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## Does higher place difficulty predict increased attachment? The moderating role of identity

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**Abstract:** In a contribution conducted in the French Southern Alps, Hinojosa et al (2016) suggested that place attachment is relatively higher where it is difficult to live. We examine whether this figure holds in other environments bringing insight on a likely general tenet. A study using comparable survey data in two different ecosystems of Ecuador (the mountains and the subtropics) reveals, indeed, that higher place difficulty predicts increased attachment. Nevertheless, our results show that place difficulty is not significant when considered solely, that is, regardless of an additional element: place identity. In the Andean mountains, place attachment is found to be higher in more difficult areas only when place identity plays a role in individuals' views of their local community (their district). In the subtropical area of Intag, place difficulty is found to be a predictor of attachment regardless of place identity.

**Key-words:** place identity; place difficulty; place attachment; Ecuador; Intag.

## **Does higher place difficulty predict increased attachment? The moderating role of identity**

### **1. Introduction**

Place attachment –generally defined as an emotional relation between an individual and a given place (Hinojosa et al., 2016, Lewicka, 2011a) – has attracted a large academic attention in several social sciences (e.g., Shamai, 1991; Altman and Low, 1992; Stedman, 2003; Trentelman, 2009; Scannell and Gifford, 2010; Hinojosa et al., 2016). In essence, the main results of the previous works are threefold: first, the literature shows that place attachment matters in various contexts (Hinojosa et al., 2016). Individuals feel generally emotionally or psychologically related to different places, such as those where they are born, lived in, visited as tourists, and so on (Anderson, 1987). Second, among the factors of place attachment, socio-demographic variables, social ties, and physical attributes are prominent (see Section 2). Third, some contributors studied the effect of place attachment on several dimensions such as subjective well-being and mobility but the results are not clear-cut (Lewicka, 2011a).

This paper adds content mainly to the second point, regarding the factors or determinants of place attachment from an original viewpoint, by considering the role of place difficulty. Interestingly, the literature devoted to place attachment has largely ignored such a crucial feature regarding place. As far as we know, the only exception is the study by Hinojosa et al (2016) who examined place attachment among a sample of livestock farmers in the French Southern Alps and found that, despite more difficult conditions (harder climate, costly access to markets), farmers operating in more difficult places, namely high mountain areas, were relatively more attached to their land compared to their counterparts with more favorable conditions in medium mountain areas. These findings have implications on land and agricultural abandonment. Thus, our focus in this paper is to examine whether the figure raised in the contribution of Hinojosa et al. (2016) also holds in other environments and give insight on a general tenet, by conducting a similar survey among a sample of farmers in two connected rural areas of the Cotacachi county in Ecuador, namely the Andes (mainly populated by indigenous people inhabiting mountain communities) and Intag (a subtropical region mainly populated by immigrants). Our study area for this paper is suitable for a discussion on comparing factors of place attachment. Firstly, Cotacachi's mountain environment gives us the opportunity to contrast Hinojosa et al.'s findings in the French Alps. Secondly, its subtropical environment allows for exploring on the likely effects of bio-physical and cultural diversities on place attachment. Moreover, given the context in which Cotacachi has developed since the 1990s, characterized by opposing forces to globalizing processes (as explained in detail below), our investigation also brings a more general dimension to some previous studies in behavioral sciences (Loewenstein, 1999; Olivola and Shafir, 2013) suggesting that people would have preferences for difficulty. For instance, Loewenstein (1999) analyzed the case of mountaineering and

stressed that such a difficult activity is motivated in part through the endured pain and exerted effort to do it as well as by the challenging nature of the high mountain environment.

