



Tourism and housing prices in Santa Marta, Colombia: Spatial determinants and interactions



Nestor Garza^{a,*}, Maria Carolina Ovalle^b

^a California State University Dominguez Hills and Universidad del Norte, Colombia

^b Universidad del Norte, Colombia

ARTICLE INFO

Keywords:

Latin America
Tourism
Real estate
Urban geography
Quantile regression
Globalization

ABSTRACT

We analyze Real Estate effects of Tourism-Oriented Development in Santa Marta, a touristic Caribbean city. We hypothesize that non-local demand affects the spatial distribution of housing prices and their determinants, for both –high and low-income groups. This is the first spatial economic analysis of the relationship between Tourism-Oriented Development and Real Estate Markets in a Global South city. We use 2016 housing transaction data to identify price determinants for different income groups using Spatial Quantile Regression. The regression results go beyond describing differentiated submarkets by income group, more common in the literature, identifying predicted prices by income groups in contiguous locations. These results are refined using qualitative information that confirms that Tourism-Oriented-Development affects the spatial distribution of prices, while increasing the everyday transport hardship in the urban agglomeration.

1. Introduction

Tourism-oriented cities exhibit spatial patterns that do not coincide with mono- or polycentric market models. The most highly priced properties are not in the city center, or in clearly defined services employment subcenters. These patterns are more visible in developing countries' cities, because touristic real estate oriented to global markets requires spatially disruptive “defensive” measures like walls and fences. (Bordsdorf & Hidalgo, 2008).

We analyze the spatial distribution of housing prices, as determined by different but overlapping sub-markets in Santa Marta (Colombia). This city is one of the main touristic destinations in the country. Santa Marta is located in the Caribbean, a region that lacks industrial development and has poverty levels well above the national average (Ramos et al., 2008; Bacca, 2009). We will test two hypotheses about the spatial distribution of prices and their determinants in this touristic developing country city. The quantitative findings will be refined using qualitative evidence, to show that Tourism-Oriented Development induces spatial patterns that increase the everyday transport hardship in this city (Kellett, 1997).

There is a growing literature about the spatial features of developing countries' touristic cities (Lopez-Guzman et al., 2016). However, it does not relate to real estate market analysis. We contribute by spatially relating these two topics in the case of a touristic Global South city. The

quantitative information comes from private records, which, unfortunately, makes it biased towards high-price housing. To deal with this problem, we use Spatial Quantile Regression (SQR). SQR is well suited to deal with distributive bias, by using all the available information but identifying the housing price determinants by income/price groups.

In Latin America, the distribution of housing and land prices is strongly associated with household income. This is due to the lack of suburban development in the proper sense of the term, and high-income groups inhabit high-price centric or peri-centric zones. Therefore, it is customary to proxy income groups by their housing prices (Garza, 2016; Inostroza, 2017). We identify high-price hotspots and find that different income/price groups have different spatial determinants of those prices. Subsequently, we examine these results using qualitative evidence (interviews and photographs) in the locations with increasing housing for non-locals.

The paper is structured in six sections. Following this introduction, the second section discusses the spatial effects of Tourism-Oriented Development in developing countries' cities and presents the two spatial hypotheses to be quantitatively tested. The third section explains SQR and shows how this technique allows us to test the hypotheses. Section four describes the Santa Marta context and the collected databases, including the qualitative information. Section five presents regression results, including maps that identify the predicted housing

* Corresponding author.

E-mail address: ngarza@csudh.edu (N. Garza).

<https://doi.org/10.1016/j.habitatint.2019.04.001>

Received 7 January 2018; Received in revised form 23 March 2019; Accepted 8 April 2019

Available online 17 April 2019

0197-3975/ © 2019 Elsevier Ltd. All rights reserved.

prices for different income groups. It also refines the results through the lens of qualitative data. We present our conclusions in section six.

2. Conceptual framework

According to traditional urban economics theory, a circular and concentric distribution of land rents and use intensities is efficient, because transport costs determine maximum willingness to pay. Disruptors to this model can be natural (topography), institutional (planning), or social (spatial segregation). Most evidence on contemporary cities shows that circular patterns are reasonable predictors of the spatial price structures, even when using polycentric models (Muñiz, Galindo, & García, 2003).

Regarding tourism, Mullins (1991) argues that it influences the built environment in post-Fordist societies undertaking labor flexibilization. This author remarks that tourism has an aesthetics with spatial manifestations of its own. However, tourism-oriented cities in developing countries differ from that description because of their longstanding labor informality where a proper Fordist stage has never occurred. The development of a new tourism-based aesthetic is also debatable: Santa Marta, our case study city, has a national and international touristic market because of its privileged natural setting and ludic culture. None of these characteristics is recently acquired, or in any other sense associated with a post-Fordist development stage. Recent globalization, however, is bringing considerable changes to Santa Marta's built environment. It has development trends similar to Mullins' hypotheses.¹

In developing countries, even when there is a high degree of informality, employment location is relevant in determining metropolitan residential markets (Bordsdorf, Hidalgo, & Vidal-Koppmann, 2010). Tourism, as a source of jobs, also determines spatial structure (Qian, Feng, & Zhu, 2012; Van Noorloos & Steel, 2016), and just like other activities with a global reach, it is associated with informality and dispossession in developing countries' cities.

The impact of tourism on the spatial urban markets of developing countries' cities remains a relatively under-studied topic. González-Perez et al. (2016) analyze the city-wide effect of tourism in Varadero (Cuba) and Punta Cana (Dominican Republic). In both cases, despite different economic systems, the authors describe Tourism-Oriented Development as Accumulation by Dispossession and associate it with Spatial Segregation. Similar processes occur in Cancún and Puerto Vallarta (Mexico), and in Maceio-Alagoas (Brazil) (Castillo, 2011; Marmolejo & Batista, 2011; Pérez-Campuzano, 2010).

