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Porto, Natalia
Espinola, Natalia
Carella, Laura

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Natalia Porto¹, Natalia Espinola² and Laura Carella³

Work in progress

Abstract

It has been widely recognized that tourism plays a crucial role both as an income generator and as a source of employment, thus contributing to economic growth and development of many countries around the world. While its impact at local, regional and national level of employment is undoubted and has been broadly documented, there is a line of research that has pointed out that jobs in tourism sector have less favorable working conditions than other sectors and, also, they could have negative effects on income distribution. Another interesting feature that could be also related to income distribution is the regional endowment of touristic amenities. Both natural and built amenities directly affect tourism activities, thus having a strong impact on income generation of tourism. Considering these two facts, it is possible that the allocation and distribution of amenities in a country could generate regional disparities in income distribution due to tourism. The aim of this study is to explore regional inequalities in wages and its relationship with the development of tourism in Uruguay. We estimate a spatial error model using a balanced panel data set from 2006 to 2019 on 19 Uruguayan departments. We built four indices of touristic amenities (land-based natural amenities, water-based natural amenities, cultural-historical amenities, and recreational amenities) and then interact them with tourism employment, as a proxy for tourism development. The evidence suggests that there are some regional disparities in income distribution in tourism sector. Also, some specifications of the econometric models show a positive relationship between employment in activities related to tourism and inequality in labor income, and that the departments with cultural-historical amenities tend to have a more equalitarian distribution of labor income.

Resumen

Ha sido ampliamente reconocido el rol clave que juega el turismo en la generación de ingresos y de fuentes de trabajo, contribuyendo de ese modo al crecimiento económico y desarrollo de numerosos países alrededor del mundo. Mientras su impacto sobre el nivel de empleo local, regional y nacional es

¹ Instituto de Investigaciones Económicas, Universidad Nacional de La Plata (UNLP),
natalia.porto@econo.unlp.edu.ar

² Departamento de Turismo, Universidad Nacional de La Plata (UNLP),
natalia.espinola@econo.unlp.edu.ar

³ Instituto de Investigaciones Económicas, Universidad Nacional de La Plata (UNLP),
laura.carella@econo.unlp.edu.ar

indudable y ha sido extensamente documentado, una línea de investigación ha subrayado que los empleos en el sector turismo tienen condiciones laborales más desfavorables que otros sectores y eso podría tener efectos negativos sobre la distribución del ingreso. Otro aspecto que podría estar relacionado con la distribución del ingreso es la dotación regional de amenidades turísticas. Tanto las amenidades naturales como las construidas afectan directamente a las actividades turísticas, teniendo en consecuencia un fuerte impacto en la generación de ingresos del turismo. Considerando estos dos hechos, es posible que la asignación y distribución de amenidades dentro de un país genere disparidades regionales en la distribución del ingreso debido al turismo. El objetivo de este trabajo es explorar las desigualdades regionales en los salarios y su relación con el desarrollo del turismo en Uruguay. Se estima un modelo de error espacial utilizando un conjunto de datos de panel balanceado de 19 departamentos de Uruguay, desde 2006 hasta 2019. Se construyeron cuatro índices de amenidades turísticas (amenidades naturales terrestres, amenidades naturales basadas en el agua, amenidades histórico-culturales y amenidades recreativas) y se computó su interacción con el empleo turístico, como un indicador del desarrollo turístico. La evidencia sugiere que existen algunas disparidades regionales en la distribución del ingreso en el sector turismo. Adicionalmente, algunas especificaciones del modelo econométrico muestran una relación positiva entre el empleo en actividades relacionadas con el turismo y la desigualdad de ingresos laborales y que los departamentos con amenidades histórico-culturales tienden a tener una distribución de ingresos laborales más igualitaria.

Keywords: amenity-led development, income distribution, regional development, spatial econometrics, tourism-related employment, tourism development

JEL: R1, L8, J4

1. Introduction

It has been widely recognized that tourism plays a crucial role both as an income generator and as a source of employment, thus contributing to economic growth and development of many countries around the world. According to the World Travel and Tourism Council (2020), travel and tourism sector generated 8.9 trillion US dollars (representing 10.3% of the world's GDP) and 330 million jobs (10% of total employment) for the world economy in 2019. In Uruguay, the sector represented 16.4% of GDP and generated 16.3% of national employment, reaching contributions above the regional average and of countries such as Chile, Brazil and Argentina (World Travel and Tourism Council, 2020). In addition, tourism income represented 16.9% of total Uruguayan exports in 2019, the most significant percentage of the region, making it a country specialized in tourism (World Travel and Tourism Council, 2020).

In this context, some relevant questions emerge. How the employment and income generated by the tourism sector is distributed? Is it distributed equally? Is there a geographical concentration of tourism incomes? It is recognized that tourism, if managed well, can be an important channel through which sustainable development can be achieved.

In Uruguay, tourism activity is highly concentrated in some areas. Considering data from 2000 to 2018, more than 56% of international tourists have travelled to Punta del Este in the East region (24.7%) and Montevideo in the Metropolitan region (31.4%). Moreover, between 2002 and 2008, these two locations have concentrated more than 60% of international tourists, reaching almost 69% in 2007. If we consider domestic tourism, East and Metropolitan region were also the main destinies of domestic travelers in 2018, with a share of 38.5% and 34%, respectively (Ministry of Tourism, 2019). These two regions also exhibit the highest shares of tourism employment on total region employment. This share is particularly high for the case of East region (16% of employment corresponding to tourism employment), followed by Metropolitan region with a share of 6.6%, and compared to 6.5% considering the whole country (Ministry of Tourism, 2019).

