

Don't Expect Too Much - High Income Expectations and Over-Indebtedness*

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Abstract

Household indebtedness is increasing worldwide. This study investigates one possible driver of this increase: high income expectations. Thereby, we refer to permanent income hypotheses, which predict that individuals borrow more today if they expect a higher income in the future. We collect data from an emerging country as (over-)indebtedness in markets with incomplete financial infrastructure and social security can be devastating. Furthermore, our sample of poor, rural households in Thailand is exposed to a high degree of uncertainty, which makes expectation formation prone to behavioral biases. Controlling for various household characteristics, while also employing several distinct measures for the accuracy of income expectations and over-indebtedness, we find a strong and robust relationship between the two. In an additional lab-in-the-field experiment, we explicitly find that biased expectations in the form of overconfidence are related to overborrowing.

Keywords: Household debt; Lab-in-the-field experiment; Emerging markets

JEL: D14; D84; D91

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1 Introduction

For households, taking out debt is a valuable tool to smooth consumption and often a necessary precursor of private investments. However, as consumer indebtedness is significantly increasing worldwide, there is widespread concern about when it turns detrimental. Specifically, when households have increasing difficulties to repay their debts, household well-being and consumption are threatened. Moreover, household over-indebtedness poses a serious threat to the stability of the financial system as a whole; for example, as experienced during the U.S. financial crisis in 2007-08.

Emerging market economies are especially at risk of low growth and even financial crises when the level of household debt is high, as their institutions and financial regulations are weaker and income inequality is higher (IMF, 2017). Therefore, understanding the factors and reacting to the consequences of over-indebtedness are crucial for improving living conditions while also ensuring a stable development of emerging economies. The determinants of over-indebtedness are, however, not well understood. Building on “permanent income hypotheses”, where income expectations determine current consumption and borrowing, this paper studies one potential driver of over-indebtedness: too high income expectations.

We investigate the relationship between the accuracy of expectations and over-indebtedness using extensive survey data on the financial situation and financial behavior of one of the most vulnerable populations in Thailand: rural households in the North-East. In our regression analysis, we control for various household characteristics and shocks that households faced, which reduces reverse causality concerns. A crucial part of our survey was to collect objective and subjective data on potential symptoms of over-indebtedness. This allows us to construct different objective and subjective over-indebtedness indicators.¹ A major contribution to the literature is that we relate these indicators to a sophisticated measure for the accuracy of subjective income expectations. Instead of relying on a qualitative Likert scale measures to capture a potential forecast error, we elicit individual distributions of expected household income and set these in relation to actual income. Hence, we are able to quantify the forecast error households make when estimating their future income. Further, we carried out a lab-in-the-field experiment to explore the effect of truly biased expectations on overborrowing.

Thailand is, on the one hand, exemplary for an emerging market but, on the other, outstanding when it comes to household finances: Financial inclusion is comparatively high, with four out of five persons participating in the formal financial system. However, simultaneously, outstanding household debt has increased to over 78.03% of the country’s

¹ It is still a highly debated topic how to measure over-indebtedness and there is no clear-cut answer on the right method of elicitation.

GDP. This makes it the emerging market with the highest household debt to GDP ratio in the world (see Figure A.1). Given these numbers, it is hardly surprising that both local policy makers and international institutions agree that over-indebtedness is a growing problem in Thailand (Tambunlertchai, 2015). Additionally, our study sample faces higher uncertainty regarding their future incomes in two ways: through the generally high level of macroeconomic volatility in emerging markets and through individual, mostly weather-related shocks common for poor, small-scale agricultural households (see Loayza et al., 2007; Klasen and Waibel, 2015). These circumstances make this part of the population especially vulnerable to become over-indebted and to struggle with financial hardship.

Our survey results show that there is a strong and robust relationship between inaccurately high expectations and over-indebtedness. Interestingly, most of our households have negative and not positive income expectations but those with positive expectations are more likely to be over-indebted than those with neutral or negative expectations. The results vary with respect to different debt indicators. The relationship between too high expectations and the objective over-indebtedness indicator is much more pronounced in comparison to the subjective indicator. Our results indicate that the subjective indicator is not only driven by actual debt levels but also by personal characteristics and perceived financial distress. In an additional exercise, we can furthermore show that the subjective over-indebtedness indicator is highly correlated to a qualitative measure for the accuracy of expectations. Eventually, we find that being more certain about the future income realization, which can be another form of forecast error, is also related to our objective over-indebtedness indicator. Rural households are exposed to a highly uncertain environment, hence, being too certain may actually harm them. The results are robust to various specifications and become more precise if we exclude parts of the sample that may had difficulties understanding the questions on eliciting future income expectations.