Santa Marta shares some of the features observed in the cases presented above, but in contrast to them: a) it has a relatively large urban core with an economic life of its own beyond tourism (agroindustry, seaport, government seat, etc.); b) it does not have the massive international lure of other Caribbean destinations; and consequently c) the effect of globalization has not been yet so intense. However, due to the growing presence and scale of Tourism-Oriented Development, Santa Marta is becoming more similar to the cities surveyed in the literature above.

Previous research about Latin American cities indicates that urban structures have evolved from originally monocentric patterns, guided by scarcity of infrastructure and elitist regulation (Garza, 2016). This evolution has generated discontinuity of the urban fabric, regardless of its high population and built environment densities (Inostroza, Baur, & Csaplovics, 2013). Sheller (2009) adds that tourism causes a splintering of Caribbean territories via the re-scaling of the locals' territories in the presence of disrupting luxury property development. González-Perez (2017) and Piñeros (2017) detect that international real estate development has had a gentrifying effect on the colonial cores of Santo Domingo (Dominican Republic) and Cartagena (Colombia). We note that none of the discussed papers makes a spatial quantitative analysis

of Real Estate markets, the area where we contribute. The spatial determinants of housing prices by income groups in a touristic Caribbean city, under increasing globalization pressure.

Tourism-Oriented Development is changing the spatial structure of Latin American cities towards splintering of the spatial competition, given the different preferences of non-local residential consumers (Schafran & Monkkonen, 2011; Sheller, 2009). Building upon these observations and using our qualitative evidence, we identify that non-local consumers directly compete with local elites for beach locations, while consumers oriented to "alternative" touristic markets bid for rentals in low-income but culturally-rich neighborhoods. In that regards we derive two hypotheses to be tested: 1) Local elite groups and non-local consumers of residential space (not limited to hotel tourists but including the owners of luxury condominiums), compete for the best locations. Their preferences are however different: distance to beach being crucial for external consumers, while distance to shopping mall and other amenities are more important for local elites; and 2) Low-income groups simultaneously value distance to the city center and to elite developments, because of their varied and mostly informal income generating activities. These groups also face non-local competition, in low-income but culturally-rich neighborhoods.

The two hypotheses do not state that households with different income compete for the same locations, with the higher-income groups pushing out the low-income ones from the most desirable locations. We state that those groups have diverging housing price determinants and payment capability, in contiguous locations. This the aforementioned splintering, where the scales and forms of the built structures produce spatial differentiation in the built environment in otherwise indistinguishable locations. This conceptual approach requires a testing strategy that spatially separates the willingness to pay by income groups. We use SQR because it identifies housing price determinants by income groups. It is surprising the lack of use of this technique in urban studies, given its suitability in dealing with biased distributions (social inequality). In addition, and given the lack of more direct information, we use qualitative evidence (interviews and photographs) to refine the results.

3. Methods

3.1. Quantitative methods

We use Spatial Quantile Regression (SQR) to detect the spatial determinants of housing prices for different income groups. SQR combines two different regression approaches: Quantile and Spatial Regression. We present these two approaches separately first, and then in their combined form.

Quantile Regression (QR): Traditional linear regression estimates the line "closest" to the data mean. In contrast, QR estimates the regression line "closest" to any specified quantile, not just correcting but also taking advantage of strongly biased distributions (Koenker, 2005). QR uses numerical optimization (not estimation) and is not subject to the limiting normality and non-heteroscedasticity assumptions of linear regression.²

QR, by definition, deals with non-linear relationships that change for every quantile. This feature is useful for our research because we argue that tourism disruptions do not just modify the general structure of housing prices, but generate independent and overlapping spatial markets by income groups.

Spatial Regression: We are interested in how location determines housing prices for different income groups (when contiguously located). We use a First-Degree Spatial Auto Regressive (SAR) model as the baseline of our empirical explorations, using a (W) matrix of spatial

¹ According to seven of the interviews performed in this research.

² QR produces standard errors by using bootstrap (permutations). All the empirical results in this paper use 100 random permutations.

weights by points/distances (LeSage & Pace, 2009).

Spatial Quantile Regression: There are two ways of combining SAR and QR models: a) Two Stages Quantile Regression (2SQR); and b) Instrumental Variables Quantile Regression (IVQR). In this paper we use 2SQR, because we do not have enough variables to choose adequate instruments (Zhang & Wang, 2016). The Two Stages are: 1) to estimate the spatially weighted dependent variable ($W\hat{y}$) as a function of all the independent variables (X) and their spatial weights (WX); and 2) to use the estimated $W\hat{y}$ (it is an instrumented SAR) as an additional independent variable in the QR.

3.2. Qualitative methods

We know that our quantitative results are subject to scarcity of information. Consequently, we conducted semi-structured interviews with local experts, using the data collected to help us refine, change or reject the main hypotheses. We interviewed ten experts: three from Real Estate agencies (including one manager), two from the City Planning Department (including a unit director), two Urban Consultants, two Final Consumers, and one Commercial Bank Officer.³ The interview tool is in the appendix.

4. Case study

4.1. The city and its context

Santa Marta is the third largest Colombian city on the Caribbean, and capital of the Magdalena province. It has approximately 500,000 inhabitants, most of them living in the urban core. Santa Marta is the oldest colonial Spanish city in Colombia. Its center has historical, architectural and cultural importance. In addition, the city is surrounded by diverse natural ecosystems (desert, coral reefs, snowy mountains, tropical rainforest), including many sheltered bays and beaches, and two National Natural Parks (*Tayrona* and *Sierra Nevada*).

The combination of natural and cultural assets in Santa Marta resembles those of other Caribbean cities. Consequently, it also experiences the urban problems faced by these other cities: labor informality, human and drug trafficking, housing unaffordability and spatial segregation.

Table 1 depicts recent national and regional economic information. It shows an increase of foreign visitors and of the M² construction destined to hotels, when compared to national performance. However, poverty remains high, and GDP per capita low, compared to the national averages (negligible convergence during the period).

