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Social Preferences Among the People of Sanquianga
in Colombia

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“SOCIAL PREFERENCES AMONG THE PEOPLE OF SANQUIANGA IN COLOMBIA”

Roots of Human Sociality Project

<http://www.hss.caltech.edu/roots-of-sociality/phase-ii>

JUAN CAMILO CARDENAS¹

Abstract

The afro-descendent people of the Sanquianga region in the Colombian Pacific Coast live under particularly extreme poverty conditions. Although highly integrated to markets through very frequent interactions, their access to basic social services and stable income generating activities are constrained, and their dependence on their local commons for food, fisheries, wood and firewood is high. Nevertheless, their pro-social preferences are rather high compared to other regions of Colombia and the world. High levels of altruism, sharing, reciprocity and hyper-fairness were observed in a series of Dictator, Ultimatum and Third-Party Punishment experiments conducted with a sample of 186 adults of two villages in the region. One of the more striking findings is that personal material wealth is associated with lower levels of generosity in the DG and UG games. Some explanations based on the historical roots of these small-scale societies may explain such pro-social behavior.

Key words: poverty, generosity, pro-sociality, experimental economics, dictator, ultimatum, third-party punishment, Sanquianga, Pacific Coast, afro-descendants.

JEL Classification: C93, D1, D31, D63, D64, I32.

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This is definitely a collective effort. The first gratitude is to Lilliana Mosquera who was the main research assistant in the field for these experiments. Ana Maria Roldán and Pablo Ramos also provided major assistance in the field, and Natalia Candelo processed the data. My colleagues Diana Maya and Maria Claudia Lopez had a major role in the field and in the design and adaptation of the experimental design to the context. Ximena Zorrilla and Carmen Candelo have always been very helpful with their enthusiasm and devotion in the field and with the communities in Sanquianga. The people of Bazán and Amarales in Sanquianga deserve as well my gratitude, as well as Eduardo Restrepo, a true scholar on the Pacific coast social systems. Jean Ensminger, Abigail Barr and Joe Henrich have made this entire project possible and have also provided valuable inputs for my particular case. An international fellowship from The Santa Fe Institute also provided ideal conditions for research.

“PREFERENCIAS SOCIALES ENTRE LA GENTE DE SANQUIANGA EN COLOMBIA”

Proyecto de las raíces de la sociabilidad humana
<http://www.hss.caltech.edu/roots-of-sociality/phase-ii>

JUAN CAMILO CARDENAS²

Resumen

Los habitantes afro-descendientes de la región de Sanquianga en la costa Pacífica de Colombia viven bajo condiciones particulares de extrema pobreza. Aunque altamente integrados a los mercados a través de frecuentes interacciones, su acceso a servicios sociales y a actividades estables de generación de ingreso es muy limitado y su dependencia muy alta de los recursos de uso común locales para obtener comida, pesca, madera y leña. Sin embargo, sus preferencias sociales son relativamente mayores a las observadas en otras regiones de Colombia y del mundo. Se observaron niveles altos de altruismo, disponibilidad a compartir, reciprocidad y de *hyper-fairness* (hiper-justicia) a través de una serie de experimentos del Dictador, Ultimatum y Sanción a Terceros llevados a cabo en una muestra de 186 adultos en dos poblaciones de la región. Uno de los resultados más sorprendentes es que la riqueza personal material estaba asociada con niveles de generosidad en los juegos de Dictador y Ultimatum. El documento ofrece algunas explicaciones a este comportamiento pro-social en las raíces históricas de estas sociedades de pequeña escala.

Palabras clave: pobreza, altruismo, pro-socialidad, economía experimental, juego del dictador, juego del ultimatum, sanción de terceros, Sanquianga, Costa Pacífica, afro-descendientes.

Clasificación JEL: C93, D1, D31, D63, D64, I32.

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Este es definitivamente un esfuerzo colectivo. El más alto agradecimiento para Lilliana Mosquera quien prestó la asistencia más importante en campo para estos experimentos. Ana María Roldán y Pablo Ramos también proporcionaron ayuda importante en campo y Natalia Candelo procesó los datos. Mis colegas Diana Maya y María Claudia López tuvieron un papel principal en este campo y en el diseño y la adaptación del diseño experimental al contexto. Ximena Zorrilla y Carmen Candelo aportaron con su entusiasmo y dedicación en el campo y para con las comunidades en Sanquianga. La gente de Bazán y de Amarales en Sanquianga merece también mi gratitud, así como Eduardo Restrepo, un experto en los sistemas sociales de la Costa del Pacífico. Jean Ensminger, Abigail Barr y Joe Henrich han hecho posible este proyecto y también han proporcionado insumos valiosos para este caso particular. Una beca internacional del instituto de Santa Fe también proporcionó las condiciones ideales para la investigación.

Introduction.

The Afro-Colombian groups that have for many centuries occupied the Pacific coast of Colombia have always been involved in one way or another with the social dilemma of extracting natural resources through mining and the use of forests, mangroves, and fisheries. Over the centuries, on the other hand, urban and rural settlements of this coastal region have been separated from the paths of state intervention and western development more typical of the Andean regions in Latin America. The differences in basic social indicators within the country reflect the lack of formal institutions and actions to address social needs through the provision of public goods such as health, education, and employment, among others³. Further, the majority of ecological settings are mangrove and catival forests, which provide more difficult conditions for the emergence of individual property rights over productive assets such as land and livestock.

These groups have a higher dependence on natural resources under joint access and an absence of the state. Thus, there are grounds for the hypothesis that these groups would maintain a set of social preferences for endogenously solving the kind of coordination failures that emerge in many small scale groups through more informal mechanisms or institutional arrangements at the very community level. Preferences that are more pro-social can be valuable for the solution of coordination, bargaining, and cooperation problems typical of groups facing, for instance, the joint use of a common-pool resource or the voluntary provision of other basic needs (e.g. social insurance using informal safety nets through generosity and reciprocal gifts).

Using a set of experimental methods aimed at measuring mechanisms and traits such as altruism, reciprocity, and endogenous punishment of anti-social behavior, we can study the degree of presence of such social preferences in a sample of individuals from a population in this region. This paper is aimed at exploring the presence of such social preferences today and providing a discussion of the mechanisms involved in their maintenance. The validity of these tests is compared to examples from outside of the field site context in which these experiments were conducted. In this respect, the exploration of whether poverty and wealth based on private assets are factors associated with more or less social preferences within the groups is of particular interest. Previous experimental work conducted in other rural settings of Colombia suggests that people who are more dependent on common-pool resources, or households with less private assets such as land and livestock, find it more difficult to solve a local commons dilemma through endogenous mechanisms (Cardenas, 2003; Cardenas et al., 2002).

³ While the rest of the country shows unemployment rates of 11%, such an indicator is at 14% for the afrocolombians living in various regions and mainly in the pacific coast. The primary schooling coverage is similar to the rest of the country. Secondary schooling reaches 62% while the rest of the nation reaches 75%. College level education coverage is only 14% for this group, compared to 26% for the rest of the nation. The uninsured population encompasses 51% of the afrocolombians while the same rate is at 35% elsewhere. Only 46% of the population in the afrocolombian population has access to sewage systems while the rest has reached an 81% level. Further, 72.85% of the afrocolombian population are at high risk of malaria, while indicators of the rest of the country are at less than a third of that (DNP, 2004).

This paper will start with a succinct description of the background of the people from which the sample of participants was drawn. It then enumerates the basic design used and gives details of the sample for the experiments conducted. Last, it discusses the results in terms of the experimental designs, institutions tested, the incentives constructed, and the socio-economic data collected for the participants.

1. The Sanquianga communities and their environment.

Extraction of natural resources has systematically marked the human occupation of the southern part of the Pacific coast in Colombia. During the XVII and XVIII centuries, gold mining induced the establishment of settlements for the extraction and trading. Over the centuries, these settlements have changed to other resource extraction like rubber, *tagua*, *naidi palm*, and logging while continuing the exploitation of fisheries and other mangrove forest resources for the subsistence of the communities (Restrepo, 1996; del Valle et al., 1996).

The Sanquianga people are Afro-descendent communities. They have occupied the sea level mangrove and *catival* forests in the Pacific coast and tropical humid forest region in the Nariño region since the abolishment of slavery in Colombia in the 1850s. Most of these groups spread through the forest and natural canals of the forest in small settlements, alternating small farming with extractive activities, initially gold mining. They then moved to logging for medium and large logging mills established in the main settlements of the region. In the coastal areas, much of the economic activity moves around extracting resources from the mangrove (firewood, logging, mollusks, crabs) and from the coast (shrimp, fish) while benefiting from other goods and services from this ecosystem (e.g. protection from natural disasters such as tides and tsunamis).

In 1977, a large portion of this region (~80,000 has) was declared the Sanquianga National Park for conservation purposes. Nevertheless about 11,000 people live today within the boundaries of the park (Ministry of Environment, 2004). The two settlements where the experiments were conducted, Bazán and Amarales, are located within the park, similar to other settlements from the five municipalities that overlap with the park area. The region is accessible by boat from the nearby urban centers (Guapi or Tumaco) and by airplane or secondary roads from the south center of the country.

The area is located within 2° 22' and 2° 04' (N), and 78°76' and 75°37' (W or E?). Humidity is around 80%, annual rainfall between 3,000 and 3,500 mm., and the mean temperature is 26°C. June and July are the months with the highest rainfall and November is the month with the lowest; there is no deficit of water throughout the year.



