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**Working Paper**

## Experimentally validated general risk attitude among different ethnic groups in Vietnam

TVSEP Working Paper, No. WP-004

**Provided in Cooperation with:**

TVSEP - Thailand Vietnam Socio Economic Panel, Leibniz Universität Hannover

*Suggested Citation:* Pham, Huong Dien; Liebenehm, Sabine; Waibel, Hermann (2017) : Experimentally validated general risk attitude among different ethnic groups in Vietnam, TVSEP Working Paper, No. WP-004, Leibniz Universität Hannover, Thailand Vietnam Socio Economic Panel (TVSEP), Hannover

This Version is available at:

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Thailand Vietnam Socio Economic Panel

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Huong Dien Pham, Sabine Liebenehm, Hermann Waibel

Leibniz Universität Hannover

2017

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The Thailand Vietnam Socio Economic Panel (TVSEP) is a long-term research project for data collection and scientific analysis funded by the Deutsche Forschungsgemeinschaft (DFG). The high quality panel data sets have been collected in rural areas of Thailand and Vietnam since 2007. The panels cover many important aspects of living standard measures, demography, geography, shocks, risks, expectations and behavioral traits of individuals. TVSEP data is available for scientific research purposes free of charge.

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# **Experimentally Validated General Risk Attitude among Different Ethnic Groups in Vietnam**

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## **Abstract**

In this paper, we compare experimentally measured individual risk attitudes and survey-based risk items for rural households in the province of Dak Lak in Southern Vietnam. In particular, we test whether the survey-based measure can be validated by a risk experiment among different ethnic groups. Albeit we find that ethnic minorities are on average more risk averse than the ethnic majority, our results show similar correlations between risk attitudes and socio-economic characteristics among the two ethnic groups. Testing the explanatory power of the survey-based risk item shows the validity of this measure among different ethnic groups. Our findings have potentially important implications. First, the survey-based item is effective to measure risk attitudes of a multiethnic community. Second, our findings also suggest that the assumption of a “self-reinforcing culture of poverty” which is often attributed to minority groups of Vietnam should be challenged in the light of these results.

**Keywords:** Ethnic minorities, Survey risk items, Risk experiments

**JEL:** C83, C93, Z19

RePEc:tv:wpaper:wp-004

## 1. Introduction

The measurement of risk attitudes continues to be controversially discussed in the literature. One group of studies argues that incentivized lottery-choice tasks as for example the typical Holt and Laury (2002) game conducted in lab- or in lab-in-the-field experiments are preferable as they allow inferring the shape of the utility function (Andersen et al., 2008; Charness et al., 2013). However, experiments are prone to noise depending on the exact elicitation method (Hey et al. 2009; Dulleck et al., 2013) and participant's cognitive ability (Dohmen et al., 2010; Dave et al., 2010; Andersson et al., 2013; Charness & Viceisza, 2015). In addition they are expensive and time-consuming and can, therefore, only be carried out on a relatively small number of respondents.

Survey measures of risk attitudes as advocated by Dohmen et al. (2011) are an economic alternative to experiments and can be easily applied to larger populations in the context of household surveys. On the downside, they are difficult to translate into formal indices and it remains a question if and to what extent they are a reliable predictor of actual risky behavior (Lönnqvist et al., 2015).

A recent review by Chuang and Schechter (2015) substantiates the usefulness of the survey measures. More specifically, empirical investigations by Dohmen et al. (2011) based on the German Socio-Economic Panel (SOEP) show that simple risk questions are well-associated with results from experiments conducted on the same respondents. Hardeweg et al. (2013) reproduces Dohmen et al.'s (2011) approach using a representative sample from Thailand and confirm the behavioral validity of the survey measure in the context of a developing country. Recently, Vieider et al. (2015) compared students' responses to incentivized lottery choices and survey measures across 30 countries and found significant correlations within most countries and between countries. Based on their findings, they suggest using survey measures for cultural comparisons on risk attitudes.

In this paper, we compare risk attitudes among the diverse ethnic communities of Vietnam. We use a representative sample of Dak Lak province, located in the southern part of Vietnam's Central Highlands, where the share of ethnic minorities among the rural population is approximately 30 percent. We test whether the behavioral validity of Dohmen et al.'s (2011) survey-based risk attitude measure also holds among this population and examine ethnic differences in risk attitudes. Some studies claim that Vietnam's ethnic minority people differ in their economic decision-making behavior in comparison to the Kinh majority. This difference in behavior has been claimed to be a major reason why poverty among ethnic

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minorities is significantly higher and persists (Montalvo & Reynal-Querol, 2005; Nguyen et al., 2012). Therefore, expected results of this study could shed light on the assumption that there is difference in economic behaviors across ethnic groups and whether the ethnic minorities in Vietnam are less rational in economic decision-making in comparison with the ethnic majority.

This paper has two contributions to the relevant literature. First, we test the validity of the survey-based risk item among a representative sample of rural Vietnam with a risk experiment conducted with the same respondents. This is complementary to the study of Hardeweg et al. (2013) in rural Thailand. Second, we compare the validity of the survey risk item between two different groups, i.e. the Kinh majority and a number of ethnic minority groups. In this way we can find out to what extent simple survey risk questions reflect risk behavior across different cultural groups including people whose decision-making behaviors may deviate considerably from the homo oeconomicus assumption.