The information reported in Table 1 comes from multiple national sources. It depicts a problematic situation for Santa Marta. The city has significantly increased tourism, measured by visitors and hotel construction, but its economic performance is at best disappointing when compared to the rest of the nation. In this case, tourism is an inefficient source of economic growth, which does not improve poverty conditions.

We do not have information to distinguish residential construction oriented towards local and non-local users. We know, however, that the boom in hotel construction is part of touristic real estate and can proxy residential development oriented to non-local consumers. For example, Moreno et al. (2017) show that local eco-tourism agencies accommodate their customers in Apartments (37.9%) or Apart-Hotels (34.5%). This might explain why Santa Marta's Property Valuation Index is higher and has a higher growth rate than the national index.

³ We did not interview leaders of popular (low-income) housing associations or non-governmental organizations, because we could not find the same type of institutions in the elite (high-income) groups. They might have condominium associations but those are completely different organizations, and we would not be following the principle of symmetry.

Summarizing, Santa Marta is experiencing a boom in tourism, hotel construction, and housing construction destined to non-locals. That boom does not manifest in higher economic growth or poverty reduction, when compared to national standards.

Map 1 shows the urban fabric, roads, seashore line, and landmarks used in the spatial regression analyses. The city has a scattered distribution of built settlements. The main urban core contains the city center facing the Santa Marta bay, a touristic attraction where the port and the most important civic and commercial buildings are also located. This city section contains a gentrifying colonial core and a marina (evidence of its increasing orientation to international high-end tourism). *El Rodadero* is the main mass tourism beach, and it has most of the hotel supply. *Gaira* has become the operations base for “backpackers” who then venture into the natural parks and other remote settlements and attractions. *Bonda* and *Taganga* are traditional farming and fishing villages, which are now becoming “alternative” tourist destinations. *Pozos Colorados* is conveniently located near the airport and fully oriented to non-local demand, including state-of-the-art hotels and luxury condominiums. According to our interviews, all of the mentioned locations have active housing markets for non-locals. High-price sales and rentals are common, decreasing the affordability for local dwellers.

Map 1 shows how sharp mountain ranges separate the different settlements. Kellett (1997) identified that low-income groups have historically occupied segregated informal developments on the northern and southern fringes of the main urban core. These groups also locate in high-slope interstitial spaces north of *El Rodadero* and east of *Pozos Colorados*. These areas have an irregular street pattern. The southeast sections of the main urban core were originally oriented to popular housing, but land scarcity has brought gentrification to that zone. They now feature upper-end housing and shopping malls (*Buenavista* and *Ocean Mall*). High-income non-local owners and renters are mainly located in scattered condominiums (although not necessarily low-density ones) at *El Rodadero* and *Pozos Colorados*, while “alternative” non-locals locate in *Gaira*, *Taganga* and *Bonda*.

The city has low –and high-density developments for different income groups, located in close proximity. This spatial structure does not require the extensive walled environments that can be found in other Latin American cities (Bordsdorf & Hidalgo, 2008), but isolated high-rise condominiums have “defensive” gates and fences.

4.2. Data description

We used two housing price databases (248 sales, and 171 rentals). Data were collected during August–October of 2016 from primary information of the local branch of Coldwell Banker. We extracted enough hedonic information to be used in our empirical exercises: Price (in COP \$), Size (in square meters); Age (years); number of Bathrooms; number of Bedrooms; and *Estrato*, a Colombian classification used to determine utility prices as a function of imputed households' income.⁴ The databases also contain the reported property type: Apartment, Row House, and Gated Community.

The data source is biased by definition. Coldwell Banker is an international real estate company, which in developing countries is oriented to middle –and upper-end consumers. However, we know that SQR uses biased distributions by targeting a very low quantile, for example the 1st decile of the distribution. Estimations with very low target quantiles can detect the prices' determinants in low-income housing. Furthermore, SQR includes the SAR component that controls location, and “cleans” the non-spatial determinants.

Map 2 shows the sales and rentals price per M.² The map shows four high-price clusters: Center, *Buenavista*, *El Rodadero* and *Pozos Colorados*. We can also see some low-priced properties near these four clusters.

⁴ *Estrato* ranges from 1 (the lowest) to 6 (the highest).

Table 1
Economic indicators and tourism, local versus national.

Year	Foreign Visitors to Magdalena ^a	Poverty Headcount Ratio ^b		Hotel Type M ² Construction ^c		GDP per capita ^d		Property Valuation Index ^e	
		Magdalena	Colombia	Magdalena	Colombia	Magdalena	Colombia	Santa Marta	Colombia
2012						6,994,995	14,259,639	190.82	168.97
2013		50.5	30.6	32,722	415,188	7,526,313	15,078,111	204.99	179.15
2014	22,263	48.1	28.5	714	404,327	7,620,756	15,884,109	223.31	189.81
2015	22,911	44.8	27.8	11,387	478,910	8,179,727	16,582,065	235.94	200.82
2016	28,053	50.0	28.0	24,563	387,111	8,713,953	17,548,148	247.47	211.82
2017	39,875	48.5	26.9	37,414	393,007		18,512,786	258.77	222.85

