

*Odisha Economy Discussion Series 5*

# **Connectivity and Savings Propensity among Odisha Tribals**



**P.V. Viswanath**



**Nabakrushna Choudhury Centre for Development Studies, Bhubaneswar**  
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# Odisha Economy Discussion Series

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# Connectivity and Savings Propensity among Odisha Tribals<sup>1</sup>

P.V. Viswanath<sup>2</sup>

## Abstract

**Purpose:** Economic sustainability of rural areas is a concern given the increasing trend towards urbanization globally and in India. Self-reliant strategies, including increased savings and investment are more valuable in this regard than external interventions.

**Approach:** This paper uses the results of a survey to examine the factors affecting saving in a rural part of Odisha populated primarily by tribals.

**Findings:** Our tentative findings are that savings propensity is determined partly by the extent to which individuals feel connected to the broader economy, and partly by cultural factors. One implication of these findings is that connecting rural areas to other, possibly urban, locations could elicit greater saving and this could lead to greater development, employment possibilities, economic betterment and all the consequent social welfare implications.

**Value:** This paper relates savings propensity to new sociological population characteristics, such as perceived connectivity and food consumption patterns, and hence provides hitherto unexplored clues for policy initiatives to increase savings.

**Keywords:** Savings Propensity, Household Finance, Development, Tribals, Connectivity, Rural, Culture, India

**JEL Codes:** O16, O18, R29, G5

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<sup>2</sup> Lubin School of Business, Pace University, 1 Pace Plaza, New York, NY 10038; Tel: (212) 618-6518, Fax: (212) 618-6410, email: pviswanath@pace.edu, web: <http://webpage.pace.edu/pviswanath>

### 1. Introduction

Market access and connectivity are very important, particularly in developing economies. If a village lacks market access, then it will arguably be less able to develop its resource endowment.<sup>3</sup> As a result, inhabitants may end up remaining in poverty, and consequently lack basic necessities such as water, electricity and schools. This may also spur emigration to locales that are better connected and where they can develop their human potential better. On the other hand, access to markets and connectivity to the broader economy may well allow local resources to be better utilized in accordance with demands for local products in the larger marketplace.<sup>4</sup> This may spur changes in livelihood patterns, and also be a catalyst for greater savings since real rates of return on investment will go up and the value of savings will increase.<sup>5</sup>

Many current development projects focus on providing information to farmers in areas with high incidences of poverty. For example, Harsha Trust's approach to poverty alleviation (as described on their website (<http://harshatrust.org/strategy/>)) is to build human capital, provide suitable technology and investment, train the community in new skill sets and finally to link them to markets. Another example in the arena of financial services is the Indian Prime Minister's *Jan Dhan Yojana*, which focuses on providing access to financial services. What is common to these approaches is an interventionist mindset, though they are not both equally so (Harsha Trust could be considered more interventionist than *Jan Dhan Yojana*). While not denying the need for such primary interventions, a second approach to development would focus on auxiliary interventions, viz. providing basic infrastructure, such as roads. The contention of this approach is that once they have roads and concomitantly, access to markets, residents will discover which livelihoods are valuable to them and make their own choices.

At the same time, access to markets will also make larger scale investments more viable, since production need no more be for the local micro-market (e.g. Malkangiri, the south Odisha location studied in this paper), but rather for the larger macro-market, consisting either of nearby large towns or perhaps even the larger national or global market, since access to a large local market (such as Jagdalpur or Bhubaneswar that are farther away from Malkangiri) will in turn provide connectedness to larger selling arenas. Once larger investments make more sense, there will be a concomitant greater need for capital, ahead of production, leading to borrowing; more frequent cashflows, leading to savings and banking needs; and finally, a need to manage risk, leading to use of various insurance products.<sup>6</sup>

Since roads are a public good, it is more difficult for residents of these regions to get together to build the roads themselves. Thus, intervention in the form of government road construction is

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<sup>3</sup> See Alstadt, Weisbrod and Cutler (2012) for evidence on transportation access and connectivity to local economic outcomes.

<sup>4</sup> See Sapkota (2014) for cross-country evidence on infrastructure access and human development. Kusharjanto and Kim (2011) provide Indonesian evidence.

<sup>5</sup> See, for example, Viswanath (2018) and the references therein.