The results of our study confirm the usefulness of Dohmen et al.'s (2011) survey measure as a valid instrument to predict risk behavior also among a culturally diverse population such as the population in Dak Lak, Vietnam. The experimental validity of the survey item can also be confirmed for different ethnic groups. We find no evidence that ethnic minority groups behave differently in risk experiments and respond differently to survey risk questions as compared to the Kinh majority group in Vietnam.

The remainder of this paper is organized as follows. In the next section we describe the sample and provide some descriptive statistics. In section 3 we present the results, first, using the full sample and second, using the two sub-samples of the ethnic minorities and the Kinh majority. Finally, in section 4 we conclude and submit recommendations for further studies.

## **2. Data**

### ***2.1 Sample population***

Dak Lak province is located in the southern tip of the Central Highlands of Vietnam with approximately 13,000km<sup>2</sup> and a population of 1.8 million people. Agriculture is the major source of income with coffee as the main commodity. The rural population is characterized by a large number of different ethnic minority groups such as Ede, M'ngong, Thai, Tay or Nung - accounting for approximately 30 percent of the population which is well represented in our sample of some 700 respondents.

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The data set was collected as part of a long-term socio-economic panel (TVSEP) that has been implemented in six provinces in Thailand and Vietnam since 2007. The initial sample composed of 4,400 households in 440 villages (Klasen & Waibel, 2013). The sample was selected based on a stratified three stages sampling procedure whereby the province (in our case Dak Lak) was purposively chosen. Due to the large heterogeneity in population density the province was subdivided into two agro-ecological zones, namely the lowland and the mountain zones. Within both zones, communes were selected according to the weight of rural population shares. In the second stage, villages were chosen by the probability proportional to the population size. Finally, ten households were randomly selected in each village<sup>1</sup>. In this study, we use the survey wave from 2010 of Dak Lak province.

The comprehensive survey instrument included detailed modules on household and individual characteristics, income, consumption and assets as well as shocks and risks. We also included Dohmen et al.'s (2011) survey-based risk item, where respondents are asked to classify themselves on an eleven-point Likert scale to answer the question: "Are you generally a person who is fully prepared to take risks, or do you try to avoid taking risks? Please choose a number on a scale from zero (unwilling to take risks) to ten (fully prepared to take risks)".

Upon completion of the interview, respondents were offered to join a Holt and Laury (2002) type of risk experiment. In brief, the respondent was confronted with 20 choices between a safe payoff and a lottery. To illustrate the choices to the respondent a table with 20 rows was used. Starting with row 1, the participant was asked for each subsequent row in ascending order whether she would prefer to receive the safe payoff or to play a lottery in which the payoff could be either VND 0 or VND 200,000 with 50 percent probability. The expected value is above a full day's salary and therefore is believed to provide sufficient incentive. The participant was informed in advance that, after the 20 choices had been noted, a random number between 1 and 20 would determine which of the 20 choices was to be played with real payoffs. The risk experiment follows the procedure applied with households in the province of Ubon Ratchathani in Thailand as described by Hardeweg et al. (2013).

Preferring the safe payoff at lower row numbers (below row 16) implies higher risk aversion; choosing the safe payoff of VND 150,000 versus the VND 0 or VND 300,000 lottery (row 16) implies risk neutrality, whereas preferring the lottery at rows 17–20 corresponds to risk-loving behavior. The row in which the respondent's preference switched from the lottery to

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<sup>1</sup>Owing to sampling procedure, the sample is not self-weighting which was considered in the regression analyses.

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the safe amount gives an indication about the respondent's risk attitude. To assure that the incentive reveals actual preferences, a number between 1 and 20 was drawn randomly after the respondent had made her choices. In case the number drawn was below the respondent's switch point the lottery would be played by tossing a coin. If the random number was higher than the switch point, the respondent received the safe amount.

Out of 701 respondents 11 refused to participate in the experiment. Furthermore, we excluded respondents younger than 16 and older than 80 years old resulting in a final sample of 679 observations. Out of the 679 respondents, over one third (37.5 percent) are ethnic minorities while the remainder belong to the Kinh majority group.

## ***2.2 Descriptive statistics***

We report in Table 1 the summary statistics of respondents' socio-economic characteristics that are the variables used in our econometric analyses. An average household size is 5.51 members. Respondents are on average in their mid-forties, the share of female respondents is 46 percent and the vast majority is married. The average dependency ratio is 59 percent, which underlines that most households are in advanced age. More than half of the respondents are members of a village organization. Engagement in self-employment like small scale businesses is infrequent with 15 percent of households.

The residential house is the major asset of respondents' household with an average value of 7,700 USD PPP which is the most important asset aside from land which however is normally not privately owned in Vietnam.

In terms of self-assessed health conditions majority of the respondents consider themselves to be healthy. When asked about the future well-being respondents are slightly optimistic with an average score of 0.33 albeit with high standard deviation.