In the supplemental experiment, we exogenously bias income expectations via two treatments that vary the level of self-confidence of the respondents. We find that overconfidence is related to more spending and overborrowing in our experimental setting. However, most probably due to “noise,” our treatments themselves have no impact on overborrowing, which is why we cannot claim a causal relationship of biased expectations on overborrowing. These results are not driven by presumably confounding factors that the treatments could have affected and are relatively robust. Rather, we find evidence for “sticky” overconfident beliefs, which also points to a high level of perceived certainty in our sample. Furthermore, participants who overspend in the lab are also the ones who rather experience over-indebtedness in real life. This might be a hint that inaccurately high income expectations in our sample are actually driven by a systematic confidence bias.

Households' borrowing behavior around the world is still puzzling in various aspects and often hard to reconcile with standard neoclassical and behavioral models. [Zinman \(2015\)](#) argues that one reason for many unresolved puzzles is the fact that household debt is vastly under-researched within household finance (which itself is under-researched in financial economics). Recently, a vibrant literature on measuring over-indebtedness has emerged (e.g. [D'Alessio and Iezzi, 2013](#); [Keese, 2012](#); [Schicks, 2013](#)). In contrast, the determinants are still mostly unidentified. Our paper contributes to closing this gap by focusing on too high income expectations as one likely cause.

Specifically, our study touches on three strands of literature: First, the literature on households' (over-)indebtedness in emerging economies, second, research on potential behavioral biases in financial decision-making and debt illiteracy, and, third, the literature on eliciting and using subjective expectations data. There are at least two reasons why the relationship between too high expectations and over-indebtedness should be explicitly studied in an emerging market setting and why findings from "WEIRD"² populations might not translate to those rural populations. First, financial literacy is substantially lower, which implies lower debt literacy and, thus might hamper expectation formation on financial matters. For example, [Lusardi and Tufano \(2015\)](#) find that debt illiteracy is related to higher debt burdens and the inability to evaluate the own debt position. [Burke and Manz \(2014\)](#) experimentally show that economic illiteracy increases financial forecast errors. Second, because of the aforementioned higher uncertainty our respondents are facing. A more volatile economic environment requires more individual belief formation, which makes biased expectation formation more likely (see for example [Johnson and Fowler, 2011](#)) and at the same time more dangerous. To the best of our knowledge, we are the first who study the relationship between inaccurately high income expectations and over-indebtedness in an emerging market.

Our work is most closely related to [Hyytinen and Putkuri \(2018\)](#) and [Grohmann et al. \(2019\)](#). The former establish a correlation between Finnish households' overborrowing and extreme positive forecast errors. They show that households exhibiting high positive forecast errors are more likely to overborrow than households exhibiting smaller errors. The errors are constructed using Likert scales regarding the future financial situation in comparison to the current. Furthermore, they elicit households' forecast errors regarding their financial situation in general not regarding their future income, which gives rise to issues of reverse causality. [Grohmann et al. \(2019\)](#) conduct a very similar experiment to ours in Germany and underpin their results with data from the German Socio-Economic Panel (GSOEP). They find a causal link between overconfidence and overborrowing in the lab within a student sample and a relation between overconfidence in ability and

² Western, educated, industrialized, rich and democratic

the level of household debt in the panel sample. As our study differs from these two, it contributes to the literature by (i) analyzing the research question in a setting where expectation formation is generally more difficult and over-indebtedness bears more severe consequences; and (ii) eliciting income expectations and over-indebtedness much more precisely.

The paper proceeds as follows: Section 2 presents the survey data we use and explains how our variables of interest are constructed. In section 3, the estimation strategy is outlined and survey results are presented. Section 4 describes the experiment and its results, while section 5 concludes.

