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**INTEGRATION TO THE MARKET ECONOMY, SOCIAL CAPITAL, AND  
CREDIT: ESTIMATES WITH LONGITUDINAL DATA FROM AN  
AMAZONIAN SOCIETY<sup>1</sup>**

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## **Abstract**

Previous research has produced conflicting results on the association between integration to the market society and traditional and new (market defined) forms of insurance, often by examining one or the other. In this article we examine the effect of integration to the market economy on both traditional forms of social capital and modern forms of insurance (i.e., credit). We use data from a panel survey (2002 to 2006 inclusive) collected among Tsimane', a society of foragers-farmers in the Bolivian Amazon in the early stages of integration to the market economy. We find that Tsimane' are highly autarkic and display low reliance on both traditional forms of social capital and on the informal credit system available on the area. Although people more integrated to the market economy seem to depend more on those two forms of insurance and despite growing integration to the market economy, the overall pattern is one of decreasing dependence on traditional forms of social capital and credit over time. The passage of time might be bringing new actors and forms of insurance to the study area that make people less dependant on the two forms studied here.

**Key words:** indigenous peoples, Bolivian Amazon, market integration, credit, social capital; panel studies

## **Introduction**

Research shows that in small-scale societies, social capital –trust, safety nets, and institutions that enable people to act collectively- helps protect households against idiosyncratic income shocks, such as illness (Carter and Maluccio 2003) or poor luck in foraging (Winterhalder 1997). Traditionally, social capital in such societies has consisted of informal institutions such as gift exchanges (Kaplan and Hill 1985; Gintis et al. 2003) or social relations based on mutual reciprocity and shared values (Bebbington and Perrault 1999; Bebbington et al. 2006). Researchers debate the effect of integration to the market economy on traditional social capital. Some researchers have found that integration into the market destroys traditional forms of social capital, whereas other researchers have argued that markets increase prosocial behaviour (Henrich et al 2010) and bring new forms of insurance (i.e., credit) that buffer environmental and economic shocks, and in doing so protect people’s well-being (Bebbington 1997; Ashley 2000; Uphoff and Wijayaratra 2000; Grootaert and Narayan 2004).

On the one side of the debate some researchers argue that market integration creates income inequality, which in turns undermines traditional community rules and customs, generates conflicts, makes exchanges difficult, and forces people to reallocate to work time previously devoted to social interactions (Bardhan 2000; Putsche 2000; Bury 2004; Hyakumura and Inoue 2006; Kramer et al. 2009). All together those social changes weaken traditional forms of social capital. Evidence of the negative effects of market integration on traditional forms of social capital comes from several societies and countries with increasing involvement in the market economy (Bardhan 2000; Putsche 2000; Bury 2004; Cinner 2005; Hyakumura and Inoue 2006). For instance, in research conducted in two communities in the Cajamarca region of Peru, Bury (2004)

interviewed 60 households to evaluate how a gold mining corporation altered household access and utilization of human, natural, and social capital. Bury found that traditional social capital, measured as household access to intra-communal networks, declined because the new economic situation created distrust and increased differences among households. Similarly, in a study in a reserve of Shipibo Indians in the Peruvian Amazon, Putsche (2000) found that market integration undermined traditional forms of social organization. Specifically, the confinement of the Shipibo to a reserve smaller than their previously occupied territory disrupted Shipibo traditional subsistence system. Shipibo became highly dependent on the closest market-town for wage labor and the purchase of food. The new situation generated significant social changes as Shipibo changed their expectations of time allocation and reduced food sharing practices. Furthermore, occupational specialization caused the increase of income inequalities and the substitution of social networks by competitive relations. In another quantitative research study in 21 coastal communities in Papua New Guinea and Indonesia, Cinner (2005) assessed the effects of market integration on the strength of highly exclusive traditional marine tenure regimes in which non-owners had to ask permission to access marine resources. Results from this research suggest that social networks of such communally-owned institutions were weakened by increasing connectivity to markets. In a study among tomato farmers in Ghana, Lyon (2000) compared the percentage of farmers giving loans to other farmers with the percentage of farmers receiving credit from outsiders to proxy traditional and modern social capital respectively. He found that pre-existing networks that facilitated access to credit, i.e., family links, became underutilized as communities increased their involvement in the market economy.