<sup>6</sup> See Ramcharran (2017) who provides evidence of returns to scale in small businesses in India. He also finds that bank lending improves returns to scale. Similar evidence is provided by Bannerjee et al. (2017).

necessary. Once connectivity is provided, though, markets will be set up by interested parties, or existing broader area markets will be utilized by local rural residents, who previously had no access to these markets.<sup>7</sup> This is an argument that starts with government investment in connectivity and results in greater economic development. This paper seeks to discover the extent to which such a narrative is supported by the data on savings and financial service use. Broadly speaking, the hypothesis that is sought to be tested is that regions with greater connectedness to markets are likely to be more involved in production for the market, and hence they are more likely to use financial services – savings, credit and insurance. The contention is not that direct intervention in terms of providing education, livelihood skills and changing of traditional mindsets is unnecessary, but that these perhaps need to be preceded by or, at the very least, accompanied by increased market access.<sup>8,9</sup>

Most work on savings behavior at the micro-level has focused on areas that are relatively well-connected to the larger economy. Savings behavior in such areas may be qualitatively different from that in less developed areas. As Polanyi (1957) has shown, the economy is always embedded in the larger society; as such, it is unwarranted to make inferences from studies that look at savings behavior in culturally different locations for the purpose of determining public policy for tribal areas. With this in view, we focus on savings behavior in economically backward areas that are arguably different in a cultural sense from the broader society. Specifically, this paper looks at how savings propensity is determined in tribal areas in Malkangiri district in Southern Odisha. If savings propensity is indeed greater in areas with greater connectivity, this would constitute support for government investment in connectivity.<sup>10</sup>

## 2. Literature Survey

The two main theories of household savings behavior depend upon the life-cycle theory (Ando and Modigliani, 1963) and the permanent income theory (Friedman, 1957) respectively. The first emphasizes the life-stage of the saver, while the second emphasizes expected future income rather than current income; hence an increase in expected future income could decrease current savings. The hypothesis that we consider in this paper could be considered a test of the permanent income hypothesis to the extent that we believe that greater connectivity implies

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<sup>7</sup> While schemes such as the Jan Dhan Yojana do depend somewhat more on the agency of the individuals involved, they may be putting the cart before the horse, in that the need for such accounts may not be perceived by the local population. The whole program seems to be part of a government push for transparency and computerization of banking operations, which make sense mainly in terms of the larger picture, rather than in terms of an immediate benefit for putative users of these services.

<sup>8</sup> If there are reasons why economic agents will not be able to respond on their own to increased market connectivity, a limited primary intervention may still be warranted. Nevertheless, targets of the intervention should be provided with a connected environment where the new skills can be profitably employed.

<sup>9</sup> Viswanath (2015) argues for educational and skill development initiatives in the context of an evaluation of microfinance programs.

<sup>10</sup> Of course connectivity, by itself, may be necessary but not sufficient for economic development. Market access may need to be accompanied by skill development and capacity building.

larger investment opportunity sets and higher permanent income. Theories of saving more pertinent to developing economies look at other factors, such as access to credit markets. Deaton (1992) suggests that financial savings can be inhibited due to lack of access to credit markets; instead individuals might prefer to invest in real assets (Rosenzweig and Wolpin, 1993) or rely on self-insurance particularly when macro-shocks like droughts are likely (Kazianga and Udry, 2006). Kulikov, Paabut and Staehr (2007) suggest that ownership of non-income producing assets, such as dishwashers may be considered as substitutes for savings, if they are considered by their owners as wealth. Hubbard et al. (1995) suggest that state-sponsored social insurance programs (like Medicaid in the US) might be a substitute for savings; the same is likely to be true of implicit social insurance in close-knit societies (Karlan et al., 2014).

We now look at studies of savings behavior in rural South Asian environments – these are particularly useful in that they are likely to provide indications of cultural determinants of savings behavior that need to be taken into account in our study. Goedecke et al. (2016) look at savings practices in coastal and central Tamil Nadu, centering on Villupuram and Cuddalore districts. They find that caste membership is important; dalits are more likely to use gold as a savings vehicle, as opposed to land which they were traditionally not allowed to own. In contrast to some other work (Carpenter and Jensen, 2002), they do not find substitution effects between informal savings and bank savings. Cheema et al. (2018) find that in Pakistan, savings propensities are higher in rural areas and among educated, wealthier families possessing livestock.

Naik (2013) looks at the question of savings in Sundergarh district in north-western Odisha. Although this area is also quite backward, most of the households that were surveyed are landless laborers. As such, the results may be different from those in Malkangiri. Naik's sample was half Christian, which made a big difference; this, too, suggests that the behavior of her sample is probably quite different. Gedela (2012) finds that savings increases with income among rural and tribal households in Vishakhapatnam district. Savings increases with age of household head, but at a lower rate. He also found that dependency ratio affected the amount of savings (the higher the dependency ratio, the lower the savings). He also found that male households save more than female-headed households (adjusted for income, age of head of household, dependency ratio, et cetera).

We find that connectivity is indeed related to savings propensity. As noted above, this can be viewed as support for Friedman's permanent income hypothesis to the extent that greater connectivity implies larger investment opportunity sets and higher permanent income. Our findings that savings propensity is related to radio ownership is contrary to the findings of Kulikov et al. (2007), but consistent with the observations of Goedecke et al. (2016) that economic behavior is affected by cultural norms and beliefs. Cultural norms may also be explanation for higher savings propensities amongst families that rely exclusively on agricultural revenue. We also see that households with older heads also save more, just like Gedela (2012) and Carpenter and Jensen (2002). Our findings regarding the relationship between food purchasing behavior and savings behavior is an original contribution to the literature. In particular, we find that



households that save more tend to purchase vegetables and milk less frequently (though not sugar and fruit). We interpret this to mean that vegetables and milk are seen as a luxury and dispensable. Alternatively, it may reflect conservatism in an area that is traditionally poor and less given to vegetable and milk consumption for reasons of poverty. Results for meat consumption were mixed.