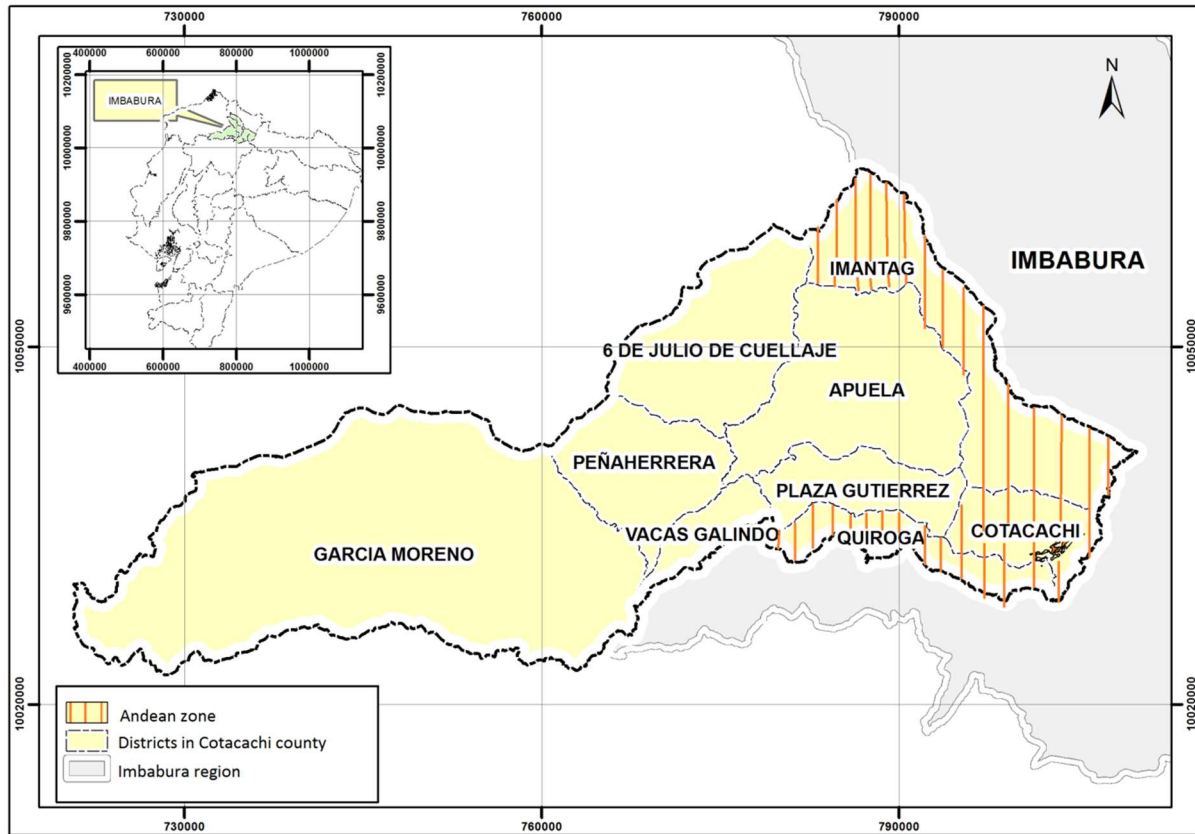
Further, in this paper we examine the role played by an additional element of the individual's domain that can produce different levels of attachment to difficult places, namely identity. The latter is defined as a process by which, through interaction with places, people describe themselves in terms of belonging to a specific place (Hernández et al., 2007). Unlike Hinojosa et al. (2016) who surveyed a population of Alpine farmers, who can be considered as homogenous by their historical and geographical origins (Coia et al., 2013; Bender and Haller, 2017), we extended our survey to a more heterogeneous population of farmers in the Ecuadorian Andes. In other words, we examine whether place difficulty, i.e. the bio-physical constraints and unfavorable conditions of the built-environment of a locality, influence place attachment while taking into account place identity, that is, whether place attachment is mediated by a sense of identity with a community of reference. By considering place identity, we introduce a differentiating element between individuals (i.e., farmers and specifically peasants) who otherwise are often considered as homogeneous groups (Morris and Evans, 2004; Bernstein and Byres, 2001), with social and political claims that go beyond their differences at developing economic activity (van der Ploeg, 2008). This enables a better understanding of intra-group heterogeneity, that is, differences between individuals who belong to the same zone, therefore of the contrasting forms how individuals relate differently with the same natural environment and societies to which they are confronted with. Comparison of different areas enables capturing inter-group heterogeneity too.

Environmental psychology and other social science disciplines have found that place identity has become a cornerstone of studies on place (c.f. Proshansky et al., 1983; Bonnes and Secchiaroli, 1995; Gieryn, 2000; Ujang and Zakariya, 2015; Cheshmehzangi and Heath, 2012). In economics, such an interest on place identity and other grounds of identity such as race or gender have barely been addressed (Davis, 2007; Benjamin et al. 2010), with only some theoretical work from Akerlof and Kranton (2000, 2010) who explored the role of identity on economic outcome. In ecological economics, individual's identity with an economic activity and the environment where it develops has also been proven to be a significant feature in inquiries about the connection between agriculture, technology and conservation (Sulemana and James, 2014). Other contributions have indirectly addressed place identity by studying the role of collective identities in fostering economic outcomes, for example through studies on the relationship between economic development and territorial labeling (Belletti and Marescotti, 2011), the interconnections between cultural identities and tourism patterns (Noonan and Rizzo, 2017) and new approaches to resilience, place and cultural economy (e.g. Pratt, 2015). Yet, these theoretical and applied studies of the role of place identity in economic and social outcomes show both tensions between theoretical approaches and still little evidence. Indeed, the connection between individuals'

identities and their corresponding groups' identities seems not to be a direct one. As Davis (2007) suggests, individuals who have similar characteristics nonetheless differ in the extent to which they see themselves as members of certain groups. In other words, individuals have personal identities as well as social identities, and these two types of identities need to be seen as related. Further, he argues that individuals form collective intentions in interaction with others and the content of those intentions binds them and guides their behavior in groups.

Within these multiple approaches to identity, we argue that a topic that remains unexplored in the economics literature is whether there are particular elements of the environment (physical and social) that create bonds between individuals and the social groups and the extent to which these influence the ways in which individuals and groups relate to such environments creating place identity. To be sure, reflecting on the argument that economic decisions on resources use and localization of economic activity require a thorough consideration of the relationship between place and people we inquire about the particular characteristics of places and people to produce attachment.

We argue that the case study used for our analysis, the Cotacachi county in the Ecuadorian Andes, suits well to empirically illustrate the relationship between place difficulty, place identity and place attachment, and to give insight on the contention among farmers to integrate themselves into the broader society or when they have to respond to external interventions in their local territories. Indeed, the territory of Cotacachi in the North–East area of Ecuador (Map 1) presents two distinctive zones, with sub-tropical and Andean ecosystems, and different traditions of local organization for resource and community management. All together Cotacachi hosts approximately 40,000 people, which include indigenous, mestizo Afro-Ecuadorian and white groups. While communities within each area are contiguous and both zones are institutionally and economically connected (i.e., all are ruled by the same local government and market relationships between them are frequent), each community and each zone has its own history and socio-economic dynamics. Accordingly, the ways in which individuals and communities relate to nature and connect with the rest of the country is often seemingly different (see, also, Walter et al. 2016).



