completely contained within tourism

markets, residents can suffer significant loss of economic opportunity (Matthew and Harold 2000; Taylor 2001) through weakened trade profitability and employee income (Anan and Ian 2008). Despite driving forms economic growth, tourism may also increase the inequality of local communities (Jeyacheya and Hampton 2020) and lead to lower returns, inflation and other adverse consequences, thereby widening income gaps and reducing the presumed poverty reduction effects of tourism. At the micro level, others point out that tourism development may destroy natural and cultural resources (Biddulph 2015), increase the crime rate, and generate other environmental and social problems (Champion 2008).

These issues collectively raise important questions about how increases in tourism development correspond to positive (or negative) changes in economic growth, particularly in China's rural areas where ethnic minorities reside. For example, at the national level in China, a study revealed that, when the proportion of inbound tourism income to GDP was greater than 2.36%, mutual promotion effects (i.e., between tourism and economic growth) appeared significant (Zhong 2013). Similar results were observed at the international level (Wu and Xie 2010). However, other studies focused on China and internationally suggest that, as tourism development becomes more specialized, the marginal effect of its positive impact on economic growth begins to weaken (Zhao and Fang 2017). In other words, with a higher threshold/greater tourism dependence, the mutually beneficial relationship between tourism dependence and economic growth begins to decline. However, significant gap persists in the literature, with studies failing to provide empirical analyses of such dynamic and possibly non-linear effects of tourism dependence on poverty alleviation in Chinese ethnic areas.

Considering previous research and existing gaps informing the development of Chinese tourism in ethnic minority areas, this paper puts forward the following two hypotheses:

Hypothesis 2 (H2): *Thresholds exist in the poverty-alleviating potential of tourism dependence in the nine Enshi Prefecture study sites.*

Hypothesis 3 (H3): *When tourism dependence in Enshi Prefecture exceeds the threshold value, the mutually beneficial relationship between tourism dependence and economic growth begins to diminish.*

The purpose of this paper is to build on previous research and address these gaps by identifying a function linking Chinese ethnic tourism development and economic growth (H1), but also by considering possible threshold effects and changes associated with tourism dependence in such areas (H2 and H3). The analyses presented aim to offer practical and theoretical guidance for sustainability and tourism development in minority areas like Enshi Prefecture (the study site). As outlined in the subsequent sections, this study questions Enshi's development goal of 'establishing a tourism state' (a policy implemented in 2006), applying threshold effect theory to reveal potential bottlenecking factors and threshold dynamics characterizing changes in the benefits ethnic areas receive through tourism over time.

2 Study Site

Enshi Tujia and Miao Autonomous Prefecture (Enshi Prefecture for short, 30°18'00"N, 109°29'24"E) is located in southwest Hubei Province, covering an area of 24,000 km², with 28 ethnic minorities including Tujia, Miao, and others. Enshi Prefecture consists of two county-level cities, Enshi and Lichuan, and six counties, Jianshi, Badong, Xuanen, Xianfeng, Laifeng and Hefeng. Since Enshi Prefecture put forward its strategy of 'invigorating the prefecture with tourism' in 2006, it has adopted ethnic tourism as a leading industry aiming to capitalize on the prefecture's rich and unique tourism resources. Over time, the number of tourism attractions and guesthouses in the area has improved considerably (Fig. 1).

At the time of writing, the region had 32 Class A scenic spots, including two 5A scenic spots and seventeen 4A scenic spots (5A being the highest national-level, scenic spot qualification issued in China). There were also 48 hotels rated three-star or above, 14 five-star guesthouses, numerous Chinese traditional and cultural tourism villages, cultural relic protection units and other tourism resources. In 2019, Enshi Prefecture received approximately 71 million tourists with a comprehensive tourism income of 53 billion yuan (~7.8 billion USD) (Enshi Tujia and Miao Autonomous Prefecture Bureau of Statistics 2020).