2 Data

This section introduces the data elicited during the survey and explains how the main variables of interest are derived. We develop a measure that approximates inaccurate perceptions about the future development of household income in negative and positive direction. However, we are mostly interested in inaccurately *high* income expectations.

Then, we turn to explain the debt measures used in the analysis. As such, the concept and measurement of over-indebtedness is debated, with no consensus on a single indicator that measures it precisely. This would indeed be very hard to achieve given the multifaceted ways over-indebtedness can occur. Hence, we provide an overview on the distinct debt measures used as dependent variables and argue that they portray households' financial situations accurately in our sample.

2.1 The Thailand Vietnam Socio Economic Panel

The survey was conducted in Thailand in November 2017 and is an add-on project of the Thailand Vietnam Socio Economic Panel (TVSEP).³ The TVSEP has been conducting yearly panel surveys in rural Thailand and Vietnam on a regular basis since 2007, with so far recurrent surveys in 2008, 2010, 2011, 2013, 2016, and 2017.

The TVSEP survey captures the living conditions of households in rural areas that are largely engaged in agricultural businesses. It focuses on factors affecting households' vulnerability to poverty. Among others, the survey includes socio-economic characteristics of every household member, sections on household consumption and savings, crop farming, livestock rearing, and, in particular, questions on exposure to shocks and anticipated risks. Furthermore, each wave captures additional topics of current research interest. About 4000 rural households in 440 villages across six provinces in Thailand and Vietnam are

³ See <https://www.tvsep.de/overview-tvsep.html>

interviewed for the survey. The sample is set to represent the rural population in these two countries while households living in urban areas are deliberately excluded. To obtain a representative sample, a three-stage cluster sampling is used. The procedure is described in [Hardeweg et al. \(2013\)](#).

Our study is conducted in only one of the TVSEP provinces in Thailand, Ubon Ratchathani, which borders Cambodia and Laos (see [Figures 1 and 2](#)). The sample consists of about 750 households in 97 villages. For the majority of our analysis, we concentrate on our own survey, adding data from the 2016 and 2017 general TVSEP survey if necessary.

