Tourism and poverty alleviation: An empirical analysis using panel data on Peru's departments*

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Abstract

This paper analyses the impact of tourism on total and extreme monetary poverty, in order to illuminate the debate surrounding the links between tourism and poverty. We apply fixed effect models to panel data on the Peruvian departments for the period 2001–2013. We also identify the key factors in the tourism model affecting the empirical results. Our findings show that tourism is important for the poor, but its benefits do not reach the extreme poor to the same extent and its potential is not fully exploited. The weak macroenvironment and low community participation impede poverty reduction through tourism.

Keywords: impacts of tourism, poverty, Peru, policy-making, panel data model, feasible generalised least square.

1. Introduction

A broad range of specialised literature traces the links between tourism and economic growth from both national and regional perspectives. Research has highlighted the impacts of tourism on foreign receipts and direct investment along with the dynamism it injects into other sectors (Cortés-Jiménez, 2008; Das and Rainey, 2010; Fayissa *et al*., 2008; Llorca-Rodríguez *et al*., 2012 and 2013; and Mistilis and Dwyer, 1999). Beyond this, tourism has an impact on the distribution of welfare. According to some authors (Belloumi, 2010; Vanegas and Croes, 2003; Williams and Shaw, 1991), it contributes to convergence at both national and international level and affects social and spatial polarisation. Tourism has therefore begun to be regarded by international development organisations as "a powerful weapon to attack poverty" (Zhao and Ritchie, 2007, p. 119), though only since the late 1990s (OECD, 2010). Indeed, in 2002 the World Tourism Organization (UNWTO) and the United Nations Conference on Trade and Development (UNCTAD) launched the Sustainable Tourism – Eliminating Poverty (ST-EP) initiative (UNWTO, 2002). The World Bank, the International Monetary Fund (IMF), the International Labour Organization (ILO) and the European Union (EU) have also highlighted the potential role of tourism in poverty alleviation (Bolwell and Weinz, 2008; Scheyvens, 2007; and World Bank, 2012).

In accordance with the UNWTO programme for eliminating poverty (UNWTO, 2002), the Peruvian Ministry of Foreign Trade and Tourism (MINCETUR, 2008b and 2013) has considered sustainable tourism as a tool for the economic, social and environmental development of the country. It should be noted that Peru suffers from pronounced social and territorial inequalities affecting its development and social cohesion (Llorca-Rodríguez *et al.*, 2016).

On the other hand, Ayres (2000) flagged up the potential risks of a growth and development model overly focused on tourism: inflationist pressures, loss of competitiveness in other sectors of the economy and environmental and social costs. In addition, Sharpley (2002) reached contradictory conclusions on the links between tourism and poverty. More recent studies, such as that of Blake et al. (2008), reveal that tourism does not lead systematically to income convergence at national level. Croes (2014) points out that tourism does matter for the poor, but that it does not appear to have systematic effects and thus the policy implications differ for each case study.

In the light of this, our research assesses the impact of tourism on poverty alleviation in Peru. Additionally, we contribute to the existing literature by analysing the main factors that prevent all the potential benefits of tourism from reaching the neediest members of the population. We have used a balanced panel data set covering the Peruvian departments for the period 2001–2013. We consider monetary poverty at total and extreme levels. Our data come mainly from the Regional Information System for Decision-Making database of the National Institute of Statistics and Information Technology (Spanish acronym INEI) and the BADATUR Tourist Monitoring Centre in Peru.

Our methodological approach is based on the hypothesis that tourism will contribute to a reduction in poverty provided that it entails pro-poor[1] design and implementation of tourism sector development. If, on the contrary, these conditions are not met appropriately, tourism will either lead to an increase in poverty or, at best, it will have no effect. The proposed model is estimated by Feasible Generalised Least Square, allowing heteroskedasticity across departments and serial autocorrelation.

The remainder of this paper is organised as follows: section 2 reviews the literature on the links between tourism and poverty, section 3 surveys tourism flows in Peru, section 4 explains the methodology and the data, section 5 discusses the results, and a final section summarises the study and offers conclusions.

2. The links between tourism and poverty

Nowadays, poverty is considered a multidimensional phenomenon (UNWTO, 2004). It not only implies inadequate income and human development; it also encompasses socio-political, environmental and cultural forces. So vulnerability and lack of voice, power and representation should be taken into account when choosing which instruments to use for development and poverty alleviation (Sharpley and Telfer, 2002; World Bank, 1990, 2000; and Zhao and Ritchie, 2007). Tourism is recognised as one of these development triggers (Croes and Vanegas, 2008).

The specialised literature highlights three different channels through which tourism expenditure influences income distribution: changes in goods through changes

[1] Pro-poor tourism is broadly defined as tourism that generates net benefits for the poor. It enables the poor to actively participate in and significantly benefit from economic activity (Chok *et al.*, 2007).

in prices; wages and returns on capital; and finally government revenues, spending and tax rates (Hyytiä and Kola, 2013).