But the finding that market integration undermines traditional social interactions does not go uncontested. Contrary to the findings just discussed, results of recent research conducted by Henrich et al. (2010) suggest that market integration increases successful social interaction among anonymous individuals. Henrich and colleagues used three games to study individual's behaviour towards anonymous people by measuring an individual's propensity for fairness and punishment. Games were performed with 2 148 individuals across 15 populations from 10 countries in Asia, Africa, Oceania, and America that vary in their degree of market integration. Researchers found a positive association between traditional social capital, measured as motivation for fairness in anonymous interactions, and market involvement.

Furthermore, researchers have also argued that markets bring new forms of insurance (i.e., credit) that buffer households from environmental and economic shocks (Bebbington 1997; Ashley 2000; Uphoff and Wijayaratna 2000; Grootaert and Narayan 2004). Furthermore, new forms of credit, such as microfinance, also promote employment generation by allowing the starting of new business thus improving well-being (Armendariz and Morduch 2005). For example, in research in Bolivia, Bangladesh, and Indonesia, Morduch (1999) analyzed the social and economic impacts of microfinance programs. He found that those programs promoted self-employment activities that were successful in increasing savings and improving resources management in relatively poor households [but see van Bastelaer (2000) for critiques of those programs]. Similarly, using data from the 7 500 households on the Indonesia Family Life Survey, Okten and Osili (2004) found that social capital, measured as participation of an individual in the community meetings during the survey, favors access to credit, especially among women.

In contrast, other authors have found that access to credit is not necessarily linked to a reduction of poverty. For instance, in ethnographic research in Tanzania, Cleaver (2005) found that even when social capital is increased by strengthening social relationships and public participation of people in supra-community organizations, modern social capital could not overcome poverty because poor-people were not able to access credit. Another study in Peru conducted among 5,853 individuals (Laszlo and Santor 2009) assessed the impact of social networks to get credit by migrant people. Results showed that social capital does not predict whether the individual receives credit.

In sum, previous studies have produced conflicting results on the association between integration to the market society and traditional and new (market defined) forms of insurance. Furthermore, most previous research on the topic has generally analyzed the association of integration to the market and either traditional forms of social capital or new forms of insurance, but not the two at the same time [but see Lyon 2000; Bebbington et al. 2006]. The result is an incomplete picture: markets could worsen traditional social capital while providing new forms of insurance that compensate for the loss of social capital. Differently from previous studies, in this article we use empirical estimates to examine the effect of integration to the market economy on both traditional forms of social capital and modern forms of insurance (i.e., credit). The approach matters because the well-being of people in the process of integration to the market economy will be only negatively affected if markets worsen traditional social capital and do not provide alternative new forms of insurance. To test our ideas, we use data from a panel survey (2002 to 2006 inclusive) collected among Tsimane', a society of foragers-farmers in the Bolivian Amazon in the early stages of integration to the market economy.

## **The Tsimane'**

The Tsimane' are a society of foragers-farmers in the Department of Beni, in the Bolivian Amazon. Relatively isolated until the mid-twentieth century, Tsimane' started to engage in more frequent and prolonged contact with Westerners after the arrival of Protestant missionaries in the late 1940s and early 1950s (Huanca 2008). Nowadays, Tsimane' continue to live in small villages of ~20 households closely linked by ties of blood and marriage and follow their traditional forms of social organization (e.g., cross-cousin marriage). We have described many aspects of Tsimane' lifestyle in previous articles (Godoy et al. 2005b; Reyes-Garcia et al. 2005; Mcdade et al. 2007; Godoy et al. 2009; Reyes-Garcia et al. 2009) and a monograph (Huanca 2008), so we limit the discussion here to the three aspects that directly relate to this paper: integration to the market economy, social capital, and credit.

Tsimane' represent an ideal case to study the effects of markets on traditional forms of social capital and credit because they display large variation in levels of integration to the market economy. For example, some Tsimane' continue to be highly autarkic and practice hunting, plant collection, and slash-and-burn agriculture for subsistence (Vadez et al. 2004), whereas others are increasingly dependant on cash cropping and wage labor (Vadez et al. 2008) mostly to obtain market goods (Godoy et al. 2007e). Research suggests that internal population pressure and outside encroachment push Tsimane' households into the market economy (Godoy et al. 2005b).