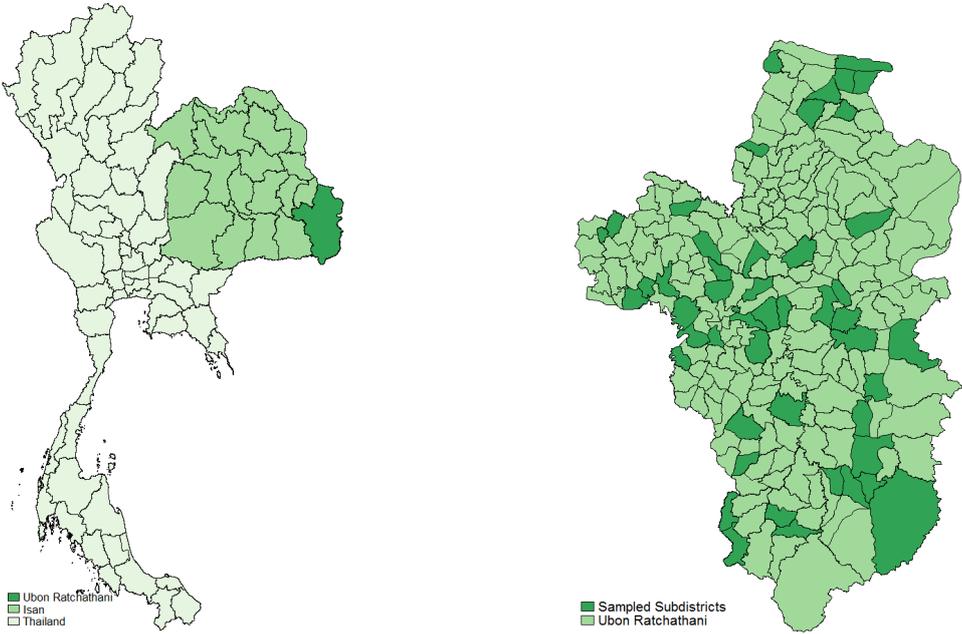


Figure 1: Study Site, Ubon Ratchathani Thailand Figure 2: Sampled Subdistricts

With our study, we want to gain new insights into debt induced financial distress within a vulnerable population. Therefore, our survey includes extensive question batteries on objective and subjective over-indebtedness (see [Sub-Section 2.4](#)), savings, financial literacy, borrowing behavior in general, and income expectations (see [Sub-Section 2.3](#)). In addition, we collect data on health, subjective well-being, personality traits, and risk preferences. We use established items to assess these data. For example, personality traits are measured using the short version of the Big Five Inventory “BFI-S” ([John and Srivastava, 1999](#); [Gerlitz and Schupp, 2005](#)). We develop a broad financial literacy score, which not only encompasses numeracy but also questions on financial behavior and attitude. The score is similar in style to that developed by the OECD ([OECD, 2018](#)). Furthermore, we construct a score for risk preference out of two questions: The first one asks whether

the person is in general fully prepared to take risks and the second question specifically asks for risk-taking behavior in financial decision-making (i.e. investing and borrowing). Self-control is assessed using the well-established scale by [Tangney et al. \(2004\)](#). Adjusted to the low numeracy within the sample, we add a phrase to each numerical value on questions involving scales.

We use a restricted sample for the analysis in Section 3 and exclude outliers by the following means: First, we trim the 1 percent highest and lowest monthly household incomes in 2016 and 2017. Second, we exclude households whose income is negative and who have a debt service to income ratio either smaller than zero or greater than four. These restrictions all downward bias our results because we cut extremely high debt service ratios as well as those households who have negative debt service ratios and whose incomes are already negative. For the latter case, we trim them as we do not know whether a negative income itself means that these households are in financial distress.

In our trimmed sample, our average respondent is 57 years old, female, the spouse of the household head, and has 5.7 years of education. Our financial literacy index indicates a relatively low level of financial literacy. On average, respondents answered four out of seven knowledge questions correctly, reached five out of nine possible points concerning financial behavior, and three out of seven possible points with regard to financial attitude. This is in line with findings from the OECD/INFE study for Thailand from 2016 ([OECD, 2016](#)). While 57.27% of our respondents are the sole financial decision makers in their households, 28.05% share this task with someone else. Hence, while capturing some respondent specific characteristics, we are still confident that these individual traits determine the household's state of indebtedness because the majority of respondents is in charge of making financial decisions.⁴

2.2 The Thai Rural Credit Market

In Thailand, over 80% of the population have a bank account and over 60% use them for digital payments. The gaps in financial inclusion between women and men as well as between the rural and urban population have declined and are relatively small ([Demirguc-Kunt et al., 2018](#)). Financial inclusion in our sample is similar: 78.34% of our sample households have an account with a formal banking institution.

Simultaneously, the rural credit market has evolved extensively, providing manifold loan options for consumers. This is mainly due to heavily subsidized government programs. The market is dominated by government-financed institutions ([Chichaibelu and Waibel, 2017](#)). The most important ones are the Bank for Agriculture and Agricultural

⁴ Still, as a robustness check, we re-run the analysis without respondents who are not at all in charge of financial decision-making within the household.

Cooperatives (BAAC) and the Village and Urban Community Fund (VF) program,⁵ with the former reaching approximately 95% of all farm households (Terada and Vandenberg, 2014). This massive expansion can also be observed in our sample, where the majority (73.4%) of households have a loan that is either still owed or has been paid back within the last 12 months. Figure 3 exhibits a graphic overview of the loan situation. Conditional on having a loan, households have on average 2.4 loans. Households borrow from formal and informal sources alike. In fact, loan sources are diverse, with the two most important credit sources being the BAAC and the VF, which is in line with the general rural credit market. Moreover, households also borrow from other sources, as, for example, from agricultural cooperatives, business partners, money lenders, relatives, and friends. Households take out loans for various reasons. Most loans are primarily used for buying agricultural related goods like fertilizer or pesticides (23.96%), for buying consumption goods (22.39%), and for agricultural investments e.g. farm land or agricultural machines (16.58%). Loans are also used for paying back another loan (9.87%), buying durable household goods (6.72%), and education (3.15%).