According to UNWTO (2002 and 2004), tourism is in a better position than many other sectors to benefit the poor since it is consumed at the point of production, and many of the poorest countries are actually at a comparative advantage in terms of capital assets such as culture or climate. Additionally, tourism contributes to a geographical spread of employment, especially in rural areas, it is a relatively diverse industry, it provides a wide range of different employment opportunities (from the highly skilled to the unskilled) for women and young people, it creates opportunities for many small entrepreneurs and, in general, it is an industry with low entry barriers.

The impact of tourism on poverty alleviation goes beyond these factors. It also provides cultural pride, greater awareness of the natural environment and of its economic value, a sense of ownership and reduced vulnerability through the diversification of income sources. Finally, the infrastructure required by tourism, such as transport and communications, can also benefit poor communities (UNWTO, 2004). Indeed, UNCTAD (2008) and UNWTO (2006) highlighted the contribution of tourism to development and the role it could play in achieving the United Nations Millennium Development Goals.

On the other hand, the specialised literature has identified adverse effects of tourism on poverty alleviation. These include the unpredictability, fluctuation and seasonal nature of tourist demand and competition in accessing life support resources such as water, energy and biodiversity (see, among others, Sharpley, 2000). Torres and Momsen (2004) point out that inadequate training, high quality requirements and failure to develop effective joint venture partnerships hinder participation by the poor. Nelson (2012) and Thomas (2014) add the complexity of the business creation process for vulnerable populations and barriers at international and national level such as lack of access to credit, investment subsidies, tax measures, long-term loans, leasing and insurance products.

In the light of such factors, Britton (1982), Saarinen and Rogerson (2014) and Scheyvens and Russell (2012) argue that the impact of tourism is ambivalent and that it can perpetuate class and regional inequalities and reinforce the dependency and vulnerability of developing countries. The majority of locals can only participate in tourism through wage labour employment or small petty retail and artisan enterprises with limited potential for generating income.

In order to increase the proportion of the economic benefit enjoyed by the poor, Chok *et al.* (2007) and Băltăreţu (2012) recommend strengthening the political commitment to direct tourism development and increasing the size and performance of tourism as a whole, together with specific actions to help and enable the poor to participate in tourist activities.

In connection with this, Winters *et al.* (2013) briefly state that the link between tourism and poverty depends on the broader context (or macroenvironment), the tourism-specific assets and institutions available, and finally the type of tourism.

It should be noted that most literature on tourism-poverty links focuses on specific countries or world regions (see, among others, Akinboade and Braimoh, 2010; and Trau, 2012) and a large number of papers have concentrated on case studies related to community-based tourism (Spenceley and Meyer, 2012). Moreover, empirical papers have addressed the influence of tourism on income generation or growth as opposed to explicitly on poverty (Winters *et al.*, 2013).

The Latin-American region has especially attracted the attention of researchers (see, for example, Blake *et al.*, 2008; Croes, 2014; Vanegas, 2014; and Vanegas *et al.*, 2015). Nevertheless, as far as we are aware, this is the first study that examines tourism's impact on poverty by applying a fixed effects model to panel data covering all the departments in Peru. It should be noted that Kim et al. (2016), for example, use panel data regression to investigate the relationship between tourism, poverty and economic development in developing countries.

3. General overview of the tourism sector in Peru

The tourism sector has generated 3.7% of Peruvian GDP in recent years (Marsano Delgado, 2014; Presidencia del Consejo de Ministros Sistema de Naciones Unidas en Perú, 2013). Foreign receipts from tourism grew at an annual average rate of 15% in the period analysed. In fact, since 1994 the tourism balance of goods and services has recorded a surplus that helps to offset the balance of trade. In 2013 it reached a surplus of 1.623 billion dollars owing to the increase in foreign tourist arrivals and business tourism. The negotiation and approval of the free trade agreement with the United States along with other trade agreements signed with the major world economies led to many business visitors, who, according to the UNWTO, should be regarded as tourists. It should be noted that the average expenditure of this type of visitor is higher than that of conventional tourists visiting Peru. The economic recovery of the tourists'

countries of origin and Peru's own economic growth are other reasons behind these results. Even the economic crisis had a minor impact on Peru's tourism. In 2013 Peru received 3.16 million foreign tourists, who spent 3.925 billion dollars. Their average daily expenditure was 99 dollars and their average stay was 10 nights. The Peruvian destinations most visited by inbound tourism were Lima, Cuzco and Tacna: 72%, 33% and 27% of foreign tourists visited these departments respectively (PromPeru, 2014 a).

Nevertheless, it should be highlighted that inbound tourism accounted for only 26.3% of the Peruvian tourism market: 44.21% of tourists were nationals with tourism being their only reason for travel and 29.47% were domestic visitors who had additional reasons (Marsano Delgado, 2014). This is a significant feature of the sector since the average expenditure of a domestic tourist in Peru is 39% that of foreign tourists (PromPeru, 2014 b), although average daily expenditure rises every year.