### 3. Sample selection and data collection

#### 3.1 Rationale

An important reason for our choice of location of Malkangiri for our study is that it is one of the least developed districts in Odisha. Malkangiri is a border district of Odisha and touches Andhra Pradesh on its south and Chhatisgarh on its west. It has a very high proportion of scheduled castes (57.85% of the population) and scheduled tribes (22.77%) as per the 2011 census. As the Odisha District Gazetteer for Malkangiri notes, “the geography of Malkangiri district is marked by different hill terrains, far-flung cut off areas and dense forest,” with more than 90% of the population living in rural areas. According to the last census, the literacy rate was below 50%. According to the 2013 State of the Forest Survey Report, 40% of the total geographical area of the district is forested, though given the prevailing rate of deforestation, the present proportion is likely to be lower (Pattanaik, Reddy and Reddy, 2011). According to the District Gazetteer, 57.8% of the population is tribal (2011 census), with 97.8% of these living in rural areas. Our sampling strategy, as outlined below, attempts to select respondents from locations that provide sufficient variation in terms of connectivity, but also rules out major urban areas (such as block headquarters). This results in a greater proportion of tribals than for Malkangiri district, overall.

#### 3.2 Method

A master list of villages for Malkangiri district in the state of Odisha was obtained in March 2017 from an Indian Government website.<sup>11</sup> The names of 996 distinct villages were obtained through this procedure. According to this site, there were seven distinct blocks – Kalimela, Khairput, Korkunda, Kudumulugumma, Malkangiri, Mathili and Podia, in which there were 108 different gram panchayats.<sup>12</sup> We first chose 36 villages which were sampled from the 996 distinct villages as follows.

Malkangiri has seven blocks, consisting of 108 Gram Panchayats (Village Governing Zones; GPs). Field workers from an NGO, WASSAN (Watershed Support Services and Activities Network), familiar with Malkangiri district, were asked to assign each GP to one of seven baskets based on the following subjectively understood criteria:

- How far is the Gram Panchayat from main roads?

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[http://indiawater.gov.in/IMISWeb/DataEntry/HabitationDirectory/Reports/Rep\\_DirectoryList.aspx?Condition=P50votMRqBU%3D&id=OzojWGbSQEo%3D&State](http://indiawater.gov.in/IMISWeb/DataEntry/HabitationDirectory/Reports/Rep_DirectoryList.aspx?Condition=P50votMRqBU%3D&id=OzojWGbSQEo%3D&State).

<sup>12</sup> Somewhat different block names are given at <https://villageinfo.in/odisha/malkangiri/m-v-79.html>

- How many Gram Panchayat roads are in the Gram Panchayat?
- How far is the Gram Panchayat from block headquarters?
- How far is the Gram Panchayat from district headquarter?
- How many Rural Development roads are in the Gram Panchayat?
- How mountainous is the Gram Panchayat?
- How many navigable waterways are there in the Gram Panchayat?
- How many waterbodies that make transportation difficult in the Gram Panchayat?
- How many market centres, both for inputs and outputs, are there in the Gram Panchayat?
- How close are market centres, both for inputs and outputs to the Gram Panchayat, if not actually in the Gram Panchayat?

**Table 1: Descriptions of the seven baskets used for sample selection**

Basket	Description
1	Block headquarters and the district HQ are nearby, Gram Panchayats are well connected to many parts of the district, permanent and weekly markets are available.
2	Block HQs are nearby, there is good road connectivity, public buses and autos are available, markets are nearby, there are many Rural Development roads in the villages and within the villages, roads are CC (cement concrete).
3	Block HQs are nearby, NHs are nearby, there are some minimal bus facilities (20-seaters), 75% of the population can access market facilities, and roads can be traversed using jeeps.
4	Block HQs are not near, 50% of the roads are of good quality, there is no public transportation, but there are bridges over rivers and small vehicles can use the roads.
5	Gram Panchayats are not close to markets, they are far from block HQs, roads are bad (60% damaged) and distant from NHs.
6	Gram Panchayats are far from the district HQ and far from NHs, the roads are in bad condition, areas are hilly, but it is possible to travel on foot, although these roads are not passable in the rainy season; locations are far from markets.
7	Gram Panchayats have no roads, any rivers that exist are non-navigable, they are far from the national highways and they are also far from large cities.

There were eleven different field workers, who engaged in this exercise. Through open discussion, agreement was reached on the assigning of Gram Panchayats to seven blocks; the characteristics of the different baskets are provided in Table 1. This procedure yielded 11 Gram Panchayats in basket 1, the most connected; 31 in basket 2; 27 in basket 3; 15 in basket 4; 8 in basket 5; 10 in basket 6; and 6 in basket 7. The field workers were asked to describe Gram Panchayats in each basket and a rubric was generated using this description.