Figure 1. Mangrove forest in the Pacific south, Nariño. Source: Ministry of Environment (2004).

The arrow in the following map (see Figure 2) shows the location of the two settlements where the experiments were conducted. The darker area corresponds to the mangrove forest area along the coast to the border with Ecuador. The thick line is the border of the national park within which the settlements are located.

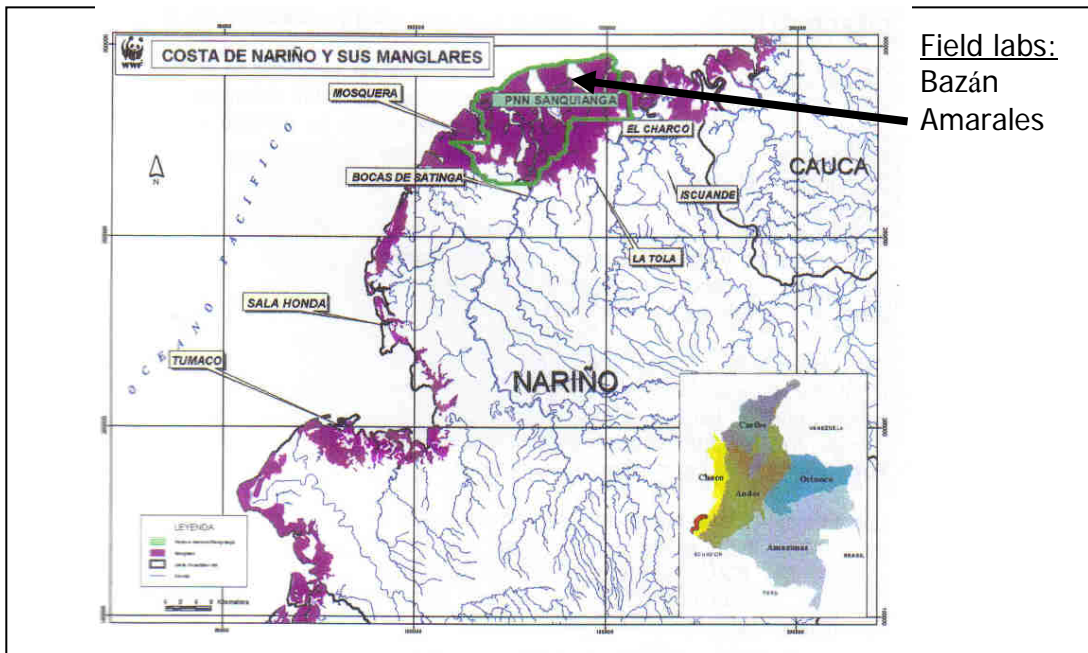


Figure 2. Location of field site in the Pacific coast of Colombia. National Park boundaries are shown in the upper part of the map. Darker shades represent the mangrove forest. Source: World Wide Fund – WWF-Colombia Program.

The map also shows the main municipalities in the region. Table 1 shows demographic data for the urban and rural population in the region. Most of the participants in the experiments live in the municipalities of El Charco and La Tola. The demographic projections for the main five municipalities show that, on average, two thirds of the population live in the rural areas.

Municipalities	Total	Urban	Rural	% Rural
EL CHARCO	21.464	5.827	15.637	73%
MOSQUERA	11.167	3.279	7.888	71%
LA TOLA	6.659	3.613	3.046	46%
OLAYA HERRERA	28.697	9.305	19.392	68%

Table 1. Distribution of urban and rural population for the main municipalities in the region. Source: Projections based on census 1993, Dane, 2003.

Dependence on extractive resources has always been a major challenge for these communities. Likewise, the challenges of resource extraction put a greater pressure on solving the social dilemma of a common-pool resource. Extraction of the “*piangua*” clam (*anadara tuberculosa*) is mostly done by women and is used for self-consumption and sale in local markets. In the last few years, the decrease in the “*piangua*” clam supply in neighboring Ecuador, and the decrease of shrimp and fish stocks in the coastal fisheries of the region, has led to many changes. Extraction has increased, the market size has decreased, and the population devoted to its extraction has changed from mostly women to include men. The officers of the National Park, with minimum monitoring, minimum enforcement resources, and few rules issued by the national and regional environmental authorities, provide a weak set of enforcement institutions for the state regulation of natural resource use. However, there have been recent attempts to formalize agreements with the local communities and organized groups to limit sizes, net types and sizes, and to enforce the closed season for some of the resources according to the biological cycles.

a. Demographic data from the sample of people participating in the experiments.

The demographic and socio-economic data of the sampled people that participated in our experiments in Sanquianga provide a fair representation of the context in which these communities operate with respect to the ecosystem and the markets. The sampled people live in two settlements, Amarales and Bazán, which are a few miles apart and have very similar ecological and economic conditions (see map in Figure 2). Due to the settlement sizes, it was difficult to recruit the entire sample from one settlement. 62% of them were recruited in Bazán and the remaining 39% in Amarales.

There is a description of the process of recruiting subjects later on. Table 2 summarizes the main demographics for the entire sample of participants in the experiments.

Variable	n	Mean	Std.Dev	Min	Max
Gender (1=female)	186	0.56	0.497	0	1
Age (years)	185	36.19	15.027	16	77
Education (years)	186	4.05	3.140	0	13
Household wealth USD	186	\$2234.98	\$4383.5	0	\$46862.31
Individual Income USD	186	\$1894.74	\$2321.7	0	\$14803.85
Household size	186	6.68	2.93	2	16
Tenure (as % of age)	185	0.53	0.35	0.004	1

Table 2. Main Demographic variables. Source: Author, surveys conducted during experiments.

The tenure demographic, obtained by dividing the number of years living in the present settlement by their age, is about 53% (see Table 2). About one third of the respondents have lived their entire life in this location, while the rest of respondents are spread across the rest of the spectrum. There is mobility across settlements and regions for various reasons including political violence and labor market fluctuations.

b. Market Integration.

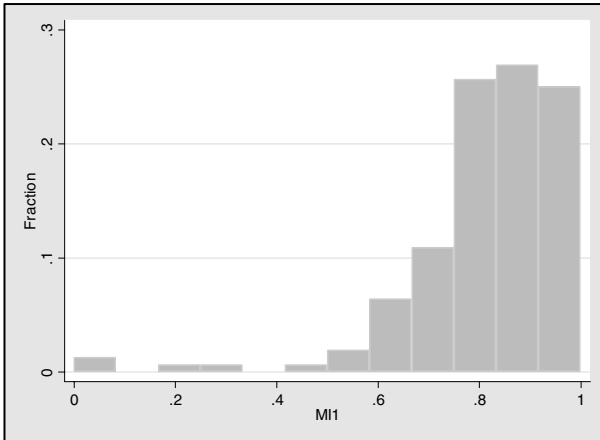
The five panels shown in Figure 3 compile the five indices of market integration developed for this study (see Table 3), which describe the socio-economic characteristics of this group and communities. These indices were estimated based on the survey data gathered through the individual and household surveys that were conducted with the entire sample of 186 participants.

Measures of market integration

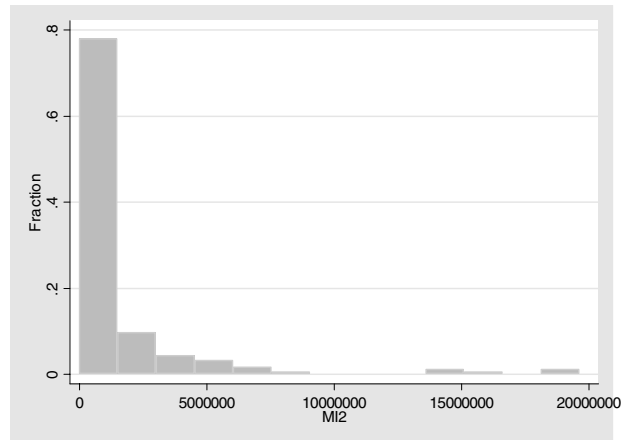
- MI1 % of Household Diet Purchased in Market
- MI2 Income from wage labor, rental, trade, in Col\$ pesos
- MI3 Frequency of wage labor in last month, in days
- MI4 Trips to market in the last 7 days
- MI5 Frequency of trading goods for purchase/resale during last month, in trades

Table 3. Indices of Market integration.