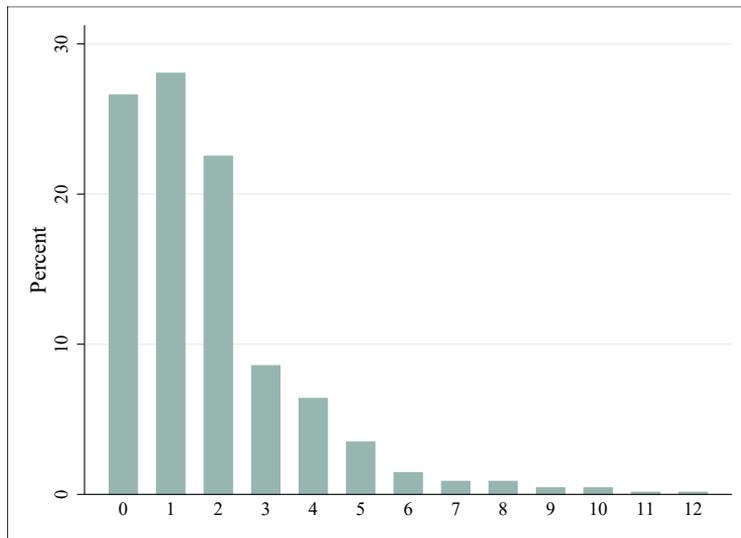


Figure 3: Number of Loans

2.3 The Accuracy of Income Expectations

In order to obtain an income expectation accuracy measure, we must elicit income expectations in the first place. Expectations play a central role in the economic theory of household decision-making, for example, determining saving, borrowing, consumption (Friedman, 1957), and occupation choices (Becker, 1964). Manifold research has tried to

⁵ The aim of the VF is to improve financial access in rural areas in Thailand. It is one of the largest microfinance programs in the world (Kislat and Menkhoff, 2013)

predict this choice behavior based on expectations, yet these are challenging to empirically elicit correctly.

2.3.1 Eliciting Income Expectations

Expectations from Former Income Realizations The traditional way of elicitation - referred to as revealed preference analysis - assumes that individuals have *rational expectations* (Dominitz and Manski, 1997; Manski, 2004) and infers expectations from data on past income realizations. For this approach, strong assumptions on the expectation formations process are needed and both the researcher and the respondent would have to have the same information set (Guiso et al., 2002). Given these strong assumptions, we decide for two alternative elicitation methods, which are explained in what follows.

Qualitative Expectations Questions The first way is to elicit expectations via qualitative questions, e.g. using Likert scales for questions on future expected events. We use such a measure in the appendix of this paper to replicate the results of Hyytinen and Putkuri (2018), who use Likert scales to construct their *forecast error* in predicting future income. However, this approach suffers from two main drawbacks: First, answers might not be comparable across respondents and, second, response options are too coarse and leave room for responses different from what is proposed.

Subjective Probabilistic Income Expectations Dominitz and Manski (1997) suggest to elicit *probabilistic expectations*. This approach is particularly useful for calculating individual cumulative distribution functions and moments of the relevant variable (Attanasio, 2009). By allowing researchers to retrieve different moments of the expected income distribution, it becomes possible to algebraically study the internal consistency of elicited expectations (e.g. apply the laws of probability) and to use these probabilistic expectations as actual probabilities describing how respondents assess future outcomes. As we elicit expectations within a rural sample in an emerging economy, we rephrase our percent change questions in a way similar to “how sure are you” and use visual aids to make the concept of probability more comprehensible.⁶ Thereby, we address the concerns of Attanasio (2009) and Delavande et al. (2011), who state that the concept of probability might be hard to convey in contexts where people have low levels of education.⁷

To check whether respondents adhere to the basic laws of probability, we first ask

⁶ Studies dealing with these kind of expectation elicitation include, among others, Attanasio and Augsburg (2016), who study income processes in India, McKenzie et al. (2013), who investigate income expectations of Tongans if they were to migrate to New Zealand, and Attanasio and Kaufmann (2014), who elicit income expectations among high school students in Mexico.

⁷ The average respondent in our sample only attended school for six years.

them how sure they are that it will rain tomorrow and how sure they are that it will rain within the next two weeks. They can indicate their answer by putting between zero and ten of the marbles that we gave them beforehand into a cup, with zero marbles meaning they are absolutely sure it will not rain and ten marbles meaning they are absolutely sure it will rain. There are 182 out of 748 respondents (24.33 %) who do not answer based on what the laws of probability would tell us. This is a substantial share of respondents, most likely caused by the low educational level in our sample. In the subsequent analysis, we run our regression both with and without these individuals.

