SUBJECTIVE INCOME EXPECTATIONS AND RISKS IN RURAL INDIA

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ABSTRACT

Income risks and expectation about future income play a fundamental role in the decision making of households. The analysis of income risk is particularly important for developing countries, where incomes are more volatile than developed countries, and credit and insurance markets are inadequately developed, limiting opportunities available to households to diversify their risks. When households have inadequate opportunities to diversify their risks, income risks may lead to relatively high fluctuations in consumption and thus greater levels of transient poverty. This may also lead to a poverty trap, as poor households may enter low-risk, low-return activities, and low-return and less capital-intensive activities. This paper analyses the pattern and determinants of (perceived) expected income and income risk in rural India. It uses unique primary survey data eliciting subjective income distribution from households in twelve villages in Bihar. The sample consists of 659 households with approximately 4,100 household members. The survey was designed to elicit the cumulative distribution function (cdf) of future household income. Using this information, it constructs household-specific subjective expected future income, its variance and coefficient of variation. It finds that both expected future income and income risks (variance and coefficient of variation) differ substantially across households. Both expected future income and its variance increase with current income, however, there is a significant negative association between the coefficient of variation of future income and current income, suggesting that low-income households face greater variability in their income. Upper caste households and households reliant on non-agricultural income have significantly higher expected future income and variance. To the extent income risks lead poor households to choose low income and low risk activities, public policies designed to reduce these risks, such as provision of insurance (e.g. rainfall insurance) and easier availability of consumer credit are likely to have a significant effect on poverty and inequality. Microfinance institutions and non-governmental organizations can play an important role in the provision of insurance and labour market information. Public investment in irrigation, better weather information, and employment guarantee schemes, such as the National Rural Employment Guarantee Act, can reduce income and consumption risk.

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INTRODUCTION

Income risks and expectation about future income play a fundamental role in the decision making of households. The analysis of income risk is particularly important for developing countries, where incomes are more volatile than developed countries, and credit and insurance markets are inadequately developed, limiting opportunities available to households to diversify their risks. When households have inadequate opportunities to diversify their risks, income risks may lead to relatively high fluctuations in consumption and thus greater levels of transient poverty (Jalan and Ravallion 2001). This may also lead to a poverty trap, as poor households may enter low-risk, low-return activities (Eswaran and Kotwal 1989; Dercon 1996), and low-return and less capital-intensive activities (Collier and Gunning 1999).

Risks and uncertainties about income are not directly observed. Most empirical studies use realized income data to derive income expectation and measures of income risk, for example, variance. As discussed by Dominitz (2001), deriving income expectation and variance from realized income data requires knowledge of the information-set of agents and how they process the information. Researchers typically assume that agents have rational expectation. However, even with rational expectation, derived variance is upward biased if researchers have limited information about the information-set of agents, which is usually the case. Given strong assumptions needed to derive income expectation and risk using realized income data and the problem of limited information, a literature has emerged which advocates the use of subjective expectations, which directly elicits probabilistic expectations from agents (Manski 2004; Delvande 2014). This is the approach I follow in this paper.

The main contribution of this paper is to use subjective income distribution data to characterize and analyse the determinants of (perceived) expected income and income risk faced by rural households in Bihar, which is one of the most populous and poorest states in India. This is one of the first papers to use subjective income distribution data to analyse determinants of income risk. A closely related paper is Attanasio and Augsburg (2016), who use income expectation data to analyse the dynamics of income in the Anantpur district of Andhra Pradesh, India. The focus of their study is expected income (first moment) rather than income risk (second moment).

The data for this study is taken from a household survey undertaken by the author from January to March 2017 in 12 villages in Bihar. The survey collected detailed information on household and village characteristics. The sample consisted of 659 households with approximately 4,100 members. It contained a module designed to elicit information on the cumulative probability distribution of the next year's household income.

Using survey data, I calculate household-specific expected future income and two indicators of income risk/variability: variance of future income and coefficient of variation (CV). These are widely used indicators of income risk/variability in the empirical and theoretical literature (Dercon 1996; Hartog and Diaz-Serrano 2013).