Appendix 1 extends Fig. 1 with additional data to show that the total number of tourism resources

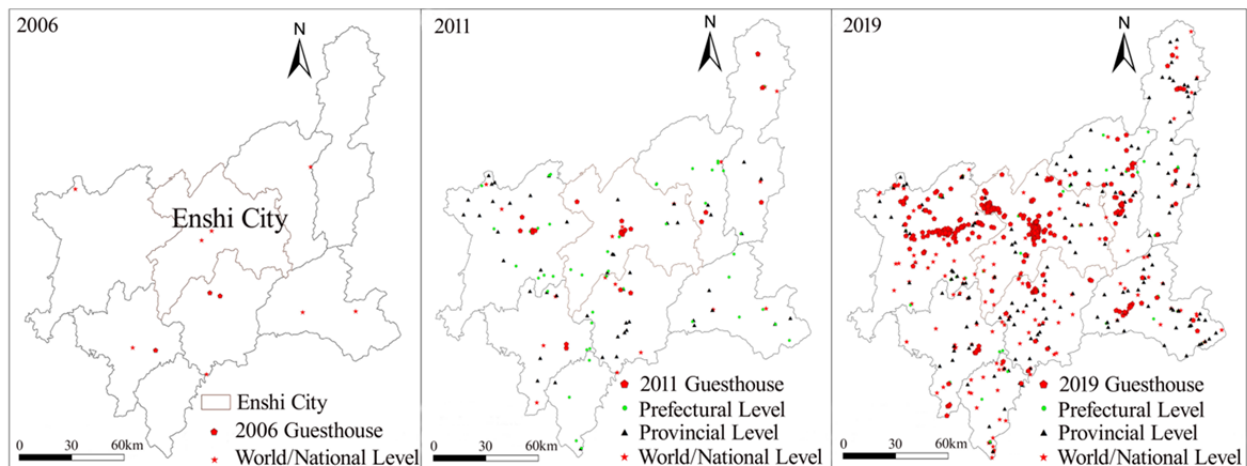


Fig. 1 Tourism resource and guesthouse distribution in Enshi Prefecture, Hubei Province, China in 2006, 2011, and 2019 (open-source data pulled from ArcGIS, from China’s largest online travel agency, Ctrip, and from regional statistics bureaus).

throughout Enshi Prefecture increased considerably over the 14 years, as did TD values for nearly every site during the same period. Alongside these patterns characterizing tourism resources and TD, differences in per capita GDP (PGDP) growth were observed by year and location (PGDP is used to approximate both economic development and poverty in the current study, with notable limitations). However, these trends were not enough to keep the Prefecture from becoming, one of China’s 14 contiguous areas of extreme poverty and a focus of poverty alleviation efforts. Indeed, though rich in human capital and other resources (Wang et al. 2022), the lack of industry integration and other challenges have kept the per capita income of rural residents in Enshi Prefecture considerably lower than the national average (Enshi Tujia and Miao Autonomous Prefecture Bureau of Statistics 2020; Zhang and Ji 2022). Therefore, as a region representative of China’s tourism-based poverty alleviation and development efforts, Enshi Prefecture is the focus in this study, offering significant insights into the relationship between tourism dependence and economic development in China’s ethnic minority areas.

3 Methods

3.1 Variables and data sources

This paper tests three hypotheses by analyzing publicly available panel data for nine sites in Enshi

Prefecture from 2006 to 2019 as the empirical test samples. Sites include two cities, six counties, and the prefecture overall. Specific data sources included statistical yearbooks, the Statistical Bulletin of National Economic and Social Development, government reports, as well as various official websites, such as those of provincial and municipal governments, the Culture and Tourism Bureau and the Cultural Relics Bureau, and Chinese traditional villages.

The variables involved in testing each hypothesis were divided into one dependent variable (DV), one independent variable (IV) and five control variables indices (CVs). The DV was economic development, measured in terms of per capita GDP (PGDP) for each of the nine sites under consideration. The IV was tourism dependence (TD), representing the proportion of total tourism income to GDP for each of the nine sites. Following Zhang and Tu (2020), the five CVs characterizing each of the nine sites included urbanization rate (UR); fixed asset investment level (FAI); financial standard (FS); industrial structure (IS); and traffic connectivity (TC). Table 1 outlines variable types, names, and descriptions, as well ties to study hypotheses, analyses and previous research.