Lima was the Peruvian department most visited by domestic tourists in 2013. It received 32.4% of visitors. Huanuco, Ayacucho, Apurímac, Amazonas and Huancavelica (the departments hardest hit by poverty) only received 1.7%, 1.5%, 0.6%, 0.5% and 0.5% respectively**.**

Table 1 summarises the principal tourism resources and other relevant data for each department in Peru. These notably include the country's extensive set of nature parks and national and biosphere reserves, as well as a vast archaeological and colonial heritage. However, only 9 departments have developed their regional strategic plan for tourism as the *National Strategic Plans for Tourism* (PENTUR) recommended. It should be remembered that Zapata *et al.* (2011) found that higher levels of involvement in tourism planning lead to enhanced socio-economic benefits for communities.

With respect to the installed capacity (Table 1), only 29.21% meets the regulations for accommodation establishments. The percentage is lower in departments with higher levels of extreme poverty, such as Apurimac, where only 8.05% of the installed capacity is classified as conforming to the regulations mentioned. Additionally, Peru has only one transoceanic airport and only 13% of roads are asphalted, affecting its degree of connectivity. This percentage radically decreases in departments with higher levels of poverty. The shortcomings of Peru's infrastructure are therefore obvious.

4. Model, data and method

The model specification and the method applied for estimation are limited by the availability of data. The INEI database of the Regional Information System for Decision-Making only presents data for total monetary poverty and average number of schooling years of the population aged over 15 for the period 2001–2013. Extreme monetary poverty data only refer to the period 2004–2009. We are therefore working with a balanced panel data set covering Peru's departments for those periods. It should be noted that panel data methods of estimation allow us to address the heterogeneity in monetary poverty and tourism flows affecting the departments of Peru.

4.1. Model and data

Our empirical model is based on the assumption that tourism affects poverty. Therefore we have included the variable $TOURISM_{it}$ in our model to control its effect efficiently through Peru's different departments. The model can be written as follows:

$$POVERTY_{it} = f(TOURISM_{it}\mathbf{X}_{it}) \qquad (1)$$

where $i = 1, \ldots, n$ is the number of departments and $t = 1..., T$ is the time periods (years). The vector $\mathbf{X}_{it}$ includes a series of variables identified in the literature as potential determinants of poverty and connected with department-level characteristics: income, human capital, population growth, the proportion of the population living in urban areas and social stability.

Our dependent variable, $POVERTY_{it}$, is measured by the proportion of people below the poverty line as a percentage of the whole population, that is, by the headcount ratio. We consider total monetary poverty and extreme monetary poverty as dependent variables. According to the INEI, the total monetary poor are people living in households with per capita expenditure that is not enough to acquire a basic basket of food and non-food products (housing, dressing, education, health, transport, etc.). The extreme monetary poor are people living in households with per capita expenditure below the cost of the basic food basket. So the basket, considered as a poverty line, marks the difference between total and extreme poverty. These data come from the INEI-ENAHO (National Survey of Households conducted by the Institute of Statistics and Information Technology in Peru).

According to Cortés-Jiménez (2008), the ideal proxy variable to model the influence of tourism is the ratio of tourism receipts to GDP. Nevertheless, as Ivanov and

Webster (2013) point out, this variable reflects only the international component of tourism and ignores the domestic one. The Regional Information System for Decision-Making database of the INEI and BADATUR only offer data on domestic and international arrivals and nights stayed. Therefore, in order to test our hypothesis better, we have run our model using these different proxy variables to measure tourism activity. The limited capacity of tourism activity is considered in our model following the standard way of dividing the tourism proxy by the population of the destination: that is, we include the tourism variables in per capita terms, as is the norm in the specialised literature (Cortés-Jiménez, 2008).

The log of per capita Gross Domestic Income (*LGDPpc*), expressed in constant prices (base year: 1994), has been selected as the income variable. The average number of schooling years of the population aged over 15 ($AGE15_{it}$) is a measure of its human capital. The population growth ($POPGROWTH_{it}$) and the percentage of urban population ($URBANPOP_{it}$) reflect the demographic characteristics of the departments. Finally, we include a dummy variable ($SOCSTAB_{it}$) to account for the subversive acts of Sendero Luminoso (a terrorist group that emerged in 1980) recorded by the security forces as a proxy to measure social conflict in the various departments in Peru. We obtained the data for all these variables from INEI's Regional Information System for Decision-Making database.

The literature on poverty (see, for instance, Vijayakumar, 2013) shows that the variables included in the $\mathbf{X}_{it}$ vector behave as follows: the impact of per capita product on poverty depends on the share of its gains received by the poor. Higher levels of education are related to better-paid jobs and therefore to less poverty if policy efforts are concentrated in poor areas. High population growth is linked to increased poverty, since it reduces available income for each individual. In contrast, urban population is associated with lower levels of poverty. Moreover, social stability, or the absence of social conflicts, is considered a key factor in reducing disparities.