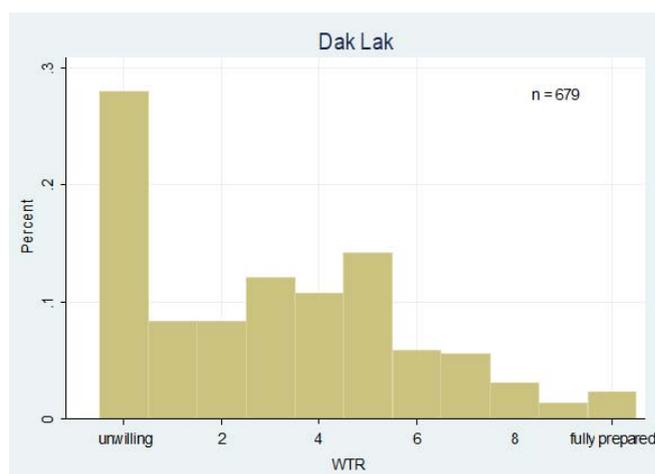
For the survey risk item average scale was 3.09 on the 11-point Likert scale, which indicates a relatively low willingness to take risk. The average switching row in the risk experiment was 8.28 which confirms the survey-based measure as of is in the moderately risk averse region. This is slightly lower for the survey risk item and slightly higher for the switching row as in the results of Hardeweg et al. (2013) for a similar population in Thailand.

**Table 1: Descriptive statistics**

Variable Name	Variable Definition	N	Mean	SD
Household size	The number of persons who belong to the household and stayed at least 180 day during the reference period	679	5.51	1.99
Age	Age of respondent in years	679	44.45	12.21
Height	Height of respondent in cm	679	159.28	6.88
Education	Years of schooling of respondent	678	6.49	3.85
Gender	Dummy Variable; Female = 1	679	0.46	-
Civil Status	Dummy Variable for civil status; married = 1	679	0.88	-
Dependency ratio	Ratio of the number of resident household members below 15 and above 64 years old	673	0.59	0.58
Membership	Dummy Variable for respondent's membership of a social or political organization; member = 1	679	0.56	0.50
Self-employed	Dummy Variable if the respondent's 1 <sup>st</sup> or 2 <sup>nd</sup> occupation is self-employment (yes = 1)	679	0.15	0.36
Ethnicity	Dummy Variable; Ethnic Majority = 1	679	0.62	-
House value	Self-reported house value at market price (in USD PPP)	678	7700	12718
Health impairment	Dummy Variable if the respondent considers himself to be unhealthy (yes= 1)	679	0.25	0.43
Optimism	Respondent's subjective assessment of well-being on a scale from -2 (much worse) to 2 (much better)	654	0.33	0.64
Willingness to take risk (WTR)	General willingness to take risk , based on survey question	679	3.09	2.72
Switching Row (SR)	The row number of the risk experiment where the respondent switched from game to safe amount	679	8.28	5.21

*Source: TVSEP survey 2010, own calculations*

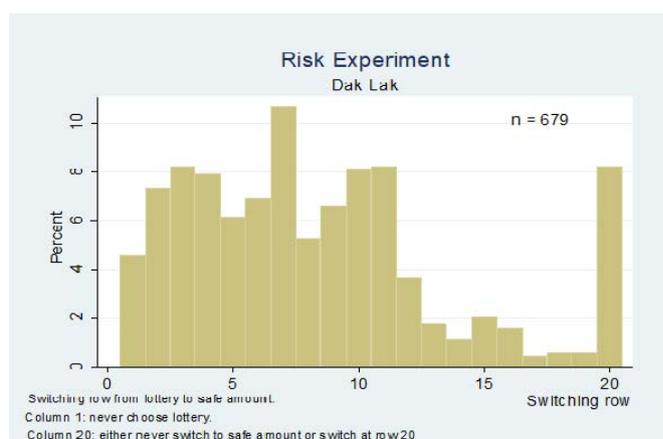
Figure 1 shows the distribution of the survey risk item. Clearly, the distribution is skewed to the right that indicates that most of the respondents have low level of willingness to take risk. Almost one third of the respondents are extremely risk averse as they opted for a zero value on the scale. Less than 10 percent show high willingness to take risk with a value of 8 and above on the 11-point Likert scale.



**Figure 1: Self-reported willingness to take risk, full sample**

Source: TVSEP survey 2010, own calculations

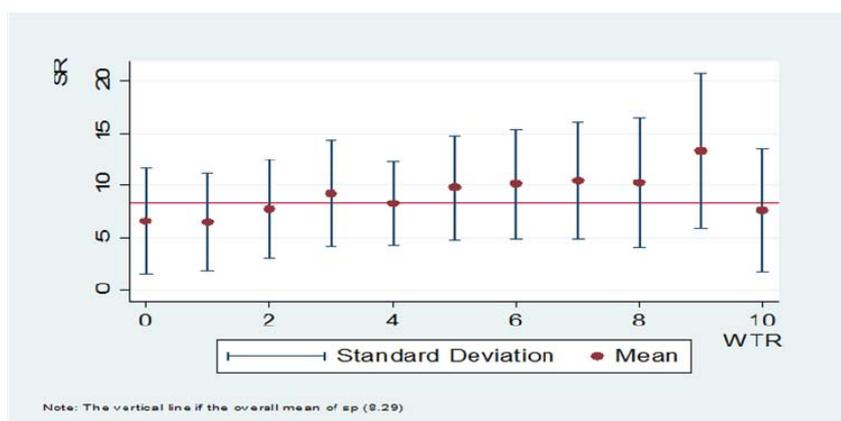
Figure 2 plots the distribution of switching rows from the lottery to the safe amount in the risk experiment. The majority of respondents switched before row 15, which confirms the general tendency of risk averse behavior which is mostly found among poor rural households in developing countries (Haushofer & Fehr, 2014) including Vietnam (Tanaka et al., 2010).