Subsequently, the same workers were asked to classify Gram Panchayats as either too dangerous for data collection due to Naxalite activities or not dangerous. All the Gram Panchayats falling in basket number 7, seven Gram Panchayats in basket 6 and three Gram Panchayats in basket 5 were classified as dangerous, for a total of sixteen Gram Panchayats. We also decided not to

include gram panchayats where block headquarters are located. Such areas are likely to be more urban and otherwise as well, quite different from rural areas. Occupations that are not found in other areas may be found only in such urban/quasi-urban areas. Thus these areas are not easy to compare with other more rural areas. Six Gram Panchayats in basket 1 were excluded following this procedure. From the remaining Gram Panchayats in six baskets, three Gram Panchayats were chosen randomly without replacement from each basket, for a total of 18 Gram Panchayats. Next, two villages were chosen randomly without replacement from the villages in each of the chosen 18 Gram Panchayats, for a total of 36 villages.

**Table 2: Households, Blocks, Gram Panchayats, Villages and Interviewers in Sample**

Interviewer	Block	Gram Panchayat	Village	No. of households
Mamta Mahapatra	Korkunda	Sikhapally	Kadal Meta	8
Mamta Mahapatra	Korkunda	Tumusapaly	Chidipali	9
Mamta Mahapatra	Korkunda	Tumusapaly	Tumusapaly	7
Subhalaxmi Das	Kudumulugumma	Parkanamala	Parkhanmalla	6
Subhalaxmi Das	Kudumulugumma	Parkanamala	Sindhiguda	2
Kanhu Charan Sahani	Kudumulugumma	Parkanamala	Sindhiguda	4
Kanhu Charan Sahani	Malkangiri	Pandripani	Pandripani	6
Kanhu Charan Sahani	Malkangiri	Pandripani	Pujari Mundi	1
Kanhu Charan Sahani	Malkangiri	Serpali	Rangamatiguda	4
Jatismaya Biswas	Podia	Kaladapalli	Udayagiri	8
Jatishmaya Biswas	Kalimela	Nallagunthi	Nallagunthi	8
Jatishmaya Biswas	Kalimela	Nallagunthi	MV 72	7
Jatishmaya Biswas	Kalimela	Maharajpalli	MPV 81	8
Jatishmaya Biswas	Kalimela	Maharajpalli	Maharajpalli	8

### 3.3 Survey

Unfortunately, there were difficulties in obtaining household lists and ultimately, interviews were conducted in only 13 villages by four different interviewers, based on household voter lists that were obtained by the workers. Interviewers were provided by the WASSAN Foundation. Local personnel were needed to interview the respondents since many of the respondents were tribals who did not necessary speak even the state language, Odiya. Most of the interviews were, in fact, conducted in Odiya and Kui; interviewers were conversant in Kui and Odiya, with a reasonable knowledge of Hindi and some understanding of English. All interviewers underwent training in order to acquaint them with the meaning of the questions that they were to ask. Even though the questionnaire itself was not translated into Hindi or English, interviewers were

provided, during the training, with explanations of the questions in Hindi by the author, supplemented by Odiya explanations from WASSAN personnel, who knew both Hindi and English.

Ultimately, 39 households were interviewed by Jatishmaya Biswas; 15 households by Kanhu Charan Sahani; 8 by Subhalaxmi Das in Parkhanmalla village in Parkanamala Gram Panchayat in Kudumulugumma Block; 24 by Mamta Mahapatra for a total of 86 households (see Table 2 for details).

The connectivity measure was obtained by asking the question “How connected do you feel your village is?” for current connectivity and “How connected do you feel your village was, three years ago?” for past connectivity. The additional information was provided to interviewers to aid them in the posing of this question:

*Data collector should provide the following information to help respondent create a frame of reference*

*(Use 1 for if you were living in the District headquarters, Malkangiri town) Answer with respect to Malkangiri town and with respect to other villages that you're familiar with.*

*I have to go far away to buy what I need. I have to go far away to sell what I produce; if I sell nearby, I don't get a fair price. I don't know what is happening in the world. People come to the village often from outside. I often travel outside the village to visit friends/relatives.*

#### 4. Model and Hypotheses

The theory, once again is the following. Access to input and output markets leads to scaled-up production and capital-intensive production that makes optimal use of local resources. This, in turn, creates a demand for financial resources, both savings and credit, as well as tools to manage risk, i.e insurance. In the absence of market access, it is optimal to keep to a subsistence economy. If markets are available, then it makes sense to produce for a larger set of consumers.

#### 5. Results

Our unit of analysis is the family. While a large majority of heads of households noted agriculture as their primary occupation (86%), an important proportion (39.74%) listed Non-timber forest products (NTFP) as their secondary source of income (Table 3). Of the 62 individuals who answered the question, 77.42% identified themselves as members of a scheduled tribe, 16.13% identified as members of a scheduled caste, 3.23% as members of another backward caste and a further 3.23% as “other.”