3.2 Hypothesis 1 analysis

The first hypothesis is that tourism dependence can significantly promote the economic development of ethnic areas. To test this hypothesis, a generalized least squares (GLS) regression was used for model estimation, assessing the extent to which changes in

Table 1 Variable types, names and descriptions with ties to study hypotheses⁽¹⁾, analyses and previous research.

Variable type/ name ⁽²⁾ / abbreviation	Variable description ⁽³⁾	Previous research for variable selection
DV: Economic development (PGDP)	Per capita GDP; lnPGDP used for H1	Lan and Zhao (2020); Wang and Liu (2018); Zhao and Fang (2017)
IV: Tourism dependence (TD)	Measures tourism industry dependence: the proportion of total tourism income to GDP, including tourism expenditures from both domestic and international visitors	He et al. (2018); Lee and Chang (2008); Liu (2020b);
CV 1: Urbanization rate (UR)	Measures industry, talent, technology, information, capital and other factors linked to industrial competitiveness	Zhang and Tu (2020)
CV 2: Fixed asset investment level (FAI)	Measures investment in networks, urban and rural coordination, people's livelihood services and other fields; the proportion of total fixed assets to GDP ⁽⁴⁾ ; lnFAI used for H1, H2 and H3	Lin and Zhao (2020); Yu and Xie (2012);
CV 3: Financial standard (FS)	Measures proportion of deposits and loans at financial institutions in GDP to represent the level of financial development	Cui and Sun (2012); Su and Liao (2009);
CV 4: Industrial structure (IS)	Measures the proportion of added value between the primary and secondary industries, or the proportion of the tertiary industry directly in the GDP; this paper primarily used the former; lnIS used for H2 and H3	Lin and Zhao (2020); Zhang and Tu (2020)
CV 5: Traffic connectivity (TC)	Measures the road connectivity between cities and annual traffic mileage length and quality by county/city (source: 2018 traffic connectivity data of Enshi Prefecture); lnTC used for H2 and H3	Li et al. (2018); Li (2008)

Note: (1). Clarification of analyses by hypothesis: H1: correlation, feasible generalized least-square regression; H2: significance test of threshold effect; H3: threshold effect regression, robustness test (GDP used).
 (2). DV is dependent variable; IV is independent variable; CV is controlled variable index; all were calculated from 2006 to 2019 for each of the nine sites under consideration (six counties, two cities, entire prefecture).
 (3). Except for CV 5, data sources for variables were the same: Statistical Yearbooks; the Statistical Bulletin of National Economic and Social Development; and government reports (county, city, prefecture).
 (4). For CV 2, data were limited, so the proportion of total social fixed assets in GDP was used to approximate the level of fixed asset investment (also expressed as the intensity of investment).

economic development (DV) can be explained by tourism dependence (IV). The GLS method also provides the correlation direction and magnitude between the two variables on the basis of eliminating estimation error, making it appropriate for analyzing H1. Here, to eliminate the estimation error of samples, the Hausman and Wald tests were used to correct heteroscedasticity concerns, and the Durbin-Wu-Hausmann test to test endogeneity.

3.3 Hypotheses 2 and 3 analyses

The second hypothesis is that thresholds exist in the poverty-alleviating potential of tourism dependence in Chinese ethnic areas. This hypothesis was tested using threshold regression. According to Hansen's threshold test idea (Bruce 1999), the significance of the threshold effect should be tested first. This is done by creating an extended model equation based on the GLS regression used in analyzing H1 while incorporating additional panel data (i.e., the control variable indices described in

Table 1).

Based on the threshold model proposed by Hansen and drawing on the design ideas of Zhang and Tu's (2020) threshold model, the following multiple threshold regression model was constructed:

$$PGDP_{it} = \mu_i + \beta_1 TD_{it}(TD_{it} \leq \gamma_1) + \beta_2 TD_{it}I(\gamma_1 < TD_{it} \leq \gamma_2) + \dots + \beta_n TD_{it}I(\gamma_{n-1} < TD_{it} \leq \gamma_n) + \beta_{n+1} TD_{it}I(TD_{it} > \gamma_n) + \delta X_{it} + \varepsilon_{it}$$

where i and t represent region and year, respectively; $PGDP_{it}$ represents the level of economic development; TD is the threshold variable of tourism dependence; γ is a specific threshold value; I is the indicator function (when the dependency of tourism industry does not cross the threshold value, the indicator function is 1; otherwise, it is 0); X_{it} refers to other control variables affecting the level of economic development, including urbanization rate UR, fixed asset investment level FAI, financial standard FS, industrial structure IS and traffic connectivity degree TC; μ_i reflects the unobserved characteristics of the individual; and ε_{it} is the random error term, which assumes $\varepsilon_{it} \sim N(0, \sigma^2)$.