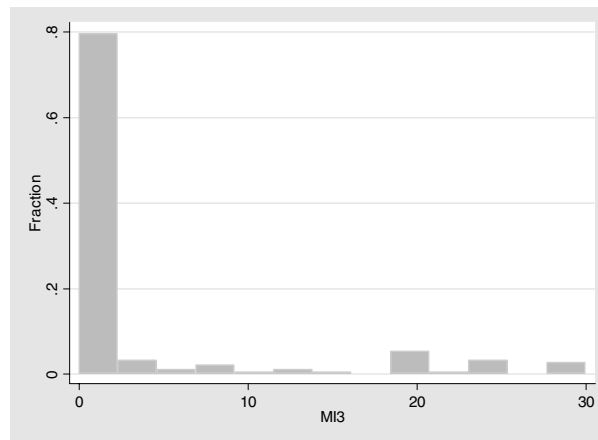
Panel A (MI1 – % Diet purchased in markets)



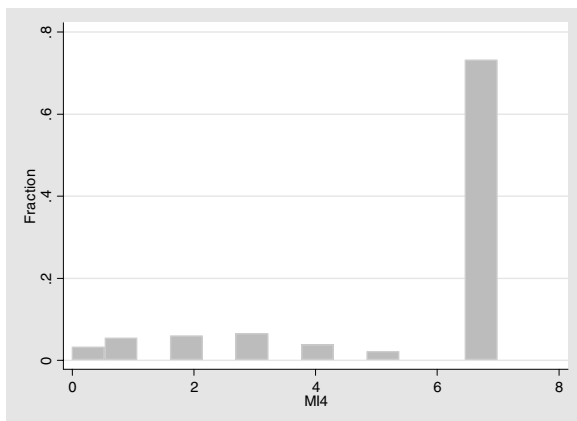
Panel B (MI2 – Income from wages, rental, trade)



Panel C (MI3 – Days in wage labor last month)



Panel D (MI4 – Trips to market in last 7 days)



Panel E (MI5 – No. trades for purchases and resale)

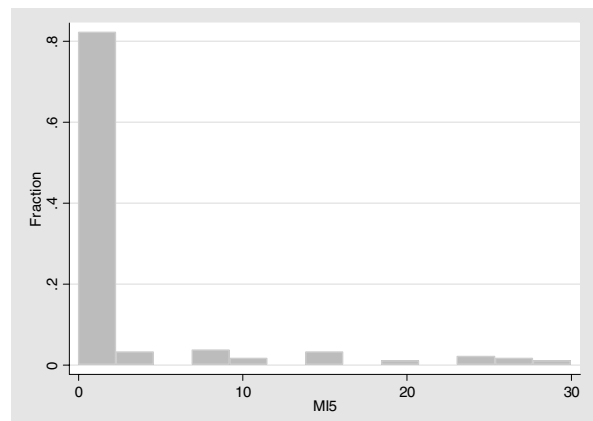


Figure 3. Distributions for the five market integration indices (n=186 individuals).

As we can see in Panel A of Figure 3, a large fraction of the participants acquire more than 80% of their diet from the market, primarily from small local stores and trading boats that pass by regularly. These people interact very frequently with the market on a daily and

weekly basis to purchase small amounts of staple food to complement their catch from fishing and *piangua* gathering. These purchases are usually rice, oil, salt, plantains, and canned food. Very few people own or farm land for subsistence but rather barter “*sea for land*” weekly when farmers from the upper stream settlements in the Tapaje, Sanquianga, and Satinga rivers come down with their plantains and other crops to acquire fish and other coastal resources.

However, a very small fraction of their income is earned through labor markets, as seen in panels B and C. These people very scarcely engage in wage labor activities, which include being hired to repair fishing nets, house building, or for the local government’s sporadic infrastructure or maintenance projects. Therefore, correlations among these market integration indices are very weak, as shown in Table 4. As expected, only income from market exchange involving wage and frequency of participation in the labor market are correlated.

	mi1	mi2	mi3	mi4	mi5
mi2	0.0642 0.4260 156	1.0000 186			
mi3	-0.0698 0.3867 156	0.3965* 0.0000 186	1.0000 186		
mi4	-0.0271 0.7371 156	-0.0932 0.2058 186	-0.1864* 0.0109 186	1.0000 186	
mi5	0.0123 0.8791 156	0.0639 0.3863 186	0.1684* 0.0216 186	-0.0772 0.2952 186	1.0000 186

Table 4. Correlation coefficients for market integration variables. P-values and sample size below correlation coefficients.

c. Wealth and income.

Material wealth represented in productive assets with a market or exchange price is rather rare (see Figure 4). More than 80% of our participants reported owning no assets that could be accounted as material wealth with some market exchange value such as farm land, livestock, or other productive equipment. A few people reported owning boats, some animals, a few hectares of land, or an outboard motor.

About half of the participants reported earning no income from the following activities: Wage work, trading profits, selling home produced items, rental income, and cash remittances. About 25% of the participants reported earning about US \$1,000/year, 10% between \$1,000 and \$2,000 and the remaining 15% spread across the rest of the range with very few earning even up to \$15,000/year (2003 prices).

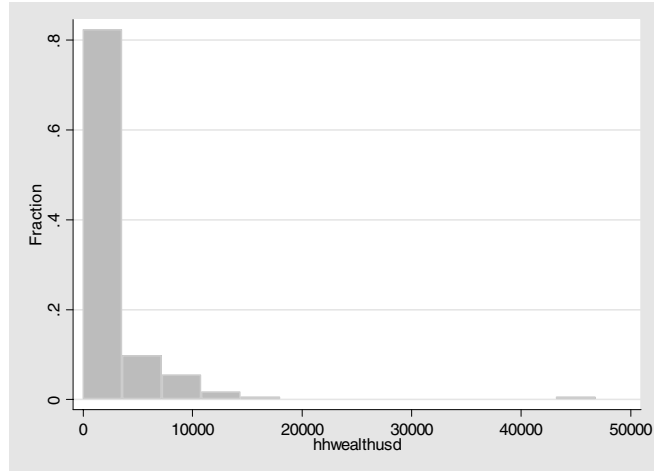


Figure 4. Distribution of wealth in USD (in productive assets valued at local prices) in the sample of individuals.

Further tests on the sample data show no significant correlations among education, wealth, and income variables. Gender does seem to be negatively correlated with income and wealth, namely, women earn a substantially lower income (based on our measure) and own less assets as measured by the protocol used. However, no significant difference exists in years of education by gender, which oscillates around 3.5 and 4.5 years of primary school for the sample.

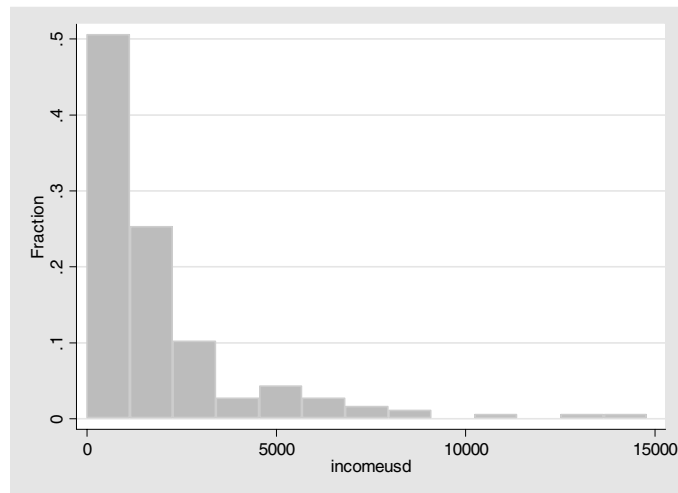


Figure 5. Distribution of income in USD (from age work, trading, profits, remittances) in the sample of individuals.

Based on these data, direct observation, and other sources (Restrepo, 1996; Del Valle, 1996), we could describe the economic and social systems of these people as highly dependent on extractive natural resources subject to the common-pool resource dilemma. Only a minor fraction of these households are dependent on private wealth (e.g. land or livestock). Human

capital (e.g. education) does not seem to explain income or wealth at individual or household levels.

There is a rather high integration to local markets and market transactions in terms of frequency, mostly in the purchase of goods for immediate consumption. However, the fraction of income that is generated through market transactions is rather small, despite some frequent transactions for selling their catch from fishing and gathering the *piangia*, and in rare occasions, obtaining wages from labor.

2. Experimental approach to the social preferences of the Sanquianga People.

This section describes specific elements of the design used for the experiments but will not go over the detailed protocols used since these were homogenous for the entire project and are reviewed in the first chapter of the volume. The Spanish version of the protocols, instructions, and forms are included in the appendix. However, some specific details about the setting for the experiments can be of value to the reader.

The experiments that were conducted for the Sanquianga case were the following⁴:

Experiment	No. Sessions	No. People
Dictator Game (DG) and Strategy Method Ultimatum Game (SMUG)	30 pairs (SMUG)	
	30 pairs (DG)	60 ⁵
Third-Party Punishment Game (3PP)	32 trios	96
Double-Blind Dictator Game (DBDG) (*):	15 pairs	30
Totals (Sanquianga)	107	186

(*) Not reported here.

Replication with Colombian students: 14 pairs (28 people) for the UG and SMUG.

Table 5. Sample size by experiment.

All experiments were conducted in Spanish by the main researcher (Cardenas) as the monitor and interviewer for all sessions. Students and field assistants provided help with collecting the additional information on the individual and household survey data forms. All sessions were run from August 19 to August 23, 2002. Field work, recruitment, follow-up, gathering of field data, and secondary sources occurred for almost the entire month of August.

Based on an estimated population of about 1,500 people in Amarales and about 2,300 in Bazán, the 72 people recruited in the former and the 114 people in the latter represent roughly 5% of the population in these settlements. The two sites are within a few miles of

⁴ The core games (DG, SMUG, 3PP) are reported here. Results for the replications with students and the Double-Blind experiments are not included in the analysis that follows.

⁵ Recall that for the DG and SMUG, the same group of people played both games, although matching was anonymous and random. Choices for the first game (DG) were not known to player 2s until the second game (SMUG) was finished.

each other by boat and have very similar conditions in terms of access to the resources they extract. Both sites are within the national park boundaries and have a common history in terms of the origins of their people, traditions, and demographic characteristics. However, Bazán has a significantly higher level of poverty in terms of income and wealth ownership, also confirmed by the sampled household wealth.

a. Logistics: Our Field Lab.