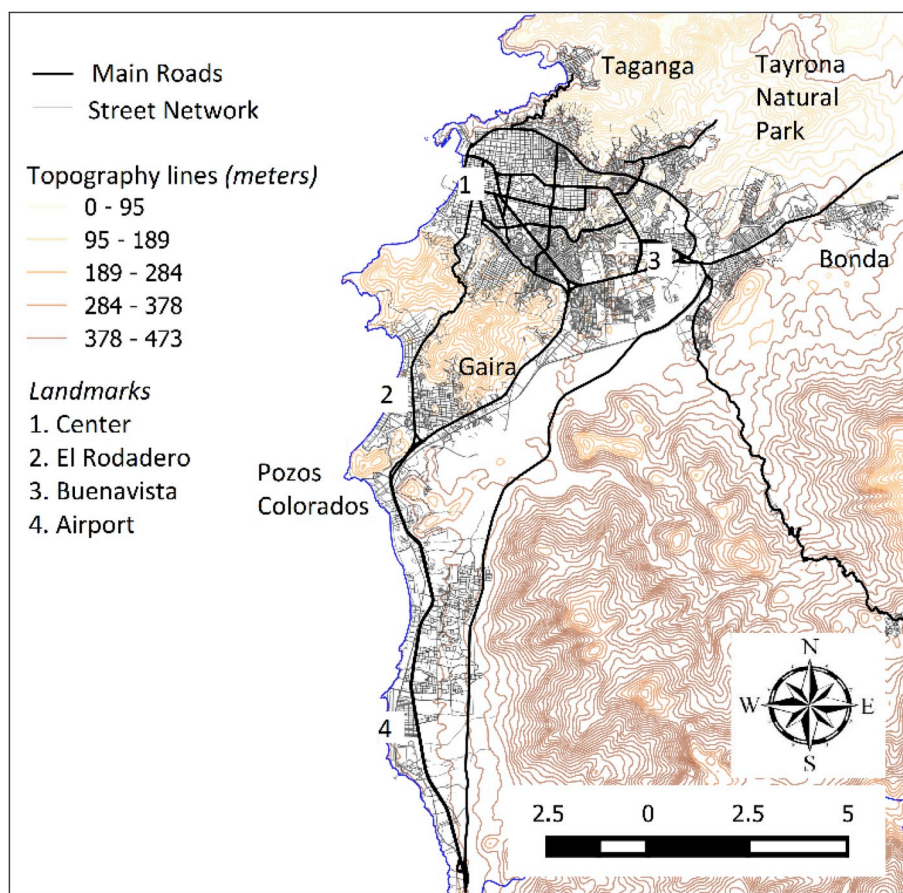
^a Source: MINCIT (September 2018), Perfiles Económicos Departamentales. Oficina de Estudios Económicos.

^b Source: DANE: Pobreza Monetaria y Multidimensional en Colombia 2017.

^c M2 licensed (approved) for construction as type Hotel. Source: DANE: Licencias de Construcción 2017.

^d Source: DANE: Cuentas Economicas Regionales 2017 (In 2017 Constant COP\$).

^e Source: DANE: Indice de Valoracion predial 2017.



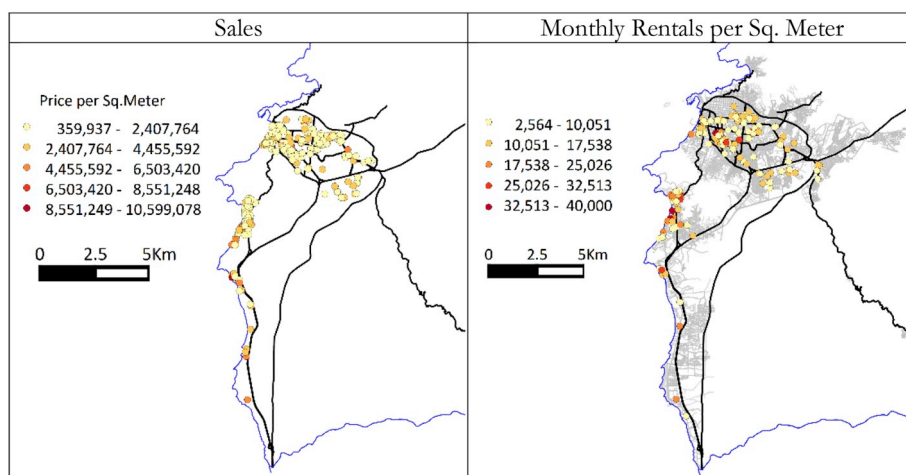
Map 1. Santa Marta: Urban structure, roads and landmarks for spatial analysis. Own elaboration using National Statistics Office of Colombia (DANE) urban cartography, and DIVA-GIS depository on natural features.

This would be an anomalous distribution of housing prices in an industrial or services capitalist city, where low –and middle-income laborers locate in reference to formal employment centers. However, in a developing country touristic city, low-income groups also locate near earning opportunities at elite residential and touristic neighborhoods. In addition, Santa Marta is topographically rugged, accommodating informal housing not just in the periphery, but also in interstitial spaces unsuitable for elite and middle-income developments (Alfonso, 2014).

5. Results

5.1. Regression results

Table 2 shows SQR results using different specifications. The regressions were performed for the 1st Decile, the Median, and the 9th Decile as quantile targets. In other words, we find price determinants for the three income groups, but the entire database was used in every estimation. The dependent variables were the total sale price in models 1–4, and the sale price per M² in models 5–8. These two variables represent different conceptual frameworks: the total price should be more dependent upon hedonic characteristics, while location should be the fundamental determinant of the price per M.²



Map 2. Housing Price per M² (COP\$). Own elaboration using Colombia cartography and Coldwell Banker information. 3,000 COP\$ ≈ 1 US\$.

The SAR component is always positive and significant, showing evidence of clustering of properties with similar prices. The hedonic characteristics have their expected signs and are significant in most of the specifications (negative for Age, positive for the other variables). As expected, the significance of the hedonic characteristics is lower in the specifications for the Price per M² (the pseudo R² in models 5–8).

The residential type Apartment has a positive and significant effect in the models for the Median and 9th Decile of the Total Price, but not for the 1st Decile. In the models for the Price per M², Apartment is positive and significant in the three Deciles. The residential type Gated Community is non-significant in most of the specifications. These results coincide with the prestige value accrued to apartments in the high-price groups, while gates do not appear to make a difference when protected by a towering building.