To determine whether thresholds exist between tourism dependence and economic development, and the specific number of thresholds, 300 bootstrap repeated samplings was conducted on the regression data. The threshold number divides the sample of tourism dependence into two intervals (one interval above a possible threshold, and one interval below) to examine differences in the effects of tourism dependence and the various control variables on economic development. If there is a significant difference, it means that the threshold effect is true, because the effect on both sides of the threshold value is inconsistent.

The third hypothesis considers changes in the effect of tourism dependence on economic development utilizing the panel data characterizing Enshi Prefecture at large across the 14-year period (2006-2019). To do so, the single threshold and the overall threshold regression results assess the impact of different threshold intervals of tourism dependence on economic development. This regression test reveals whether diminishing returns may be at play when tourism dependence exceeds the calculated threshold value.

A concomitant robustness test, meanwhile, determines whether such threshold effects hold true amid observed changes in the number and distribution of tourism resources presented in Fig. 1. While only three years are considered in that figure (2006, 2011, and 2019), mapping out changes in tourism resources allows for a more nuanced visualization and analysis of changes in the relationship between tourism dependence and economic development over time. The years 2006 and 2019 were selected as logical “book-ends” to the analyses presented here (given Enshi’s focus on invigoration through tourism since 2006, and the region’s significant tourism growth observed through 2019). The year 2011 was selected purposefully, as well, since tourism dependence in the region entered a new stage at that time. Specifically, a major shift toward tourism livelihoods occurred, with an extensive (>10k) rural surplus labor force moving into tourism-related employment circa 2011 (Enshi News Network 2012). Along these lines, using only three (2006, 2011 and 2019) instead of all years would have improved the visualization of regional tourism growth. And threshold regression values characterizing all nine sites across the 14-year period are considered robust to the extent that coefficient signs and

significance do not change when comparing robustness test results to the original regression values.

4 Results

4.1 Correlation and panel data regression

From 2006 to 2019, tourism dependence was positively correlated with economic development ($r = 0.637$, $p < 0.01$) across the nine Enshi Prefecture sites analyzed (eight counties plus the Prefecture overall). A significant Hausman test ($H = 69.60$, $p < 0.1$) led to the selection of a fixed effect regression model as opposed to a random effect model. The Wald test was used to examine whether there was inter-group heteroscedasticity, and feasible generalized least square (FGLS) was used to correct the heteroscedasticity of panel data to obtain the effective parameter estimation results of the model.

At the same time, endogeneity may occur in the regression analysis of panel data, so an endogeneity test on the samples was conducted. Due to the significant inter-group heteroscedasticity in the samples, the lag period of tourism dependence became an instrumental variable in conducting the Durbin-Wu-Hausman (D-W-H) test for endogeneity. Results were non-significant ($p > 0.05$), so no endogeneity problem was observed. Therefore, the regression results of the FGLS method were used for model estimation (Table 2).

As seen in Table 2, the final model including all five CVs revealed a positive, significant influence of tourism dependence on economic development ($R^2=0.825$, $\beta=0.1252$, $p<0.05$). Regression coefficients for each of the five CVs, including UR, $\ln(\text{FAI})$, FS, $\ln(\text{IS})$ and $\ln(\text{TC})$, were all significant at the $p < 0.01$ level, with positive relationships observed between economic development and urbanization rate, UR ($\beta=0.0304$), fixed asset investment, FAI ($\beta=0.4814$), and traffic connectivity, TC ($\beta=0.0959$). Meanwhile, regression coefficients revealed a negative relationship between economic development and both financial standard, FS ($\beta=-0.0632$), and industrial structure, IS ($\beta=-0.0166$).