In both Amarales and Bazán, we chose the local school as the main site for conducting the experiments. Recruitment was done during the days before the sessions in the following manner. Through local contacts (local leaders, school teachers, and municipal officials), the word was spread that a set of economic exercises were to be conducted in the local school in a specific number of days and times and that any adult from the village could participate. It was also clear that no two people from the same household could be in the same session, yet we encouraged people from the same household to sign up for the exercises in order to have better coverage of the entire village⁶. The small sizes and high population density of the two settlements guaranteed that once the word was spread, it was quite unlikely that the sample could have a specific bias in favor of these contacts



Figure 6. School at Amarales, people waiting for their turn in the DG and SMUG games. Source: Author.

⁶ In fact, such recruitment rules were easily enforced by the same pool of potential participants willing to participate if they saw two people from the same household in one session.

All participants were recruited in batches of about 20 people and were assigned to specific periods of the day (morning, afternoon). For each of the groups, the same protocol was followed and can be roughly summarized as follows: once the number of required people arrived (e.g. 20 people for 10 pairs of DG and SMUG games), the door for the school room



was closed. The researcher welcomed everyone and read the instructions of the games. Once examples were presented, the roles (player 1 or 2) were assigned randomly. The actual individual experiments were conducted in a separate place (see figure 6) where each participant made their decision one at a time.

Figure 6. Researcher with a participant in the Dictator game (Bazán), sitting in the second story of a municipal building where fishermen lay their nets. Source: Author.

While each of the players made their decisions with the researcher, the rest of the group waited in the original school room or outside. The players that had already been through the individual decision step were moved nearby to a third location, usually next to another school room. In both cases (before and after the decisions) the groups were held under supervision of a monitor or assistant, who did not allow people to engage in conversations regarding the game. The assistants used this time to fill out the individual and household surveys, as shown in the next pictures in Figure 7. We provided refreshments for the groups while they waited during the sessions.

It was difficult, however, to keep the groups from discussing decisions and strategies about the game, at least for those leaving the individual decision step. Nevertheless, the data does not seem to support major differences between the early sessions and later sessions within a site, thus making it unlikely that there were carry-on effects.



Figure 7. Group of participants waiting for their turn in the experimental sessions and monitor filling survey forms with participant. Source: Author.

After all the participants made their decisions, players were informed of their payoffs, paid, and asked to sign receipts and finish filling in the survey forms. When this was completed, we moved on to the next batch of participants.

3. Analysis: explaining behavior in social preferences experiments.

The Dictator (DG), Ultimatum (SMUG), and Third-Party Punishment (3PP) experiments provide very valuable information about people's preferences for fairness, altruism, reciprocity, and social punishment. These have emerged as key features in the literature on individuals and their economic rationality regarding others (Bowles, 1998; Camerer and Fehr, 2004). Given their simplicity and standardization of the protocols, these games allow us to replicate tests across sites, cultures, social groups, and individuals, offering the possibility of cross-site comparisons and discovery of factors that may explain the observed behavior within and across sites. Such is the case for the Sanquianga people, where very low levels of schooling and social relations based on fairness and reciprocity are usually observed in daily life interactions with their environment and with each other.

This section describes the main outcomes of the core experiments and will statistically explore how the demographic and socio-economic characteristics of the participants may in fact explain variations in the experimental behavior. The section starts with the main distributions of decisions by first players in the three core games and will continue with the

strategic data (schedules) on second players in the SMUG and third players in the 3PP games.

a. Offers by Player 1s (core games) driven by strong fairness norms.

In our sample, the same 30 people were player 1 in both the DG and SMUG, and another 30 people were player 2 in both games, although the pairing was not fixed from one game to the other. Recall that player 2 did not know decisions from the DG at the time he had to decide his schedule of rejections for the SMUG. In the 3PP game, we had 32 trios. All offers are summarized in Figure 8. The offers could only be made in tenth units, as we endowed player 1s with Col\$10,000 in bills of \$1,000.

The median and distribution of offers are highly consistent with previous work where fair offers of 50% of the initial endowment is the most frequent decision by player 1s in these experiments. For all three cases, sending 50% of the initial endowment was the modal offer. Reported offers in the experimental literature using the DG game with students and non-students⁷ are below the 50% average (Cardenas and Carpenter, 2005). In our SMUG the modal offer of sending half was made by 70% of the participants, which is consistent with the literature that reports increased fair offers under this institution.

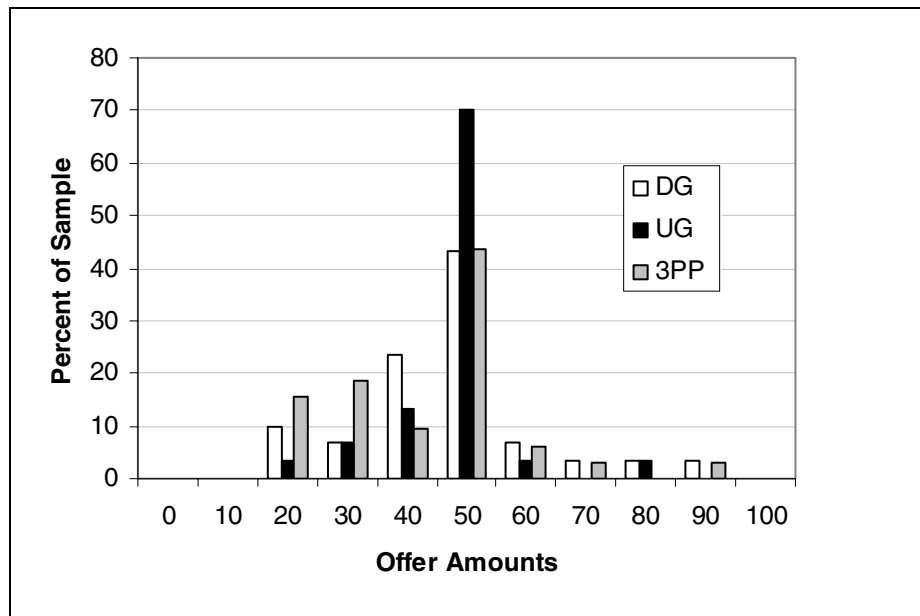


Figure 8. Frequencies of offers by player 1s in the Dictator (DG), Strategy Method Ultimatum (SMUG) and the Third-Party Punishment (3PP) games.

⁷ Cardenas and Carpenter (2005) survey about 15 papers from different countries in the world using the dictator game. For the student subject pools, the average offer is around 25% and ranges from 20-30%. For non-students the average offer found is 40%.

A few points regarding fairness behavior by player 1s are worth discussing from these data. Notice in Figure 8 that the frequency of low offers decreased from the DG to the SMUG. Also, the 50% offers increased from 43% to 70%. The possibility of a very costly punishment created by a rejection in the SMUG induces, on average, more fair offers in player 1s if compared to their offers in the DG case. However, it is interesting to note that 57% of our player 1s maintained their exact offers from DG to the SMUG and 27% increased theirs. In fact, eight out of the thirty people in the role of player 1 increased their offers from the DG to the SMUG, and five decreased their offers, two of whom had originally offered 90% and 70% of their endowment in the DG case. There is a strong statistical pairwise correlation between the offers (pairwise correlation = 0.5700, p-value=0.0010), and we fail to reject the hypothesis that the two distributions are statistically different. A Wilcoxon matched-pairs signed-ranks test for the 30 pairs of observations yields a z value of -0.709 with a Prob > |z| = 0.4780, and a simple t-test also supports the idea that the two distributions are equal, with a minuscule difference in mean offers of \$0.06 (about 0.7% of the initial endowment) and a t-test = -0.2842 and a P > |t| = 0.7783.

Therefore, the Ultimatum structure of rules increases the chance of 50/50 splits. It seems that there are already strong preferences for fairness and equal splits even under the less strategic Dictator Game in this community. Later, the discussion will focus on the behavior of player 2s in the SMUG to help explain the behavioral elements just discussed. As we will observe, the likelihood of rejection by player 2s in the SMUG is rather low compared to similar experimental evidence and further confirms the proposition of very strong hyper-fair norms among these social groups. This is highly consistent with the fair offers in both the DG and SMUG.

The offers for the Third-Party Punishment game deserve additional comments. As we can see in Figure 8, the 50/50 offers in the 3PP are less frequent than in the SMUG; offers of 20% and 30% of the initial endowment were more frequent under the 3PP game. On average, the offers in the 3PP were similar to those in the DG⁸ and slightly smaller than those in the SMUG⁹. The differences are not statistically significant, but this could be because of the limited sample size of 30 and 32 observations, respectively.

b. Strategies of rejection and punishment by Player 2s driven by hyper-fairness, aversion to inequality for some, and conformism for others.

The data on player 2s for the case of the SMUG and player 3s for the 3PP game enrich our understanding of the Sanquianga people and their strong social preferences. Recall that in both cases we used the strategy method, namely because responders would have their strategy of rejections (SMUG) or punishing (3PP) elicited before knowing the exact choice of player 1s but knowing that player 1s had already made their decisions. Since the design and sequence of decisions was common knowledge for all players, we assumed that this strategic environment in the experiment may affect the behavior of player 1s.

⁸ Pairwise comparisons are not feasible since the sample of participants in DG and 3PP were different.

⁹ For the hypothesis that the SMUG offers were higher than for the 3PP, we obtain a t-test $t = 1.3306$, $P > t = 0.0942$, with an average difference in offers of \$0.387, about 4% of the initial endowment.