The main findings of the paper are as follows. Both expected future income and income risks differ substantially across households. Upper caste, intermediate caste and Muslim households have significantly higher expected future income and variance relative to backward caste and scheduled caste/tribe households. Households reliant on the non-agricultural sector as their primary source of income have significantly higher current and expected future income and higher variance than agricultural households. Current income is a significant predictor of both the expected future income and its variance. While both expected future income and its variance increase with current income, there is a significant negative association between the coefficient of variation of future income and current income, suggesting low-income households face greater variability in their income relative to high-income households.

The rest of the paper is structured as follows. Section 2 provides details of survey and income distribution data. Section 3 discusses the calculation of income expectation and income risks. Section 4 describes and discusses the econometric model and explanatory variables. Section 5 analyses the determinants of expected future income and current income. This is followed by the analysis of determinants of income risk. Section 7 analyses the inter-relationships among current income, expected future income, and income risk. This is followed by the conclusion.

DATA

Survey

The survey 'Risk and Investment in Education' funded by the International Growth Centre, United Kingdom, was conducted from January to March 2017 in 12 villages in six districts (two villages in each district) of Bihar. These districts are in three distinct regions of Bihar: North Bihar, Central Bihar, and South Bihar, with two districts (four villages) taken from each region. The sample consists of 659 households with approximately 4,100 household members. These households are part of the panel survey conducted by the Institute for Human Development, New Delhi. The survey was administered to households with children aged 5 to 17 years. Table 1 shows the distribution of these households over villages.

Table 1
Distribution of Respondent Households over Villages and Districts (in %)

Village	District	Distribution of Households
Alapur Bishanpur	Gaya	5.00
Amrahi	Rohtas	4.29
Belabadan	Purnia	9.65
Chandkura	Nalanda	6.89
Dewan Parsa	Gopalgunj	8.88
Jitwarpur	Purnia	17.92
Khangaon	Madhubani	12.10
Mahisam	Madhubani	16.39
Mohiuddinpur	Nalanda	2.30
Paharpur Dayal	Gopalgunj	2.45
Rupaspur Salempur	Gaya	5.97
Samhauti Buzurg	Rohtas	8.12

Note: Number of Households/Respondents: 659.
Source: Author's Calculation

The survey consisted of a family questionnaire and a questionnaire for each 5- to 17-year-old in the household. It collected detailed information on schooling indicators such as enrolment, schooling expenditure, time use and household and parental background. The survey contained a module designed to elicit information on households' distribution of the next year's income.

The Income Expectation Module

The questionnaire was designed to elicit the cumulative distribution function (*cdf*) of future household income. In each household, an adult member (at least 18 years of age) was asked about their subjective expectation of the next year's household income.

The questionnaire was similar to those used in previous studies (Dominitz 2001, Attanasio and Augsburg 2016). The expectation module began with two simple questions to assess whether respondents understood the concept of probability and their response to high and low probability events. Following these preliminary questions, respondents were asked about the previous year's household income (year 2016) and the expected maximum and minimum income for the next year (year 2017). Respondents were then asked what the percentage chance was that the next year's income would be higher than the previous year's household income, and what would be the mid-point of the maximum and minimum of the next year's income (calculated by the interviewer and read to the respondent). The questionnaire and detailed discussion of the salient characteristics of respondents and responses are available in the working paper version of this paper, hereto referred as Kumar 2017.

Table 2 shows the response rate of households to expectation questions, and whether these responses violate the laws of probability and the types of violation. Six households out of 659 did not provide answers to the income expectation module questions (response rate 99%). However, out of 653 responses, 152 violated the laws of probability (24%).

Table 2
Types of Violation of Laws of Probability

	Number of Households
Total Number of Households	659
Total Number of Responses for Income Expectation Module	653
y_cur > y_mid & incdf_cur > incdf_mid	46
y_cur < y_mid & incdf_cur < incdf_mid	25
y_cur = y_mid & incdf_cur != incdf_mid	46
Total Number of Violation of Monotonicity	117
Other Types of Violation	
Y_cur < =y_min & incdf_cur < 100%	30
Y_cur >= y_max & incdf_cur > 0%	3
incdf_cur or incdf_mid>100%	2
Total Number of Excluded Households	152
Total Number of Included Households	501

Note: y_cur: current income; y_mid = (y_min+ y_max)/2: The mid-point of the support of the future income distribution; y_max: the maximum future income; y_min: the minimum future income; incdf_cur: and the probability mass to the right of current income; incdf_cur: and the probability mass to the right of y_mid.