In our previous research, we have assessed the effects of market integration on Tsimane' health status (Byron 2003; Tanner 2005), traditional ecological knowledge (Reyes-Garcia et al. 2005), income inequality (Godoy et al. 2004; Reyes-Garcia et al.



2007), use of renewable natural resources (Vadez et al. 2004; Vadez et al. 2008), and wildlife consumption (Godoy et al. 2010). Findings suggest that integration to the market economy has mixed-effects on Tsimane' livelihood and well-being. For example, integration into the market economy does not seem to be strongly associated to a person's health status (Byron 2003) and it does not seem to accentuate economic inequalities within Tsimane' villages (Godoy et al. 2004). However, integration into the market economy seems to induce crop specialization (Vadez et al. 2004).

In our previous studies we have also analyzed the formation of traditional forms of social capital among the Tsimane' (Reyes-Garcia 2006; Godoy et al. 2007b) and the relation between traditional social capital and individual income (Godoy et al. 2007a), health (Brabec et al., 2007), and schooling (Godoy et al., 2007d). We have equated social capital with gifts given to people of other households, work done for people of other households, or with participation in communal work. We have observed that Tsimane' routinely share food and home-brewed drinks, although gift-giving seems to account for a small share of daily personal income (Godoy et al. 2007c). Ethnographic research has also documented cooperation in many activities, such as fishing, hunting expeditions, maintenance of schools, or the clearing of public places. In villages far from the market town we also observed cooperation in difficult agricultural tasks, such as clearing of forests in preparation for planting of subsistence crops. Our previous findings suggest that community and household level variables are better predictors of individual investment in social capital than individual level variables (Reyes-Garcia 2006; Godoy et al. 2007b). Thus, village-level expressions of generosity seem to be associated with higher individual social capital, whereas village inequality went along with less individual generosity. Our main finding related to traditional social capital among the Tsimane' is that, despite its widespread presence, traditional forms of social

capital provide incomplete insurance in times of need and do not solve the vulnerability of foragers to seasonal changes in the supply of food (Brabec et al. 2007; Godoy et al. 2007a).

We have paid less attention to Tsimane' access to credit. In fact, the Tsimane' do not have access to formal credit provided by banks or other legislated public or private institutions. Rather, credit is provided by outside encroachers (i.e., loggers, cattle ranchers, colonist farmers, and traveling traders), who often visit Tsimane' villages (Reyes-Garcia et al., in press). Outsiders visit Tsimane' villages to offer employment and to buy and swap crops and forest goods. Those economic transactions are often based on a credit system where the outsider provides commercial goods or cash to Tsimane' in exchange for work, farm or forest products to be delivered in the future. This credit system allows Tsimane' to access commercial goods or cash both for daily consumption and during an emergency. Although most Tsimane' might re-pay their debts within short periods (as future borrowing are conditioned to having paid previous debts), some debts can stand for several months or even years. Traveling traders are the most economically important outsiders for the Tsimane' and account for most of the credit supplied in the area.

## **Methods**

For this article we draw on data from the Tsimane' Amazonian Panel Study (TAPS, <http://www.tsimane.org/>), a panel study in progress that started in 2002 and continues nowadays. Four Tsimane' who have worked in the study from its inception served as translators. Data were collected through individual-level interviews lasting about one hour/person.

Sample: Information for this article was collected annually during June-September from 2002 to 2006 (inclusive) among all adults in 13 Tsimane' villages differing in their proximity to San Borja, the only town along the Maniqui river. Villages in the panel were originally selected to display variation in market integration (Godoy et al., 2009). The sample contains 359 females and 363 males over the age of 16 with complete data for at least two survey years. Informants in our sample belong to 227 households.