**Figure 2: Switching row in risk experiment, full sample**

Source: TVSEP survey 2010, own calculations

To explore the association between the survey-based item and the experiment we plot the WTR values against the switching rows (SR) for every value on the 11-point Likert scale (Figure 3). Generally, the means values of SR tend to go up as WTR values increase. However, for the low WTR (i.e. below five) values, the SR means are below and are mostly above the average of SR for the WTR values above five. The standard deviation values seem reasonable as they are lower than their means and remain fairly constant over the WTR range. Hence we have reason to assume that there is some significant correlation between the two measures of risk attitudes.



**Figure 3: Mean and standard deviation comparison between SR and WTR**

Source: TVSEP survey 2010, own calculations

### 3. Results

In order to test the behavioral validity of the survey measure among the culturally diverse population in Dak Lak, we proceed in two steps. First, we take the full sample and investigate the correlations between the survey measure and socio-demographic characteristics and test whether the survey measure is correlated with the outcome of the experiment. Second, we split the sample into two groups, namely the ethnic minorities and the Kinh majority, and repeat the analyses separately among the two sub-samples.

#### 3.1 Full sample

Table 2 shows five alternative specifications of regression models with respondents' self-assessed risk attitude (WTR) as dependent variable. As a first specification (Table 2, column 1), we only consider the most exogenous individual characteristics such as gender, age, height, education, civil status and ethnicity as explanatory variables. Many studies suggest that being female, older and smaller is positively associated with risk aversion (e.g. Eckel & Grossman, 2008; Dohmen et al., 2011; Hardeweg et al., 2013; Nielsen et al., 2013; Sunde & Dohmen, 2016). The significant positive correlation coefficients on respondents' height and ethnicity confirm our expectations. More specifically, the respondents who belong to the ethnic majority in Vietnam are associated with lower levels of risk aversion.

In the second specification (Table 2, column 2) we include the variable house value to reflect respondents' economic status meanwhile remaining the group of variables in the first specification. Many studies suggest that risk aversion should decline in wealth (e.g., Dohmen et al., 2011; Guiso & Paiella, 2008; Yesuf & Bluffstone, 2009). Other studies, however, do not find a significant relationship (e.g., Binswanger, 1980; Tanaka et al., 2010) and some even find a positive correlation (e.g., Harrison et al., 2007; Liu, 2013; Vieider et al., 2014). With

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the positive significant correlation coefficient on house value, we correspond to the first strand of studies and find that risk aversion is negatively associated with wealth.

In the third specification (Table 2, column 3) we add three groups of variables, i.e. (i) respondents' household characteristics (ii) respondents' employment status and (iii) respondents' subjective attitudes. With respect to the first group of variables, the literature suggests that being married and living in larger households with a higher dependency ratio is positively associated with risk aversion. This was found, for example, by Skriabikova et al. (2014) using data from Ukraine, by Caliendo et al. (2009) using the German SOEP and by Hardeweg et al. (2013) in Thailand. The latter study also found that rural household members who engage in self-employment for example through small-scale village businesses are prepared to take more risk than those who earn their living from farming or wage employment (Hardeweg et al., 2013). Hence, for our Vietnam sample we expect a positive correlation between self-employment and respondents' WTR. Furthermore, being a member of a socio-political organization (mostly village committees) puts a household in a better position to share risk with others. Therefore, we expect a positive association between membership and willingness to take risk. For variables like the respondents' health impairment, we expect a negative sign and for and expectations about the future, we expect a positive association with WTR. Among the three variable groups, we obtain four significant correlation coefficients that confirm our expectations. The correlation coefficient between WTR and household size is significant and negative. Generally, poorer households and those engaged more subsistence-type of agriculture tend to have more children and thus tend to be more risk-averse. Membership in village organizations is positively associated with respondents' willingness to take risk i.e. respondents are willing to take more risk because they tend to have better social protection and better access to information and new technologies. Furthermore, respondents who feel healthier and who are more optimistic about the future are more willing to take risk.

Contrary to most findings in the literature, age is positively correlated with the willingness to take risk. For Vietnam, a possible explanation is that older people belong to the "war generation" who were conditioned to take more risk than younger people who did not have this experience. However, this correlation is rather weak and less robust across specifications.

Specifying model (3) as an ordered probit model (Table 2, column 4) or as an OLS model (Table 2, column 5) confirms the correlation results. All coefficients which are found significant in the third specification remain consistent both in terms of sign and significance.

**Table 2: Multivariate correlates of the survey-based willingness to take risk (WTR), full sample**

	(1)	(2)	(3)	(4)	(5)
Gender	0.220 [0.380]	0.261 [0.371]	0.251 [0.348]	0.089 [0.120]	0.196 [0.262]
Age (years)	0.012 [0.011]	0.005 [0.010]	0.022** [0.010]	0.008** [0.004]	0.019** [0.007]
Height (cm)	0.062** [0.029]	0.057** [0.027]	0.053** [0.026]	0.019** [0.009]	0.037** [0.018]
Ethnicity	1.571*** [0.295]	1.171*** [0.298]	0.783*** [0.269]	0.275*** [0.092]	0.589*** [0.203]
Civil Status	0.639 [0.518]	0.418 [0.493]	0.450 [0.442]	0.151 [0.150]	0.356 [0.316]
Education (years)	0.173*** [0.032]	0.135*** [0.030]	0.071** [0.030]	0.025** [0.011]	0.055** [0.023]
House value (ln)		0.648*** [0.116]	0.586*** [0.114]	0.202*** [0.040]	0.469*** [0.090]
Dependency ratio			-0.207 [0.200]	-0.078 [0.068]	-0.184 [0.151]
Household size			-0.185** [0.075]	-0.063** [0.025]	-0.144*** [0.052]
Self-employed			0.165 [0.300]	0.060 [0.106]	0.110 [0.250]
Membership			1.032*** [0.211]	0.358*** [0.074]	0.752*** [0.167]
Health impairment			-0.881*** [0.311]	-0.296*** [0.106]	-0.685*** [0.213]
Optimism			0.894*** [0.240]	0.309*** [0.085]	0.704*** [0.181]
Constant	-11.075** [4.544]	-14.424*** [4.536]	-12.991*** [4.456]		-8.189** [3.099]
Ln sigma	1.154*** [0.044]	1.118*** [0.043]	1.061*** [0.044]		
Log likelihood	-1419.616	-1393.271	-1299.456	-1284.269	
Pseudo R <sup>2</sup>	0.025	0.043	0.066	0.066	0.247
Observations	679	678	646	646	646