Source: Author's Calculation

I exclude the households whose respondent violated the laws of probability in the calculation and analysis of expected future income and risk. Thus, the overall sample consists of 501 households. One important concern is whether excluded households are systematically different from included households. This would lead to selection bias. To examine this issue, I estimate an ordinary least squares model and a logit model to check whether the violation of laws of probability is related to household and respondent characteristics. Overall, these results suggest that excluded households are not systematically different from included households (Table 5, Kumar 2017).

CALCULATION OF SUBJECTIVE EXPECTED INCOME AND RISK

To calculate household-specific expected future income and income risk/dispersion from this information, one needs to make distributional assumptions. In this paper, I assume a piece-wise uniform probability distribution (see Kumar 2017 for details). Attanasio and Augsburg (2016) also use uniform probability distribution in their analysis. To measure income risks, I calculate two indicators: variance of future income and coefficient of variation, which are widely used in the empirical literature (Dercon 1996; Hartog and Diaz-Serrano 2013).

Table 3 provides summary statistics of household-specific expected future income, its variance, and coefficient of variation. It shows that the average expected future income was Rs. 81,799 with the minimum expected future income being around Rs. 5,211, and the maximum being Rs. 857,250. The average household-specific standard deviation was Rs. 8,934 with the standard deviation of Rs. 14,549. The average household-specific coefficient of variation was 0.12 with the standard deviation of 0.09.

Table 3
Summary Statistics of Expected Future Income and Indicators of Income Risk

Variable	Mean	S.D.	Minimum	Maximum
Expected Future Income (in Rs.)	81799.0	73693.0	5211.5	857250
Standard Deviation of Future Income	8933.9	14549.5	0	226509.9
Variance of Future Income (in 0000 Rs.)	29100	254000	0	5130000
Coefficient of Variation	0.1150	0.0934	0	0.9762

Note: Number of observations 501.
Source: Author's Calculation

ECONOMETRIC MODEL AND EXPLANATORY VARIABLE

To examine the major determinants of expected and current income and income risks, I estimate versions of following model:

$$\log(y_i) = \beta' X_i + u_i \qquad (1)$$

where $\log(y_i)$ is the (natural) log of either expected income or current income, or indicators of income risk of ith household, X_i is the matrix of explanatory variables including constant, β' is the associated vector of coefficients, and $u_i \sim N(0, \sigma^2)$ is the normally distributed error term. The standard errors are clustered at the village level to account for correlations in error terms across households in a village. All regressions include village fixed effects to control for the effects of unmeasured village characteristics, which may affect income distribution and at the same time be correlated with explanatory variables.

In the analysis, I use a large number of explanatory variables suggested by theoretical models and existing empirical studies. Explanatory variables include demographic characteristics of households: the size of household, number of children five years of age and below, the number of 61-years-olds and over, whether the household has a migrant member, and caste/religion of household. I use indicator variables to capture caste and social hierarchies: upper caste households, intermediate caste households, backward caste households, and Muslim households. Scheduled caste and tribe households are taken as the base group.

The survey provides information on the primary source of household income. This is indicated by: whether the primary source is self-employment in agriculture, self-employment in the non-agricultural sector, casual employment in the non-agricultural sector, regular/salaried employment, and non-employment income such as pensions, interest, rent, and remittances. Households whose primary source of income is casual employment in agriculture are taken as the base group.

Other indicators of economic conditions are whether the household is landless and has a bank account. The survey also provides information on the perception of households as to whether their economic conditions significantly deteriorated in the last five years. Households that did not experience significant deterioration in their economic conditions in the last five years are taken as the base group.