We have the benchmark of the canonical game-theoretical model prediction. SMUG player 1 should send the minimum nonzero offer assuming player 2 would be better off. Since player 3 in the 3PP case derives no positive material gain from punishing and player 2 cannot affect player 1's well-being, the former should offer zero. However, once a player 1 assumes that the preferences of responders in the SMUG or 3PP include a component of fairness, care for others, or equality, Player 1s should rethink their strategies even for the case of the homo-economicus, who would maximize their earnings by offering fractions that guarantee an acceptance in the case of SMUG or that reduce the probability of punishment in the 3PP game.

Table 7 and Figure 9 show the frequencies of rejection and punishment rates for the SMUG and the 3PP cases. The first and most interesting result is the “U” curve for rejections in the case of the SMUG. We find that very unfair offers are much more likely to be rejected, even if they are unfair to the sender and favorable to the respondent. The zero rejection rates for the 50/50 split confirm the preference for highly fair distributions.

Let us first discuss the strategy by player 2s in the Ultimatum game and later on the punishing behavior of players 3 in the Third-Party Punishment game.

OFFER	UG count	3PP counts	UG (%)	3PP (%)	UG Expected Income (%)	3PP Expected Income (%)
0	12	20	40.00	62.50	60.0	62.5
10	9	19	30.00	59.38	63.0	54.4
20	8	17	26.67	53.13	58.7	48.1
30	5	14	16.67	43.75	58.3	43.8
40	3	9	10.00	28.13	54.0	43.1
50	0	1	0.00	3.13	50.0	48.1
60	2	0	6.67	0.00	37.3	40.0
70	3	0	10.00	0.00	27.0	30.0
80	8	0	26.67	0.00	14.7	20.0
90	8	0	26.67	0.00	7.3	10.0
100	14	0	46.67	0.00	0.0	0.0

Table 6. Frequency of rejections (SMUG) and punishments (3PP) and expected income for both games.

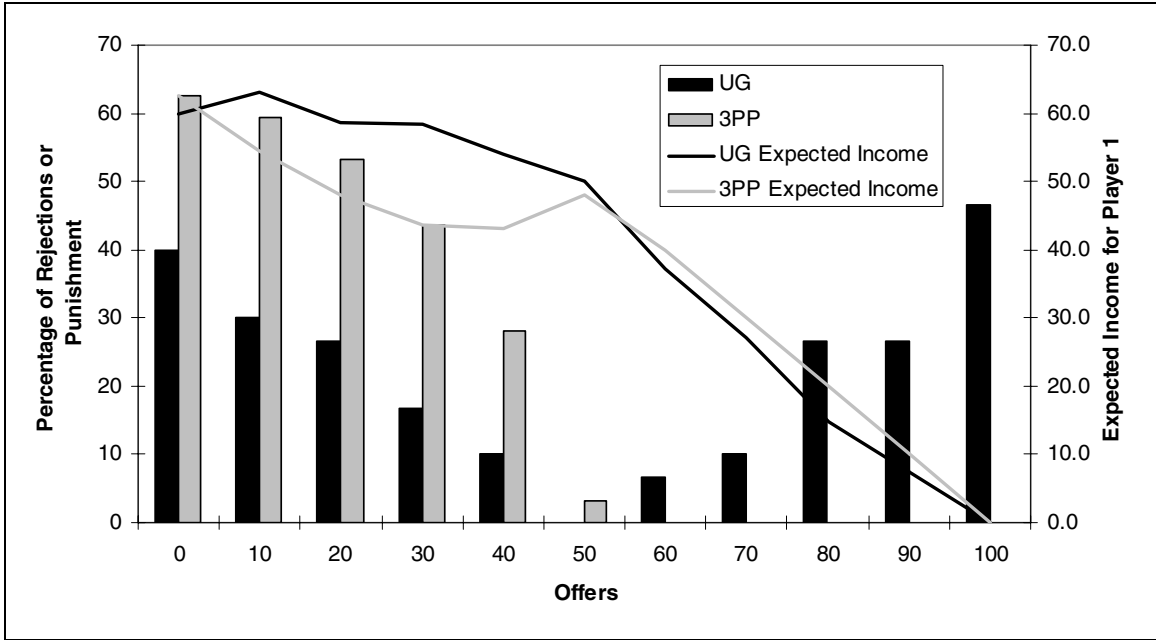


Figure 9. Frequency of rejections (SMUG) and punishments (3PP) and expected income for both games.

However, a more detailed look at the individual data reveals a more complicated story about the behavior of respondents in the SMUG. Looking at the individual schedules elicited from these 30 people, roughly half (14) of them accepted all possible offers from 0% to 100%, and the remaining half (16) responded by rejecting unfair offers based on the “U” curve shown in figure 9. Table 7 shows the individual accept/reject schedules with each row being one player 2. The data is sorted by the percent of rejections, where 1s are accepted offers and 0s are rejected offers. The first column shows amounts these players actually received based on the offers sent by player 1s and their rejection. The last column shows the percent of offers accepted for that particular player 2.

P2: Offer Received	P2: Accept 0	P2: Accept 10	P2: Accept 20	P2: Accept 30	P2: Accept 40	P2: Accept 50	P2: Accept 60	P2: Accept 70	P2: Accept 80	P2: Accept 90	P2: Accept 100	SumAccept
5000	1	1	1	1	1	1	1	1	1	1	1	100%
4000	1	1	1	1	1	1	1	1	1	1	1	100%
2000	1	1	1	1	1	1	1	1	1	1	1	100%
5000	1	1	1	1	1	1	1	1	1	1	1	100%
3000	1	1	1	1	1	1	1	1	1	1	1	100%
5000	1	1	1	1	1	1	1	1	1	1	1	100%
5000	1	1	1	1	1	1	1	1	1	1	1	100%
5000	1	1	1	1	1	1	1	1	1	1	1	100%
5000	1	1	1	1	1	1	1	1	1	1	1	100%
5000	1	1	1	1	1	1	1	1	1	1	1	100%
5000	1	1	1	1	1	1	1	1	1	1	1	100%
5000	1	1	1	1	1	1	1	1	1	1	1	100%
5000	1	1	1	1	1	1	1	1	1	1	1	100%
5000	1	1	1	1	1	1	1	1	1	1	1	100%
5000	1	1	1	1	1	1	1	1	1	1	1	100%
5000	1	1	1	1	1	1	1	1	1	1	1	100%
5000	1	1	1	1	1	1	1	1	1	1	0	91%
5000	1	1	1	1	1	1	1	1	1	1	0	91%
6000	1	1	1	1	1	1	1	1	1	1	0	91%
5000	1	1	1	1	1	1	1	1	1	1	0	91%
5000	0	1	1	1	1	1	1	1	1	1	0	82%
5000	0	1	1	1	1	1	1	1	1	1	0	82%
8000	0	0	1	1	1	1	1	1	1	1	1	82%
5000	0	0	0	1	1	1	1	1	1	1	1	73%
4000	0	1	1	1	1	1	1	1	0	0	0	64%
5000	0	0	0	1	1	1	1	1	0	0	0	45%
3000	0	0	0	1	1	1	1	1	0	0	0	45%
5000	0	0	0	0	1	1	1	1	0	0	0	36%
0	0	0	0	0	0	1	1	1	0	0	0	27%
5000	0	0	0	0	1	1	0	0	0	0	0	18%
0	0	0	0	0	0	1	1	0	0	0	0	18%
5000	0	0	0	0	0	1	0	0	0	0	0	9%
% Acceptance	60%	70%	73%	83%	90%	100%	93%	90%	73%	73%	53%	
% Rejection	40%	30%	27%	17%	10%	0%	7%	10%	27%	27%	47%	

Table 7. Schedules of acceptances by thirty player 2s in the SMUG.

Notice the symmetry in the responses in Table 7 for those with rejections (0s), including four cases where respondents would accept any offer except for to the case where player 1 sent the entire 100% of the endowment. As one goes to the bottom of the table we have more hyper-fair individuals who would accept only very equal offers.

These data offer a puzzle regarding social preferences. Most people seem to value high fairness and altruism, and their behavior does not seem to show highly self-oriented choices with respect to material payoffs. However, we observe that this emerges from a combination of two major types of individuals: those who greatly value fairness and are willing to forego income when the distribution is unequal and others who are conformist with any distribution. Notice, however, that the latter could be of the first type as well, and they are certain that no unequal offers will be made that no enforcement (rejection) of the fair distribution needs to be made. A look at the qualitative data in the next section may enrich the analysis of the experimental data.

c. What did player 2s (SMUG) say about their rejection/acceptance strategy?