Map 1. Study area: the Cotacachi county in North-Eastern Ecuador

Further, since the early 1990s, Cotacachi has become a symbolic space for studies on local alternative forms of development and contestation to globalization due to their resistance to change their economic and ecological structures should the global commodity chain of mining and energy industries would get installed in the county (Conde, 2017; Avcı and Fernández-Salvador, 2016; Larrea et al. 2016). In that context, there has been increasing interest in understanding the contingent responses that populations and their local organizations gave to the installation of mining or to the alternative forms of local development (Bebbington et al., 2008a; Walter et al., 2016). An example of such contingency was evidenced in the local consultation implemented by a coalition of civil society organizations and the Cotacachi local government. While the general outcome was a rejection to the installation of mining and a strong defense of Cotacachi's rights to territorial decisions, there were significant differences between communities' and groups of population' (for example elders and young) responses. Curiously, those who rejected more were those living in more difficult conditions (personal communication from local leaders from Cotacachi county). Whether such differences correlate with place-difficulty, reflected in the bio-physical characteristics or reduced opportunities by lack or insufficient external intervention, the hypothesis is that, under particular conditions, those enduring conditions create place attachment in local populations.

The remainder of this paper is the following: Section 2 presents the empirical approach, a brief description of the study area, data and methods. Section 3 is devoted to the main results. Section 4 is devoted to a general discussion in perspective of the main findings. Section 5 concludes.

## 2. Data and methods

We follow Hinojosa et al.'s (2016) empirical approach in order to produce solid basis of comparison with their research on place attachment of Alpine farmers (see the supplementary material for the survey instrument). Hence, the variables description and rationales behind their introduction largely borrows from their study. For the case study of this paper (i.e. the Cotacachi region) we held in person interviews with a sample of 720 farmers among which 504 answered all the questions (see, also, supporting information). Located in the north-east part of Ecuador, Cotacachi is a third level sub-national territory (a *canton*, in Spanish). Known by its recent reputation of place identity (Larrea et al. 2016), the canton Cotacachi is an area of high biodiversity and cultural heterogeneity, with mountainous and sub-tropical regions (Kocian et al. 2011). The mountains (i.e. the Andes) host indigenous ancestral Quechua communities and the sub-tropical areas (i.e. the Intag region) a variety of ethnic and social groups, which came lately into this region to develop agricultural activity. In our sample, 277 farmers are located in three Andean districts (the rural sections of Cotacachi district and Quiroga, and Imantag) and 227 in six districts of the sub-tropical zone Intag (García Moreno, Peñaherrera, Plaza Gutierrez, 6 de Julio de Cuellaje, Vacas Galindo, and Apuela).

In order to measure place attachment, we use the variable called *ATTACHMENT* which corresponds to individuals' responses about their attachment to their place. The variable *ATTACHMENT* is ordered, ranging from 1 (if the respondent reports he/she is not attached at all) to 10 (if he/she reports to be fully attached). Our main hypothesis, stating that place difficulty predicts attachment, is tested using the variable *DIFFICULTY*, which is equal to 1 if the surveyed individual lives in a difficult area and 0 otherwise. Although classification by the level of place difficulty of districts was informed by some available statistical information, which indicate that difficulties are mainly due to access both to reach the communities through the precarious road network and to public services such as health, education and agricultural technical assistance, the level of difficulty of communities and districts was established through direct observation in fieldwork, particularly by the travel distance and time from main roads to the communities. More precisely, given that the constraints imposed by bio-physical factors and those from the built-environment differ between districts, in the Andes the variable *DIFFICULTY* is equal to 1 if the respondent is located in the rural communities of Cotacachi district (which conditions of access strongly differ from the urban area) and 0 if he/she is in Imantag or Quiroga. In sub-tropical Intag, it is equal to 1 if the farmer is located in the districts García Moreno, Peñaherrera, Plaza Gutierrez, Vacas Galindo or Cuellaje, and 0 if he/she is located in Apuela.

In addition, as mentioned in the previous section, we introduced in our survey another dimension regarding identity because of different historical settlement patterns of the case study. In other words, the role of place difficulty is examined in isolation and in interaction with identity. Formally, respondents were asked to indicate to which place (i.e. a local referent) they most identify themselves. The specific question for identity was: “Please indicate to which of the following you identify the most.” Six options were presented to them, namely their ancestral community, their district, the Intag zone, the Manduriacus zone, the county, and an option called “other” to include other possible places outside the study area. For each option, four variables have been created according to whether the surveyed individual lives or not in a difficult area and whether he/she identifies or not him/herself to his/her community (for Andean individuals) or his/her district or Intag area for Intag respondents. Regarding place attachment, the question was “Suppose that the attachment to a district is measured on a scale from 1 (not attached at all) to 10 (fully attached). Overall, are you attached to your district?”