Note: Dependent variable is the general willingness to take risks. Columns 1-3 report Interval Regression estimates of the self-reported willingness to take risk on an 11-point Likert scale. Column 4 reports Ordered Probit estimates and column 5 reports Ordinary Least Squares estimates. All specifications take into account the complex sampling design and standard errors in brackets.

Significance levels: \* p<0.1, \*\* p<0.05, \*\*\* p<0.01.

Source: TVSEP survey 2010, own calculations

In Table 3, we perform the same multivariate analysis for the results of the incentivized field experiment (conducted with the same respondents) as we did for the survey-based item in Table 2. The purpose of this comparison is to test the validity of both measures for the data set of the rural population of Dak Lak province. Accordingly, this would be the case if the control variables show similar direction of influence and similar statistical performance for both dependent variables. In addition, we are interested in the direct correlation between both measures of risk attitude.

In column (1) of Table 3 we simply include the survey item as a single covariate and find a highly significant correlation coefficient. A change by one unit on the Likert-scale is accompanied by a change in the experiment by more than 0.5 rows. The relationship and its

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magnitude do not fundamentally change as we include additional variables. Controlling for other individual characteristics such as gender, age, height or ethnicity in column 2, decreases the coefficient on the survey measure, it remains significant at the 1 percent level. At the same time, the same control variables as in Table 2, i.e., height and ethnicity are statistically significant. This result holds when further variables are added in columns 3 and 4 and different regression models are used in columns 5 and 6. The survey-based item, hence, remains as a significant predictor of the outcome of the experiment.

Similarly, we compare the results of the correlation analysis presented in Table 3 with those of a rural population in Thailand (Hardeweg et al., 2013). We find that the behavioral validity of the survey measure that was found for Thai population also holds for Vietnamese. Differences in the levels of economic development history and in the political system between two countries do not seem matter. The distinguishable finding for Vietnamese population is that in Vietnam, ethnicity must be considered. However, it is not a factor in the rather culturally homogenous population of Northeast Thailand. Therefore, in the next sub-section we will explore the role of ethnicity further.

**Table 3: Multivariate correlates of the switching row in the risk experiment (SR), full sample**

	(1)	(2)	(3)	(4)	(5)	(6)
WTR	0.553*** [0.099]	0.401*** [0.096]	0.388*** [0.106]	0.317*** [0.100]	0.065*** [0.021]	0.284*** [0.092]
Gender		0.240 [0.613]	0.253 [0.621]	0.184 [0.648]	0.056 [0.115]	0.139 [0.588]
Age		-0.025 [0.022]	-0.025 [0.022]	-0.003 [0.020]	-0.001 [0.004]	0.000 [0.018]
Height		0.071** [0.034]	0.072** [0.034]	0.073** [0.032]	0.014** [0.006]	0.070** [0.029]
Ethnicity		1.779*** [0.433]	1.727*** [0.449]	1.281*** [0.441]	0.234** [0.086]	1.174*** [0.398]
Civil Status		-0.572 [0.651]	-0.596 [0.635]	-0.451 [0.695]	-0.064 [0.116]	-0.429 [0.605]
Education		0.131** [0.060]	0.130** [0.060]	0.113* [0.066]	0.015 [0.014]	0.099 [0.060]
House value			0.089 [0.220]	-0.033 [0.242]	-0.012 [0.047]	-0.040 [0.213]
Dependency ratio				-0.311 [0.412]	-0.065 [0.074]	-0.275 [0.364]
Household size				-0.038 [0.124]	-0.011 [0.026]	-0.031 [0.107]
Self-employed				2.065*** [0.505]	0.371*** [0.091]	1.924*** [0.448]
Membership				0.237 [0.454]	0.058 [0.084]	0.189 [0.409]
Health impairment				-1.454*** [0.444]	-0.281*** [0.089]	-1.372*** [0.410]
Optimism				0.470 [0.353]	0.116* [0.066]	0.417 [0.317]
Constant	6.105*** [0.427]	-5.248 [5.665]	-5.954 [5.979]	-5.332 [5.990]		-4.277 [5.406]
Ln sigma	1.708*** [0.042]	1.684*** [0.041]	1.685*** [0.041]	1.679*** [0.043]		
Log likelihood	-1965.430	-1946.946	-1944.118	-1848.144	-1729.952	
Pseudo R <sup>2</sup>	0.012	0.020	0.020	0.024	0.026	0.135
Observations	679	679	678	646	646	646

Note: Dependent variable is switching row (SR) in the experiment. Columns (1- 4) report Interval Regression estimates of the switching row in the experiment. Column 5 reports Order Probit regression estimates and column 6 reports Ordinary Least Squares estimates. All specifications take into account the complex sampling design and standard errors in brackets. House value is self-reported at current market price.