The Distance to Center, which according to theory should be determining prices per M² (although not necessarily total prices) in specifications 3 and 7, shows an unexpected positive sign and is significant for the Median and the 9th Decile. It is, however, non-significant for the 1st Decile. For middle –and high-income groups, price increases with Distance to Center, while it is not a determinant for the low-income group. The rationale for such a result would be that high-income locals locate close to their own amenities, while Distance to Center is not relevant for high-income non-locals.

Specifications 4 and 8 include all the hedonic and location variables simultaneously. In these models, Distance to Center was not significant (except in one case) ruling it out as a determinant of housing prices for the three groups. In contrast, Distance to Airport was negative and significant in all the models for the three Deciles. We infer that high-income and non-local consumers value closeness to the airport, and low-income groups adapt to that locational preference.

Table 3 summarizes results for total rental prices. This database does not include some hedonic characteristics available in the sales database, limiting our analytical possibilities. In the three selected quantiles SAR is significant. *Estrato* and hedonic characteristics have their expected signs and are significant, except Bedrooms for the higher income. Coinciding with Table 2, the type Apartment is not a determinant of the 1st Decile prices, while it has a positive effect for the Median, and for the 9th Decile when not using all the location controls (model 5). The rentals are not related to Distance to Center in models 1, 3 and 5. However, when using all the landmarks in models 2, 4 and 6, the effect is always negative and significant. This result is expected given we are using total rental prices, which, just like the total sales value, is more dependent upon hedonic than location characteristics. We can notice however, that the location determinants are still different by income groups in Table 3, in coincidence to the results using sales data in Table 2. Low-income renters accommodate the peripheral

location preferences of elites and non-locals, in terms of Distance to Center and to Buenavista shopping mall.

Considering that the sales data is more complete, we use the results in Table 2 to map the predicted price by deciles –the housing sub-markets as perceived by different income groups. The results are presented in Map 3.

Map 3 reveals three different spatial housing markets that overlap in the same territories. For the 1st decile the four landmarks identified in Map 1 (Center, Airport, *El Rodadero* and *Buenavista*), plus the eastern peripheries, are attraction centers. 1st Decile consumers would be willing to pay prices that hypothetically would range between three and six million COP\$ per M² in order to locate in these places, but in most cases these prices are less than what actual consumers are already paying in these locations. Median consumers would be willing to pay prices that are similar to the ones already prevailing in most locations, their preferred locations coincide with the landmarks identified in Map 1. The eastern periphery is a slightly less attractive option for this group.

Consumers in the 9th decile have a different city perception. Their willingness to pay is extremely high, even for low-price locations (two to three million COP\$ per M²), and much more so in the high price locations (26–51 million COP\$ per M²). Their spatial price differentiation is extreme, and their prime locations are close to the Airport and located only at *El Rodadero* and the coastline. This group includes external consumers that buy (or rent) vacation 2nd homes, and for whom the locals' high-end location *Buenavista* is not the most desirable. The Historic Center near the Marina is an emerging high-price location for this group.

5.2. Qualitative results

We reappraise our quantitative results by using interview data. Interviewee input regarding 4 topics was analyzed: 1) the location of tourist and non-local residents; 2) the central place for local elites; 3) the location of alternative non-locals; and 4) the effect of Tourism-Oriented Development on housing markets and gentrification.

Stronger residential demand by non-locals occurs in *El Rodadero – Gaira*. This area does not show much evidence of gentrifying displacement yet, mostly because of its historical orientation towards tourism. However, the flat sections that border *Gaira* are beginning to change, as can be seen in Fig. 1 below.

According to local experts the central point for new local high-income housing is the Ocean Mall, located in the Bavaria neighborhood. It is not the Buenavista Shopping Mall, located about 4 km east of that location. This specification from the qualitative data does not require rejection of the general quantitative results. Bavaria is closer to the

Table 2
Spatial quantile results (2SQR) for sales prices (in COP\$).

		Sale Price				Sale price per M ²			
		1	2	3	4	5	6	7	8
1st Decile	SAR	0.612***	0.591***	0.585***	0.487***	0.676***	0.668***	0.667***	0.616***
	Age	-0.166***	-0.143***	-0.138***	-0.099***	-0.166***	-0.120***	-0.137***	-0.118***
	Bathrooms	0.406***	0.359*	0.345*	0.446***	0.233	0.403**	0.332*	0.410***
	Estrato	0.717***	0.618**	0.593**	0.654***	0.499***	0.193	0.399*	0.449**
	Rooms	0.286	0.256	0.339	0.387**	-0.086	-0.052	0.039	0.015
	Size	0.445***	0.560***	0.565***	0.613***				
	Apartment		0.214	0.225*	0.182		0.420***	0.426***	0.271**
	Gated		0.130	0.142	0.226**		0.333***	0.368***	0.312***
	D. Center			-0.020	-0.157***			0.075	0.016
	D. Airport				-0.706***				-0.484**
	D. Buenavista				0.059				0.087
	D. Rodadero				-0.005				-0.007
	Pseudo R ²	0.334	0.342	0.342	0.406	0.140	0.168	0.172	0.246
	Quantiles Test	0.007	0.021	0.000	0.000	0.001	0.000	0.000	0.004
Median	SAR	0.592***	0.585***	0.595***	0.533***	0.689***	0.690***	0.719***	0.667***
	Age	-0.111***	-0.091***	-0.110***	-0.093***	-0.131***	-0.092***	-0.123***	-0.115***
	Bathrooms	0.227**	0.183*	0.213**	0.140*	0.056	0.005	0.133*	0.065
	Estrato	0.842***	0.761***	0.704***	0.513***	0.737***	0.556***	0.592***	0.424***
	Rooms	0.021	0.079	0.127	0.235**	-0.051	0.026	-0.053	0.066
	Size	0.688***	0.721***	0.763***	0.665***				
	Apartment		0.176**	0.155**	0.201***		0.261***	0.145**	0.219***
	Gated		0.076	-0.005	0.050		0.139*	-0.025	0.113*
	D. Center			0.101***	-0.056			0.134***	0.023
	D. Airport				-0.654***				-0.414***
	D. Buenavista				-0.028				0.070
	D. Rodadero				-0.009				-0.006
	Pseudo R ²	0.326	0.339	0.357	0.422	0.099	0.121	0.153	0.236
	Quantiles Test	0.137	0.004	0.000	0.000	0.052	0.000	0.016	0.001
9th Decile	SAR	0.579***	0.584***	0.624***	0.475***	0.684***	0.699***	0.781***	0.546***
	Age	-0.058	-0.024	-0.023	-0.020	-0.057	-0.040	-0.022	-0.038
	Bathrooms	0.060	0.024	0.081	0.010	0.063	-0.030	0.078	-0.079
	Estrato	1.205***	0.718***	0.679***	0.451**	1.216***	0.671***	0.766***	0.367**
	Rooms	-0.060	0.287	0.223	0.238*	-0.249	0.121	0.207	0.157
	Size	0.793***	0.799***	0.751***	0.850***				
	Apartment		0.497***	0.305***	0.217**		0.450**	-0.267***	0.199**
	Gated		-0.003	-0.116	-0.057		-0.024	0.255***	-0.043
	D. Center			0.180***	-0.032			-0.153*	-0.076
	D. Airport				-1.023***			0.181***	-1.176***
	D. Buenavista				-0.118*				-0.134*
	D. Rodadero				-0.029***				-0.027**
	Pseudo R ²	0.399	0.439	0.505	0.555	0.077	0.131	0.238	0.315
	Quantiles Test	0.016	0.955	0.000	0.000	0.109	0.860	0.000	0.000