We now explore some of the arguments that may explain player 2s' responses to the survey at the end of the experiment. The following are answers to the question, "How would you have felt if you received an offer of 0 from Player 1?" given by those players in the upper half of table 7 above, i.e. those accepting any possible offer by player 1:

- *Well, it would be the will of the other person; it was him who would share from his heart.*
- *I'd feel fine, because each person has her own way of thinking.*
- *I'd feel bad, but I could not do anything¹⁰*
- *I'd feel fine because this is what their heart and conscience told them to do.*
- *Fine, relaxed, because I cannot force their mind.*
- *Fine, I'd accept what their conscience would tell them.*
- *Relaxed, the other person could take all the money, The One up there (God) told him to.*
- *Fine, because it was the decision of the other person.*
- *Two things, I'd be an unfair person (not accepting), or maybe the other person needed the cash, that's why I accepted all.*
- *Fine, anyway the other person took something home.*
- *I wouldn't feel anything, because it was a present.*
- *I was decided to accept whatever the other person sent me.*

And for the next question in the questionnaire, "How would you have felt if you had received an offer of 10 from Player 1?", these are answers by the same group of players in the upper section of table 9 accepting all possible offers:

- *Fine.*
- *Fine, their hearts told them to send all the money to me.*
- *Fine too, because it was their decision.*
- *Fine, I'd be thankful.*
- *Happy, but why they wouldn't take any money?*
- *Fine.*
- *Fine, because it was voluntary.*
- *The other person gave me all, therefore I wouldn't feel bad.*
- *Bad, because it is better to share.*
- *It's not right, I cannot use all the money.*
- *I'd feel uncomfortable.*
- *I will feel bad because I know that it's the decision of the other person, but it would not be fair that he does not get any money.*

Although the latter ones show some remorse for getting a 100% offer, they still accepted all offers in their decision schedule. If we look at responses given by those in the bottom of the

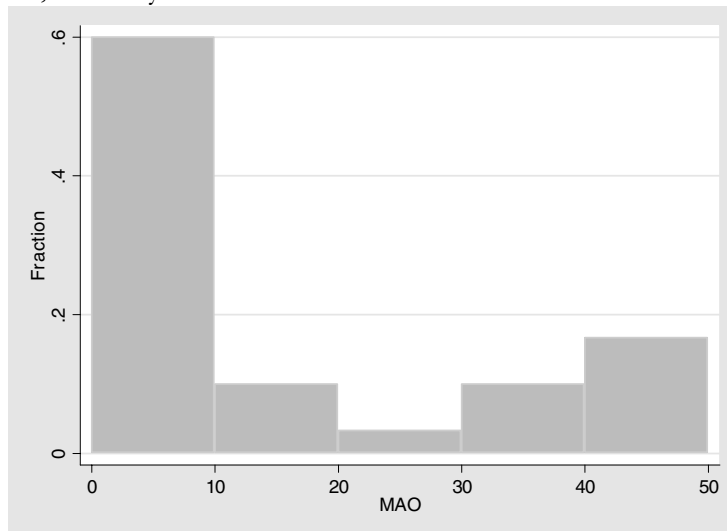
¹⁰ This player knew he could reject any offer he/she wished but had decided to accept any offer.

table with the hyper-fair responses, their reactions to receiving a 100% offer from player 1 support the argument for a discomfort with unfair outcomes:

- *I'd feel bad, because the other person would not keep anything.*
- *Bad, because the money belongs to the other person, and how come would they give it up all?*
- *Bad, because we have to share.*
- *I won't accept!*
- *I'll feel bad, but otherwise happy.*
- *Good for me but bad for the other.*
- *I don't think the conscience of the other would do that.*
- *Bad too.*
- *Bad because none of us win.*
- *Bad, because I think the other must share half and half.*
- *Bad, because the other person did not take any money, it's much better to share.*
- *Fine and relaxed.*
- *Fine because it's a choice of the other person.*

Except for the last two, most players expressed a negative sentiment about taking all the money and a strong preference for fair outcomes. The players choosing schedules with both very low and very high offers were rejected.

The strategy method in the UG can provide another valuable measure: the MAO (Minimum Acceptable Offer) of player 2s, which is calculated based on the smallest percent that would be accepted by respondents in the Ultimatum Game. We have two particular situations regarding this measure for the Sanquianga people. First, 60% of our sample had a MAO of 0%, which yields a bimodal distribution as shown in the histogram below. Secondly, the



hyper-fair rejections would not be reflected in the way the MAO index is constructed, and therefore, it does incorporate these additional components in the preferences. As we will see later when explaining the variation of experimental behavior in the multivariate analysis, we obtained non-significant results for the models explaining the MAO variation.

Figure 10. Frequencies of Minimum Acceptable Offers (MAO) for Player 2s in the SMUG.

It is worth noting that these combinations of behavior (fair and altruistic offers by player 1s, half of conformists, and half hyper-fair respondents) resulted in a high number of accepted transactions (only 2 of the 30 cases were actually rejected). The distribution of offers in the DG and the SMUG are not very different in terms of fairness and altruism. Player 2s seem to elicit, with their rejection schedules, preferences similar to such fair behavior. We therefore would have more ground for generosity in the SMUG to be based on the weight of the well-being of others and on the inequality aversion than on the fear of negative reciprocity (Fehr and Schmidt, 1999)¹¹.

d. Willingness to punish unfair offers in the 3PP

The Third-Party Punishment game was also conducted using the strategy method for player 3s, who had to reveal their schedules of punish/not punish for every possible decision by player 1s. The data was shown in Table 6 and Figure 9. 62.5% of player 3s are willing to punish when player 1s offer nothing. Thereafter, the rate of punishment decreases in a concave, smooth rate down to 28% of player 3s willing to punish a 40%¹² offer from player 1. Offers of 50% and above were not punished by player 3s.

This behavior is consistent with the argument that humans are willing to undertake costly actions in order to maintain social norms that are beneficial to the group (Fehr and Fischbacher, 2004; Fehr and Gächter, 2002). We have already observed from the DG and SMUG data that fairness and equality are strong social norms demonstrated not only by player 1s but also expected by player 2s. These are norms that punishers (player 3s) would be attempting to sustain through this costly behavior (i.e. paying 20% (\$2000) of their initial endowment (\$5000) to decrease the payoffs of player 1s by \$3000). In fact, the data for the Sanquianga people is quite similar to the concave schedule reported by Fehr and Fischbacher (2004) for the same experiment, although in their case the fraction of people willing to punish unfair offers remains at 60% for offers up to 40% from player 1s. In our case, when offers are of 40%, only 30% of players 3 are willing to punish.

The individual data on the punishment schedules and the offers by players can provide some additional insights. Only 4 (\$2000, \$3000, \$4000, \$3000) of the 32 offers were in fact punished by player 3s. However, recall that there were more frequent cases of less generous offers here than in the DG and SMUG cases. There were at least five cases in which player 1s offered 30% or less and these happened to be matched with player 3s that were not interested in punishing any of the offers.

¹¹ It is not argued here that reciprocity is not playing a role in the experiments or in the daily social exchange of this society. On the contrary, reciprocity plays a major role for this group. Further, it will be argued later that ex-post incentives outside of the field lab but within the subjects' group may also play a key role, as discussed in Cardenas (2004).

¹² There was one player 3 who had chosen to punish a 50% offer and not punishing the rest of superior offers. These decisions were double checked with participants during the decision stage.

e. Explaining experimental behavior from demographic characteristics

The next step in the analysis is to further explore the observed variation in the key choice variables in our sample by exploring the data collected about behavioral, social, and economic conditions of the individuals. We have found aggregate patterns that are consistent with similar literature and experiments regarding these same experiments and the role of norms such as fairness, reciprocity, and altruism across the three core games. However, there is variation across players regarding their individual preferences for altruism, reciprocity, and social sanctioning.

Since we gathered demographic and socio-economic information about the individual participants and their household, we can explore how much of the individual and household characteristics of the participants could explain the variation across individual decisions within the experiments.

The dependent variables we aim at explaining are the offers by player 1s for the three core games (DG, SMUG and 3PP) and the minimum acceptable offers (MAO) for the SMUG, as it is being calculated for all sites in the project. The regression results are included in Appendix II.

The statistical procedure for all sub-samples was similar to the protocol of the entire project. The explanatory (independent) variables chosen for the regressions were age, gender, education, individual income, household wealth, and household size. In order to explore the robustness of some of these variables and to explain variation in the dependent variables, we report different models (columns in the regression tables). In order to compare coefficients of variables that have different units, we transformed them by dividing each value by the standard deviation of the sub-sample. We will now go in detail through the estimations beginning with offers by player 1s in the Dictator, Ultimatum, and Third-Party Punishment games.

Dictator Game Offers (Table A.1): According to the different models estimated, we are able to explain about 40% of the variation in offers using the 30 players' personal and household characteristics. Overall the models' significances allow us to derive some conclusions about the associations of these characteristics and accept that these characteristics caused the changes in the independent variables because they existed prior to the experiment. Based on the regression results and given that we have transformed variables, the estimation results show that years of education and household size had a significant and positive effect on the amount offered by player 1s, while the effect of household wealth was negative. Given that individual income was not found to be correlated to household wealth, we suggest that income has no effect by itself. In terms of the relative weight in explanatory power, household size and education seem to be similar and have a higher effect than the effect of wealth.

Ultimatum Game offers (Table A.2): With the first model we can explain about 50% of the variation and have a significant model. Once again, gender does not seem to have explanatory power. Education, household size, and wealth have the same effects on offers. This result is expected given that these are the same 30 people and that the Dictator Game

and the Ultimatum Game offers were highly correlated for the sample. Only age, now showing a positive significant coefficient, and income, with a negative significant effect, add to the explanatory power of the estimator.

Minimum Acceptable Offers (MAO) responses (Table A.3): The results here are rather weak when compared to the estimations of the Dictator and Ultimatum games. The only model with a statistically significant explanatory power, model (5), shows age and wealth as significant and positive in both cases, explaining a very small fraction of variation in the MAO responses. The Adjusted R-squared is only 14%. Most of the statistical problem lies on the data for the dependent variable. We know that about 60% of our participants were basically indifferent to any offer, that is, their MAO is zero. Therefore, the results reported here should be interpreted with caution.