Several studies have argued that the tourism sector is mainly characterized by jobs that require relatively low levels of schooling, little skills, and exhibit unfavorable conditions such as higher levels of informality, short average tenure and with lower relative wages as compared to the local economy's average (Ashworth, 1992; Lee & Kang, 1998; Delfim Santos & Varejão, 2007; Blake et al., 2008; Muñoz-Bullón, 2009; Espinola, 2016). Although these features might negatively affect the average level of regional or local wages and income, results from the literature are not conclusive. While some authors have shown that tourism development enhances income inequality, others found that the tourism development contributes to regional economic convergence (Li et. Al, 2016).

At the same time, both natural and built amenities directly affect tourism activities, thus having an impact on income and employment (Marcouiller et al., 2004; Porto & Espinola, 2019; Roback, 1988; 1982). Again, empirical evidence about the impact of these resources on income distribution is ambiguous. Although amenities play a key role as inputs in the tourism industry, the jobs in this sector are also related to more disadvantaged labor conditions than other sectors, as previously mentioned. Conversely, it has also been argued that natural amenities constitute an attraction for certain type of migrants that tends to increase incomes in the region. Also, natural amenities are believed to anchor cities (or neighborhoods) to high income over time and to exhibit a persistent spatial distribution of income. Considering these two facts, it

is possible that the allocation and distribution of amenities in a country could generate regional disparities in income distribution due to tourism.

The aim of this study is to explore regional inequalities in wages and its relationship with the development of tourism in Uruguay. Employing a methodology previously applied for the case of Argentina (Porto & Espinola, 2019), we build touristic amenities indices and we incorporate them into a spatial econometric model to account for this relationship. The structure of the paper is as follows. Section 2 presents a brief review of the literature. Section 3 includes a characterization of employment in tourism based in summary statistics of variables at individual level and presents the methodology to explore the relation between a departmental endowment of touristic amenities and income distribution in the tourism sector. Section 4 presents the results and Section 5 concludes.

2. Literature review

Several studies have shown that the tourism sector is characterized by jobs that require relatively low levels of schooling, little skills, short average tenure, have a high rate of informality, and with lower relative wages as compared to the local economy's average (Ashworth, 1992; Lee & Kang, 1998; Delfim Santos & Varejão, 2007; Blake et al., 2008; Muñoz-Bullón, 2009; Nyaruwata & Tendayi Nyaruwata, 2013; Espinola, 2016). As these features negatively affect the average level of regional or local wages and income, a higher or a lesser dependence of a region on tourism activities, could generate income inequality both between and within regions of a country.

Alam & Paramati (2016) investigated the impact of tourism on income inequality in 49 developing economies around the world and found that tourism significantly increases income inequality. Göymen (2000) and Seckelmann (2002) also found that regional inequality in Turkey is also increased by tourism, since most investments and public policies are focused there. Similarly, Carrascal Incera & Fernández (2015) showed that tourism consumption contributed to income inequality in some regions of Spain by benefiting high-income households more than low-income ones.

Other authors found evidence of a positive effect of tourism on income distribution. Lee & Kang (1998) found that tourism generates a moderately equal distribution of earnings in South Korea, and Marcoullier & Xia (2008) arrived to similar conclusions for the United States. Li et al (2016) also found that the tourism development contributes to regional economic convergence in China, through a spatiotemporal model.

In addition, literature has focused on the role of a region's endowment of amenities in income distribution. Both natural and built amenities directly affect tourism activities, thus having a strong impact on income generation of tourism (Marcoullier et al., 2004; Roback, 1988; 1982). However, there are different theories about the impact of touristic amenities on income distribution (Goe & Green, 2005; Kuentzel & Ramaswamy, 2005). Although amenities play a key role as inputs in the tourism industry, the unfavorable conditions of jobs in this sector might lead to enlarged inequalities. Conversely, it has also been argued that natural amenities provide an attraction for amenity-based migrants, many of whom are highly educated, mobile, and dependent on technology, which is more likely to be related to higher incomes, thus offsetting this negative effect. Also, natural amenities—when they are persistent—are believed

to anchor cities (or neighborhoods) to high income over time and to exhibit a persistent spatial distribution of income (Lee & Lin, 2017). The determinant role of natural amenities in income distribution was also assessed by other studies (English et al., 2000; Lee & O'Leary, 2008; Marcouiller et al., 2004; Reeder & Brown, 2005).

Examining lake states in United States, Marcouiller et al. (2004) found that certain types of amenities (mainly, water-based amenities) are associated to a more equal income distribution. Based in nonmetropolitan counties of the United States, Lee & O'Leary (2008) found that income inequality was positively related to benefits in the recreation and tourism industry, while English et al. (2000) showed that recreation-and tourism dependent counties have higher average income, lower economic diversity, and higher household costs, as compared to other counties in the region. On the contrary, Gunderson & Ng (2005) found that the average per capita income in tourism dependent counties is lower than in non-tourism-dependent counties. Other recent studies have emphasized the role of amenities –mainly natural amenities with nature-based tourism supply (Fredman et al., 2012; Margaryan & Fredman, 2017; Mollard & Vollet, 2015).