Explanatory variables:

Market dependence was defined as the percentage of the total personal income that depends on market activities. In societies that are not totally integrated into market economies, it is hard to measure household income because income does not come only in the form of cash, but also in the form of goods that enter the household and are consumed in it. To proxy *market dependence* we first calculated 1) the inflation-adjusted (hereafter real) monetary value of a person's weekly consumption of foods produced or gathered by the household (i.e., foods that do not involve market transactions) (hereafter *food consumption*) and 2) the real personal income of the same time period obtained through market-based activities such as barter, sale, and wage labor (hereafter *cash income*).

We measured *food consumption* at the household level by asking the female household head about the quantity of foods consumed by the household during the seven days before the day of the interview. In our calculations of *food consumption*, we included common crops grown by Tsimane' (e.g., rice, plantain, manioc), game, fish, domesticated animals, and animal products (e.g., eggs). We multiplied the quantity of the food consumed by the village selling price of the food to estimate the nominal

monetary value for each food. If the village lacked a price for a food, we imputed the price from the nearest village. We added the value of all the foods items to arrive at the total value of non-market food consumption for a household. Then, to obtain an individual level estimate of food consumption, we divided the household estimate by male adult equivalents as calculated for the same population by Byron (2003).

*Cash income* was defined as the real amount of cash earned by the individual through sale, barter, or wage labor during the week previous to the interview. For items bartered, we used the market price of the items obtained in the transaction as the amount of cash earned.

The *total income* of a person was defined as the monetary value of the person's *food consumption* plus his/her *cash income*. *Market dependence* was then calculated as the ratio between *cash income* and *total income*, and ranged from 0 to 100, where lower numbers indicate higher self-sufficiency and higher numbers indicate higher market dependency.

#### Outcome variables:

*Traditional social capital:* We asked about two common measures of traditional forms of social capital: gifts and labor help to other households (Reyes-Garcia, 2006). First we asked about gifts of staples (plantain, rice, manioc, and maize), wildlife (game and fish meat), and other goods (seeds and medicines) given by the individual to people outside the household during the seven days previous before the interview. Second, we asked about help provided in subsistence (e.g., hunting, fishing, and farming) and other activities (e.g., healing and running errands) given by the individual to people outside the household during the same period. We defined traditional social capital as the total

number of times a person gave items or provided help in labor to people outside his/her household during the week before the day of interview.

Credit: We proxied modern forms of insurance as a person's ability to obtain credit from people outside the community, typically non-Tsimane', because access to credit is a standard way in which households manage income risks (Grootaert and Narayan, 2004). Specifically, we asked individuals to report their total outstanding debts in *Bolivianos* at the moment of the interview. As with other cash-related measures, in our computations we used the real value of credit.

Control variables:

The model used includes personal-, household-, and village-level control variables. Individual level variables included demographic (i.e., the person's sex, her age, maximum school attainment, length of residency in the actual village of residency, and body mass index), and economic (i.e., wealth) variables. Following the standard practice (Glaeser et al. 2002; Reyes-Garcia 2006; Godoy et al. 2007b), we also included a term for age square to control for the non-linearity of the association between age and the outcome variables. The model using *traditional social capital* as an outcome also included *credit* as a control, and *vice versa*. Control variables at the household and village level included household size (total number of people living in the household at the time of the interview) and a full set of village dummy variables to control for village attributes that remain fixed during 2002-2006. We also used a variable to control for the year of the interview.

Analysis:

Our main aim is to estimate the association between individual market dependence and a) traditional social capital and b) credit. To do so, we ran two separate regressions with each of the two outcome variables but included the same explanatory variables in the two regressions. Because dependent variables were censored, we used lowered-censored Tobit regressions to analyze data. To ease the interpretation of the coefficients we transformed both dependent variables, traditional social capital and credit, to logarithms. We cannot correct for endogeneity biases, so results must be read as associations. For the statistical analysis we used Stata for Windows, version 10 (StataCorp, College Station, Texas).

## **Results**

Tsimane' market dependency: Table 1 shows the descriptive statistics of variables used in the regression analysis. Our data show that the Tsimane' continue to be a highly self-sufficient society. On average, only 28.6% of Tsimane' total personal income comes from market-related activities, the rest coming from the consumption of agricultural and forest goods. Furthermore, as much as 45.2 % of the people and 19.5% of the households in the sample (or 188 observations over the five years of the panel) had no market-based income and fully depended on agriculture, fishing, hunting, and gathering for subsistence. Over the study period, about 57.6% of the households in the sample had 25% or less of their total income based on market activities and only 13.5% of the people and 4.3% of the households in the sample had 75% or more of their total income based on market transactions.