Third-Party Punishment game offers (Table A.4): Although the overall significance of the models estimated for these 32 observations is slightly stronger here than in the previous case, the results need to be interpreted with caution. The estimation suggests that some of the coefficients and signs that were statistically significant in the DG and SMUG data now have effects that are similar in some cases and not in others. Education seems to reduce the amount being sent (Positive or negative effect?). Income now shows to be negative and significant, while wealth is positive.

The positive sign for wealth could be interpreted in two ways. First, wealthier people were more generous, contradictory to the DG and SMUG data, due to their smaller value of foregone cash as percentage of average income. Second, wealthier people expect to be punished more often by third parties, although in this case player 1s knew that player 3s could not identify at any point who was in fact punished¹³. At this point, it is difficult to reject either interpretation. Nevertheless, the motivation for wealthier player 1s to send higher offers due to a stronger social punishment towards them remains a plausible explanation

Household size is no longer a powerful explanatory variable of variation in offers. Nevertheless, the different models were, at best, able to explain about one fourth of the variation in offers. It is worth noting that other variables for tenure, measured as the percentage of time the individual had lived in that village, or indicators of engagement in cooperative activities in the village did not help to statistically explain the variation of these experimental decisions above.

In general, wealth, age, household size, and education seem to be factors that statistically explained the behavior in the estimated models. These factors offer some grounds for developing arguments about the motivations that individuals may have for their pro-social behavior in these experiments. These arguments will be discussed in the next section.

¹³ In Cardenas (2004) a series of trust game experiments are reported where college students are recruited across 4 campuses and the only available information they have about the other player is the university affiliated with, which maps accurately with the predicted socio-economic status of the others. Offers by player 1s were smaller when they came from higher socio-economic status private universities, and especially when they were offers made to students in public universities with middle and low income populations.

4. On the roots of social behavior and preferences in Sanquianga.

Using the demographic, socioeconomic, and experimental data gathered in the field and from secondary sources, this section attempts to provide a coherent discussion about the foundations for the social preferences and pro-social behavior observed in the experimental behavior among the Sanquianga people.

a. Strong and symmetric aversion to inequality.

There are strong preferences among the Sanquianga people for altruistic and fair outcomes. There is a strong social acceptance for symmetric fairness and a strong aversion to unequal outcomes regardless of the direction, even at a cost in terms of efficiency. The data, in fact, does not replicate the typical asymmetric pattern in rejection schedules in the Ultimatum game, where people are willing to reject offers that are unfair to them but would accept most offers generous to them. The data from the Sanquianga case presents a very symmetric rate of rejections and acceptances. For about half of the people tested, any division of the money would be acceptable, and for the other half, only very equal divisions are acceptable. This has been labeled as a hyper-fair set of preferences.

Thus, inequality aversion is much stronger here than it is proposed by Fehr and Schmidt (1999), who assume a smaller disutility from advantageous inequality than from disadvantageous inequality. Our data suggests that the weights observed are quite symmetric, yet also varying from very conformist to very (symmetrically) averse to inequality across individuals.

Arguments provided by the respondents to questions about receiving very unfair and/or very generous offers suggest that the inequity aversion argument may only play a partial role and that pure altruism would be a much stronger preference than usually observed. The fact that the offers in the Dictator game were already generous and fair, compared to the Ultimatum, may suggest that pure altruistic preferences play a significant role.

Such highly altruistic preferences by those player 2s accepting any offer and by those player 1s offering very fair offers is quite consistent with observed behavior in the field. When households, for instance, had a “bad catch day” in fishing, they receive transfers from neighbors who did better, given that such transfers could happen in the opposite direction in the future¹⁴. During the follow-up conversations with the participants, there were reports of frequent food transfers in cases of illness or need.

¹⁴ Restrepo (1996) describes how the catch from a fishing day does not go to the local market but rather, is kept for the household and is often used to share with relatives, friends, and neighbors who may not have immediate access to fishing resources: “*Los peces que se destinan para el autoconsumo, se utilizan tanto para el consumo doméstico como también pueden distribuir a los parientes o amigos cercanos que no tienen es ese momento acceso a ellos, o sea, que circulan por las redes de reciprocidad anotadas para el caso de la cacería o de la recolección*”.

Interestingly, a recent experiment using a replication of the Strategy Method Ultimatum Game with the same protocols as the present study among the Gipsy population of Vallecas, Madrid (Brañas-Garza, 2005), generated results that are compatible with the arguments here. The mode for the rejection by player 2s was zero. However, 97% of player 1s offered 50% of their endowment. The argument remains that if the social norm among this particular group is for everyone to share any surplus you may have, you might as well accept any offer and avoid the risks of a rejection that destroys any output to be divided. The argument that was used more frequently by the Gypsies to justify their no rejection of most offers was that of deservedness of the other: “*Si el lo necesita*”. If player 1 needs the cash he will keep it and that is fine with player 2. Bahry and Wilson (2006) also reported a very high portion of 50% offers from player 1s for a set of experiments with different rural and urban individuals in two ex-soviet republics.

Fair offers in the Ultimatum game, therefore, could be interpreted as altruistic decisions rather than strong fears of reciprocal rejections by player 2s, although a small fraction of the offers moved towards the 50/50 split afterwards. Recall, however, that 17 out of 30 player 1s offered the same amount in both Dictator and Ultimatum games, and 11 of these offered the 50-50 split.

Therefore, if such a strong social norm exists, it is rational to observe hyper-fair rejection rates where about half of player 2s would accept any offer. The latter would be trying to reduce the risks of a rejection that would have produced no payoffs at all for anyone. In other words, not only was there a strong preference for the well-being of the others present in the experiments, but there was also a strong preference for the sum of payoffs rather than on the equity between them. Combined with a common understanding that fair outcomes are a norm, it would be logical to observe the two types of behaviors in the respondents (conformists and hyper-fairness enforcers).

However, when looking at the strategic behavior of player 3s, the debate over hyper-fair vs. conformist preferences among this social group still involves a puzzle from the Third-Party Punishment game data. If the hyper-fair or the conformist preferences were to be argued as general to the population or group, why would player 3s punish offers only unfair to player 2s and not also those excessively unfair to players 1 (i.e. very generous)? On the contrary, a conformist player 3 would accept that a player 1 keeps all the endowment, then they should not punish any offers by players 1. The fact that player 3s are not directly affected in monetary terms by the social interaction could be part of the argument. The responses given by player 2s in the SMUG and reported in previous sections suggest that hyper-fair individuals had a strong feeling against receiving too much and leaving the first players with nothing, a feeling that player 3s in the 3PP game would not perceive personally. If that happened, player 3s would not feel guilty having determined partially such a result, as is the case for hyper-fair player 2s in the SMUG where they can, at a large cost, make sure that at the end the outcome is not unfair.

b. Poverty, wealth and pro-social behavior.

Many of the arguments about sharing excess goods are related to caring for equal distribution of resources and opportunities, especially for those in greater need. This raises the issue of the role that private wealth and income play in sharing networks and small scale societies. The results suggest that wealthier households or individuals with higher (cash) income are less likely to share in the DG and SMUG¹⁵. These findings would be consistent with the rationale that poorer people are more familiar with sharing, or with others similar to them being in need, and therefore found in the experiment another situation in which others would need part of newly available resources (in this case an amount of cash arriving from outside, i.e. the experimenter).

It has been argued above that poverty or lack of private wealth (assets) might be associated with more altruistic preferences due to the personal familiarity with such situations of participating in exchanges based on altruism or solidarity. Less wealth among your neighbors also implies that it is more likely that you engage in sharing activities with other poor. Since the experimental design was such that the subgroups or sessions were conducted with people from the same settlement who were familiar with one another, then the immediate context could explain the likelihood that you are more pro-social, at least for the case of sharing, like in the DG and SMUG. In previous experiments in rural villages in Colombia (Cardenas, 2003), we found that the actual individual wealth and the social distance created by it among eight villagers reduced the level of cooperation in the group participating in a common-pool experiment. One of the arguments is that those with less private productive assets are more familiar or more likely to engage in interactions based on pro-social norms such as fairness, trust, and reciprocity. We are therefore able to device and sustain more effectively a cooperative agreement in the experiment.

Other experimental work on related but not exact type of preferences being observed in public goods and common-pool resources would also suggest that individuals with less private opportunities and more dependent on reciprocal relationships would be willing to act in more pro-social ways. Buckley and Croson (2006) report on a series of experiments, consistent with their analysis of charitable giving, that less wealthy people are willing to contribute equally or more percentage of their income than the well-off. In other experiments run in the field (Cardenas et.al, 2002) under asymmetric payoff structures where a fraction of users of a common-pool resource have poorer private opportunities (or exit options), they are more willing to engage in cooperative behavior than those with less income dependence on the common-pool and better exit private options.

Further, the level of group poverty may have an effect on the reinforcement of social norms with respect to sharing. A small test across sites within our sample may suggest evidence in this direction, although there are statistical limitations from the sample size. Since we had to recruit participants from two neighboring settlements in this location in order to complete

¹⁵ Notice that while wealth has a negative effect on offers in DG and SMUG, education has a positive effect. Since education and wealth are not correlated for this group, one could reject the argument that wealthier people behave closer to the *homo-economicus* prediction because they better understand the incentives and rules of the game.

our sample, we ran our experiments in Bazán and Amarales. There are differences in the average distribution of income and wealth, Bazán being a village with a higher fraction of much poorer people than in Amarales. T-tests for the two indices, wealth and income, confirm a statistical difference between the two settlements.