Porto & Espinola (2019) is the only study that explores the relationship between tourism employment, income distribution and endowment of amenities for a country in Latin America. From data of 29 urban agglomerates in Argentina during the period 2004–2015, this study examines the impact of touristic amenities in wages inequality. Results suggest that labor income distribution depends on the natural resources endowment, as well as the development of tourism in the agglomerates. The study seeks to open the debate on the need to develop indicators on the resource endowment of the countries, as well as to deepen the analysis of the relationship between tourism development and regional economic development, for the development and targeting of tourism policies in Latin American countries. This study is the starting point from which the present article is developed.

3. Data

This section exhibits a descriptive analysis of tourism sector with the aim of exploring the sociodemographic and economic characteristics as well as working conditions of the workers in the tourism sector compared to the workers in the non-tourism sector. The definition of tourism sector employment is based in a supply approach. We define the sensitive tourism employment as that of any establishment whose primary economic activity is any of the following: 1) accommodation services, 2) restaurants, 3) passengers' transport services, 4) travel agencies and complementary touristic support services and 5) entertainment, cultural and sport services (Espinola, 2016; Porto & Espinola, 2019 and United Nations & UNWTO, 2010). For the econometric estimations, transport services were not included in the definition of tourism employment. The reason is that, for year prior to 2012, activities in the survey were classified following ISIC Revision 3, which does not allow for distinguishing between passengers' and freight transport. Although we could have chosen to restrict the sample to years 2012 on, that would have resulted in an extremely low number of observations for the estimations. The non-tourism sector includes all economic activities of services not related to tourism.

We use data from the Continuous Household Survey (Encuesta Continua de Hogares, ECH, Spanish acronym) conducted by the National Institute of Statistics of Uruguay. This database includes cross-sectional information on sociodemographic, labor and geographical variables over an extensive period. It provides the official labor market and household income indicators of the country and it is also used to estimate poverty indexes. The study covers years 2006 to 2019. The survey has national coverage since 2006, thus allowing for the spatial analysis to cover both urban and rural departments.

Table 1 shows the average characteristics of workers by sector, tourism sector, non- tourism service sector, rest of the economy (including primary and secondary sector) and overall economy for the year 2019.

Table 1. *Main labor and socio-economic characteristics, by employment sector, 2019.*

	Employment				Mean diff.
	Tourism	Non Tourism	Rest of Economy	Total	(T-NT)
Age	39,96	41,52	41,88	41,53	-1,56**
Years of education	10,36	11,67	8,98	10,65	-1,32**
Maximum educational level (%)					
Until primary complete	13,48	13,06	33,08	19,78	0,42
Secondary uncompleted	51,53	36,36	44,93	40,63	15,17**
Secondary complete	21,57	19,30	12,22	17,14	2,27**
Superior uncompleted	7,09	7,97	4,38	6,65	-0,88
Superior complete	6,33	23,31	5,35	15,79	-16,98**
Informality (%)	23,30	14,77	33,71	22,24	8,53**
Monthly labor income ⁽¹⁾	13910,09	16302,34	13930,69	15285,56	-2392,26**
Weekly hours of work	39,42	37,44	39,53	38,24	1,98**
Hourly wage ⁽¹⁾	86,63	106,34	82,44	96,65	-19,71**
Part time employment (%)	15,57	14,95	14,55	14,95	0,63
Size of firm (%)					
< 10 employees	48,34	40,26	58,49	47,47	8,08**
Between 10 and 50 employees	17,78	13,34	14,75	14,15	4,43**
> 50 employees	33,88	46,40	26,76	38,39	-12,51**
Occupational qualification (%)					
Professional	8,63	23,10	4,36	15,50	-14,46**
Technician	7,58	10,07	4,21	7,83	-2,49**
Operator	70,34	52,07	68,29	59,47	18,27**
Unskilled	13,45	14,77	23,14	17,20	-1,32
Share of women (%)	40,40	56,17	26,13	44,26	
Number of obs.	3468	26176	14875	44519	
Share of employed (%)	8,07	58,95	32,98	100,00	

⁽¹⁾ Monthly income and hourly wages from mean activity in LCU at prices of 2010.

* significant at 5%; ** significant at 1%.

Source: Own calculations based on SEDLAC (CEDLAS and the World Bank) and ECH 2019.

Tourism sector accounts for around 8% of total employment while non-tourism services' employment represents about 59% of those employed in the economy. Regarding socio-

economic characteristics, workers in tourism sector are on average younger than workers of non-tourism sector –the difference is close to a year and a half. Also, they have less years of formal education (more than one year of difference) and more than half of workers in the sector (51.5%) have secondary uncompleted as their maximum educational level achieved while in the non-tourism sector this share is about 36.4%, with more than 23% of workers with superior complete, against 6.3% in the tourism sector. These characteristic patterns remain when tourism is compared to the economy as a whole and are also in line with international evidence (Delfim Santos & Varejão, 2007 for the case of Portugal; Muñoz-Bullón, 2009 for Spain and Espinola, 2016 for Argentina).