INSERT TABLE 1 ABOUT HERE

A tobit regression of the variable individual *market dependence* against year of the survey (controlling for village of residency with a set of village dummies) suggests

increasing levels of individual *market dependence* throughout the five years of the panel study. Specifically, we found that the passage of each additional year was associated with an increase of 1.6% each year in the variable that measures market dependence ( $p=0.08$ ).

Traditional social capital and credit: About 57.0% of the adults in the sample did not report making any gifts or offer any help in labor to people outside their household during the week before the interview. The average person reported 0.7 occurrences of our measures of traditional social capital per week ( $SD=1.09$ ). A tobit regression of the variables that proxy for *traditional social capital* against year of the survey (controlling for a set of village dummies) suggests a negative growth rate for *traditional social capital*. Specifically, we found that traditional social capital decreased by 0.14 occurrences/year ( $p=0.001$ ).

The average outstanding debt of respondents in the sample was of 4.7 Bolivianos ( $SD=27.17$ ) (1 US\$=8.1 Bolivianos). We found that as much as 85.5% of the people in the sample did not have any outstanding debts at the moment of the interview. As traditional social capital, credit seems to experience a negative growth rate during the study period. Every year, Tsimane' decrease their amount of outstanding debts by 19.3 Bs ( $p<0.001$ ), which seems to suggest an overall decreasing ability (or need) to borrow money.

Market dependence, traditional social capital, and credit. Table 2 contains regression results of our measure of individual market dependence against traditional social capital (column [A]) and credit (column [B]). We highlight four findings from Table 2. First, contrary to what one would expect, individual *market dependence* was associated in a positive and statistically significant way to traditional forms of social capital. We found that a one percent increase in our measure of *market dependence* was

associated with a 2.4% increase in the occurrence of our measures of traditional social capital ( $p=0.002$ ). Since the mean occurrence of expressions of social capital is 0.71, data suggest that increasing market dependence by 10% would be associated with 0.17 more expressions of traditional social capital.

INSERT TABLE 2 ABOUT HERE

Second, individual *market dependence* was also associated in positive and statistically significant way to credit. Increasing individual market dependency by one percent was associated with a 4.9% increase in a person's outstanding debts ( $p=0.01$ ). Since the average person in the sample had a debt of 4.5Bs, our data can be interpreted to suggest that increasing market dependence by 10% would be associated with an increase in total outstanding debts of about 2.25Bs.

Third, in the two models, the variable that captures the year of the survey has a negative and statistically significant association to our measures of traditional social capital and credit, suggesting an overall decreasing trend in people's ability to access either of those two forms of insurance.

Last, from all the other control variables in our model, only the informant's age, sex, and the size of her household showed a consistent and statistically significant association with the two outcome variables. The education level of a person bore a positive association with credit, but not with traditional social capital; personal wealth bore a positive association with traditional social capital but not with credit; and length of residency bore a negative association with traditional social capital. In neither of the two models, do the variables that proxy for traditional social capital or credit appear as statistically associated one to each other in a significant way.

Robustness. We tested the robustness of our findings by running a set of variations for the regressions in Table 2 (Table 3). In our first robustness model, we ran



the same tobit regression using raw, rather than log transformed data (model [2]). For the next two models we included additional control variables that might affect an individual's market dependence and her access to traditional social capital and credit, such as Spanish fluency (model [3]) and number of days the person reported to be sick in bed during the week previous to the interview (model [4]). In model [5] we used a fixed-effect regression model controlling for attributes of the person that remain fixed during the study period (such as stable personality traits). Since households are the social units where Tsimane' share income and consumption, in the next three models we ran several variations to the core model controlling for household level attributes. Model [6] resembles model [5], except that we used a household, rather than individual fixed-effect model; in model [7] we use a model that resembles model [1] except that we substituted individual by household wealth; last, in model [8] we ran a model with dependent and explanatory variables aggregated at the household level. Model [8] does not include individual-level control variables.