We have data available for various aspects of the family's financial condition, both the balance sheet and the income statement, as well as other characteristics of the family's living and working environment that are useful for our analysis. From the balance sheet, we have information about the various kinds of assets that they possess. From Table 4, we see that the propensity to save –

defined as the bank balance divided by total household income – varies according to different respondent characteristics. In particular, we can see that the propensity to save is increasing in connectivity. The more the respondent feels that his/her village is connected to the broader world, the more they tend to save out of their income.<sup>13</sup>

**Table 3: Primary and Secondary Occupations of Respondents**

Item	Primary Occupation (% of total)	Secondary Occupation (% of total)
Agriculture	85.88	10.26
NTFP	1.18	39.74
Migratory Labor	3.53	11.54
Petty Trade	7.06	11.54
Office Employment	1.18	1.28
Labor	1.18	21.79
Animal Husbandry and Fishery	0	3.85
Total Number of Respondents	83	78

After looking briefly at how savings propensity varies with income, we will investigate more deeply the impact of connectivity on savings propensity and try to show that the evidence from lifestyle variables can be marshalled into a consistent picture of the positive impact of connectivity on savings behavior. The evidence, we will show, suggests that connectivity is connected with an economic conservatism that derives from closer links to the broader economy and expectations of better times ahead.

### *5.1 Propensity to Save and Income*

The propensity to save is negatively correlated with the total income of the family (Table 4). This may be due to the fact that when the family has a very low level of total income, a rise in income is unavoidably used to increase consumption and is not available for saving.<sup>14</sup> This notion is strengthened by the finding that when we regress the level of savings against total income and total income squared, the coefficient of the latter is positive, showing that the intertemporal substitution effect does win out at higher income levels. However, total income is endogenous and causality may well go in the other direction. The fitted equation is given below, where the coefficient for Total Income Squared is significant at the 10% level of significance.

<sup>13</sup> Although there is a stronger correlation between the propensity to save and current perceived connectivity, compared to past connectivity, there is no significant relationship between the propensity to save and the change in perceived connectivity.

<sup>14</sup> It is possible that the negative correlation of total income with the savings propensity is due to a weakening of the precautionary motive for savings when income increases from initial low levels, while the intertemporal substitution effect is also weak due to the immediate need for consumption. The net result is that even the actual level of savings can drop with a rise in income when initial income levels are low.

## Connectivity and Savings Propensity among Odisha Tribals

$$\text{Bank Balance} = 8905.20 - 0.1524 \text{ Total Income} + 1.36 \times 10^{-6} \text{ Total Income Squared}$$

(2409.82) (0.0966)                      (7.41 × 10<sup>-7</sup>)

Robust standard errors in parentheses; R-squared = 0.1652.

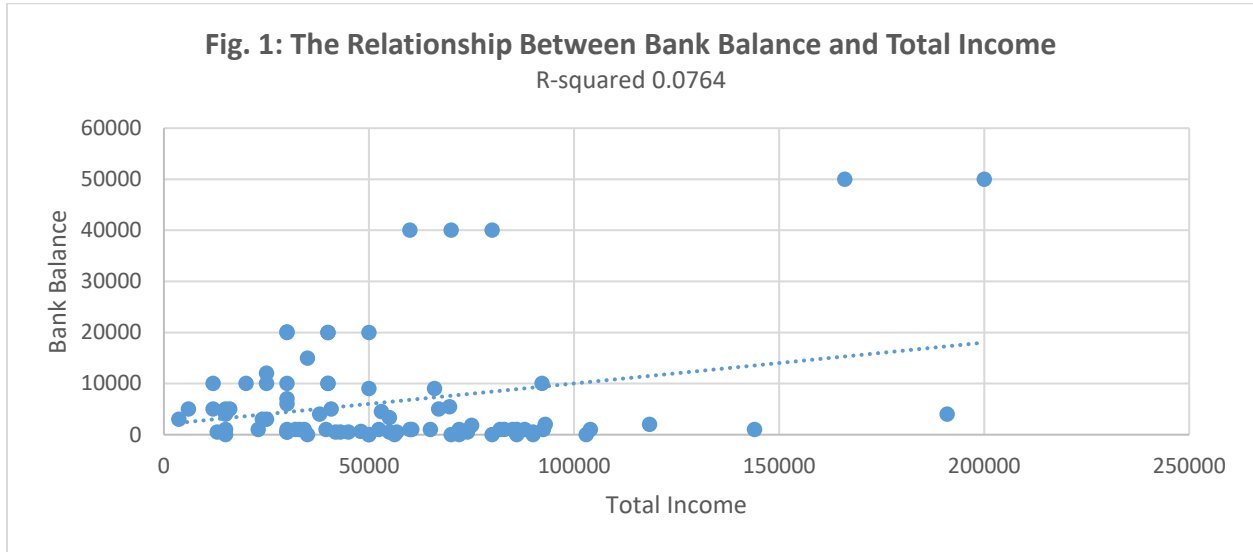
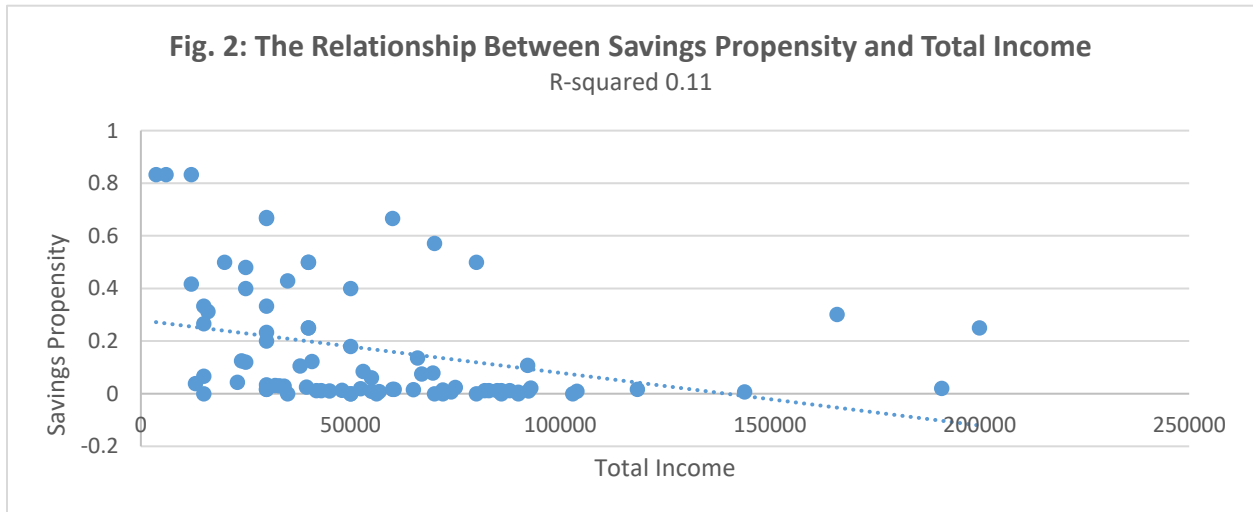