Regarding labor conditions, tourism sector also shows a more disadvantaged environment than the non-tourism one, since it exhibits higher informality rates,⁴ lower monthly income and hourly wages, and more weekly hours of work. Also, the share of part time employment is higher –although the difference is less one percent point- and is more concentrated in small firms. If we consider occupational qualification, the results are consistent with those related to education. More than 70% of workers in tourism perform tasks as operators or unskilled workers. This proportion lowers to 52.1% for the non-tourism sector and 59.5% for total economy.⁵

This characterization broadly remains for each year from 2006 to 2019 and supports the hypothesis that employment in tourism sector entails unfavorable working conditions and lower levels of income. As regions that mainly rely on tourism activities may be negatively affected by this, it is interesting to explore whether there are spatial differences in incomes than can be related to location characteristics.

Tourism development and spatial analysis

Tourism development is measured through the regional endowment of amenities. Amenities are a key input for tourism production, generation of employment, and income. Following Porto & Espinola (2019), we compute four indices of touristic amenities for each department: land-based natural amenities, water-based natural amenities, cultural-historical amenities, and recreational amenities –which were selected based on specialized literature (Deller et al., 2001; English et al., 2000; Marcouiller et al., 2004). These indices were computed as an arithmetic average of a set of standardized variables in order to homogenize and group them. These variables were built from a comprehensive search of data in national, regional and local sources, both governmental –such as the National Institute of Statistics, Ministry of Tourism, Ministry of Agriculture, Livestock and Fishing, Ministry of Culture and Education, Ministry of Environment, Uruguayan Institute of Meteorology, among others- and non-governmental ones - Uruguayan

⁴ A worker is considered informal if (s)he does not have the right to a pension when retired.

⁵ Occupational qualification was classified in those four categories, following Espinola (2016), who studies the Argentinian case, with the aim of being able to perform a comparative analysis between both countries in a future step of this research. However, Argentinian and Uruguayan household surveys use different classification of occupations. While Uruguay adopts ISCO-08 codification, Argentina relies on its own National Classification of Occupations (CNO). This national taxonomy explicitly identifies these four categories, but the same does not occur with the ISCO codification. Thus, for this article, we followed a criterion based on Ospino Hernandez (2018), and thus we defined these four categories by assuming a correspondence between main ISCO groups and the skills required for each of them. As a result, we classified groups 1 and 2 as professional, group 3 as technician, groups 4 to 8 as operators and group 9 as unskilled.

Football Association and touristic and local websites such as “Portales del Uruguay”, “WelcomeUruguay.com”, “Montevideo Portal”, among others. A detailed description of how indices were computed can be found in Porto & Espinola (2019).

Tourist amenities and income distribution

Income inequality is measured by the Gini index, which takes values between 0 (perfect equality) and 1 (perfect inequality). It is important to note that the index is not affected by changes in scale which implies, for example, that a lower (higher) observed inequality in one department as compared to a second would not respond to a relative situation of lower (higher) average labor income in the first department, but to a condition of lower (higher) relative inequality per se.

Table 2 reports Moran's Index for the Gini coefficient and touristic amenities indices. Moran's Index evaluates spatial autocorrelation based on both feature locations and feature values, simultaneously. Given a set of features and an associated attribute, it evaluates whether the pattern expressed is clustered, dispersed, or random. If the index takes positive values, it implies positive spatial autocorrelation, since each observation value and their neighboring values are similar. On the opposite, if it takes a negative value, it implies negative spatial autocorrelation. The table also reports Geary's Contrast, which is another measure of spatial autocorrelation, like Moran's Index, but its value varies in a different range. Experimental simulations have shown that both measures usually conclude the same (Griffith, 1987).

Table 2 shows that, for the Gini Index, the null hypothesis of the Moran's Index cannot be rejected. That is, the evidence does not reject the hypothesis that there is no spatial autocorrelation in income inequality. In other words, evidence is consistent with an income distribution that is not spatially correlated. The same conclusion emerges from Geary's test.

In contrast, both indices suggest spatial autocorrelation in the endowment of amenities. For water-based and cultural-historical amenities, the association is positive -meaning that if a geographical unit has a high level and distribution of this type of amenities, its neighbors will also have a high level and distribution of them- while for land-based and recreational amenities the autocorrelation is negative, meaning that if a region has a high level and distribution of this attribute, its neighbors will have a low level of it.

Table 2. *Moran's Index for Gini coefficient and tourist amenities*

Variables	Moran's I	p-value	Geary's c	p-value
Gini Index	0.013	0.276	0.971	0.168
Land-based amenities	-0.091	0.000	0.893	0.003
Water-based amenities	0.085	0.000	0.847	0.000
Cultural-historical amenities	0.431	0.000	0.583	0.000
Recreational amenities	-0.107	0.000	1.106	0.000
Land-based amenities interacted with tourism employment	0.006	0.534	0.770	0.000
Water-based amenities interacted with tourism employment	0.013	0.270	0.928	0.044