Assuming that (1) is linear and using the headcount ratio (*HR*) to measure poverty, equation (1) can be written:

$$HR_{it} = \beta_0 + \beta_1 TOURISM_{it} + \beta_2 LGDP_{pcit} + \beta_3 POPGROWTH_{it} + \beta_4 URBANPOP_{it} + \beta_5 AGE15_{it} + \beta_6 SOCSTAB_{it} + \varepsilon_{it} \qquad (2)$$

where ε_{it} is the stochastic error term and β_i are the parameters of the model.

Tourism can impact on poverty through many direct and indirect channels (Winters *et al.*, 2013) and as previously mentioned it is not possible to predict the sign

of these influences from a theoretical standpoint. Therefore from equation (2) two hypotheses on the effect of tourism on poverty levels can be formulated:

Hypothesis 1. Tourism contributes to the reduction of poverty. Therefore, $\beta_1<0$.

Hypothesis 2. Tourism facilitates an increase in poverty ($\beta_1 > 0$,), or, in the best possible scenario, has no effect ($\beta_1 = 0$).

4.2. Method

Taking into consideration that we are working with balanced panel data, we started our estimation process by allowing for department and time effects using fixed effects models and random effects models to address the previously mentioned heterogeneity (see, for example, Russell and Mackinnon, 2004).

The F test for fixed effects models, the Breusch-Pagan Lagrange Multiplier (LM) and finally the Hausman test show that fixed effects models are more appropriate than random effects models for our data. Additionally, we estimated a two-way fixed effect model, but we accept the null hypothesis of absence of time effects and consequently we have not included time dummy variables in our model (see tables in Appendix).

In many cross-sectional datasets, the variance for each of the panels differs. To test heteroskedasticity across panels we conducted the Wald test for heteroskedasticity across groups in fixed effect models. The null hypothesis of homoskedasticity is rejected and hence our models present heteroskedasticity. In addition, we have tested for the presence of heteroskedasticity by using the LM test proposed by Juhl and Sosa-Escudero (2014),[2] which strongly rejects the null hypothesis of homoskedasticity. We tested the autocorrelation within panels by using Wooldridge's test (Wooldridge, 2002). The null hypothesis of no first order autocorrelation is rejected and hence there is serial correlation. In order to account for endogeneity between tourism and poverty we use the Hansen J statistic, which is a test of overidentification restrictions[3]. The p-value of this

[2] This test is an extension of the Koenker (1981) robustified version of the Breusch-Pagan procedure for heteroskedasticity after fixed effects estimation of linear panel models.

[3] The Hansen J statistic is a test of overidentification restrictions testing the same hypothesis as the more widely recognised Durbin-Wu-Hausman endogeneity test. These two tests are numerically the same in the framework of instrumental variables (Baum *et al.,* 2003 and 2007). To obtain the Hansen J test we estimated our models using instrumental variables regression. The instrumented variables are *Nightspc and Arrivalspc,* that is, our tourism proxies*,* and the instruments used, following the specialised literature, are the average income of tourists and the transport price index. It should be noted that the Hansen J Test is an overidentification test and that it requires more instruments than instrumented variables to be

test (see Tables 3 and 4) suggests that there is no endogeneity in our models. Finally, the condition number and the variance inflation factor of the different models show that there is no multicollinearity.

In summary, we have to address heteroskedasticity and autocorrelation problems. To do this, we reestimate equation (2) using Feasible Generalised Least Square (FGLS), allowing heteroskedasticity across groups and autocorrelation.

Tables 3 and 4 contain the FGLS estimates for the headcount ratios of total and extreme monetary poverty, respectively, and the results of statistical tests applied. Tables A1 and A2 in the appendix summarise the estimation process.

5. Results and policy implications

Table 2 contains the main descriptive statistics of the sample selected to estimate equation (2) using the headcount ratio of total and extreme monetary poverty as dependent variables. The means of these variables were 46.87% and 19.65% respectively. The mean urban population was 61.16%, and 9.1476 was the average number of years in education of the population over 15 years of age. In all the variables the variation between departments (between standard deviation) was greater than the temporal variation (within standard deviation). This was particularly marked for the variables representing tourism (Table 2).

As previously mentioned, Peru is characterised by pronounced territorial divides sustained over time. The Gini indexes of income and spending have remained virtually unchanged during the period analysed, despite the economic growth of the country (PNUD, 2014 and INEI 2011 and 2016). The evolution of inequality by departments does not show any significant improvement or worsening (Table 1).[4] Total monetary poverty exceeded 50% in the departments of Ayacucho and Cajamarca. Extreme poverty especially affects rural areas and the departments of Cajamarca, Huancavelica and Apurimac; whilst Lima and Ica, for example, have practically eradicated it. The rural population was 24.35% in the whole country in 2013, but in Apurimac and Huancavelica it was 61.61% and 77.81% respectively. Moreover, the average number of years of schooling of the population aged over 15 was 8.3 in Amazonas or Cajamarca, whilst Lima recorded 11.1 and had an illiteracy rate of only 2.3%.

included. The instruments are significant in explaining tourism proxies but are uncorrelated with the dependent variable in our sample.