Significance levels: \* p<0.1, \*\* p<0.05, \*\*\* p<0.01

Source: TVSEP survey 2010, own calculations

### 3.2 Comparison between ethnicities

In this section, we investigate if the survey-based risk item can predict the outcome of the experiment among different ethnicities in Vietnam. More specifically, we examine the difference between the majority of Kinh ethnic group and the group of various ethnic minorities.

In the first step, we investigate differences in means of observable characteristics between the two ethnic groups (Table 4). Most importantly, we notice that the ethnic minorities are less willing to take risk based on the WTR as well as on the SR measure. Moreover, the ethnic

minorities are significantly younger by about 5 years on average but are significantly less educated with about 3 years of schooling. On the other hand, the ethnic minority families on average are significantly larger by 0.7 household members and households show a significantly higher dependency ratio. Among the ethnic minorities, self-employment is rare with less than 5 percent against 21 percent of the Kinh majority. The ethnic minorities significantly less frequent are members of socio-political organizations. The above-described differences that we find when comparing the ethnic groups in our sample corresponds well with the finding in relevant studies in Vietnam (e.g., Vu & Baulch, 2011; Imai et al., 2011; Kang & Imai, 2012). In addition, the members of the ethnic minority are also significantly less optimistic towards the future as they self-reported.

**Table 4: Differences in observable characteristics between Ethnic minority groups and the ethnic majority**

	Ethnic minorities		Ethnic majority		Difference in means
	Mean	SD	Mean	SD	
WTR	2.067	2.26	3.712	2.79	-1.645*** <sup>c</sup>
SR	6.729	6.73	9.208	5.41	-2.479*** <sup>c</sup>
Gender	0.463	0.03	0.458	0.02	0.005 <sup>a</sup>
Age	41.835	12.78	46.028	11.6	-4.193*** <sup>b</sup>
Height	158.969	6.37	159.465	7.17	-0.496 <sup>b</sup>
House value	3717	306.58	10085	735.55	-6367*** <sup>b</sup>
Education	4.709	3.92	7.561	3.38	-2.853*** <sup>b</sup>
Dependency ratio	0.701	0.6	0.527	0.56	0.174*** <sup>b</sup>
Household size	5.984	2.38	5.231	1.64	0.753*** <sup>b</sup>
Civil Status	0.863	0.02	0.887	0.02	-0.024 <sup>a</sup>
Self-employed	0.047	0.01	0.215	0.02	-0.168*** <sup>a</sup>
Membership	0.463	0.03	0.611	0.02	-0.325*** <sup>a</sup>
Health impairment	0.239	0.43	0.252	0.43	-0.013 <sup>a</sup>
Optimism	0.204	0.62	0.408	0.64	-0.204*** <sup>c</sup>
N	255		424		

*Note:* <sup>a</sup>prtest (test for the same proportion between two groups) is used for dummy variables; <sup>b</sup>t-test. <sup>c</sup>Chi square test

Significance levels: \* p<0.1, \*\* p<0.05, \*\*\* p<0.01

Source: TVSEP survey 2010, own calculations

In a next step, we analyze the correlations between the survey-based risk item and observable characteristics among the two ethnic groups following the procedure applied to the full sample. We, however, limit the analysis to three regression models including all explanatory variables as for the full sample including interval regression, ordered-probit and OLS. Columns (1), (2) and (3) of Table 5 show the results for the majority group and columns (4), (5) and (6) show results for the minorities.

Results for the Kinh majority are reported in the first three columns of Table 5 that are similar to the results for the full sample presented in Table 2. This is not surprising since almost 60 percent of the full sample belong to this ethnic majority group. More specifically, six out of eight significant variables (excluding the ethnicity variable) in the full sample remain in this

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reduced sample. However, two variables, namely height and education, turn insignificant in the majority sample (Table 5). Interestingly, we find that the variable dependency ratio that was insignificant in the full sample turns significant in the majority sample. The correlation coefficient is negative suggesting that a higher share of economically inactive (dependent) people in the household will tend to make decision makers in the majority group slightly more risk-averse. That seems plausible because fewer people who have probably higher financial responsibility that reduces their willingness to jeopardize by taking risks into their economic decisions.

Applying the same models for the ethnic minorities results the outputs in columns 4-6 of Table 5. The results show three significant correlation coefficients that are similar in sign and magnitude in comparison with that of the Kinh majority sample (columns 1-3 of Table 5) and in the full sample (Table 2). Among those three coefficients are: (i) house value as an indicator for wealth, (ii) being a member of a socio-cultural organization and (iii) being optimistic about the future. In particular, those minority respondents who are wealthier, who belong to socio-political organizations and who are more optimistic towards their future wellbeing are more willing to take risks. Furthermore, the two variables that were insignificant in the majority sample, namely height and education, turn significant in the minority sample as that of the full sample.

Although there is smaller number of significant correlations found in the minority sample, the consistency in the common significant predictors in sign and magnitude in comparison between the two ethnic groups indicates to some extent the robustness of the survey-based risk item measure to reveal individual risk attitudes across ethnic groups.