n = 248. All the regression variables introduced as Natural Logarithm, except the dummies.

* Significant at 10%; ** significant at 5%; *** significant at 1%.

main road from the south, connecting with elite beach developments at *Pozos Colorados* and *Bello Horizonte* and with the traditional downtown, the preferred locations of high-income non-locals.

Tourists interested in “alternative activities” do not have a visible real estate effect yet. According to the interviewees they have a nomadic life pattern floating between *Gaira*, *Taganga* and *Minca*, and the Natural Parks further North. They already have, however, an effect in commercial real estate as specialty restaurant and hostel entrepreneurs.⁵

None of our interviewees identified gentrification as a problem, either because of their lack of knowledge about it, or because in Latin

⁵ An interesting feature of the interviews is that the growth in “alternative” non-locals has opened access to a market for globalized cuisine, which caters to multiple income level groups.

America the process does not exactly match its developed countries’ definition (Smets & Salman, 2016). In fact, Ospina and Mejia (2016) describe that the re-development strategy for the Santa Marta Historical District has expelled high-income locals that directly compete with boutique hotels, restaurants and non-locals housing, near the marina. However this re-development has not expelled resilient street sellers, night-time activities, or low-income housing (Cortés, 2011; Rodriguez, 2015).

In contrast to their lack of awareness about gentrification, eight of our interviewees identified that touristic real estate (both residential and hotels) creates spatial scattering of residential development (splintering), which worsens daily commutes. That is very much in line with the discussed conceptual framework, the experiences of other Caribbean cities, and our SQR results.

Regarding our two hypotheses, the combined quantitative and

Table 3
Spatial quantile results (2SQR) for rentals (in COP\$).

	1st Decile		Median		9th Decile	
	1	2	3	4	5	6
SAR	0.583***	0.476***	0.602***	0.502***	0.608***	0.219***
Estrato	0.945***	0.776***	0.629***	0.602***	0.579***	0.525***
Bedrooms	0.408***	0.389***	0.353***	0.467***	-0.209	0.200
Size	0.162***	0.155***	0.322***	0.273***	0.475***	0.417***
Apartment	-0.021	-0.047	-0.294***	-0.291***	0.280**	0.011
Gated	-0.191***	-0.154**	-0.353***	-0.312***	0.114	0.031
D. Center	0.005	-0.596***	0.018	-0.681***	0.015	-2.026***
D. Airport		-0.135		-0.003		-0.270***
D. Buenavista		-0.118**		-0.162***		-0.499***
D. Rodadero		-0.030		0.038***		0.012
R ² adjusted	0.323	0.341	0.252	0.310	0.163	0.320
Quantiles Test	0.000	0.000	0.000	0.000	0.000	0.000

n = 171. All the regression variables introduced as Natural Logarithm, except the dummies.
* Significant at 10%; ** significant at 5%; *** significant at 1%.

qualitative results indicate that: 1) high-income locals and non-locals compete for the best locations. Non-locals dominate the beaches and areas close to the Airport, while locals have gentrified the south east of the main urban core. Housing price determinants for high-income households are very different from other groups, and their predicted prices (willingness to pay) were about 10 times higher in contiguous locations; 2) low-income groups have emerging, but not yet too strong, competition of “alternative” non-locals in culturally-rich neighborhoods.