[4] The data for Ucayali could reflect the impact of the extraction of minerals (gold), liquid hydrocarbons and natural gas, together with the establishment of two multinational factories.

Additionally, this department accounted for a significant proportion of Peru's total Gross Domestic Product (GDP). With respect to tourism variables, Llorca-Rodríguez *et al.* (2016) found high levels of territorial polarisation in Peru in the significance of tourism activity, owing to the position held by Cuzco compared with the other Peruvian departments.

The results of Tables 3 and 4 (FGLS models) show that in Peru higher levels of income per capita reduce total poverty but not extreme poverty. Moreover, higher urban population percentages and longer periods in education bring down the number of people in poverty. Therefore the urban population actually has higher levels of income per capita; efforts in education policy are focused on the poor and more years in education are observed among them. On the other hand, as we might expect, higher population growth entails a higher level of poverty.

The coefficients in Table 3 lead us to conclude that tourism has reduced total monetary poverty in Peru, since in both models the tourism proxies display a negative sign. Turning to the models for extreme monetary poverty (Table 4), we find that tourism variables once again act as instruments of alleviation, although to a lesser extent than in models for total monetary poverty. In addition, we can observe that in all the models coefficients of variables for number of nights are lower than those for arrivals, although the differences are higher in the regressions for extreme poverty. The number of nights spent by tourists in a given destination reflects the economic impact of tourism more realistically than arrivals (Cortés-Jiménez, 2008). So these results provide a re-dimensioning of tourism's impact on poverty reduction in Peru. In any case, we can conclude that Peru has reduced its monetary poverty through tourism development, but that tourism does not benefit the poorest to the same extent and its potential benefits are not fully exploited in this country.

If we return to the literature on tourism-poverty links, we find that the characteristics of the Peruvian tourism model explain our results. The circuits promoted on a national level are restricted in practice to very limited areas of the Pacific corridor and the Cuzco-Arequipa zone. Therefore tourism does not reach the departments hardest hit by poverty to the same extent, as previously mentioned. It is notable, for example, that only 0.3% of foreign tourists visit Ayacucho or Amazonas. Nevertheless, the country has eleven UNESCO World Heritage Sites (MINCETUR, 2008b) and considerable expanses of exceptional natural resources in the northern, southern and central regions (Table 1). So Peru's extensive pre-Hispanic archaeological, colonial and

natural heritages would complement each other as primary tourism products, increasing the competitiveness of its tourism supply and contributing to its sustainable development, as pointed out by Benur and Bramwell (2015). Alternative tourism models, highly valued by tourists, could be developed: ecotourism, agritourism, rural tourism, sports tourism and heritage or cultural and community-based tourism (MINCETUR, 2013 and Llorca-Rodríguez *et al.*, 2016).

Special attention must be paid to community-based tourism. The Peruvian National Strategic Plans for Tourism (MINCETUR, 2008b and 2013) advocated it in order to promote the economic development of rural areas and, at the same time, improve the conservation of the environment and prevent the possible negative effects of tourism on small economies (see, among others, Manyara and Jones, 2007). This tourism model provides opportunities for the creation of small enterprises with intensive female employment (UNWTO, 2002 and MINCETUR, 2008a and 2013), fostering the pro-poor potential of tourism (Scheyvens and Russell, 2012).

However, alternative tourism models such as community-based tourism require considerable improvement in workforce training and qualification (Ayres, 2000), habitability of potential accommodation (electricity, water, and sewage systems), access to new information and communication technologies and geographical connection infrastructure. Moreover, it is vital that local communities are strongly involved and that local cooperation networks are set up for planning tourism (Ladkin and Martínez, 2002; Lima *et al.*, 2011, Scheyvens and Russell, 2012; and Zorn and Farthing, 2007). These are the major weak points of most Peruvian departments and it is therefore here that efforts must be concentrated. The previously mentioned problems with the workforce's level of education, poor-quality accommodation and restrictions on connectivity and local community participation prevent Peru's tourism potential from being fully exploited.

5. Conclusions

The specialised literature has broadly established the links between tourism and economic growth. More recently, international organisations and researchers have discussed the pro-poor suitability of tourism.

Our research assesses the impact of tourism on total and extreme monetary poverty using panel data covering the departments in Peru for the period 2001–2013.

This country is characterised by high levels of poverty and deep socio-economic inequalities, and its economic growth is partially based on tourism. The analysis of our empirical results, in the light of the Peruvian model of tourism development, allows us to inform the debate on the determinants of tourism-poverty links.