**Table 5: Multivariate correlates of the survey-based willingness to take risk (WTR), separate estimation by ethnic groups**

Model variant:	(1)	(2)	(3)	(4)	(5)	(6)
	Ethnic majority (Kinh)			Ethnic minorities		
Gender	-0.006 [0.453]	-0.002 [0.155]	0.035 [0.374]	0.684 [0.569]	0.261 [0.210]	0.426 [0.359]
Age	0.031** [0.012]	0.011** [0.004]	0.026** [0.010]	0.011 [0.020]	0.004 [0.007]	0.011 [0.013]
Height	0.035 [0.031]	0.012 [0.010]	0.027 [0.023]	0.096** [0.038]	0.037** [0.014]	0.061** [0.022]
House value	0.653*** [0.132]	0.221*** [0.045]	0.547*** [0.108]	0.407** [0.183]	0.153** [0.068]	0.286** [0.126]
Education	0.019 [0.036]	0.008 [0.013]	0.016 [0.030]	0.132*** [0.044]	0.051*** [0.016]	0.099*** [0.033]
Civil Status	0.603 [0.581]	0.200 [0.194]	0.457 [0.440]	0.197 [0.728]	0.053 [0.271]	0.127 [0.477]
Dependency Ratio	-0.535** [0.233]	-0.188** [0.078]	-0.485** [0.186]	0.260 [0.272]	0.094 [0.098]	0.232 [0.176]
Household size	-0.219* [0.110]	-0.076** [0.036]	-0.195** [0.088]	-0.129 [0.097]	-0.043 [0.037]	-0.087 [0.063]
Self-employed	0.163 [0.343]	0.057 [0.117]	0.116 [0.282]	0.709 [0.750]	0.287 [0.282]	0.543 [0.603]
Membership	1.141*** [0.282]	0.383*** [0.096]	0.887*** [0.225]	0.935*** [0.300]	0.367*** [0.115]	0.637*** [0.204]
Health Impairment	-0.904*** [0.326]	-0.302*** [0.108]	-0.756*** [0.245]	-0.697 [0.550]	-0.238 [0.205]	-0.420 [0.314]
Optimism	0.800*** [0.241]	0.271*** [0.082]	0.657*** [0.190]	1.188** [0.436]	0.451** [0.179]	0.924*** [0.331]
Constant	-9.519* [5.185]		-6.297 [3.874]	-18.851** [6.966]		-11.009** [4.186]
Ln sigma	1.078*** [0.053]			0.981*** [0.061]		
Log likelihood	-878.135	-864.468		-414.300	-407.491	
Pseudo R <sup>2</sup>	0.046	0.046	0.188	0.065	0.067	0.228
Observations	409	409	409	237	237	237

Note: Dependent variable is the general willingness to take risks. Columns (1) and (4) report the Interval Regression estimations of the self-reported willingness to take risk. Columns (2) and (5) report Order Probit regression estimates and columns (3) and (6) report Ordinary Least Squares regression estimates. All specifications take the complex sampling design into account and standard errors in brackets.

Significance levels: \* p<0.1, \*\* p<0.05, \*\*\* p<0.01.

Source: TVSEP survey 2010, own calculations

In the next step, we verify whether the survey-based risk measure item can predict the outcome of the experimental measure among different ethnic groups. We include the WTR measure as a predictor in the multivariate analysis of the SR, separately for both ethnic groups. Table 6 shows the regression results, of the same three equations for both groups.

Columns 1-3 of Table 6 show that the same variables are significant for the majority sample as for the full sample presented in Table 3. In other words, results among the Kinh majority are consistent with the full model. However, results for the minority sample are different, i.e. only three significant correlation coefficients remain. These are the coefficients of WTR, of health impairment (columns 4-6 in Table 6) and of the variable age (columns 4 and 6 only). Comparing the magnitude of the correlation coefficient of the variable WTR between the ethnic majority subsample (column 3 in Table 6) and the ethnic minority subsample (column

6 in Table 6) shows that the coefficient is larger in the ethnic minority subsample. Specifically, a change by one unit in the self-assessed risk attitude is associated with a change in the experiment by approximately 0.2 rows in the majority group and by approximately 0.6 rows in the minority group. Across alternative specifications, the self-assessed risk attitude measure remains a strongly significant correlate of the switching row in the experiment among the minority sample. Hence, we can conclude that the survey-based risk item is well-validated by the risk experiment even among a mixed sample of different ethnic groups. It can equally be applied to ethnic minority groups who differ significantly in socio-economic characteristics from the Kinh majority in Vietnam.

**Table 6: Multivariate correlates of the switching row in the risk experiment (SR), separate estimation by ethnic groups**