Figure 1 shows how the bank balance (our measure of saving) behaves as a function of total income, while Figure 2 shows how the savings propensity itself varies according to total income.



**Table 4: Correlation with Savings Propensity**

Item	Correlation	Number of Observations
Connectivity	0.4687*	76
Past Connectivity	0.3974*	76
Change in connectivity	-0.1622	83
Age of Household head	0.2117*	83
Total income of all family members	-0.3317*	82
Total income of all family members, using components	-0.3544*	83
Total Value of assets used in livelihood (other than land)	-0.0916	83
Total Bank balance	0.5981*	83
Total loans	-0.135	83
Total amount remitted by migrant labor	-0.131	83
Total migrant labor income	-0.1696	83
Total migrant labor income as proportion of total family income	-0.2598*	83
Total non-migrant labor income	-0.1528	83
Total Salaried income	-0.0754	83
Total income from home occupations	-0.1379	83
Total income from animal husbandry	-0.1876	83
Total income from NTFP	-0.2732*	83
Total income from Vegetables	0.1379	83
Total income from agriculture	-0.2836*	83
Total income from livelihoods	-0.0112	83
Total time spent on rice cultivation over the last twelve months	-0.0982	83
Revenue from selling rice in past twelve months	-0.2752*	83
Total land owned (in acres)	-0.0815	83
Note: Savings Propensity is defined as respondent's bank balance as a proportion of total income of all family members. Asterisks indicate significance at the 5% level of significance.		

### 5.2 Propensity to Save and Lifestyle

From Table 5, we see that the propensity to save is higher for those who purchase meat less frequently, those who purchase vegetables less frequently, those who do not have mobile phones, and those who do not have television sets or motor vehicles. On the other hand, people who own radios do seem to save more. Finally, people who possess life, health, crop or other insurance also seem to save more as a proportion of their income. One way of understanding this is to say that this is an expression of conservatism. We note that people who are less likely to consume high-quality and high-priced goods (for example, using radios instead of television

sets for entertainment) and those who purchase insurance are more likely to save. Both these characteristics can be reasonably identified with an economic conservatism, expressed in a willingness to postpone current consumption in the expectation of better times in the future.