Our findings show that tourism reduces poverty in Peru but that the poorest are not receiving all the potential benefits of tourism to the same extent as the poor with higher levels of income. Low diversification of tourism products and high territorial concentration could explain these results. The commitment of local communities, the workforce's level of education and access to infrastructure — particularly as regards geographical connections — are key factors for the pro-poor impact of tourism. They are essential to developing alternative models of tourism that take advantage of the archaeological, colonial and natural heritage.

The policy implications are therefore clear: in designing and implementing tourism development policies, policy-makers should be especially careful to take full advantage of the potential benefits and avoid any undermining of convergence in social and spatial welfare. They should analyse in depth the shortcomings affecting structural inequities and reinforce actions for increasing capacity to enhance the benefits of tourism for local communities. In line with part of the existing literature, we can conclude that real political commitment to direct tourism development, access to infrastructure, products, the location of tourism activity and the participation of the poor in tourism development design and implementation are key factors in reducing poverty through tourism.

Future research should explore the roles played by domestic and international tourism in poverty reduction.

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Appendix

Table A. 1: The estimation process: random and fixed effects models. Arrivals and Total Poverty

	TOTAL POVERTY	
	Random Effects Model	Fixed Effects Model
ARRIVALS pc	–0.2369 (0.1507)	0.0986 (0.6154)
LGDP	–0.0978 (0.0770)	–0.0681 (0.1406)
POPGROWTH	0.0877 (0.0746)	0.1561 (0.2166)
URBANPOP	–0.4445* (0.2684)	–1.2093 (1.7189)
AGE15	–0.0565 (0.0683)	–0.1306 (0.1228)
SOCSTAB	0.0388 (0.0501)	–0.0126 (0.0671)
CONSTANT	1.3611*** (0.4796)	2.2844** (1.0742)
Breush-Pagan LM test	1.47	

F test , F(23, 282)		1.81***
Wooldridge test for autocorrelation in panel data, F(1, 23)		12.266***
Modified Wald test for group wise heteroskedasticity		1.60E+06***
Juhl and Sosa-Escudero LM test for heteroskedasticity		273.811***
Observations		312
Number of Departments		24

Robust standard errors in parentheses;*** p<0.01, ** p<0.05, * p<0.1
Source: Authors' elaboration based on INEI and Badatur data

Table A. 2: The estimation process: random and fixed effect models. Nights and Total Poverty

	TOTAL POVERTY	
	Random Effects Model	Fixed Effects Model
NIGHTS pc	–0.1520*** (0.0528)	–0.0661 (0.1093)
LGDP	–0.0788 (0.0747)	–0.0337 (0.1466)
POPGROWTH	0.0881 (0.0614)	0.1068 (0.2342)
URBANPOP	–0.5246*** (0.2497)	–0.9507 (1.6964)
AGE15	–0.0179 (0.0656)	–0.1321 (0.1224)
SOCSTAB	0.0469 (0.0491)	–0.0137 (0.0673)
CONSTANT	1.0579** (0.4653)	2.2361** (1.1041)
Breush-Pagan LM test	0.46	

F test , F(23, 279)		1.48*
Wooldridge test for autocorrelation in panel data, F(1, 23)		10.306***
Modified Wald test for group wise heteroskedasticity		3.0E+06***
Juhl and Sosa-Escudero LM test for heteroskedasticity		272.938***
Observations		309
Number of Departments		24

Robust standard errors in parentheses;*** p<0.01, ** p<0.05, * p<0.1
Source: Authors' elaboration based on INEI and Badatur data

Table A. 3: The estimation process: random and fixed effect models. Arrivals and Extreme Poverty

	EXTREME POVERTY	
	Random Effects Model	Fixed Effects Model
ARRIVALS pc	–0.1513**	0.1208
	(0.0726)	(0.2509)
LGDP	0.0379	0.0807
	(0.0393)	(0.0763)
POPGROWTH	0.0699**	0.0074
	(0.0337)	(0.0794)
URBANPOP	–0.5333***	–1.6264***
	(0.1172)	(0.5590)
AGE15	–0.0504**	–0.0667**
	(0.0230)	(0.0272)
SOCSTAB	0.0096	0.0087
	(0.0118)	(0.0125)

CONSTANT	0.8990 (0.1628)	1.6183*** (0.3481)
Breush-Pagan LM test	112.41***	
F test , F(23, 114)		13.84***
Wooldridge test for autocorrelation in panel data, F(1, 23)		32.454***
Modified Wald test for group wise heteroskedasticity		4582.75***
Juhl and Sosa-Escudero LM test for heteroskedasticity		192.09***
Observations		144
Number of Departments		24

Robust standard errors in parentheses;*** p<0.01, ** p<0.05, * p<0.1
Source: Authors' elaboration based on INEI and Badatur data

Table A. 4: The estimation process: random and fixed effect models. Nights and Extreme Poverty