I include a large number of characteristics of household heads such as their education level, occupational status, age, gender, and marital status. I use indicator variable to capture the education level of the household head: whether the household head has less than primary education (grade 5). Household heads who have completed at least primary schooling are taken as the base group. The occupational status of the household head is indicated by whether the head is self-employed, a regular/salaried employee, a casual worker, or has a non-employment income sources. Household heads whose primary occupation is domestic work are taken as the base group. I also interact scheduled caste/tribe with indicators of education and landlessness. The summary statistics of explanatory variables are given in Table 4.

Table 4
Summary Statistics of Explanatory Variables

Variable	Mean	Standard Deviation	Minimum	Maximum
Household Characteristics				
Household Size	6.80	2.84	2	29
No. of Children 5 Years and Below	0.82	1.07	0	5
No. of 61-Year-Old sand Above	0.35	0.60	0	2
Migrant Member (Yes 1, 0 Otherwise)	0.45	0.50	0	1
Landless (Yes 1, 0 Otherwise)	0.56	0.50	0	1
Landless*SC (Yes 1, 0 Otherwise)	0.21	0.41	0	1
Bank Account (Yes 1, 0 Otherwise)	0.84	0.36	0	1
Primary Source of Income (Yes 1, 0 otherwise)				
Self-Employment Agriculture	0.20	0.40	0	1
Casual Employment Agriculture	0.14	0.36	0	1
Self-Employment Non-Agriculture	0.14	0.34	0	1
Casual Employment Non-Agriculture	0.29	0.46	0	1
Regular/Salaried Employment	0.13	0.33	0	1
Non-Employment Income	0.10	0.30	0	1
Experienced Significant Economic Deterioration in the Last Five Years (Yes 1, 0 Otherwise)	0.11	0.31	0	1
Upper Caste (Yes 1, 0 Otherwise)	0.25	0.43	0	1
Intermediate Caste (Yes 1, 0 Otherwise)	0.16	0.37	0	1
Backward Caste (Yes 1, 0 Otherwise)	0.26	0.44	0	1
Muslim (Yes 1, 0 Otherwise)	0.10	0.30	0	1
Characteristics of Household Head				
Age (Years)	48.91	12.59		
Gender (Male 1, 0 Otherwise)	0.91	0.28	0	1
Married (Yes 1, 0 Otherwise)	0.86	0.35	0	1
Education Grade Less Than 5 (Yes 1, 0 Otherwise)	0.49	0.50	0	1
Education Grade Less Than 5*SC (Yes 1, 0 Otherwise)	0.16	0.37	0	1
Self-Employed (Yes 1, 0 Otherwise)	0.34	0.47	0	1
Casual Employed (Yes 1, 0 Otherwise)	0.41	0.49	0	1
Regular/Salaried (Yes 1, 0 Otherwise)	0.10	0.29	0	1
Non-Employment Income (Yes 1, 0 Otherwise)	0.07	0.26	0	1

DETERMINANTS OF EXPECTED AND CURRENT INCOME

To examine the determinants of income, I use log of expected future income and current income as dependent variables. Table 5 shows the results. It also shows whether the coefficients of expected and current income equations are significantly different from each other.

Table 5
Determinants of Expected Future and Current Income
(Dependent Variable: log of expected future/current income)