As pointed out by a referee, one may argue that an individual’s identity can influence how difficult he/she perceives his/her place, meaning that the variable *DIFFICULTY* may be endogenous. In order to test this potential endogeneity, we performed the Durbin-Wu-Hausman and Wu-Hausman tests of endogeneity (Greene, 2012). Given that both test statistics were found to be not significant for the two studied samples, we do not reject the null of exogeneity and treat *DIFFICULTY* as exogenous.

The relation between place difficulty and attachment is examined using an ordered probit model (Greene, 2012). Moreover, in addition to *DIFFICULTY* and *PLACE IDENTITY*, we also include in the model a set of other variables that have been proved to be likely to influence place attachment (Stedman, 2003; Lewicka, 2005, 2011a, 2011b; Hinojosa et al., 2016), namely socio-demographic variables (age, gender, and education), social variables (household’s size, the presence of family around, and the nature of relations individuals have with their farming and non-farming neighborhood), activity/farm level variables (presence of another activity in addition to farming, profitability, satisfaction at work, and whether farmers think someone else would take over their business once they stop farming), and local environment variables (the meaning of place and whether farmers think local environment could be better in another place). All the variables used in estimation and their description are presented in Table 1, along with some descriptive statistics. No severe problem of multicollinearity has been detected (see SI 2 for the Pearson correlation coefficients). In addition, we also checked the variance inflation factors (VIF), and, the largest value was 2.53, that is, below the rule-of-thumb cutoff of 10 (Ryan, 1997).

**Table 1: Variables used in estimation and sample statistics**

Variables	Description	Andes	Intag	French Alps
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		(N=277)		(N=227)		sample (N=234)	
		Mean	SD	Mean	SD	Mean	SD
<i>Dependent variable</i>							
ATTACHMENT	How the respondent is attached to his/her place. Ordered: from 1 (not attached at all) to 10 (fully attached).	8.54	1.71	8.64	1.62	7.68	2.48
<i>Explanatory variables (all binary, equal to 1 if yes, and 0 otherwise)</i>							
DIFFICULTY ***	The respondent's district is located in a difficult area.	0.22	0.41	0.66	0.47	0.63	0.48
PLACE IDENTITY ***	The respondent identifies him/herself to his/her: - Community, in the Andean area. - A particular district in Intag or the Intag whole area.	0.66	0.47	0.54	0.49	-	-
AGE	The respondent's age < 40 years.	0.44	0.49	0.44	0.49	0.27	0.44
GENDER	The respondent is a male.	0.43	0.49	0.79	0.40	0.74	0.43
EDUCATION ***	The respondent went to the University.	0.05	0.21	0.01	0.13	0.38	0.48
HOUSEHOLD_SIZE *	The respondent's household's size (=1 if two or more).	0.55	0.49	0.51	0.50	0.86	0.34
FAMILY	The respondent has family around.	0.87	0.32	0.81	0.38	0.82	0.37
RELATION_FARMERS	The respondent has good or excellent relations with neighboring farmers.	0.83	0.36	0.89	0.30	0.61	0.48
RELATION_NEIGHBORS	The respondent has good or excellent relations with non-farming neighborhood.	0.85	0.35	0.87	0.33	0.60	0.49
PROFITABILITY	The respondent's farm is profitable over the last five years.	0.22	0.41	0.25	0.43	0.35	0.47
SATIS_WORK	The respondent is satisfied in his/her work.	0.69	0.46	0.65	0.47	0.83	0.37
OFF_FARM_ACTIV	The respondent has off-farm activities.	0.42	0.49	0.35	0.48	0.33	0.47
SUCCESSOR	The respondent thinks that someone else will take over his/her business after him/her.	0.61	0.48	0.62	0.48	0.56	0.49
DISTINCTIVE *	What the respondent's district means to him/her (=1 if unique/exceptional).	0.40	0.49	0.46	0.50	0.29	0.45
OTHER_ENVIRONMENT **	The respondent thinks that local environment (defined in the survey as the presence of social, cultural and leisure structures) could be better if he/she moves to another district.	0.10	0.30	0.16	0.37	0.29	0.45

\*, \*\*, and \*\*\* stand respectively for significance at the 10, 5, and 1 percent level when comparing respondents from the Andes and Intag.

### 3. Results

Ordered probit estimation results of the relation between place difficulty and attachment, and goodness-of-fit measures are presented in Table 2. We present the results for place difficulty in isolation, simultaneously with identity, and, in interaction with identity. Moreover, in order to check the robustness of our results, several versions of the model have been tested to the omission of some variables (see, also, supporting information - SI 3). The main findings remain robust.