After this “warm-up” exercise, we ask respondents how certain they are that their monthly household income in the next twelve months will be in a predefined range. We use income quartiles from the 2013 TVSEP wave to predetermine the four bins to which respondents allocate their ten marbles. The four bins range between 0 - 3,300 Thai Baht (THB), 3,300 - 8,100 THB, 8,100 - 16,590 THB, and 16,590 - 921,000 THB.⁸ Respondents distribute their ten marbles based on how certain they are that their future monthly income will lie in each specific bin.⁹ We assume that respondents do not give random answers just for the sake of finishing the interview, but provide reasonable estimates for their expected future monthly income. Hence, with this information, we are able to calculate the individual cumulative distribution function (CDF) for the expected monthly income as we interpret the number of marbles distributed between the cups as points on their individual CDFs.

We then fit a subjective income distribution following [Attanasio and Augsburg \(2016\)](#) and assume a piecewise (i.e. per cup) uniform probability distribution. This enables us to calculate a specific expected mean and median income, as well as the standard deviation, for each household.

Table 1: Probabilities Assigned to Sections of the Income Distribution

	Observations	Minimum	Maximum	Median	Mean	S.D.
0-3300 THB	737	0	100	20	32.18	35.1
3301-8100 THB	737	0	100	30	30.71	29.27
8101-16590	737	0	100	20	24.03	28.38
16591-300000	737	0	100	0	13.08	24.08

Respondents allocate the number of marbles to the cups as a function of their un-

⁸ The range of the last bin is very broad. Compared to the maximum monthly income respondents state, we find that only two respondents expect an income as high as 921,000 THB. All other maximum income guesses range between 0 - 300,000 THB. In order to avoid artificially high expected median incomes, we restrict the range of the last bin in our calculation of expected median income to a maximum of 300,000 THB.

⁹ The enumerator places four cups in front of them, each labelled with a different income range and makes sure that all marbles are allocated at the end of the exercise.

derlying subjective probability to earn income in the specific income range. The average distribution of marbles per cup, i.e. the average implied probabilities to earn income in the respective income quartile is shown in Table 1. Additionally, Figure 4 presents the probability density function of expected income in our sample. The average respondent’s expected income distribution is skewed to the right; that is, on average, respondents believe it is more probable that their average monthly future income is in the lower cups.

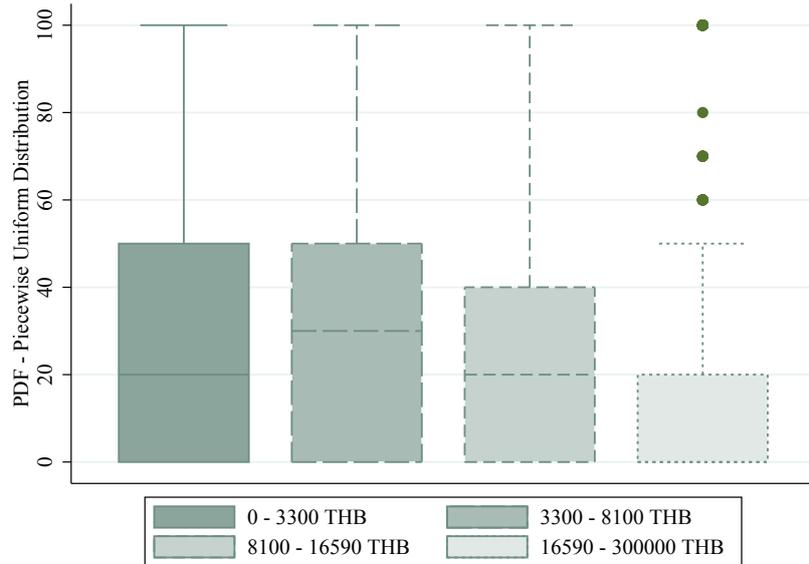


Figure 4: Probability Density Function of Expected Income

We must ensure that the elicited expected income is not at odds with actual realized income. As measure for income, we use the actual realized income in 2016 and an income measure averaging the perceived income in a very bad and a very good month. Correlations between these measures are always statistically significant and range between 0.27 and 0.33, which is encouragingly high given that the correlation between actual income in 2016 and 2017 is only 0.48. As [Attanasio \(2009\)](#) proposes, we check how the subjective expected median income covaries with respondents’ observed characteristics in our sample, particularly with the household composition, educational achievement, and realized income. Beyond the already stated influence of income, household total education affects the elicited median income significantly and positively. A little ambiguous, however, is the effect of the household composition on elicited income: While a higher number of elders in the household is associated with a decrease in income (albeit not significant), more workers in the household also seem to decrease elicited household income (results available upon request).¹⁰