Since the only treatment we ran in both sites was the Third-Party Punishment game, we can only compare offers across sites for this sample. The small sample size restricts the power of the statistical test, but we do observe a higher frequency of 50/50 offers for the Bazán case as shown in the histograms of Figure 11. The left panel shows the distribution of 3PP offers by those in Amarales, while the right panel shows the offers for the Bazán case. Although there is no statistical difference, the 50/50 case clearly happened more often.

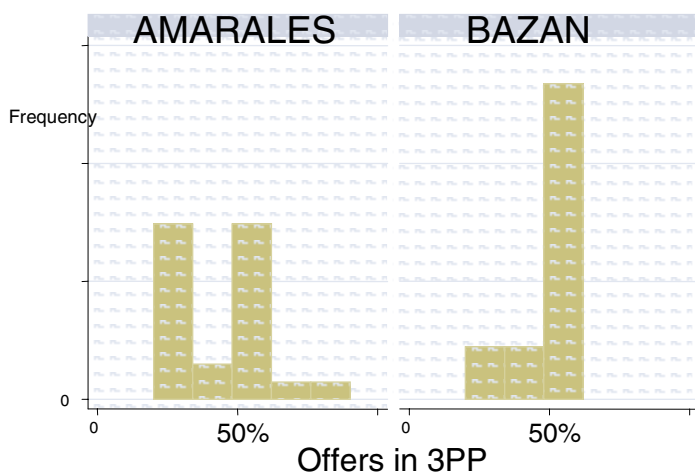


Figure 11. Distribution of 3PP offers by player 1s in Amarales (left) and Bazán (right).

5. Final discussion: back to history.

Over the last three centuries, the history of human occupation of the mangrove forest in the Pacific coast has shown a set of patterns that include a permanent interaction and high dependence on the ecosystem, and therefore, on resolving the common dilemma by devising institutions that align the individual's and group's interests. For such institutions to work, at least for the case of these regions where external enforcement on the part of the state is rather rare, social groups require individuals with more pro-social preferences in terms of fairness, altruism, reciprocity, and cooperation (Ostrom, 1998).

The history of these settlements has also shown that informal social networks and acts of solidarity are essential to the survival of groups. This can be a response to a weak ability of the state to provision public goods and infrastructure when compared to other rural regions in the country. Restrepo (1996) highlights the importance of relations of solidarity among the black slaves and among the indigenous population in the Pacific during the slavery periods in mining.

Before slavery was abolished some of the slaves were able to buy-out their own freedom by working in the weekends when the *encomienda* and mining enterprises would not operate for cultural and religious reasons. Early settlements (*palenques*) of free slaves and *cimarrones* (slaves that had escaped) emerged within a context of a lack of a state and endogenous systems of rules while continuing with extractive systems, from gold to *caucho*, *tagua*, logging, and other valuable resources, depending on the period. The concept of *Minga* is also present in these coastal communities and at the upper Andean lands where indigenous cultures had used it for millennia for collective action. However, it has been displaced by the *cambio de mano*, or hand-exchange, in which an individual “contributes” with personal unpaid labor to producing something for someone who will later reciprocate by giving the former an equivalent unit of unpaid labor (Restrepo 1996). Therefore, the behavior in the experiments reported here was of no surprise to the observers and to the participants in informal interviews.

Fifty years before this study, another anthropologist, Thomas Price, reported on the strength of social preferences of the afro descendent people of this region. This passage, cited by Restrepo (1996), eloquently describes what the experiments in this study capture about behavior in the Sanquianga people:

“Relatives, compadres and friends are accustomed to give each other whatever food which they have on hand over and above the immediate requirements of the family, especially to those who are known to be need. Any individual can relate the names of many person to whom at one time or another he has given food; some of these have eventually reciprocated, while the others may be called on when the need arises. As an instance of the way in which it works, the case may be cited of man who, though his neighbors declared that he had once been in a comfortable situation, had been without work for sometime. Though he has no money his prospect of job were rather dim, both he and his wife seemed well fed. He was very much given to talking long walks, at the end of which he would inevitably return home with several large plantains, yuca, and the like, announcing that by chance he had encountered a friend who, after inquiring about his family an determining in the typically indirect way that the informant was in need, has given him these gifts. In conversation, it become clear that the one who had given him the food had in the past been in the same situation, and had benefited from similar gifts of food.” (Price, 1955: 20).

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Appendix I: Regression results (explaining offers in DG, SMUG, 3PP and MAO in the SMUG)

	(1)	(2)	(3)	(4)
Variables (divided by Std.Deviations)	perc_offerdg	perc_offerdg	perc_offerdg	perc_offerdg
Age	1.47 (3.43)			
Female dummy(a)	4.69 (6.73)	4.19 (6.51)		
Education	9.36 (3.82)**	8.27 (2.80)***	8.21 (2.76)***	8.23 (2.69)***
Individual income (USD)	1.05 (2.96)	0.97 (2.91)	-0.19 (2.25)	
Household wealth (USD)	-5.17 (2.54)*	-5.28 (2.48)**	-5.33 (2.45)**	-5.34 (2.39)**
Household size	11.04 (2.84)***	10.89 (2.77)***	10.56 (2.69)***	10.56 (2.64)***
Constant	5.47 (18.48)	11.43 (11.90)	16.46 (8.88)*	16.24 (8.34)*
Observations	30	30	30	30
Model significance (p-value)	0.009	0.004	0.002	0.001
Adjusted R-squared	0.37	0.39	0.40	0.43
Standard errors in parentheses				
* Significant at 10%; ** significant at 5%; *** significant at 1%				
(a) (not divided by std.deviation)				

Table A.1. Dictator Game offers explained by demographic variables.

	(1)	(2)
Variables (divided by Std.Deviations)	per_ugofg	per_ugofg
Age	5.23 (1.99)**	4.96 (1.94)**
Female dummy(a)	3.08 (3.90)	
Education	8.71 (2.21)***	8.46 (2.17)***
Individual income (USD)	-1.52 (1.72)*	-2.36 (1.33)*
Household wealth (USD)	-4.93 (1.47)***	-4.98 (1.46)***
Household size	4.48 (1.64)**	4.21 (1.60)**
Constant	15.24 (10.70)	19.92 (8.85)**
Observations	30	30
Model significance (p-value)	0.001	0.000
Adjusted R-squared	0.49	0.50
Standard errors in parentheses		
* Significant at 10%; ** significant at 5%; *** significant at 1%		
(a) (not divided by std.deviation)		

Table A.2. Strategy Method Ultimatum Game offers explained by demographic variables.

	(1)	(2)	(3)	(4)	(5)
Variables (divided by Std.Deviations)	mao	mao	mao	mao	mao
Age	8.12 (3.61)**	8.23 (3.53)**	7.16 (3.47)**	7.62 (3.45)**	6.89 (3.18)**
Female dummy(a)	2.57 -7.69				
Education	4.69 -3.72	4.62 -3.65			
Individual income (USD)	5.79 -4.01	5.15 -3.47	3.34 -3.19		
Household wealth (USD)	6.27 (3.26)*	6.29 (3.20)*	6.05 (3.23)*	5.98 (3.23)*	5.81 (3.18)*
Household size	-0.84 -3.49	-0.78 -3.42	-1.6 -3.4	-2.02 -3.38	
Constant	-27.22 -18.42	-25.02 -16.89	-9.95 -12.13	-5.58 -11.4	-9.06 -9.67
Observations	30	30	30	30	30
Model significance (p-value)	0.193	0.12	0.124	0.1	0.049
Adjusted R-squared	0.11	0.14	0.12	0.12	0.14
Standard errors in parentheses					
* Significant at 10%; ** significant at 5%; *** significant at 1%					
(a) (not divided by std.deviation)					

Table A.3. Minimum Acceptable Offers (MAO) by Player 2s in the Strategy Method Ultimatum Game.

	(1)	(2)	(3)	(4)	(5)	(6)
Variables (divided by Std.Deviations)	tpoifg	tpoifg	tpoifg	tpoifg	tpoifg	tpoifg
Age	1.65 (2.82)					
Female dummy(a)	8.37 (6.27)	7.55 (5.96)				
Education	-3.86 (2.75)*	-5.05 (2.54)*	-4.61 (2.55)*	-4.69 (2.62)*	-5.39 (2.66)*	-4.61 (2.55)*
Individual income (USD)	-3.95 (3.03)	-4.58 (2.95)	-6.41 (2.60)**	-5.39 (2.59)**	-5.64 (2.66)**	-6.41 (2.60)**
Household wealth (USD)	5.91 (3.01)*	5.24 (2.85)*	4.53 (2.83)			4.53 (2.83)
Household size	1.68 (2.87)	1.71 (2.82)	2.41 (2.79)	4.32 (2.59)		2.41 (2.79)
Constant	33.25 (12.48)**	41.11 (9.38)***	44.21 (9.16)***	41.8 (9.28)***	54.83 (5.15)***	44.21 (9.16)***
Observations	31	32	32	32	32	32
Adjusted R-squared	0.24	0.26	0.24	0.2	0.15	0.24
Prob > F	0.043	0.023	0.02	0.025	0.034	0.02
Standard errors in parentheses						
* Significant at 10%; ** significant at 5%, *** significant at 1%						
(a) (not divided by std.deviation)						

Table A.4. Third Party Punishment Offers explained by demographic variable