	Expected Future Income (1)		Current Income (2)		P-value for diff in coeff. (3)
Variable	Coefficient	SE	Coefficient	SE	
Upper Caste (1/ 0)	0.1621***	0.0914	0.1670***	0.0926	0.80
Intermediate Caste 1/0)	0.1244	0.0919	0.1627	0.0930	0.07
Backward Caste (1/0)	0.03663	0.0739	0.0498	0.0813	0.49
Muslim (1/ 0)	0.1527**	0.0671	0.1919*	0.0701	0.28
Household Size	0.0657*	0.0170	0.0660*	0.0162	0.92
No. of Children 5 Years and Below	-0.0440	0.0323	-0.0461	0.0310	0.70
No. of 61-Year-Olds and Above	-0.0303	0.0575	-0.0285	0.0532	0.90
Migrant Member (1/ 0)	-0.0087	0.0518	-0.0160	0.0566	0.16
Primary Source of Income (1/ 0)					
Self-Employment Agriculture	-0.0431	0.0785	-0.0410	0.0897	0.94
Self-Employment Non-Agriculture	0.1654*	0.0674	0.1693*	0.0649	0.86
Casual Employment Non-Agr.	0.1714*	0.0683	0.1694*	0.0607	0.93
Regular/Salaried Employment	0.3829*	0.1431	0.3979*	0.1466	0.66
Non-Employment Income	0.1875*	0.0782	0.1864*	0.0727	0.96
Landless (1/ 0)	-0.0485	0.0676	-0.0479	0.0649	0.96
Landless*SC (1/0)	-0.0185	0.0341	-0.0179	0.0442	0.96
Bank Account (1/ 0)	-0.0240	0.0524	-0.0372	0.0558	0.55
Experienced Significant Economic Deterioration (1/ 0)	-0.0454	0.0517	-0.0519	0.0540	0.71
Household Head					
Self-Employed (1/ 0)	-0.1224	0.1099	-0.0669	0.1143	0.00
Casual Employed (1/ 0)	-0.1216	0.1088	-0.0879	0.1106	0.08
Regular/Salaried (1/ 0)	-0.0954	0.1558	-0.0857	0.1471	0.80
Non-Employment Income (1/ 0)	0.0367	0.1060	0.0997	0.0969	0.04
Education Grade Less Than 5 (1/ 0)	-0.0912	0.0793	-0.0753	0.0758	0.34
Education Less Than 5*SC (1/ 0)	-0.2012***	0.0872	-0.188***	0.0755	0.56
(log) Age (Years)	0.1043	0.1207	0.1138	0.1007	0.84
Gender (Male 1, 0 Otherwise)	0.2841**	0.1234	0.2535**	0.1204	0.00
Married (Yes 1, 0 Otherwise)	-0.2638*	0.1003	-0.2305**	0.1003	0.01
R-Squared	0.28		0.29		
No. Observations	498		498		

*Note: All regressions include village-fixed effects and standard errors (SE) are clustered at village level. *, **, and *** indicate 1%, 5%, and 10% of level of significance respectively.*

The results show that upper caste households have significantly higher expected future and current incomes than households of other castes. This result is consistent with the view that caste is one of the most important factors determining social and economic status and the upper caste households dominate economic, social, and political landscape (Munshi and Rosenzweig 2006).

One surprising result is that Muslim households have significantly higher expected and current income. This is largely due to the fact that a sizeable proportion of Muslim households have migrant member (around 70%) with majority of them working in Gulf countries.

Results show that both expected future and current income are significantly associated with the type of primary source of households' income. Households with regular/salaried income have the highest expected future and

current income, and households reliant on casual work in the agricultural sector have the lowest income. Interestingly, households whose primary income source is self-employment in non-agriculture have significantly higher income than households with self-employment in agriculture. Similarly, households whose primary income source is casual employment in non-agriculture have higher income than households with casual employment in agriculture.

These results have implications for the role of rural non-agricultural employment in the development process, which has been a subject of controversy. One view is that it is a residual sector and its growth is largely a manifestation of the economic distress caused by the failure of agriculture to gainfully absorb the growing rural population (Vaidyanathan 1986; Kumar 1993, Kumar and Shergill 2018). The other view is that the growth of the rural non-agricultural sector plays a critical role in the alleviation of rural poverty, particularly in the case of small and marginal farmers (Ravallion and Datt 1995). The household income pattern suggests that the rural non-agricultural sector may not be a residual sector in Bihar.

Apart from caste/religion and the primary source of income, other significant determinants of expected future and current income are household size and the characteristics of household heads. The household size has significant positive impact on both expected future and current incomes, primarily reflecting greater availability of labour. Scheduled Caste/tribe households with heads having less than primary education have significantly lower expected future and current incomes. Similarly, households headed by married females have significantly lower expected future and current incomes.

The last column of Table 5 reports the p-value for the test of equality of the coefficients between the two models. The results show that most of the explanatory variables have similar effects on expected future and current incomes, both in sign and size. However, the coefficients differ significantly across these two models with respect to the effects of characteristics of household heads such as gender, marital status, and primary source of income.