6. Conclusions

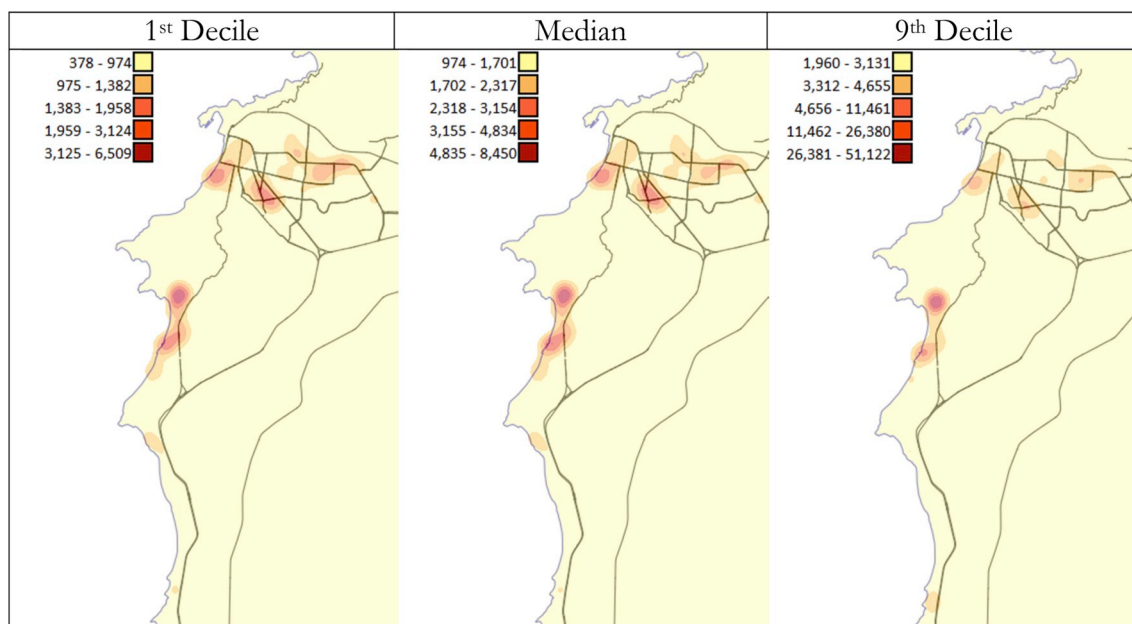
Santa Marta is a Colombian Caribbean city strongly oriented towards tourism. Its natural attractions, rich colonial history and festive culture attract travelers with varied incomes and preferences. This city has worse poverty and inequality indicators than the rest of the country. In recent years, there has been a touristic boom with substantial increases of foreign visitors and hotel construction. However, the city's overall economic performance is still disappointing.

We use SQR, a technique that not just corrects, but takes advantage

of, a strongly biased distribution of housing prices. The SQR regressions showed that housing price determinants are different by income groups. For example, closeness to Airport and to the beaches are strong determinants of prices for the high-income groups. SQR also allowed us to depict the urban geographies of housing (both sales and rentals) for different income groups, including their willingness to pay in the same locations. The actual location of local and non-local residential consumers by income groups was clarified using interviews and photographs.

We modelled a city spatial structure of housing prices per M² that differs by socio-economic groups. They are submarkets based on income levels and payment capability. These are not, however, submarkets in the spatial sense of the term. The different income groups overlap each other in the same locations. The result is a city with a weakened center, scattered development, and relatively high prices, even for the low-income market segments (Dayaratne & Kellett, 2008).

Tourism-Oriented Development in Santa Marta has undesirable effects: a) housing prices increase; b) spatial scattering that can be associated to transport hardship; and c) spatial segregation at the micro-scale using defensive measures like walls and fences. Tourism-Oriented



Map 3. Predicted submarkets by deciles (Sales Price in thousands COP\$ per M²).

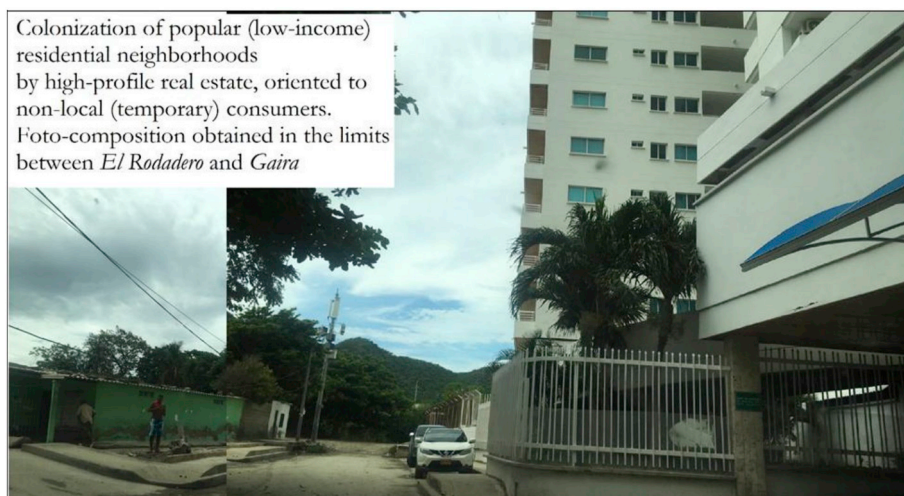


Fig. 1. High-end real estate encroachment in low-income settlements. Source: photographs by the authors.

Development limits this city's options for coordinated spatial development and public transport (Kellett, 1997).

We cannot deny the importance of tourism for economic development. We must however warn that the spatial structures and the extreme inequality attributed to touristic and high-end real estate enterprises in developing countries' cities, are not the most appropriate for their long-run development potential (Gough & Kellett, 2001).

Santa Marta will continue pursuing Tourism-Oriented Development. We believe that such development will contribute more effectively to the local economy if oriented towards the urban core, not the scattered developments alongside southern roads. The emphasis in the traditional urban core: a) facilitates collective and radially converging transport options; b) contributes to the conservation of the city's natural landscape, the source of its attraction in the first place; and c) helps develop to a more diverse and fully used urban built environment. The potential expulsion effects of such a strategy will not fall upon low-income groups, because local elites are the current dwellers of that Central Core.

Acknowledgement

Nestor Garza wishes to thank the contributions of Dr. Margaret Thorley and Ryan Schlom, and the useful comments from the journal reviewers.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.habitatint.2019.04.001>.