**Table 5: Mean of Savings Propensity for different population subgroups**

Variable	Yes	No	T-statistic
Low caste (ST/SC) Dummy	0.1795	0.1061	0.71
Scheduled Tribe member (only for low caste respondents)	0.1160	0.0597	0.81
High Meat purchase frequency (if daily or weekly)	0.0596	0.1269	<b>-1.80</b>
High Sugar purchase frequency (if daily or weekly)	0.0967	0.0655	0.90
High Milk purchase frequency (if daily or weekly)	0.0567	0.1371	-1.51
High Veg purchase frequency (if daily or weekly)	0.0720	0.3571	<b>-3.76</b>
High Fruit purchase frequency (if daily or weekly)	0.0645	0.0899	-0.68
High Bank balance (Higher than median)	0.3221	0.0137	<b>8.31</b>
Dummy for mobile phone ownership	0.1423	0.2702	<b>-2.25</b>
TV ownership dummy	0.1082	0.2297	<b>-2.25</b>
Radio ownership dummy	0.4007	0.1476	<b>3.63</b>
Electricity availability dummy	0.1819	0.1993	-0.18
Motor vehicle ownership dummy	0.0873	0.2108	<b>-1.85</b>
bicycle ownership dummy	0.1669	0.2084	-0.74
Participation in Microfinance Institutions (MFI)	0.1057	0.1794	-1.13
Possession of life, health, crop or other insurance	0.3535	0.1281	<b>3.60</b>
Notes: Savings Propensity is defined as Proportion of income saved by respondent, specifically respondent's bank balance as a proportion of total income of all family members. T-statistics is for difference. T-statistic in bold indicate significance in a two-tailed t-test at the 10% level of significance or in a one-tailed t-test at the 5% level of significance.			

Table 6 shows that those who pursue farming as an occupation exclusively tend to have a greater savings propensity compared to those who are farmers primarily, but also tend to have other occupations. This may be explained as due to a greater need for precautionary savings caused by the lower level of income diversification. Alternatively, it may reflect a more conservative attitude to saving on the part of a population subgroup that is probably more conservative in its attitudes generally.

We now provide some results from multivariate analysis in Table 7. Considering that our dependent variable is the propensity to save, which takes values between zero and one, we recognize the bias in the estimated regressions from an OLS analysis (Papke and Wooldridge, 1996). At the same time, the traditional solutions of probit and logit analysis are inappropriate because the dependent variables are not really measuring underlying binary responses. Extreme value observations are also problematic for various reasons (Gallani and Krishnan, 2016). We



therefore apply the fractional response model of Papke and Wooldridge (1996, 2008), using a probit formulation to model the conditional mean of the dependent variable. We also use robust standard errors to adjust for heteroscedasticity, considering that our data is cross-sectional.

It would also seem that the positive relationship between savings propensity and perceived connectivity is not an artifact of the negative relationship between savings propensity and income; a multiple regression of savings propensity on total income and perceived connectivity has the expected signs of the coefficient, but the slope coefficient on total income is no longer significant (Table 7; Model V).

**Table 6: Savings propensity for occupational subgroups**

Item	Mean savings propensity for pure farmers	Mean savings propensity for mixed farmers	t-value
Pure farmers and those with secondary occupation NTFP	0.4032 (n=8)	0.1677 (n=28)	2.3569
Pure farmers and those who have migratory jobs as a secondary occupation	0.4032 (n=8)	0.03905 (n=9)	4.3728
Pure farmers and those who are shop-owners in a secondary occupation	0.4032 (n=8)	0.0958 (n=5)	2.6443
Pure farmers and those who have non-migratory labor as a secondary occupation	0.4032 (n=8)	0.0819 (n=15)	4.1452

The remarks made earlier from univariate analysis seem to bear up, more or less, in a multivariate analysis, as well. Households buying vegetables and milk with higher frequency tend to save less, while meat purchasing frequency is no longer significant. Families owning radios tend to save more as before, while television ownership is not significant. Motor-vehicle ownership is negatively related to savings propensity, as before, but only in model I. Mobile phone ownership, which had a negative simple correlation with savings propensity is now positive related, but again only in model I. Families with more migrant labor income seem to save less, but this only shows up in model I. Revenue from rice sales is negatively correlated with savings behavior, which reflects our previous result regarding stronger savings propensity for farmers (which in this area primarily means rice farming). Participation in microfinance organizations and loans taken are negatively correlated with bank savings. Since most microfinance organizations provide loans and do not accept deposits, both of these results probably reflect the same phenomenon, which is that households use up savings before taking loans.

What is consistent over all the models is the strong positive relationship between connectivity and savings propensity. This relationship is maintained even after controlling for household income, consumption behavior and occupational specialization. We may say, tentatively, that there are two effects, one -- cultural conservatism (reflected in the stronger savings propensity of farmers) and two -- economic conservatism, fueled by expectations of high returns from saving

and investment. The relationship between consumption and savings may reflect this economic conservatism. The economic conservatism effect could be explained as a concomitant of the connectivity effect.