DETERMINANTS OF INCOME RISK

To examine the determinants of income risk, I use log of variance of future income and coefficient of variation as dependent variables. Table 6 shows the results.

It shows that social groups and the type of primary sources of income are significantly associated with variance. Upper caste, intermediate caste, and Muslim households have significantly higher variance than scheduled caste and tribe households. Households whose primary source of income is non-agricultural employment, regular employment, and non-employment sources of income have significantly higher variance than agricultural sector households. Apart from these variables, larger households whose heads have non-employment income have significantly higher variance. However, households that experienced significant deterioration in economic conditions have significantly lower variance. Overall, these results show that factors which lead to higher expected income also lead to higher variance.

In the case of coefficient of variation, it shows that intermediate caste and Muslim households, households with non-employment income, and households whose heads are married and self-employed have significantly higher coefficient of variation. On the other hand, households experiencing a significant deterioration in economic conditions with heads having less than primary education have a significantly lower coefficient of variation.

CURRENT INCOME AS A PREDICTOR OF EXPECTED FUTURE INCOME AND INCOME RISK

Now, I examine the issue of how good a predictor current income is of expected income and income risks. This analysis will shed light on the dynamics of income distribution and the choices made by households regarding economic activities and their risk-mitigating strategies.

To examine these issues, I estimate the following model:

$$\log(y_i) = \alpha + \mu \log(y\_cur\ i) + \beta X_i + u_i \qquad (2)$$

where y_i is the expected future income or indicator of income risk and y_cur i is the current income.

Table 6
Determinants of Income Risk/Variability
(Dependent Variable: log of variance and CV)

	Variance (1)		CV (2)	
Variable	Coefficient	SE	Coefficient	SE
Upper Caste (1/ 0)	0.6773**	0.2343	0.1427	0.1079
Intermediate Caste 1/0)	0.2641**	0.1041	0.2070***	0.1108
Backward Caste (1/0)	0.2827	0.2205	0.0890	0.0821
Muslim (1/ 0)	0.7791*	0.1642	0.2103**	0.0767
Household Size	0.1412*	0.0291	0.0072	0.0145
No. of Children 5 Years and Below	-0.0761	0.0771	0.0056	0.0239
No. of 61-Year-Olds and Above	-0.1018	0.1060	-0.0218	0.0587
Migrant Member (1/ 0)	-0.0981	0.2295	-0.0488	0.0719
Primary Source of Income (1/ 0)				
Self-Employment Agriculture	-0.0862	0.2613	-0.0006	0.1010
Self-Employment Non-Agriculture	0.3854***	0.2025	0.0394	0.0846
Casual Employment Non-Agr.	0.3702***	0.1938	0.0254	0.0674
Regular/Salaried Employment	0.8940*	0.2961	0.1163	0.1206
Non-Employment Income	0.8454*	0.1957	0.2428**	0.0844
Landless (1/ 0)	-0.0359	0.1209	0.0540	0.0461
Landless*SC (1/0)	-0.0122	0.1191	0.0312	0.0391
Bank Account (1/ 0)	-0.0892	0.2912	-0.0103	0.1204
Experienced Significant Economic Deterioration (1/ 0)	-0.2782**	0.1209	-0.0931*	0.0309
Household Head				
Self-Employed (1/ 0)	0.2337	0.3082	0.2700*	0.0754
Casual Employed (1/ 0)	0.0686	0.3630	0.1832	0.1143
Regular/Salaried (1/ 0)	-0.1783	0.3733	0.0501	0.1773
Non-Employment Income (1/ 0)	0.6371***	0.3430	0.2991	0.1730
Education Grade Less Than 5 (1/ 0)	-0.1679	0.2093	-0.1709*	0.0513
Education Grade Less Than 5*SC (1/ 0)	0.0723	0.2419	0.1644	0.1008
(log) Age (Years)	-0.1808	0.4196	-0.1928	0.1643
Gender (Male 1, 0 Otherwise)	0.3751	0.3003	-0.1019	0.1165
Married (Yes 1, 0 Otherwise)	-0.1118	0.2225	0.2031***	0.0985
R-Squared	0.20		0.15	
No. Observations	483		483	

*Note: All regressions include village-fixed effects and standard errors (SE) are clustered at village level. *, **, and *** indicate 1%, 5%, and 10% of level of significance respectively.*

Table 7, Model 1 shows that current income is a significant predictor of the expected future income with the coefficient being close to 1. This suggests that the income process is highly persistent. Attanasio and Augsburg (2016) find similar results for Anantpur district, Andhra Pradesh, in India.