	EXTREME POVERTY	
	Random Effects Model	Fixed Effects Model
NIGHTS pc	–0.0460** (0.0206)	0.0359 (0.0427)
LGDP	0.0332 (0.0391)	0.1050 (0.0711)
POPGROWTH	0.0347 (0.0281)	0.0569 (0.0963)
URBANPOP	–0.4964*** (0.1172)	–1.8327*** (0.6193)
AGE15	–0.0519** (0.0229)	–0.0663** (0.0271)
SOCSTAB	0.0099	0.0080

	(0.0117)	(0.0125)
CONSTANT	0.9156*** (0.1613)	1.6661*** (0.3486)
Breush-Pagan LM test	125.13***	
F test , F(23, 114)		14.64***
Wooldridge test for autocorrelation in panel data, F(1, 23)		33.362***
Modified Wald test for group wise heteroskedasticity		6157.83***
Juhl and Sosa-Escudero LM test for heteroskedasticity		186.669***
Observations		144
Number of Departments		24

Robust standard errors in parentheses;*** p<0.01, ** p<0.05, * p<0.1
Source: Authors' elaboration based on INEI and Badatur data

Tables

Table 1: Principal tourism resources and other data by Department

DEPARTMENT	TOTAL POVERTY RATE (%) 2013	EXTREME POVERTY RATE (%) 2009	GINI INDEX 2013-2001	AVERAGE SCHOOLING YEARS 2013	CAPACITY MEETING REGULATIONS (%) 2013	ASPHALTED ROADS(%) 2013	STRATEGIC PLAN FOR TOURISM	PRINCIPAL TOURISM RESOURCES
Amazonas	47.3	24.99	-0.01	8.3	25.9	3.0	NO	Pre-Hispanic archaeology: Kuélap Fort Marañón River valley
Áncash	23.5	8.21	0.01	9.5	43.4	6.3	NO	Pre-Hispanic archaeology: Chavín de Huántar Huascarán National Park; Cordillera Negra and Cordillera Blanca mountain ranges
Apurímac	42.8	40.32	-0.04	9.2	8.1	2.9	NO	Pre-Hispanic archaeology: Saywite Apurímac canyon Intangible heritage: traditional fiestas and celebrations
Arequipa	9.1	4.08	-0.04	10.8	49.0	9.4	YES	Colonial architecture (UNESCO World Heritage Site) Colca canyon; Cotahuasi canyon and Misti, Ampato and Sabancaya volcanoes
Ayacucho	51.9	26.21	0.05	9.1	16.6	3.6	YES	Pre-Hispanic archaeology: Vilcashuamán-Intihuatana Colonial architecture Pampa Galeras protected nature area
Cajamarca	52.9	24.91	0.05	8.3	30.4	6.1	NO	Pre-Hispanic archaeology: the aqueducts of Cumbemayo; the Kunturwasi complex; Cuarto del Rescate (the Ransom Room) and Ventanillas de Otuzco (the Small Windows of Otuzco)
Cuzco	20.74	18.8	0.00	9.7	33.8	6.8	YES	Pre-Hispanic archaeology: Machu Picchu shrine; Lost City of the Incas; Ollantaytambo; Tambomachay and Sacsayhuamán Colonial architecture Intangible heritage: customs and festivities
Huancavelica	46.78	46.6	-0.03	8.5	4.2	2.8	NO	Colonial architecture

Huánuco	40.1	32.63	0.06	8.7	26.5	2.8	NO	Pre-Hispanic archaeology: Templo de las Manos Cruzadas (Temple of the Crossed Hands) in Kotosh; Inca Seat of Government in Huánuco Pampa Tingo María National Park La Bella Durmiente (Sleeping Beauty) mountain range
Ica	4.7	0.42	-0.10	10.8	52.8	3.5	NO	Pre-Hispanic archaeology: the Nazca Lines Colonial architecture Paracas Nature Reserve Traditional taverns
Junín	19.5	10.01	-0.02	10.0	11.1	5.8	YES	Colonial architecture: Tarma Junín National Reserve Intangible heritage: Andean and jungle-dwelling communities maintaining ancient ways of life
La Libertad	29.5	12.89	0.00	9.6	52.8	3.9	NO	Pre-Hispanic archaeology: La Huaca del Sol y la Luna (the Temple of the Sun and the Moon); El Brujo and Chan Chan (UNESCO World Heritage Site) Colonial architecture Huanchaco beach resort and Totora ponies
Lambayeque	24.7	6.54	-0.03	9.7	64.5	3.4	YES	Pre-Hispanic archaeology: Batán Grande pyramid complex; Sipán/Huaca Rajada and Túcume Colonial architecture
Lima-Callao	13.1	0.73	-0.04	11.0	22.4	7.2	YES	Pre-Hispanic archaeology: Caral and Pachacamac Colonial architecture Lachay National Reserve Intangible heritage: festivities
Loreto	37.4	27.29	0.03	9.0	18.3	0.8	YES	Colonial architecture: Casa de Fierro (the Iron House) designed by Eiffel Pacaya Samiria protected nature area
Madre de Dios	3.8	1.75	0.04	9.9	8.3	2.0	NO	Tambopata-Candamo National Reserve El Manu Biosphere Reserve
Moquegua	8.7	3.70	0.00	10.6	26.9	3.2	NO	Colonial architecture Vineyards (pisco)
Pasco	46.6	23.95	0.00	9.9	12.1	1.5	NO	Bosque de Piedras de Hauyllay National Park Yanachaga-Chemillén National Park
Piura	35.1	9.62	-0.02	9.3	21.1	6.9	YES	El Angolo hunting reserve (biosphere reserve) Cerros de Amotape (biosphere reserve)