**Table 2: Estimation results of the relation between place difficulty and attachment**

Variables	Coefficients and significance					
	Andes area			Intag area		
DIFFICULTY	0.207	0.307*	.	-0.002	-0.002	.
IDENTITY	.	0.401***	.	.	0.021	.
DIFFICULTY_1_PLACE IDENTITY_1	.	.	0.475**	.	.	0.425*
DIFFICULTY_1_PLACE IDENTITY_0	.	.	-0.212	.	.	0.476**
DIFFICULTY_0_PLACE IDENTITY_1 (Ref)	.	.	.	.	.	.
DIFFICULTY_0_PLACE IDENTITY_0	.	.	-0.320*	.	.	0.273
AGE	-0.195	-0.179	-0.194	-0.222	-0.225	-0.239
GENDER	-0.134	-0.101	-0.097	-0.022	-0.021	-0.012
EDUCATION	0.021	0.167	0.127	0.121	0.120	0.087
HOUSEHOLD_SIZE	-0.043	-0.048	-0.017	0.127	0.125	0.152
FAMILY	-0.137	-0.196	-0.182	0.188	0.186	0.162
RELATION FARMERS	1.268***	1.235***	1.233***	0.680**	0.678**	0.686**
RELATION_NEIGHBORS	-0.692*	-0.606*	-0.593*	-0.620**	-0.626**	-0.592*
PROFITABILITY	0.192	0.182	0.174	0.243	0.243	0.239
SATIS WORK	-0.008	0.011	0.005	0.309*	0.312*	0.269
OFF FARM ACTIV	0.351**	0.377**	0.384***	-0.203	-0.204	-0.224
SUCCESSOR	0.142	0.150	0.157	-0.097	-0.094	-0.127
DISTINCTIVE	0.617***	0.617***	0.616***	0.624***	0.623***	0.664***
OTHER_ENVIRONMENT	-0.252	-0.184	-0.171	-0.193	-0.194	-0.178
Pseudo R2	0.0597	0.0684	0.0697	0.0507	0.0508	0.0565
Log pseudolikelihood	-419.51759	-415.63046	-415.05274	-325.08617	-325.07733	-323.09956
Wald Chi2	61.63***	71.33***	73.09***	33.83***	33.92***	37.90***
Number of observations	277	277	277	227	227	227

\*\*\*, \*\* and \* refer to significance at the levels of 1%, 5% and 10%, respectively.

At first glance, estimation results do not support the prediction according to which attachment increases with place difficulty, since the variable *DIFFICULTY* is found to be not significant for both samples. Interestingly, introducing *DIFFICULTY* and *IDENTITY* leads to a significant (resp. non-significant) effect of both in the Andean (resp. Intag) case. We contend, however, this would lead to flawed prescriptions. Indeed, when place difficulty is considered in interaction with the identity dimension, things turn to be different. In the Andean (respectively, Intag) case, place attachment is found to be higher in more difficult areas only when considering individuals who identify themselves to their community (respectively, their district or the Intag area). Nevertheless, in the Intag area, place difficulty is positively associated with place attachment even when considering the pool of individuals who do not identify themselves with their district or the Intag area. Summing up, our study reveals that increased attachment is predicted by a higher place difficulty, but the latter should not be considered solely.

Regarding other predictors of place attachment included in the model, our study also partially confirms the findings of Hinojosa et al. (2016). Indeed, socio-demographic variables are found to be not significant. As appropriately pointed by a reviewer, these findings are probably due to the way we have

operationalized some variables, especially *AGE* and *EDUCATION*, which were specified similarly to the work of Hinojosa et al (2016) in order to make the comparison of both results appropriate. Nevertheless, in order to address such issue, we run other models using different specifications for age and education. The results are reported as supporting information (SI 4). While the overall results remain robust, only education turns to be significant, but in the Andean case only and not for all categories. Individuals with a primary or a secondary education levels have been found to be relatively less attached than individuals without education at all, but the respondents who reached a university are not significantly more or less attached to their place compared to the reference group.

As for social variables, only good or excellent relations with neighboring farmers are found to significantly increase place attachment. It is, however, worthy to notice that the opposite is found when considering relations with non-farming neighborhood. Nevertheless, this counter-intuitive result is significant only at the 10% level and not robust to other model specifications. Regarding the activity/farm level variables too, only one is found to be significant, namely having off-farm activities, which has been found to significantly increase attachment in the Andean case. However, when considering place difficulty in isolation satisfaction at work turns to be significant at the 10% level in the Intag area. Interestingly, similarly to Hinojosa et al (2016), we found that place attachment is not related to the profitability of the farm, providing additional empirical content to the insight according to which farmers qualify their economic results in a relative way (e.g., Chanel et al., 2014). Lastly, as for the variables measuring farmers' perception regarding their district, only individuals thinking their place are unique or exceptional are more likely to report higher levels of place attachment. In other words, unlike the French sample, individuals in the both examined areas of Ecuador are not more or less likely to be attached to their place if they think local environment could be better elsewhere.

#### **4. Discussion**

In a recent paper, Hinojosa et al (2016) suggested that place attachment may be related to the difficulty to live in that place. The previous authors surveyed a sample of livestock farmers in the French Southern Alps. Using similar survey data among two samples of farmers located in two different areas of Ecuador (The Andes and Intag), we found that their insight can be considered as a general tenet as long as the identity dimension is taken into account. In other words, our study reveals that increased attachment is predicted by a higher place difficulty, but the latter should not be considered solely. This finding also adds content to another recent literature in behavioral sciences (Loewenstein, 1999; Olivola and Shafir, 2013) arguing that individuals may have preferences for difficulty. Either alone, or mediated by identity, this paper suggests that place attachment and place difficulty are shown to be positively correlated both in mountainous and sub-tropical environments.