Results show that apart from current income, the characteristics of household heads are significant predictors of expected future income. Households with self-employed or female heads have significantly lower expected income. Other significant predictors of expected future income are whether the household head is married, whether the household is reliant on non-employment income, and whether it belongs to intermediate caste. However, their coefficients are significant only at 10 per cent.

Table 7
Current Income as a Predictor of Expected Future Income Risk
(Dependent Variable: log of expected future income, variance and CV)

	Expected Future Income (1)		Variance (2)		CV (3)	
Variable	Coefficient	SE	Coefficient	S.E.	Coefficient	SE
(log) Current Income	0.9999*	0.0164	1.5168*	0.1071	-0.2373*	0.0576
Upper Caste (1/ 0)	-0.0048	0.0179	0.3848***	0.1917	0.1883***	0.1016
Intermediate Caste 1/0)	-0.0281***	0.0157	0.4557***	0.2313	0.2522**	0.2522
Backward Caste (1/0)	-0.0131	0.1985	0.1957	0.1694	0.1027	0.1027
Muslim (1/ 0)	-0.0391	0.0379	0.4575*	0.1553	0.2606*	0.0850
Household Size	-0.0004	0.0037	0.0426	0.0262	0.0227	0.0145
No. of Children 5 Years and Below	-0.0021	0.0058	-0.0086	0.0457	-0.0049	0.0247
No. of 61-Years-Olds and Above	-0.0017	0.0148	-0.0552	0.0947	-0.0291	0.0535
Migrant Member (1/ 0)	-0.0247	0.0182	-0.1212	0.1627	-0.0452	0.0806
Primary Source of Income (1/ 0)						
Self-Employment Agriculture	-0.0021	0.0287	-0.0428	0.1780	-0.0074	0.1069
Self-Employment Non-Agriculture	-0.0039	0.0234	0.1315	0.1530	0.0791	0.0834
Casual Employment Non-Agr.	0.0019	0.0216	0.1142	0.1177	0.0655	0.0680
Regular/Salaried Employment	-0.0150	0.0313	0.3333***	0.1857	0.2040***	0.1085
Non-Employment Income	0.0011	0.0243	0.5592*	0.1417	0.2875*	0.0870
Landless (1/ 0)	-0.0006	0.0136	0.0910	0.0758	0.0453	0.0409
Landless*SC (1/0)	-0.0002	0.0141	0.0910	0.0758	0.0453	0.0409
Bank Account (1/ 0)	-0.0132	0.0218	-0.0132	0.2421	-0.0222	0.1253
Experienced Significant Economic Deterioration (1/ 0)	0.0065	0.0180	-0.1984**	0.0685	-0.1055*	0.0331
Household Head						
Self-Employed (1/ 0)	-0.0554*	0.0181	0.3937	0.1755	0.2450**	0.0865
Casual Employed (1/ 0)	-0.0337	0.0195	0.2469	0.2319	0.1553	0.1216
Regular/Salaried (1/ 0)	-0.0096	0.0387	-0.0015	0.3125	0.0225	0.1653
Non-Employment Income (1/ 0)	-0.0629***	0.0322	0.5121***	0.2906	0.3187***	0.1744
Education Grade Lees Than 5 (1/ 0)	0.0159	0.0179	-0.2677**	0.1093	-0.1553**	0.0591
Education Grade Less Than 5*SC (1/ 0)	0.0131	0.0244	-0.2053	0.1873	-0.1210	0.0984
(log) Age (Years)	-0.0095	0.0505	-0.3453	0.3448	-0.1671	0.1705
Gender (Male 1, 0 Otherwise)	0.0307**	0.0109	-0.0292	0.2279	-0.0387	0.1157
Married (Yes 1, 0 Otherwise)	-0.0333**	0.0141	0.2336	0.1762	0.1491	0.0933
Wald Test (p-value)[1]	0.99					
R-Squared	0.95		0.45		0.19	
No. Observations	498		483		483	

*Note: All regressions include village-fixed effects and standard errors (SE) are clustered at village level. *, **, and *** indicate 1%, 5%, and 10% of level of significance respectively.*

[1]: Wald Test: (H0: Coefficient of log of current Income =1).