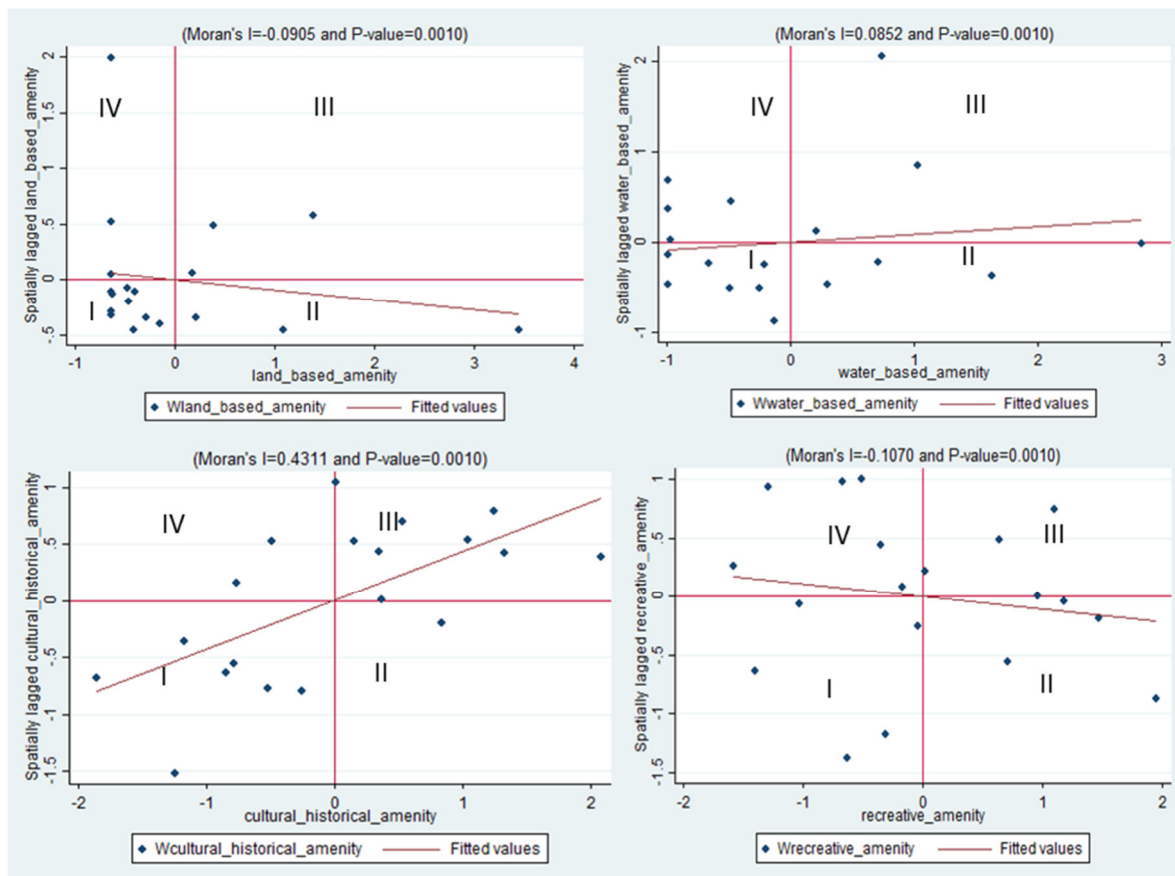
Cultural-historical amenities interacted with tourism employment	0.452	0.000	0.555	0.000
Recreational amenities interacted with tourism employment	-0.174	0.000	1.140	0.000

Source: Own calculations.

The pattern of regional distribution of touristic amenities can also be observed in Figure 1, which shows Moran scatter plot (Anselin, 1995) for amenities. This plot is based in Moran's Index and degree of linear association between the value of a variable x in the spatial unit i and the spatially weighted mean of the neighboring values of variable x , W_x (or spatial lag) (Anselin & Bera, 1998). The Moran scatter plot can be divided into four quadrants to indicate different types of spatial association. Quadrants I and III represent positive spatial association because low–low and high–high values are associated, respectively. Quadrants II and IV indicate negative spatial association because high–low and low– high values are associated, respectively.

These estimates support the hypothesis that the amenities are not randomly located, but they could present a spatial association, suggesting that the use of a SEM may be accurate.

Figure 1. Moran scatter plot for types of amenities



Source: Own elaboration.

Finally, we also present the geographical pattern of income distribution, employment rates in tourism and the main type of touristic resources (Figure 2, 3 and 4). Although there are not

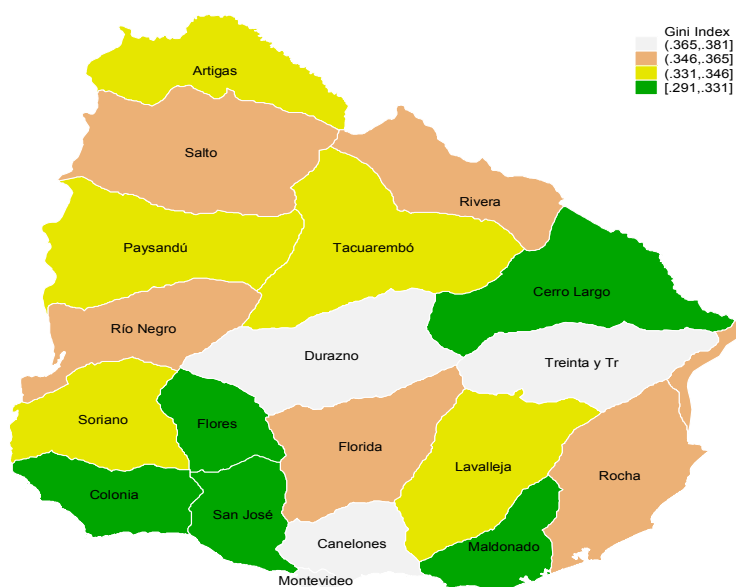
clearly delimited regions with high or low values of income inequality, the area formed by Colonia, Flores and San José exhibit lower levels of income inequality as compared with the rest of the country. Also, Maldonado shows lesser inequality levels than other departments. On the opposite, departments in the interior regions (Durazno, Treinta y Tres, and Canelones) exhibit the highest levels of income inequality in Uruguay (Figure 2).