#### INSERT TABLE 3 ABOUT HERE

The results from our robustness analysis confirm the findings of the core model with one exception. When using individual fixed-effects, we did not find any statistically significant association between our measure of individual market dependence and traditional social capital nor credit. Those results however need to be taken with caution since they do not respect the lower-censoring on the data.

### **Discussion**

We organize the discussion around four important findings of this work. First, our data suggest that the Tsimane' continue to be a highly self-sufficient society, although they display increasing market dependency. Ethnographic accounts have

described Tsimane' traditional subsistence economy as one centered around hunting, fishing, gathering, and subsistence agriculture (Chicchon 1992; Ellis 1996; Daillant 2003; Huanca 2008). Scholars have also highlighted how this economic system is changing due to macro-level forces such as the opening of trade, extraction of natural resources to national and international markets, encroachment, and acculturation (Godoy et al. 2005a; Godoy et al. 2009; Reyes-Garcia et al., in press). Data presented here provide a quantitative estimate of the pace at which non-market oriented activities are being replaced by market-oriented economic activities. Specifically, since we found that the passage of each additional year was associated with an increase of 1.6% per year in the variable that measures market dependence, assuming a linear relation, our data suggest that the passage of a decade would increase individual market dependence by 16%. An increase of 16% over a decade meshes with data from a previous study in two of the communities used for this study, the most isolated and one of the most integrated to the market economy. In that previous study, conducted a decade ago (1999-2000), we found that the average share of cash income represented 15% of the sources of income entering Tsimane' households (Reyes-García 2001). This is 14% less than the average of 29% of household income derived from market sources observed in the current data.

Second, Tsimane' do not seem to extensively rely on either traditional social capital or credit. Anthropologists have noted that people in small-scale societies extensively practice gift-giving and cooperation (Gurven et al. 2000; Hill 2002; Gintis et al. 2003). Our previous findings among the Tsimane' show that social capital in the form of gifts and labour services received from the rest of the village accounted for a small share of daily personal income (< 5%) and did not get activated to any great degree when people suffered a mishap, suggesting that Tsimane' invest in social capital

for social more than for economic reasons (Godoy et al. 2007a). The current findings further suggest that Tsimane' also do not extensively rely on goods and services provided by non-Tsimane' outside their household. The average individual total income (consumption plus cash income) estimated in this study is of 51.5Bs/week (data not shown), which means that the average Tsimane' has an outstanding debt of about 10% of his/her weekly income.

Third, this study finds that people with higher market dependency seem to depend more both on traditional social capital and on credit, although the magnitude of the association is low. Specifically, our data suggest that increasing market dependence by 10% would be associated with 0.17 more expressions of traditional social capital and an increase in total outstanding debts of about 2.25Bs. That people with higher levels of market dependency are more reliant on credit than more self-sufficient people meshes with the literature discussed in the introduction (Morduch 1999, Okten and Osili 2004). What is not clear is what explains the positive association between traditional social capital and individual market dependence? We offer two potential explanations. First, remember that our measure of traditional social capital measures the number of times an individual makes gifts or provides help in labour. Ethnographic observations suggest that people invest much of their cash income to buy locally appreciated edibles (i.e., noodles, sugar, and candy) or consumables (i.e., hooks, bullets). Because these goods are relatively uncommon in villages, especially in comparison to goods that can be obtained through own effort, individuals who are more integrated into the market economy and that therefore have more possibilities to acquire those goods might be facing more pressures to share them. Individuals whose consumption mainly comes from forest and agricultural goods locally produced may be under little to no pressure to share these foods, as they are widely available. Another possible explanation for the

positive association between traditional social capital and market involvement might be related to the acquisition of norms and institutions from markets that enable people to sustain social relationships by maintaining trust and fairness, as recently suggested by Henrich et al. (2010).