Model variant:	(1)	(2)	(3)	(4)	(5)	(6)
		Ethnic majority			Ethnic minorities	
WTR	0.217*	0.039*	0.183*	0.646***	0.158***	0.607***
	[0.114]	[0.021]	[0.102]	[0.123]	[0.030]	[0.116]
Female	0.102	0.038	0.096	0.291	0.078	0.199
	[0.900]	[0.146]	[0.808]	[0.872]	[0.192]	[0.804]
Age	-0.031	-0.004	-0.022	0.039*	0.007	0.037*
	[0.032]	[0.006]	[0.028]	[0.022]	[0.006]	[0.021]
Height	0.077*	0.014*	0.074*	0.045	0.008	0.044
	[0.043]	[0.007]	[0.039]	[0.047]	[0.011]	[0.043]
House value	-0.005	-0.005	0.004	-0.002	-0.009	-0.032
	[0.292]	[0.054]	[0.253]	[0.312]	[0.074]	[0.286]
Education	0.152*	0.017	0.128*	0.062	0.010	0.054
	[0.083]	[0.017]	[0.073]	[0.089]	[0.021]	[0.084]
Married	-1.015	-0.122	-0.812	0.286	0.074	0.128
	[1.095]	[0.157]	[0.945]	[0.904]	[0.203]	[0.835]
Dependency ratio	-0.465	-0.071	-0.444	-0.132	-0.084	-0.080
	[0.494]	[0.084]	[0.458]	[0.585]	[0.129]	[0.486]
Household size	0.031	0.005	0.014	-0.128	-0.032	-0.107
	[0.224]	[0.040]	[0.190]	[0.155]	[0.038]	[0.141]
Self-employed	2.427***	0.415***	2.209***	-0.389	-0.058	-0.250
	[0.594]	[0.095]	[0.514]	[1.244]	[0.339]	[1.138]
Membership	0.491	0.097	0.433	-0.298	-0.034	-0.314
	[0.565]	[0.099]	[0.498]	[0.616]	[0.141]	[0.562]
Health	-1.364**	-0.246**	-1.271**	-1.609**	-0.372**	-1.539**
	[0.585]	[0.104]	[0.520]	[0.625]	[0.160]	[0.588]
Impairment	0.413	0.119	0.385	0.109	0.026	0.073
	[0.501]	[0.090]	[0.447]	[0.558]	[0.116]	[0.517]
Constant	-3.558		-2.934	-3.179		-2.072
	[8.252]		[7.312]	[8.041]		[7.343]
Ln sigma	1.761***			1.482***		
	[0.044]			[0.072]		
Log likelihood	-1184.68	-1103.31		-648.69	-603.04	
Pseudo R <sup>2</sup>	0.016	0.017	0.093	0.028	0.033	0.148
Observations	409	409	409	237	237	237

Note: Dependent variable is switching row in the risk experiment. Columns (1) and (4) report the Interval Regression estimates of the switching row in the experiment. Columns (2) and (5) report Order Probit regression estimates and columns (3) and (6) report Ordinary Least Squares regression estimates. All specifications take the complex sampling design into account and standard errors in brackets.

Significance levels: \* p<0.1, \*\* p<0.05, \*\*\* p<0.01.

Source: TVSEP survey 2010, own calculations

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#### 4. Summary and conclusions

In this study we test the behavioral validity of the widely known survey-based measure of risk attitudes as initially suggested by Dohmen et al. (2011) among the culturally diverse rural populations in the province of Dak Lak, Vietnam. To do so, we use a representative sample of 629 respondents who are heads or representatives of rural households. We conduct comprehensive household interviews in 2010 that include the survey risk item and was followed by a Holt and Laury (2002) type of “lab-in-the-field” experiment for the same respondents. This data enable us to apply a multi-variate regression model and estimate the correlations between both risk measures and a set of socio-demographic characteristics known to be explanatory variables of individual risk attitudes. We further examined if the survey-based risk measure can predict the outcome of the risk experiment. Most importantly, since our sample consisted of two main ethnic groups, namely the Kinh majority group and several ethnic minorities we applied this estimation approach among the full sample and separately for the ethnic majority and ethnic minorities.

Our results show that the minority groups expressed a higher degree of risk aversion than the respondents of the majority group. We can also show that both groups differ significantly in several individual and household characteristics including economic. We found that many of the hypothesized variables were significantly correlated with the survey-based and the experiment-based risk measure for both groups. Our major result is that we found the survey measure to be a significant predictor of the experiment not only for the majority group but also for the ethnic minorities. The results remain robust across different model specifications. We therefore, conclude that Dohmen et al. (2011)’s survey measure is a valid instrument to predict risk behavior among a culturally diverse population. This does not mean that survey risk measures are complete substitutes of experimental measures rather are they complements (Chuang and Schechter 2015). For example experimental measures continue to be needed in the context adoption studies for new and complex technologies where loss averse behavior is relevant (Liu and Huang, 2013) and for in-depth studies on behavioral characteristics of decision-makers (Liebenehm and Waibel 2014). On the other hand survey risk measure widens the scope for empirical research that depends on large scale panel data.

We submit two potentially important policy conclusions of this empirical analysis. First, we confirm the results found by Hardeweg et al (2013) for a rural population in Thailand for similar conditions in Vietnam. Therefore with a second in-depth study from real world decision makers in developing countries we confirm that that the simple survey-based

measure of risk attitudes, which has been widely used in developed countries, can also be applied well in developing countries. This can help to improve the understanding of decision making and welfare dynamics of rural households in emerging market economies when simple risk measures are routinely included in socio-economic and living standard surveys. Of course care must be taken that the survey risk question is properly asked.

Second we can show that survey risk questions and risk experiments can be carried out successfully with also with ethnic minority groups in Vietnam. This is interesting because ethnic minorities, aside from being poorer and less educated, are often also labeled with following behavioral patterns which are different from the rational decision makers of the Kinh majority in Vietnam and therefore to a “self-reinforcing culture of poverty” has been attributed to ethnic minority groups (van der Walle and Gunewardena 2001). Our results however do not confirm any such behavioral differences since the same survey risk item and the same risk experiment can be equally well applied to both groups. Our results therefore also have some relevance for the anti-poverty-programs of the Vietnamese government which are often based on a philosophy of stigmatization and discrimination of the minority groups. Our results suggest that ethnic minorities should be treated equally with other disadvantaged ethnic majority groups.

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