Puno	32.4	25.91	0.01	9.7	29.2	8.7	NO	Pre-Hispanic archaeology: Sillustani and Kalasasaya Religious and colonial architecture Titicaca National Reserve
San Martín	30	12.01	0.05	8.7	15.8	3.9	NO	Pre-Hispanic archaeology: Gran Pajatén stone complex Abiseo River National Park
Tacna	11.8	1.59	-0.02	10.7	33.3	3.4	NO	Prehistoric remains: Miculla petroglyphs and Toquepala rock paintings Hot springs
Tumbes	12.7	3.73	-0.05	9.7	34.0	1.1	YES	Beaches: Punta Sal; Punta Mero and Zorritos Los Manglares national shrine Amotape National Park Tumbes Reserve
Ucayali	13.4	8.51	-0.12	9.3	12.6	1.1	NO	Collpa de las Aves Prensoras (natural gathering site for parrots)

Source: Authors' elaboration based on INEI and Peruvian Institute of Economics data and MINCETUR (2001).

Table 2: Descriptive statistics

Variable		Mean	Std. Dev.
TOTAL POVERTY	Overall	0.4687	0.4192
	Between		0.2202
	Within		0.3594
EXTREME POVERTY	Overall	0.1965	0.1603
	Between		0.1561
	Within		0.0467
ARRIVALSpc	Overall	0.3910	0.2689
	Between		0.2698
	Within		0.0483
NIGHTSpc	Overall	0.8965336	0.6865047
	Between		0.542265
	Within		0.4565131
LGDPpc[a]	Overall	1.3946	0.5388
	Between		0.5003
	Within		0.2227
POPGROWTH	Overall	1.1966	0.5439
	Between		0.5319
	Within		0.1546

URBANPOP	Overall	0.6116	0.2164
	Between		0.2089
	Within		0.0705
AGE15	Overall	9.1476	0.9324
	Between		0.8778
	Within		0.3584
SOCSTAB	Overall	0.6194	0.4862
	Between		0.3643
	Within		0.3299

[a]Note that the variable GDP is in logarithms in order to provide a clearer interpretation of its estimated coefficient in terms of percentages.
Source: Authors' elaboration based on INEI and Badatur data

Table 3: FGLS models for Total Poverty

	ARRIVALS MODEL[a]	NIGHTS MODEL[a]
ARRIVALS pc	–0.1960*** (0.0622)	
NIGHTS pc		–0.1317*** (0.0162)
LGDP pc	–0.0290* (0.0159)	–0.0277** (0.0148)
POPGROWTH	0.0918*** (0.0293)	0.0643*** (0.0205)
URBANPOP	–0.3727*** (0.0872)	–0.3674** (0.0718)
AGE15	–0.0907*** (0.0164)	–0.0660*** (0.0148)
SOCSTAB	–0.0023 (0.0075)	–0.0045 (0.0073)
CONSTANT	1.5145*** (0.1192)	1.3462*** (0.1068)
Wald Test	379.11***	645.76***
Hansen J. Test	0.482 p-val=0.4875	0.519 p-val=0.4713
Observations	312	309
Number of Departments	24	24

[a]Robust standard errors in parentheses;*** p<0.01, ** p<0.05, * p<0.1
Source: Authors'elaboration based on INEI and Badatur data

Table 4: FGLS models for Extreme Poverty

	ARRIVALS MODEL[a]	NIGHTS MODEL[a]
ARRIVALS pc	–0.1119*** (0.0289)	
NIGHTS pc		–0.0329*** (0.0144)
LGDP pc	0.0266 (0.0166)	0.0206 (0.0191)
POPGROWTH	0.0194 (0.0135)	0.0088 (0.0141)
URBANPOP	–0.4771*** (0.0550)	–0.5041*** (0.0581)
AGE15	–0.0285*** (0.0109)	–0.0228* (0.0131)
SOCSTAB	0.0011 (0.0050)	0.0023 (0.0063)
CONSTANT	0.7192*** (0.0743)	0.6845*** (0.0888)
Wald Test	382.18***	357.02***
Hansen J. Test	0.717 p-val=0.3972	0.325 p-val=0.5689
Observations	144	144
Number of Departments	24	24

[a]Robust standard errors in parentheses;*** p<0.01, ** p<0.05, * p<0.1

Source: Authors'elaboration based on INEI and Badatur data