The fourth finding of this study is that access both to traditional forms of social capital and to credit seems to be decreasing over time (although it increases for people more market oriented, as mentioned before). The finding might be picking up other changes in the area not measured in this study. Our ethnographic observations suggest that with the passage of time, Tsimane' choice of how to protect themselves has expanded. For example, new actors have arrived to the area (i.e., researchers, care givers, NGO's) providing the Tsimane' alternative sources of wage labor (not based on the credit system described before). Furthermore, since its election in 2004, the new government led by Evo Morales has generated several subsidies (i.e., for pregnant women, children in school, retirement pensions) which have resulted in an increase of the flow of cash in the studied communities, thus decreasing the economic dependence on itinerant traders. So, it is possible that our variable for year of the survey is just picking up the fact that people now have more forms of insurance and thus depend less on the two sources studied here.

In conclusion, consistently with previous studies, here we find that Tsimane' are highly autarkic and display low reliance on both traditional forms of social capital and on the informal credit system available on the area. Although people more integrated to the market economy seem to depend more on those two forms of insurance and despite growing integration to the market economy, the overall pattern is one of decreasing dependence on traditional forms of social capital and credit over time. Those findings raise two questions that deserve further research. First, what are the combined effects of

the changes in traditional social capital and credit on Tsimane' overall well-being. And second, if the Tsimane' do not rely on the traditional social capital nor on credit, how do the Tsimane' protect themselves. In the previous paragraph we have suggested that Tsimane' might have just increased their dependence on other forms of cash income and insurance not discussed here. Future studies should confirm this hypothesis.

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**Table 1.** Definition and summary statistics of variables measured annually and used in the regressions. Cells contain the aggregate of the research period (2002-2006, inclusive) (N=2063)

<b>Variable</b>	<b>Definition</b>	<b>Mean</b>	<b>SD</b>
<b><i>I. Outcome variables:</i></b>			
<i>Traditional social capital</i>	Frequency of gifts and help in labor offered by the individual to people outside her household	0.71	1.10
<i>Credit</i>	Bs of outstanding personal debts at the moment of the interview.	4.46	26.64
<b><i>II. Explanatory variable:</i></b>			
<i>Market dependence</i>	Personal cash income as proportion of total personal income. From 0 to 100.	28.58	32.38
<b><i>III. Control variables</i></b>			
<i>Male</i>	Sex of the participant	0.49	0.50
<i>Age</i>	Age of participant (years)	35.93	16.29
<i>Schooling</i>	Maximum school grade achieved by participant	1.94	2.28
<i>Residency duration</i>	Number of years the subject has lived in the village	20.10	16.08
<i>BMI</i>	Body-mass index (weight in kg/ height in m <sup>2</sup> )	23.53	2.71
<i>Wealth</i>	Real value of 19 physical assets owned by the subject; <i>bolivianos</i> per person	497.21	557.4
<i>Household size</i>	Number of people in the household (n=806)	6.19	2.75

**Table 2:** Tobit regressions of traditional social capital and credit (explanatory variables) and individual market dependence (outcome).

	[A]	[B]
	Traditional social capital, in logs	Credit, in logs
Market dependence	.024***	0.049**
Age	.211***	.669***
Age square	-.002***	-.008***
Male	1.114**	4.981***
Education	-.135	.696**
BMI	.016	.131
Residency duration	-.038**	.056
Individual wealth	.002***	.001
Traditional social capital	^	.585
Credit	-.014	^
Household size	-.303***	-.426*
Year	-.493***	-3.927***

Notes: Regressions include a full set of dummy variables for villages and years, and a constant (not shown). Standard Errors in brackets. \*\*\*, \*\* and \* significant at < 10%, 5%, and 1%.

**Table 3:** Robustness analysis: regressions of traditional social capital and credit and individual market dependence. Regressions resemble those in Table 2 except for changes noted on the column “Changes”.

	<b>Changes</b>	<b>Traditional social capital</b>	<b>Credit</b>
[1]	Core model	.024***	.049**
[2]	With raw data	.003**	.294***
[3]	With Spanish fluency	.023***	.049**
[4]	With number of days sick last week	.024***	.050**
[5]	Individual fixed-effect	.004	.004
[6]	Household fixed-effect	.010**	.009**
[7]	Controlling for household-level economic variables	.253***	.005**
[8]	Using data aggregated at the household level	.016*	.069***

Notes: Regressions include the same controls than in Table 2, a full set of dummy variables for villages and years, and a constant (not shown). Standard errors in brackets. \*\*\*, \*\* and \* significant at < 10%, 5%, and 1%.