With respect to tourism employment rates (Figure 3), a slightly clearer pattern can be distinguished. Southern-east departments such as Maldonado, Rocha, Cerro Largo, Lavalleja and Treinta y Tres hold the higher employment rates.

Figure 4 shows the main type of amenities in each department. A region constituted by Salto, Paysandú and Tacuarembó is mainly characterized by having recreational amenities, while we can also perceive a “cultural” region in the area of Durazno, Florida and Lavalleja, and also in Soriano and Colonia.⁶

If we consider these spatial patterns, at first glance we might conjecture that there is a positive link between income inequality and tourism employment -for instance, in Treinta y Tres and Montevideo and less remarked in Salto and Rocha. Since Treinta y Tres and Rocha are mainly characterized as having water-based amenities, while Montevideo and Salto have mostly recreational amenities, this could be an indication of a positive effect of these type of amenities on income inequality.

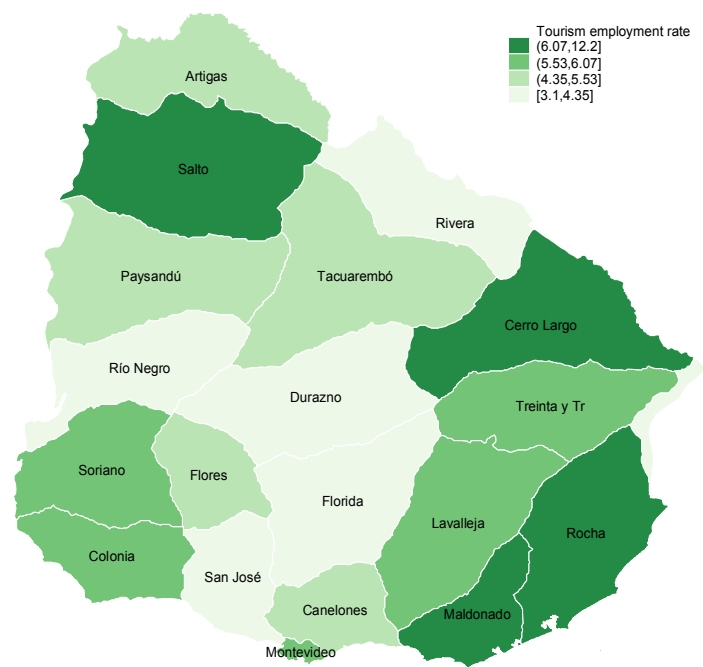
Figure 2. *Average Gini Index per department in Uruguay. Year 2019*



Source: Own elaboration.

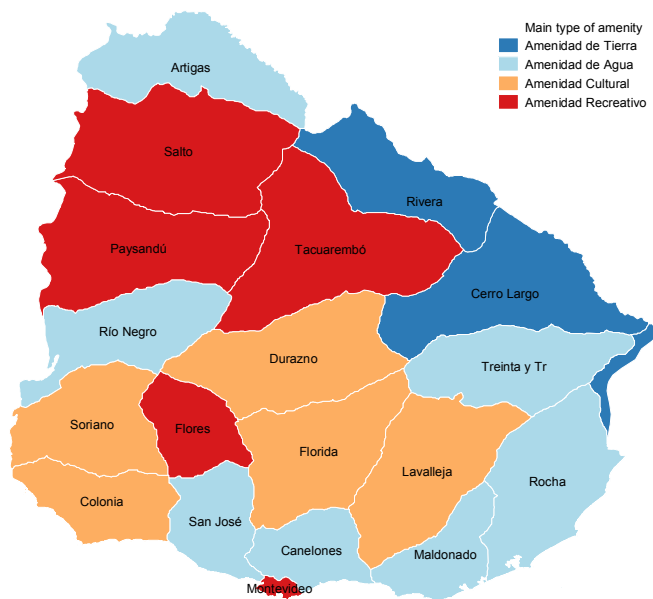
⁶ Although this might seem contrary to Moran's index, which evidenced the presence of negative autocorrelation for this type of amenity, it might be due to the distance of this area to Flores and Montevideo, where also main amenities are recreational.

Figure 3. *Tourism employment rate per department in Uruguay. Year 2019*



Source: Own elaboration.

Figure 4. *Main type of amenity per department in Uruguay*



Source: Own elaboration.

4. Methodology

The descriptive analysis displayed in the preceding section put in evidence the existence of differences in labor conditions between tourism and non-tourism sector. The spatial analysis also suggested a possible association between income distribution and tourism employment and, more on, that this association might be related to the endowments of amenities in each region. As amenities are spatially correlated between departments, as was shown by Moran's index, it must be taken into account for the econometric estimation of this relationship.