4.2 Threshold effect regression

In Hansen’s approach to threshold analysis

Table 2 Feasible generalized least square (FGLS) regression analysis¹ of the impact of tourism dependence and other factors on economic development in Enshi Prefecture (nine sites; 2006-2019)

Variable	β-coefficient, significance, and standard error					
	(1)	(2)	(3)	(4)	(5)	(6)#
TD	0.7918*** (0.0878)	0.2579*** (0.0461)	0.1212*** (0.0446)	0.1381*** (0.0422)	0.1391*** (0.0379)	0.1252** (0.0487)
UR		0.0349*** (0.0016)	0.0248*** (0.0023)	0.0303*** (0.0019)	0.0307*** (0.0017)	0.0304*** (0.0018)
ln(FAI)			0.4908*** (0.0452)	0.5757*** (0.0446)	0.5824*** (0.0416)	0.4814*** (0.0476)
FS				-0.0486*** (0.0180)	-0.0546*** (0.0185)	-0.0632*** (0.0196)
ln(IS)					-0.0131*** (0.0050)	-0.0166*** (0.0049)
ln(TC)						0.0959*** (0.0158)
Constant term	9.4045*** (0.0837)	8.2187*** (0.0504)	8.7668*** (0.0791)	8.7644*** (0.0659)	8.7497*** (0.0595)	8.9685*** (0.0651)

Note: Standard error indicated in parentheses; ** and *** represent $p < 0.05$ and $p < 0.01$, respectively. #, the final model included tourism dependence (TD) plus the five control variables: $R^2 = 0.825^{**}$; Wald Chi-square = 1611.46***; Hausman Chi-square = 0.53 (not significant).

Table 3 Threshold effect regression of tourism dependence on economic development in Enshi Prefecture

Threshold model	F-value	Confidence interval	Threshold estimate value	Critical value		
				1%	5%	10%
Single threshold	30.16***	[0.3372, 1.004]	0.3389***	31.2988	27.7029	21.3076
Double threshold	-1.43	[0.0975, 0.613]	0.5393	68.2309	43.5222	26.2299

Note: *** indicates $p < 0.01$.

(Bruce 1999), the significance of the threshold effect should be tested first. A threshold effect regression was performed using the regression results above, which combined panel data from all nine sites across the 14-year period. To enhance efficiency, 300 Bootstrap repeated sampling tests were conducted for all the regression data (Zhang and Tu 2020).

Results of the single threshold model were significant ($F = 30.16$, $p < 0.01$), so the single-threshold model was selected. With a single threshold value, the TD is divided into two value ranges (one above the threshold and one below), allowing for analysis of possible non-linear relationships between tourism dependence and economic development. Tourism dependence was thus taken as the threshold variable to test the threshold effect; the single threshold value was 0.3389, or approximately 34% (Table 3).

4.3 Threshold effect bootstrap and robustness test results

Threshold regression results (Table 4) reveal differing effects of tourism dependence on economic development above and below Enshi Prefecture's

threshold value (0.3389). Specifically, when TD values crossed the threshold value (i.e., due to a rise in regional dependence on tourism), the magnitude of the regression coefficient increased from 0.544 to 0.9179, but the correlation became negative.

Table 4 Single threshold effects and robustness test results of tourism dependence on economic development in Enshi Prefecture.

Variable	Regression coefficients (t-value)	Robustness test coefficients (t-value)
(TD ≤ 0.3389)	0.5444** (2.79)	0.4694** (2.83)
(TD > 0.3389)	-0.9179** (-3.35)	-1.0473** (-5.49)
UR	0.0016 (0.46)	0.0011 (0.35)
ln(FAI)	0.1406* (2.52)	0.0770 (1.62)
FS	-0.0900 (-1.70)	-0.1022* (-2.27)
ln(IS)	-0.0545** (-4.73)	-0.0374** (-3.81)
ln(TC)	0.7999* (2.16)	0.8096* (2.56)
R^2	0.9807	0.9941

Note: * and ** denote $p < 0.05$ and $p < 0.01$ respectively; R^2 is for reference only; t-values are in parentheses.