References

- Alfonso, O. (2014). *Bogotá segmentada: Reconstrucción Histórico-social de la Estructuración Residencial de una Metrópoli Latinoamericana*. Bogotá: Ediciones Universidad Externado de Colombia.
- Bacca, W. (2009). Las visiones sobre instituciones y desarrollo regional en el Caribe colombiano: un debate en marcha. *Revista de Economía del Caribe*, 3, 147–175.
- Bordsdorf, A., & Hidalgo, R. (2008). New dimensions of social exclusion in Latin America: From gated communities to gated cities, the case of Santiago de Chile. *Land Use Policy*, 25(2), 153–160.
- Bordsdorf, A., Hidalgo, R., & Vidal-Koppmann, S. (2010). Social segregation and gated communities in Santiago de Chile and Buenos Aires. A comparison. *Habitat International*, 54, 18–27.
- Castillo, O. (2011). Segregación socio espacial en Cancún: 1990-2010, tres ciudades en una misma. *Provincia*, 26, 11–31.
- Cortés, J. (2011). *Uso actual del espacio público en el centro de las ciudades intermedias: Estudios de caso Santa Marta, popayán y manizales*. Bogotá: Tesis, Universidad Nacional de Colombia.

- Dayaratne, R., & Kellett, P. (2008). Housing and home-making in low-income urban settlements: Sri Lanka and Colombia. *Journal of Housing and the Built Environment*, 23(1), 53–70.
- Garza, N. (2016). Primate cities in Latin America: A theoretical framework based upon intra-urban driving forces. *International Journal on the Unity of the Sciences*, 20(2), 241–259.
- González-Pérez, J. (2017). A new colonisation of a Caribbean city: Urban regeneration policies as a strategy for tourism development and gentrification in Santo Domingo's colonial city. In M. Gravari-Barbas, & S. Guinand (Eds.). *Tourism and gentrification in contemporary metropolises: International perspectives*. Oxford, UK: Routledge – Taylor and Francis.
- González-Pérez, J., et al. (2016). Urban growth and dual tourist city in the Caribbean: Urbanization in the hinterlands of the tourist destinations of Varadero (Cuba) and Bávaro-Punta Cana (Dominican Republic). *Habitat International*, 58, 59–74.
- Gough, K., & Kellett, P. (2001). Housing consolidation and home-based income generation: Evidence from self-help settlements in two Colombian cities. *Cities*, 18(4), 235–247.
- Inostroza, L. (2017). Informal urban development in Latin American urban peripheries. Spatial assessment in Bogotá, Lima and Santiago de Chile. *Landscape and Urban Planning*, 165, 267–279.
- Inostroza, L., Baur, R., & Csaplovics, E. (2013). Urban sprawl and fragmentation in Latin America: A dynamic quantification and characterization of spatial patterns. *Journal of Environmental Management*, 115, 87–97.
- Kellett, P. (1997). City profile: Santa Marta. *Cities*, 14(6), 393–402.
- Koenker, R. (2005). *Quantile regression*. New York: Cambridge University Press.
- LeSage, J., & Pace, K. (2009). *An introduction to spatial econometrics*. Boca Raton FL: CRC Press – Taylor & Francis Group.
- Lopez-Guzman, et al. (2016). Turismo All-Inclusive en República Dominicana. Un análisis desde la perspectiva de la demanda turística. *Revista de Economía del Caribe*, 17, 125–142.
- Marmolejo, C., & Batista, N. (2011). Estructura urbana y segregación socio-residencial: Un análisis para maceió-alagoas, Brasil. *Papeles de Población*, 17(70), 247–286.
- Moreno, et al. (2017). *Caracterización de los servicios de ecoturismo que ofertan las agencias de viajes operadoras de Santa Marta*. Bogotá: Tesis, Universidad Los Libertadores.
- Mullins, P. (1991). Tourism urbanization. *International Journal of Urban and Regional Research*, 15(3), 326–342.
- Muñiz, I., Galindo, A., & García, M. (2003). Cubic spline population density functions and satellite city delimitation: The case of Barcelona. *Urban Studies*, 40 – 7, 1303–1321.
- Ospina, N., & Mejía, Y. (2016). Rehabilitación del centro histórico de Santa Marta y barranquilla: Políticas públicas, dinamismo económico y conservación de espacios patrimoniales en tensión. *Revista de Direito da Cidade*, 08(1), 135–157.
- Pérez-Campuzano, E. (2010). Segregación socio-espacial en ciudades turísticas, el caso de Puerto Vallarta, México. *Región y Sociedad*, 22(49), 143–176.
- Piñeros, S. (2017). Tourism gentrification in the cities of Latin America: The socio-economic trajectory of Cartagena de Indias, Colombia. In M. Gravari-Barbas, & S. Guinand (Eds.). *Tourism and gentrification in contemporary metropolises: International perspectives*. Oxon, England: Routledge – Taylor and Francis.
- Qian, J., Feng, D., & Zhu, H. (2012). Tourism-driven urbanization in China's small-town development: A case study of Zhao town, 1986–2003. *Habitat International*, 36, 152–160.
- Ramos, J., et al. (2008). La mendicidad en el Caribe colombiano: El caso de los distritos de Barranquilla, Santa Marta y Cartagena. *Revista de Economía del Caribe*, 2, 66–105.
- Rodríguez, M. (2015). Estrategias de ordenamiento territorial en los centros históricos colombianos. *Territorios*, 32, 81–95.
- Schafran, A., & Monkkonen, P. (2011). Beyond Chapala and Cancún: Grappling with the impact of American migration to Mexico. *Migraciones Internacionales*, 6(2), 223–258.
- Sheller, M. (2009). The new Caribbean complexity: Mobility systems, tourism and spatial re-scaling. *Singapore Journal of Tropical Geography*, 30(2), 189–203.
- Smets, P., & Salman, T. (2016). The multi-layered-ness of urban segregation: On the simultaneous inclusion and exclusion in Latin American cities. *Habitat International*, 54(1), 80–87.
- Van Noorloos, F., & Steel, G. (2016). Lifestyle migration and socio-spatial segregation in the urban(izing) landscapes of Cuenca (Ecuador) and Guanacaste (Costa Rica). *Habitat International*, 54(1), 50–57.
- Zhang, H., & Wang, X. (2016). Effectiveness of macro-regulation policies on housing prices: A spatial quantile regression approach. *Housing, Theory and Society*, 33(1), 23–40.