We estimate a spatial error model (SEM) to explain the relationship between income labor inequality and tourism development. The equation to estimate is as follows:

$$Gini_{it} = \alpha + \beta_k X_{it}^k + \gamma_i + \delta_t + \mu_{it} \quad (1)$$

With

$$\mu_{it} = \lambda W u_{it} + \varepsilon_{it} \quad (2)$$

The dependent variable is $Gini_{it}$, which resumes labor income inequality measured by Gini index in department i in period t , where i is one of the 19 departments that compose Uruguay, and t represents a year in the period 2006-2019. Matrix X_{it}^k comprises a set of $(k - 1)$ supply-side determinants of wage inequality—such as personal, sociodemographic, and labor variables—and interactions terms of amenities with the share of tourism-sensitive employment (that is, employment in a set of predefined activities that are related to tourism sector), as a proxy for tourism development. β_k is the estimated coefficient of variable k , whereas γ_i and δ_t capture unobservable time-invariant departments effects (such as labor market policies, union presence, department size, and social and cultural characteristics) and unobservable temporal effects that are fixed or constant departments (e.g. national labor market policies, national juncture, outbreak, among others), respectively.

Each μ_{it} is an error term that can be spatially autocorrelated, due to the possible spatial autocorrelation of amenities variables included in the model. It is known that natural amenities attributes are, in general, not randomly located and they are usually clustered, so they should not be considered as random variables in classical models. In the presence of spatial autocorrelation, the ordinary least squares method is likely to underestimate the error term and it generates inefficient variance estimators, thus affecting hypothesis tests, with the consequent misinterpretation of results and incorrect policy implications (Anselin & Bera, 1998; Porto & Espinola, 2019).

The SEM allows for the possible spatial autocorrelation in the error term (Kim et al., 2005; Marcouiller et al., 2004). This is represented by equation (2), where ε_{it} is the uncorrelated error vector and it follows a $N(0, s^2)$, and the scalar λ is the spatial autoregressive coefficient to be estimated. An SEM includes a $(n \times n)$ positive and symmetric spatial weights matrix, W . The spatial weight matrix is often expressed as a first-order contiguity matrix for incorporating the values of variables in adjacent geographic areas. The elements w_{ij} of W are 1 when departments i and j are defined as neighbors and 0 when they are not neighbors.

The model is estimated through a fixed effects specification for panel data, since it involves a small number of groups -only 19, corresponding to departments in Uruguay.

5. Results

The estimation of the SEM is reported in Table 3. The first and second columns show the pooled OLS estimates and the fixed effects (FE) estimates of the model, respectively. The remaining columns present different specifications for the SEM estimates, including the interaction between tourism amenities and tourism employment. All specifications include socio-demographic variables as control.

The table also reports the estimate of spatial autoregressive coefficient (λ), which is statistically significant, that is, there is empirical evidence of the presence of spatial autocorrelation in the error terms. However, it has a negative sign, meaning that the residues of a department tend to be surrounded by neighbors with quite different residues. A similar counterintuitive result was also found by Porto & Espinola (2019) for the case of Argentina. Possible explanations for this finding might be the diverse patterns of spatial autocorrelation in the different types of amenities. It might also be due to the way in how amenities indices were computed.

The estimates weakly support the hypothesis that tourism employment is related to higher inequality in incomes. Although the estimated effects have the expected sign, they are not statistically significant, except for the SEM specifications (3) -including the interaction between cultural-historical amenities and the share of tourism employment- and (5) -including all interaction terms. For these specifications, estimated coefficients are positive and statistically significant at 10% confidence, giving some evidence of a positive relation between tourism employment and income inequality. As was previously discussed, this positive association may be related with the fact that jobs in tourism sector tend to be characterized by more unfavorable conditions.

If we consider the interaction between amenities and tourism employment, the full model (5) suggest that departments with cultural-historical amenities tend to have a more equalitarian distribution of labor hourly incomes at 10% confidence level. This result is also found in specification (3) of the SEM and the pooled OLS, although estimates may be biased since this specification does not consider the possible correlation between the error terms and regressors. The FE specification also shows an equalitarian effect for land-based amenities and an inequalitarian effect of water-based amenities. That is, departments for which the main amenities are land-based tend to exhibit lower levels of income inequality, while the opposite is true for water-based departments. These results are partly in line with those found by Porto & Espinola (2019) for the case of Argentina, in the sense that natural amenities are found to have some impact on income distribution while built amenities are not, but for that case, the role of water-based and land-based amenities are the opposite. The determinant role of natural amenities in income distribution was also remarked by previous studies (English et al., 2000; Lee & O'Leary, 2008; Marcouiller et al., 2004; Reeder & Brown, 2005).

Some relationships between income distribution and socioeconomic characteristics can be established. The share of men in employment has a negative effect on the inequality index, although this effect is statistically significant only in the FE estimation. Regarding workers age,

results suggest that, in general, when the share of elder workers is higher, income distribution is more equalitarian. Conversely, seniority is associated with higher levels of inequality. Higher inequality is also related to the share of informal, although the estimates are in general not statistically significant.