Based on previous research, the method of replacing the dependent variable was also adopted to verify robustness (Meng et al. 2019; Zhou et al. 2019; Gu et al. 2018). Considering the strong correlation between PGDP and GDP, PGDP was replaced by GDP

to test the robustness of the threshold effect results (Table 4). The data show that the substitution of *GDP* for *PGDP* does not affect the main empirical results, with the impact of tourism dependence on economic development in Enshi Prefecture maintaining threshold characteristics. Specifically, as in the original model, the magnitude of the regression coefficient increased from 0.4694 to 1.0473 but the sign changed to negative when the threshold was crossed.

5 Discussion

This study uses threshold effect regression and other analyses to explore the dynamic relationship between tourism dependence and economic growth in Chinese ethnic regions. Results from the preliminary regression suggest that, indeed, tourism dependence in Enshi Prefecture significantly and positively influences economic growth (Table 2). This supports H1.

In further analyzing panel data across nine sites over a 14-year period (2006-2019), threshold regression results suggest that a single threshold currently exists in the poverty-alleviating potential of tourism dependence in Enshi Prefecture (Table 3). The results of the threshold effect test and concomitant robustness test suggest that the positive influence of additional tourism development on economic growth begins to diminish when tourism dependence exceeds approximately 34% in any of the nine sites (Table 4). More nuanced findings presented in Appendix 1 suggest the threshold effect varies by location and year. These findings collectively support H2 and H3.

More specifically, in view of the changing sign of

the regression coefficient (from positive to negative) when tourism dependence exceeds the calculated value of 0.3389, one can deduce that tourism dependence appears to significantly and positively contribute to economic development, but only up to a certain dependence level. These findings not only indicate that a threshold exists in the poverty-alleviating potential of tourism dependence in Enshi Prefecture, but also highlight non-linear change characteristics in the impact of tourism dependence on economic growth.

The total number of tourism resource and guesthouse points in cities and counties of Enshi Prefecture is increasing, alongside TD values (Fig. 1, Appendix 1). However, as with any attempt to model tourism phenomena, threshold effects observed in the model presented here begin to break down for some of the sites – under more fine-tuned, micro-levels of analysis (Table 5). For example, while the tourism dependence levels of Hefeng, Badong, and Xianfeng Counties have remained above the threshold since 2014, the extent of their economic growth has decreased more recently, holding true to the model and reflecting non-linear characteristics. Additionally, while tourism development in Xuanen County has not yet crossed the threshold, its economic growth follows what the threshold model would suggest and continues to increase.

However, several sites analyzed do not hold true to the model. For example, Enshi City and Lichuan City in fact show increasing levels of economic growth despite having crossed the threshold since 2014. Again, the tourism dependence levels of Jianshi and Laifeng Counties have yet to cross the threshold, but their economic growth is also decreasing, demonstrating that tourism dependence does not necessarily positively influence economic growth

Table 5 Tourism dependence threshold crossing rate of cities and counties in Enshi Prefecture (2006-2019)

Year	Number*	Regions that crossed the threshold	Threshold crossing rate
2012	1	Hefeng County	11.11%
2013	3	Enshi City, Badong County, Xianfeng County	33.33%
2014	4	Enshi City, Lichuan City, Badong County, Xianfeng County	44.44%
2015	5	Enshi Prefecture, Enshi City, Lichuan City, Badong County, Xianfeng County	55.56%
2016	5	Enshi Prefecture, Enshi City, Lichuan City, Badong County, Xianfeng County	55.56%
2017	5	Enshi City, Lichuan City, Badong County, Xianfeng County	55.56%
2018	5	Enshi Prefecture, Enshi City, Lichuan City, Badong County, Xianfeng County	55.56%
2019	5	Enshi Prefecture, Enshi City, Lichuan City, Badong County, Xianfeng County	55.56%

Notes: Number* refers to the number of regions that crossed the threshold.

In 2006-2011, there is no region crossing threshold, and the number, regions and crossing rate are all zero, so they are not shown in the table.

before the dependence threshold is reached. These findings suggest that, far from being prescriptive or deterministic, the model presented here reveals patterns characterizing the Prefecture at large, but many factors are at play within individual destinations that can help them avoid or reverse diminishing returns that may arise from excessive tourism dependence.