Comparing our results to previous inquires from Hinojosa et al. (2016) in the Alps, two issues are indeed important to discuss: the possibility of a selection bias and the heterogeneity of the populations studied. One could suggest that in the French Alps a possible selection bias in the responses could have led to an overrepresentation of the more attached individuals – i.e. the population of farmers that still stays in difficult places is older and socially homogeneous, while the less attached individuals could have already left. The Ecuadorian case study shows that even if the surveyed population is younger, with more feminine presence and with less dependent members (Table 1), indicating potential migration drivers, attachment to their place is significant. In addition, the Ecuadorian case is fairly heterogeneous with regards to the population composition, with Quechua indigenous communities (Andes) and migrant farmers (Intag). In such heterogeneous social environment we show that the integration of place identity (which level significantly differs between the Andes and Intag as shown in Table 1) enables to control the heterogeneity of the population when evaluating the level of place attachment. In the following, we provide a discussion on what does this inform to the academic debate on place and the implications it can have for territorial politics and policy.

The drivers of change in rural economies and societies in the global south and their different manifestations at the place level are recurring topics of research on resilience and adaptation in rural areas (Bernstein and Byres, 2001; van der Ploeg, 2008). In this context, the concepts associated with place are useful to understand change and permanence in rural areas. Further, in resilience and adaptation to the impacts of global and climate changes the concepts related to place (i.e. place attachment, place identity, place difficulty) bring back attention to the ties between people and their natural and cultural environments (Paton et al., 2008). These can be insightful to inform why *the local* takes a prominent role in explaining the limits of globalization.

Qualitative rural studies focus on the ethical or moral relationships between farmers and the farm, highlighting the importance of a cultural approach in the creation of farmers' identities and in their relationship with the sociocultural construction of given places (Paniagua, 2013). Material features of the natural environment and those produced through humans through agriculture underlie the ties between the local societies and places. For example, regarding livestock farming, Riley (2011) suggests that animals are central to the everyday farmers' lives and identities, thus separation from their flock alters farmers' attachment to particular practices, places and social networks. Similarly, Sulemana and James (2014) suggest that identity matters for the farmers' attitudes toward ethical environmental issues and corresponding views about the future. These studies have however limited scope for generalization as research has focused on farmers in remote rural areas.

In broader debates, such as contestation to globalisation from local communities, we believe our study of Cotacachi adds content to the literature with quantitative evidence on factors intrinsic to individuals. This can explain divergent views, within and between communities, of globalizing processes. For the specific case of socio-environmental conflicts that has affected Cotacachi, our findings complements qualitative research, which has mainly asserted about the role of political, social and ideological factors at the level of groups and collective agencies that play in public domains (c.f. Bebbington et al., 2008b; Larrea et al., 2016; Lewis, 2016).

## **5. Conclusions**

Our study contributes to the emerging literature on the role of identity, coupled with the individuals' perception of place-difficulty, in place attachment. In other words, our study in Ecuador confirms that increased attachment is predicted by a higher place difficulty, as it was also evidenced in the French Alps, however in the Andean mountains such association is mediated by place-identity. Therefore, we highlight two dimensions of place attachment as suggested in environmental psychology (c.f. Scannell and Gifford, 2010): the place dimension that emphasizes the place characteristics of attachment, including spatial level, specificity, and the prominence of social or physical elements, and the person dimension that refers to its individually or collectively determined meanings, which make part of the formation of place identity.

Our contribution put in the context of the broader debate on globalization and the increasingly prominent role of "the local" in explaining the limits of global and regional integration despite economic gain (for a review, see Antonsich, 2011), calls for more attention to the ties between people and their natural and cultural environments. We point out that the concepts related to place (i.e. place attachment, place identity, place difficulty) are insightful to understand why local populations end up by resisting to integration, or alternatively adapt to it. Therefore, as suggested by Akerlof and Kranton (2010), Benjamin et al. (2010) and Davis (2011), we advocate for more consideration in the economics enquiry of the role of identity in explaining economic, social and environmental outcomes. We finally assert that, for both debates being important actors in shaping the politics of state interventions whether at the local or national levels.

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**Supporting information 1: Survey instrument** (translated from Spanish).

This survey is completely anonymous. We would ask you to answer all the questions. There is no good or bad answer. Only your opinion matters. Thank you in advance.

**1. General information**

- 1.0. Please indicate the name of your district: \_\_\_\_\_
- 1.1. For how many generations you are in this district? \_\_\_\_\_
- 1.2. Please, indicate the following information:  
Age: \_\_ years old Sex: F  M  Level of education: \_\_\_\_\_ Household size: \_\_ persons
- 1.3. Do you have family nearby? Yes  No

**2. Information relative to your activity**

- 2.0. Is farming your only activity? Yes  No
- 2.1. For the last five years, how do you consider the profitability of your farm?  
Profitable                       Neither unprofitable, not profitable                       Not profitable
- 2.2. Do you think someone else would take over your business?  
Certainly not     Probably not                       Probably yes                       Certainly yes

**3. Situation at work and in your district**

- \* Please indicate to which of the following you identify the most:  
Your community  Your district  Intag area  Manduriacus area  The county  Other: \_\_\_\_\_
- 3.0. Suppose that the attachment to a district is measured on a scale from 1 (not attached at all) to 10 (fully attached). Overall, are you attached to your district?  
(Not attached at all) 1    2    3    4    5    6    7    8    9    10 (Fully attached)
- 3.1. Could you indicate your level of satisfaction at work on farm?  
Not satisfied at all     Slightly satisfied                       Quite satisfied                       Fully satisfied
- 3.2. In general, how do you consider your relations with?  
Your farming neighborhood:    Terrible     Bad     Average     Good     Excellent   
Your non-farming neighborhood:    Terrible     Bad     Average     Good     Excellent
- 3.3. Do you think that your local environment could be better if you move to another district? (Local environment refers to the presence of social, cultural and leisure structures) Yes  No