Table 3. *Estimation of the spatial error model*

VARIABLES	Dep. Var.: Labor hourly Income Inequality Index						
	Pooled OLS	FE	SEM				
			(1)	(2)	(3)	(4)	(5)
Tourism employment	0.274 (0.236)	0.365 (0.253)	0.221 (0.166)	0.244 (0.164)	0.317* (0.169)	0.260 (0.168)	0.305* (0.173)
Land-based amenities*tourism	-0.0437 (0.484)	-0.343** (0.154)	-0.103 (0.252)				-0.125 (0.266)
Water-based amenities*tourism	0.226 (0.383)	0.667** (0.273)		-0.178 (0.250)			0.0587 (0.291)
Cultural-historical amenities*tourism	-0.909*** (0.336)	-1.114 (0.666)			-0.563* (0.288)		-0.585* (0.328)
Recreational amenities*tourism	0.200 (0.543)	-0.730 (0.661)				-0.279 (0.419)	-0.0225 (0.455)
Variables Control							
Men	-0.120 (0.120)	-0.238* (0.127)	-0.0998 (0.108)	-0.0965 (0.107)	-0.0976 (0.107)	-0.0989 (0.107)	-0.104 (0.107)
p_edad_26_36_ag	-0.178 (0.145)	-0.296 (0.202)	-0.273** (0.110)	-0.271** (0.110)	-0.273** (0.110)	-0.276** (0.110)	-0.278** (0.111)
p_edad_36_50_ag	-0.243* (0.143)	-0.574*** (0.174)	-0.304*** (0.111)	-0.304*** (0.110)	-0.297*** (0.110)	-0.311*** (0.112)	-0.302*** (0.112)
p_edad_mas50_ag	-0.235 (0.159)	-0.437 (0.255)	-0.320** (0.131)	-0.325** (0.131)	-0.331** (0.131)	-0.323** (0.131)	-0.334** (0.131)
p_prii_ag	0.0147 (0.180)	1.061*** (0.203)	-0.0431 (0.142)	-0.0536 (0.143)	-0.0528 (0.142)	-0.0506 (0.143)	-0.0521 (0.143)
p_pric_ag	-0.122 (0.115)	0.267* (0.136)	-0.195* (0.101)	-0.197** (0.101)	-0.172* (0.101)	-0.193* (0.101)	-0.169* (0.101)
p_seci_ag	-0.201* (0.111)	0.0150 (0.130)	-0.243*** (0.0921)	-0.248*** (0.0920)	-0.250*** (0.0920)	-0.251*** (0.0925)	-0.248*** (0.0925)
p_secc_ag	-0.224* (0.129)	-0.408*** (0.128)	-0.202* (0.115)	-0.199* (0.115)	-0.211* (0.115)	-0.205* (0.115)	-0.218* (0.116)
antigua_ag	0.0154*** (0.00465)	0.0251*** (0.00696)	0.0158*** (0.00310)	0.0158*** (0.00309)	0.0170*** (0.00315)	0.0160*** (0.00312)	0.0171*** (0.00319)
p_informalidad_ag	-0.0203 (0.0726)	0.211** (0.0809)	0.0219 (0.0599)	0.0260 (0.0602)	0.0316 (0.0599)	0.0302 (0.0613)	0.0319 (0.0612)
Constant	0.762*** (0.193)	0.543** (0.196)					
Years	Yes						
Departments	Yes						
Observations	266	266	266	266	266	266	266
R-squared total	0.879	0.772	0.009	0.011	0.018	0.014	0.019
Number of id		19	19	19	19	19	19
lambda			-0.871*** (0.164)	-0.879*** (0.164)	-0.836*** (0.165)	-0.873*** (0.162)	-0.841*** (0.169)
sigma2_e			0.000307*** (2.85e-05)	0.000307*** (2.84e-05)	0.000305*** (2.82e-05)	0.000307*** (2.84e-05)	0.000305*** (2.83e-05)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

6. Discussion and concluding remarks

Throughout this article, we have shown some preliminary results of an ongoing research about regional inequalities in wages and its relationship with the development of tourism and resources endowment for the case of Uruguay in the period 2006-2019. Following the methodology applied by Porto & Espinola (2019) for the case of Argentina, we built four indices of touristic amenities and then we incorporated them into estimations as a proxy for tourism development of Uruguayan departments.

The descriptive analysis revealed existing differences in labor conditions between tourism and non-tourism sector. The spatial analysis also suggested a possible association between income distribution and tourism employment and, more on, that this association might be related to the endowments of amenities in each region.

Although estimates are preliminary, some empirical association might be established. The econometric estimates did not strongly support the hypothesis of a positive relationship between tourism employment and wage inequality, though evidence was found for some specifications. This result contrasts with those found by Porto & Espinola (2019) for the case of Argentina, where all specifications showed empirical evidence of the association between both variables.

With respect to touristic amenities, the evidence suggests that departments with cultural-historical amenities tend to have a more equalitarian distribution of labor hourly incomes. FE model also shown an equalitarian effect for land-based amenities and an inequalitarian effect of water-based amenities. In other words, departments for which the main amenities are land-based type tend to exhibit lower levels of income inequality, while the opposite is true for water-based departments. These results coincide with those documented by Espinola & Porto (2019) for the case of Argentina in the fact that natural amenities have some impact on income distribution while built amenities are not. However, for that case, the role of water-based and land-based amenities are the opposite. One possible explanation for the differences between findings in both studies is that the household survey of Argentina only covers urban areas, while the ECH of Uruguay has national coverage in the period under analysis. Hence, the representativeness of data is not the same in each case, with the corresponding effect on the estimations.

One interesting extension in our analysis is to consider an alternative measure of tourism development taking into account the regional distribution of international and domestic tourists along the territory. It might be likely that departments with a higher share of tourism tend to have higher levels of income, yielding in a higher inequality between regions. It could also be thought as a proxy for amenities. Next research agenda considers incorporating this type of indicators into estimations.

Another extension of the study will be to analyze the possibility of improving amenity rates, adding more variables to detect the particularities of each department.

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