6 Conclusion

6.1 Theoretical and practical implications

This study examines thresholds associated with the poverty alleviating potential of tourism dependence and its relationship to economic growth. Using panel data from 2006 to 2019, it focuses on Enshi Prefecture as an ethnic tourism area in central China, with findings suggesting that a single threshold exists between tourism dependence and economic growth in the destinations considered. Findings also highlight an interactive relationship with non-linear characteristics between these variables, with the threshold effect varying by city, county, and prefecture.

From both a practical and theoretical perspective, a major implication of these findings for ethnic areas follows what other studies have long suggested regarding destinations and even micro-destinations; namely, that sustainable tourism development requires effective governance to minimize destination decline and negative effects of excessive tourism dependence on resident populations. In this study, it is worth questioning whether tourism development in nascent destinations like Enshi Prefecture is worth pursuing at all, since the eventual negative effects (e.g., on economic growth) associated with developing tourism too much may at some point exceed other worst-case potentialities of not developing tourism at all (e.g., unemployment, dependence on other industries, lack of infrastructure, etc.). From a tourism-poverty perspective in ethnic areas, the key to addressing such issues crucially depends on effective governance tied to locally-grounded decision-making.

Another implication with practical and theoretical ramifications pertains to whether and how destinations like those considered here can alter thresholds to extend the mutually beneficial relationship between tourism dependence and economic growth. Understanding the geo-political

contexts of the nine sites in this study helps to address this issue. Specifically, findings presented in [Appendix 1](#) suggest that, with an effective policy orientation, places with high tourism dependence alongside well-developed tourism resources (e.g., Enshi City or Xuanen County) can perhaps extend the mutually beneficial relationship between tourism dependence and economic growth. Meanwhile, destinations with ostensibly lower quality of tourism resources (e.g., Hefeng County, Badong County, etc.) have garnered lower levels of government and investor support, contributing to significant growth limitations. Such differences in threshold and destination characteristics suggest that, with effective investment alongside political and resident support, increased tourism dependence may continue positively influencing economic growth beyond calculated points of reversal.

6.2 Limitations and Future Research

While conventional wisdom suggests that “tourism can promote local economic growth”, this study presents a more nuanced perspective with the help of threshold modeling. However, the study has notable limitations tied primarily to data collection and variable selection, pointing to the need for future research.

Firstly, the data used in this study were pulled primarily from official city, county, and prefecture websites, including statistical yearbooks and the national economic bulletin. However, due to the time-period involved (2006 to 2019), some data from these sources were not complete for every year. For example, the regional resident population was not recorded in some county and city yearbooks and statistical bulletin, so interpolation methods were required in some cases, affecting sample accuracy.

Secondly, this paper mainly discusses the relationship between tourism dependence and economic growth in ethnic areas, and the complexity of tourism systems requires new directions to better capture such complexity. For example, future studies might analyze potential threshold effects characterizing the relationship between economic growth and specific sub-sectors of the tourism industry such as accommodations, scenic spots, and transportation.

Thirdly, this paper emphasizes political support and investment as principal drivers of the influence of tourism dependence on economic growth. In the

future, new variables such as vulnerability – as a topic of increasing importance given COVID-19 and other threats to tourism systems (Knight et al. 2020) – may be considered in their relationship to economic growth. In such analyses, researchers might assess how exposure, sensitivity, and resilience (as measures of vulnerability) might influence the tourism economy, and whether their relationship follows non-linear characteristics with similar (positive or negative) effects.

In closing, a primary contribution of this paper is to enhance research into the relationship between tourism dependence and economic development in ethnic areas from a non-linear perspective. While such analyses may inform tourism-based poverty alleviation efforts in China, no sweeping claims can be made that generalize findings to pro-poor tourism contexts elsewhere, particularly in view of the nuances and contestations of the tourism-poverty nexus. That said, the modeling in this study combined with ArcGIS analysis do offer insights into potential ties between excessive tourism dependence and

poverty stemming from diminishing returns from distinct, economic thresholds. Such nuances merit further study and would benefit from incorporating qualitative and longitudinal data to better understand ways residents of nascent tourism destinations (e.g., Enshi Prefecture) may begin experiencing the apparent bottlenecking effects of tourism over-dependence.

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