3.4. Among the following meanings, which one most corresponds to your district (one answer, please)?

Common/Ordinary

Unique/ Exceptional

Other  \_\_\_\_\_

## Supporting information 2: Pearson correlation coefficients

### Andes Sample

	DIFFICULTY	IDENTITY	AGE	GENDER	EDUCATION	HOUSEHOLD_SIZE	FAMILY	RELATION_FARMERS	RELATION_NEIGHBORS	PROFITABILITY	SATIS_WORK	OFF_FARM_ACTIV	SUCCESSOR	DISTINCTIVE	OTHER_ENVIRONMENT
DIFFICULTY	1.00	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PLACE IDENTITY	-0.15	1.00	.	.	.	.	.	.	.	.	.	.	.	.	.
AGE	-0.11	-0.01	1.00	.	.	.	.	.	.	.	.	.	.	.	.
GENDER	-0.02	-0.09	-0.01	1.00	.	.	.	.	.	.	.	.	.	.	.
EDUCATION	-0.12	-0.14	-0.00	0.06	1.00	.	.	.	.	.	.	.	.	.	.
HOUSEHOLD SIZE	-0.01	0.02	0.05	0.01	0.03	1.00	.	.	.	.	.	.	.	.	.
FAMILY	0.01	0.12	-0.03	-0.04	-0.16	0.02	1.00	.	.	.	.	.	.	.	.
RELATION FARMERS	-0.07	0.01	-0.13	-0.04	0.01	0.02	0.04	1.00	.	.	.	.	.	.	.
RELATION NEIGHBORS	-0.05	-0.05	-0.12	-0.03	0.09	0.04	0.00	0.84	1.00	.	.	.	.	.	.
PROFITABILITY	-0.03	0.03	0.01	-0.08	0.07	0.10	0.03	0.09	0.09	1.00	.	.	.	.	.
SATIS WORK	0.00	-0.04	0.10	-0.02	0.08	0.04	-0.00	0.19	0.24	0.08	1.00	.	.	.	.
OFF FARM ACTIV	-0.12	-0.08	0.09	0.17	0.16	0.12	-0.07	-0.15	-0.09	-0.05	-0.06	1.00	.	.	.
SUCCESSOR	-0.09	-0.02	0.01	0.10	0.04	-0.01	-0.07	-0.00	-0.00	0.01	0.04	0.01	1.00	.	.
DISTINCTIVE	0.05	0.00	-0.03	-0.04	0.14	0.03	-0.00	0.04	0.04	0.16	0.09	-0.13	0.04	1.00	.
OTHER ENVIRONMENT	-0.01	-0.07	0.21	-0.08	-0.07	-0.07	0.05	-0.23	-0.26	-0.09	-0.18	0.06	-0.01	-0.16	1.00

### Intag sample

	DIFFICULTY	IDENTITY	AGE	GENDER	EDUCATION	HOUSEHOLD_SIZE	FAMILY	RELATION_FARMERS	RELATION_NEIGHBORS	PROFITABILITY	SATIS_WORK	OFF_FARM_ACTIV	SUCCESSOR	DISTINCTIVE	OTHER_ENVIRONMENT
DIFFICULTY	1.00	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PLACE IDENTITY	-0.00	1.00	.	.	.	.	.	.	.	.	.	.	.	.	.
AGE	0.11	0.14	1.00	.	.	.	.	.	.	.	.	.	.	.	.
GENDER	-0.04	-0.07	-0.12	1.00	.	.	.	.	.	.	.	.	.	.	.
EDUCATION	0.02	0.05	0.08	-0.04	1.00	.	.	.	.	.	.	.	.	.	.
HOUSEHOLD SIZE	-0.06	0.09	0.15	-0.01	-0.06	1.00	.	.	.	.	.	.	.	.	.
FAMILY	0.01	0.07	0.02	-0.04	0.06	-0.09	1.00	.	.	.	.	.	.	.	.
RELATION FARMERS	0.09	0.14	-0.07	0.04	-0.06	-0.02	0.02	1.00	.	.	.	.	.	.	.
RELATION NEIGHBORS	0.06	0.18	-0.11	0.01	-0.04	-0.03	0.02	0.68	1.00	.	.	.	.	.	.
PROFITABILITY	0.08	0.00	0.15	0.14	-0.00	0.04	0.06	0.13	0.16	1.00	.	.	.	.	.
SATIS WORK	0.05	-0.12	-0.04	0.21	0.02	0.00	0.01	0.04	0.05	0.21	1.00	.	.	.	.
OFF FARM ACTIV	0.07	0.10	0.09	0.07	0.10	-0.09	0.08	0.16	0.11	0.21	0.04	1.00	.	.	.
SUCCESSOR	0.05	-0.10	-0.06	-0.06	-0.03	-0.01	0.11	0.14	0.14	0.11	0.10	-0.10	1.00	.	.
DISTINCTIVE	-0.11	0.03	-0.04	-0.01	0.14	-0.00	0.07	0.03	0.09	0.18	0.09	0.00	0.03	1.00	.
OTHER ENVIRONMENT	-0.04	-0.00	-0.03	-0.04	0.03	0.02	-0.10	-0.08	-0.11	-0.01	-0.07	0.01	0.04	-0.17	1.00