Similarly, Table 7, Model 2 shows that the current income is significantly and positively associated with variance of future income. However, there is a significant negative association between the current income and coefficient of variation (Model 3).

Overall, these results show that in rural Bihar higher current income is associated with both higher expected future income and variance. However, current income is significantly and negatively associated with the coefficient of variation. This suggests that expected future income is more responsive to current income than the variance of future income. Another interpretation is that the trade-off between expected future income and its variability is smaller at higher levels of current income and larger at lower levels of current income, i.e. higher-income households are able to reduce a given amount of income variability by sacrificing a smaller amount of expected returns.

There are a number of reasons for a positive association between current income and expected future income and its variance. One reason may be that there is heterogeneity in the risk-preferences of households. Households with higher levels of risk-aversion may be engaged in activities with low income and low risk. On the other hand, households with lower levels of risk aversion are engaged in activities with high income and high risk.

The other explanation which has received considerable empirical support (Rosenzweig and Binswanger 1993; Dercon 1996) emphasizes heterogeneity in wealth rather than heterogeneity in risk aversion. Poorer households have a lower capacity to bear income risk and face larger welfare costs due to variability in consumption. They are willing to pay relatively large premiums (in terms of reduction in expected income) to reduce income risk.

The negative relationship between the coefficient of variation and current income can also arise due to heterogeneity in risk preference, wealth, and information. More risk-averse or poorer households may be willing to sacrifice average income (or pay a higher price) relatively more for a given reduction in their income variability than less risk-averse or richer households. Thus, more risk-averse or poorer households may have relatively lower current and expected future income than less risk-averse or richer households, but higher variance relative to their own income. Similarly, poor households may have inferior information and opportunities to diversify their income risks than richer households. Thus, they may be able to trade off risks and returns less efficiently than richer households.

Apart from current income, other significant predictors of the variance and coefficient of variation of future income are caste/religion, primary source of household income, and characteristics of household head. Upper caste, intermediate caste, and Muslim households have significantly higher variance and coefficient of variation of future income relative to the scheduled caste/tribe households. Similarly, households whose primary source of income is either regular and salaried employment or non-employment income, or who have a head reliant on non-employment income, have significantly higher variance and coefficient of variation. Households which experienced significant deterioration in their economic conditions have significantly lower variance and coefficient of variation. Additionally, households with heads having less than primary education has significantly lower variance.

CONCLUSION

In this paper, I analysed the main determinants of income expectation and income risk faced by rural households in Bihar using subjective income distribution data. I find that expected future income is significantly and positively associated with its variance, suggesting a trade-off between higher future income and higher variability. Current income, caste, and the primary source of household income are significant predictors of both expected future income and its variance. Households belonging to higher castes and reliant on the non-agricultural sector have significantly higher expected future income and higher variance. While both the expected future income and its variance increase with current income, there is a significant negative association between the coefficient of variation of future income and current income, suggesting low-income households face greater variability in their income relative to high-income households.

To the extent income risks lead poor households to choose low income and low risk activities, public policies designed to reduce these risks, such as provision of insurance (e.g. rainfall insurance), health insurance (Kumar and Chen 2013), labour market information (Kumar 2008) and easier availability of consumer credit are likely to

have a significant effect on poverty and inequality. Microfinance institutions and non-governmental organizations can play an important role in the provision of insurance and labour market information. Public investment in irrigation, better weather information, and employment guarantee schemes, such as the National Rural Employment Guarantee Act, can reduce income and consumption risk.

ENDOTES

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