**Table 7: The relationship between propensity to save and respondent characteristics**

Var/Model	I	II	III	IV	V
Constant	<b>-3.9773</b> (-5.47)	<b>-1.9178</b> (-3.66)	<b>-1.7708</b> (-2.98)	<b>-1.5776</b> (-2.87)	<b>-1.6825</b> (-2.98)
Connectivity	<b>0.3000</b> (5.21)	<b>0.323521</b> (5.60)	<b>0.3373</b> (2.43)	<b>0.1190</b> (2.79)	<b>0.3531</b> (2.95)
Income	<b>5.82x10<sup>-06</sup></b> (2.30)	<b>5.63x10<sup>-06</sup></b> (2.38)	-3.88x10 <sup>-06</sup> (-0.75)	-1.37x10 <sup>-06</sup> (-0.35)	-2.73x10 <sup>-06</sup> (-0.35)
Total Value of assets used in livelihood (other than land)	-8.87x10 <sup>-06</sup> (-1.49)				
Revenue from selling rice in past twelve months	<b>-1.4446</b> (-7.30)	<b>-1.3x10<sup>-05</sup></b> (-2.28)	<b>-2.41x10<sup>-05</sup></b> (-2.56)	<b>-1.99x10<sup>-05</sup></b> (-2.84)	<b>-1.74 x10<sup>-05</sup></b> (-2.53)
High Veg purchase frequency dummy (if daily or weekly)	<b>0.3396</b> (2.43)	-0.81581 (-1.86)			
High Meat purchase frequency dummy (if daily or weekly)	-0.28126 (-1.70)	0.047946 (0.33)			
High Milk purchase frequency dummy (if daily or weekly)	<b>0.31576</b> (2.02)	-0.2147 (-1.13)			
High Sugar purchase frequency dummy (if daily or weekly)	1.21 x10 <sup>-06</sup> (0.14)	0.199971 (1.02)			
Total loans	-0.4891 (-1.88)	-6.96E-06 (-0.57)	<b>-3.97 x10<sup>-05</sup></b> (-3.38)	<b>-3.94 x10<sup>-05</sup></b> (-3.59)	
Total migrant labor income as proportion of total family income	<b>-0.5115</b> (-3.42)	-0.05769 (-0.18)	-0.4366 (-1.14)	-0.4588 (-1.41)	
Dummy for mobile phone ownership	<b>0.5401</b> (3.11)		-0.2790 (-1.1)		
TV ownership dummy	0.5828 (1.54)		0.4131 (1.71)		
Radio ownership dummy	<b>2.7209</b> (3.32)		<b>0.4888</b> (2.12)		
Elec avail dummy	-0.3212 (1.26)		0.411 (1.36)		
Motor vehicle ownership dummy	<b>-0.2901</b> (-1.94)		-0.5255 (-1.81)		
Participation in MFI	<b>-1.2 x10<sup>-05</sup></b> (-2.06)	<b>-0.31986</b> (-2.25)	<b>-0.8188</b> (-2.57)	<b>-0.7487</b> (-2.82)	<b>-0.7703</b> (-2.96)
No of obs	43	54	64	76	76
Pseudo R-squared	0.2264	0.1456	0.1831	0.1516	0.1362
Note: Results are from a fragmented regression analysis using a probit model for the conditional mean of the dependent variable. Coefficients in bold are significant at the 5% level of significance in a two-tailed t-test. Computed standard errors are robust.					

### *5.3 Analysis of Results*

As mentioned above, our hypothesis could be considered a test of the permanent income hypothesis to the extent that greater connectivity implies higher future income. To that extent, our results could be considered support for the permanent income hypothesis.

We find a negative correlation between savings propensity and TV and mobile phone ownership (in our univariate analysis, but not consistently in our regression analysis). This goes contrary to the hypothesis of Kulikov et al. (2007). However, radio ownership is positively correlated with savings propensity. One way of reconciling these seemingly disparate results is to look at the implications of the mediating variables as measures of respondent expectations regarding the future. Radios are cheaper as entertainment devices, compared to television sets and mobile phones. Hence a choice to buy radios may reflect a desire to spend less on current consumption and save more because of beliefs regarding improved future prospects. From this point of view, these results complement our primary results regarding connectivity.

On the other hand, connectivity may be proxying for availability of savings vehicles. Hence, villages with greater connectivity may show greater savings simply because the possibility of savings vehicles exists.

## **6. Conclusion**

Savings propensity is determined by at least two forces in our sample – those with a feeling of greater connectivity, save more. This makes sense if connectivity is a proxy for the ability to use money better in the future. This is consistent with the finding that bigger savers also tend to be those who do not spend on mobile phones and television sets – all pointing to looking ahead and not consuming today.

The second possibility that savings propensity is at least partly cultural. This is backed by the finding that individuals who are farmers and are not involved in other activities (no alternate secondary occupation) tend to save more. Households with older heads also save more. These people also tend to purchase milk and vegetables less frequently. This also makes sense if these commodities are seen as luxuries and dispensable.

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**Nabakrushna Choudhury Centre for Development Studies (NCDS)**

(an Indian Council of Social Science Research (ICSSR) institute  
in collaboration with Government of Odisha)

Bhubaneswar - 751013

Odisha, India

Phone: +91-674-2301094, 2300471

Email: [ncds\\_bbsr@dataone.in](mailto:ncds_bbsr@dataone.in)

Web: <http://ncds.nic.in>

Facebook: [@ncdsbhubaneswar](https://www.facebook.com/ncdsbhubaneswar)

Twitter Handle: [@ncds\\_bbsr](https://twitter.com/ncds_bbsr)

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