**Supporting information 3: Check of the results' robustness to the omission of some variables**

Variables	Coefficients and significance							
	Andes area				Intag area			
DIFFICULTY_1_PLACE IDENTITY_1	0.489**	0.353	0.415**	0.543**	0.394*	0.436*	0.281	0.306
DIFFICULTY_1_PLACE IDENTITY_0	-0.188	-0.239	-0.373*	-0.193	0.463**	0.471**	0.227	0.358
DIFFICULTY_0_PLACE IDENTITY_1	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
DIFFICULTY_0_PLACE IDENTITY_0	-0.331*	-0.265	-0.238*	-0.328*	0.312	0.276	0.280	0.146
AGE	.	-0.232*	-0.180	-0.220	.	-0.186	-0.149	-0.269*
GENDER	.	-0.112	-0.131	-0.087	.	0.017	0.088	-0.024
EDUCATION	.	-0.016	0.060	0.366	.	0.038	0.232	0.420
HOUSEHOLD SIZE	-0.026	.	0.105	0.022	0.114	.	0.245*	0.118
FAMILY	-0.181	.	-0.214	-0.195	0.152	.	0.238	0.222
RELATION FARMERS	1.236***	.	0.710***	1.208***	0.675*	.	0.137	0.578*
RELATION_NEIGHBORS	-0.553	.	-0.192	-0.560	-0.517	.	-0.074	-0.461
PROFITABILITY	0.178	0.189	.	0.259	0.187	0.221	.	0.368*
SATIS WORK	-0.022	0.097	.	0.076	0.278*	0.262	.	0.300*
OFF FARM ACTIV	0.364**	0.292**	.	0.292	-0.237	-0.196	.	-0.247
SUCCESSOR	0.146	0.156	.	0.174	-0.114	-0.099	.	-0.134
DISTINCTIVE	0.624***	0.580***	0.424***	.	0.682***	0.639***	0.517***	.
OTHER_ENVIRONMENT	-0.220	-0.313	-0.155	.	-0.154	-0.172	-	.
							0.473***	
Pseudo R2	0.0669	0.0459	0.0439	0.0477	0.0534	0.0481	0.0414	0.0281
Log pseudolikelihood	-416.3253	-431.24565	-	-426.63283	-	-	-	-334.96725
Wald Chi2	67.25***	44.29***	584.9587	45.95***	324.1848	325.9816	491.2284	27.38**
Number of observations	277	282	1	278	36.88***	3	3	228
			62.13***		227	31.64***	40.91***	
			387			227	333	

\*\*\*, \*\* and \* refer to significance at the levels of 1%, 5% and 10%, respectively.

**Supporting information 4: Check of the robustness of the results to different specifications of the variables EDUCATION and AGE**

Variables	Coefficients and significance			
	Andes area		Intag area	
DIFFICULTY	0.175	.	0.075	.
DIFFICULTY_1_PLACE IDENTITY_1	.	0.467**	.	0.492**
DIFFICULTY_1_PLACE IDENTITY_0	.	-0.244	.	0.572**
DIFFICULTY_0_PLACE IDENTITY_1 (Ref)	.	.	.	.
DIFFICULTY_0_PLACE IDENTITY_0	.	-0.295*	.	0.310
AGE_1 (Less than 30 years old) (Ref)	.	.	.	.
AGE_2 (Between 30 and 39 years old)	-0.130	-0.115	-0.096	-0.116
AGE_3 (Between 40 and 59 years old)	0.031	0.056	0.003	-0.000
AGE_4 (60 years old and more)	0.165	0.198	0.376	0.383
GENDER	-0.118	-0.078	-0.083	-0.085
EDUCATION_1 (without education) (Ref)	.	.	.	.
EDUCATION_2 (Primary education)	-0.462**	-0.466**	0.166	0.107
EDUCATION_3 (Secondary education)	-0.575**	-0.512**	-0.108	-0.210
EDUCATION_4 (Higher education)	-0.428	-0.309	0.216	0.119
HOUSEHOLD_SIZE	0.011	-0.040	0.200	0.237
FAMILY	-0.132	-0.174	0.222	0.197
RELATION_FARMERS	1.342***	1.304***	0.696**	0.704**
RELATION_NEIGHBORS	-0.777**	-0.678**	-0.615**	-0.580*
PROFITABILITY	0.226	0.198	0.251	0.259
SATIS_WORK	-0.012	0.020	0.315*	0.278
OFF_FARM_ACTIV	0.375***	0.402***	-0.172	-0.185
SUCCESSOR	0.134	0.148	-0.080	-0.112
DISTINCTIVE	0.590***	0.587***	0.611***	0.643***
OTHER_ENVIRONMENT	-0.210	-0.129	-0.170	-0.159
Pseudo R2	0.0664	0.0761	0.0576	0.0651
Log pseudolikelihood	-416.52053	-412.2257	-322.74492	-320.17598
Wald Chi2	77.57***	86.25***	36.73***	42.02***
Number of observations	277	277	227	227

\*\*\*, \*\* and \* refer to significance at the levels of 1%, 5% and 10%, respectively.