¹⁰ Reflecting on this last result, we assume that households with more working members are, in general,

2.3.2 Defining Income Expectation Accuracy

We develop a new kind of income expectation accuracy which is based on the subjectively elicited expected future monthly income. To derive this *quantitative forecast error* (*Quant. FE*), we first calculate the percentage change between actual monthly income generated in t and future expected monthly income in $t + 1$, which is elicited by the procedure explained in Section 2.3.1. Specifically, t refers to the year 2017 for which we also have actual income data. Consequently, $t + 1$ considers income expectations for 2018.

$$\text{Quantitative Forecast Error (Quant. FE)} = \frac{E_t(Inc_{i,t+1}) - Inc_{i,t}}{Inc_{i,t}} \times 100 \quad (1)$$

In a second step, we divide the quantitative forecast error into quintiles such that our outcome measure allows for five categories ranging from a very negative, negative, mildly negative forecast error, via a “neutral” forecast error to a positive quantitative forecast error. Thus, the negative (positive) errors capture households that expect relatively less (more) future monthly income as compared to their actual earned income in the current year. Each quintile enters the regression via a dummy variable where households with a mildly negative quantitative forecast error serve as the omitted group.

In general, respondents seem to be rather pessimistic with regard to their future income. The distribution of changes in expected future income ranges from -98.6% to 19528.6% whereas the maximum is a clear outlier and might also be driving the average increase of expected future income of about 35%.¹¹ However and importantly, the median household expects a 51% decrease of future income relative to actual income, thus the distribution is shifted to the right. In fact, 75% of the sample expect their future income to be lower than what they received in the year of the survey. This also explains why three of the quintiles clearly range in the negative scope of the distribution and are thus coined “negative forecast” error and only the highest quintile is composed of households that have a clearly positive outlook on their future income.

While we cannot formally test rationality of expectations with our subjective expected income data,¹² we assume that a high and positive relative difference between expected income in 2018 and realized income in 2017 is partly due to respondents being overconfident of what they will earn in the future. This assumption is based on studies finding

poorer and have less stable incomes. There is a tendency in Thailand to abolish multi-generational households in favor of small family homes, which is however only possible if income is high enough and stable.

¹¹ The corresponding household has a very low income in 2017, but - during the cup game - placed all available balls into the bin with the highest income range. We suspect the household may have not fully grasped the elicitation game.

¹² For example, because we lack data about realized income in 2018, the year after we asked for expected income, and we do not know (yet) about shocks households endured during that time.

that expectations about various future outcomes may tend toward being positively biased (see for example [Zinman, 2015](#)). Furthermore, considering the median household’s negative expectation on future monthly income, we are confident to capture very confident households with regard to income development in the highest quintile of the distribution.

We derive a second measure of expectation accuracy following [Souleles \(2004\)](#) and [Hyytinen and Putkuri \(2018\)](#) in Appendix A. It is based on a more coarse assessment of the household’s future income, which is why we call this measure the *qualitative forecast error*. The exact derivation and estimation results can be found in Appendix A.

Last, we also account for perceived income uncertainty in our analysis. In addition to asking respondents how they think that their income will develop over the next 12 months, we ask how certain they are that this income development will truly become reality. Being potentially too certain about future realizations of stochastic processes can be a form of biased expectation called “overprecision” ([Moore and Healy, 2008](#)).

Figure 5 provides a graphic overview of the results on our measure for perceived income certainty: 55.56% of respondents are at least somewhat certain about their income development and 28.44% are very certain. The survey took place during the harvest season, so that respondents might have an idea about the harvest outcome and therefore perceive their expected future income as rather certain or they truly suffer from overprecision.

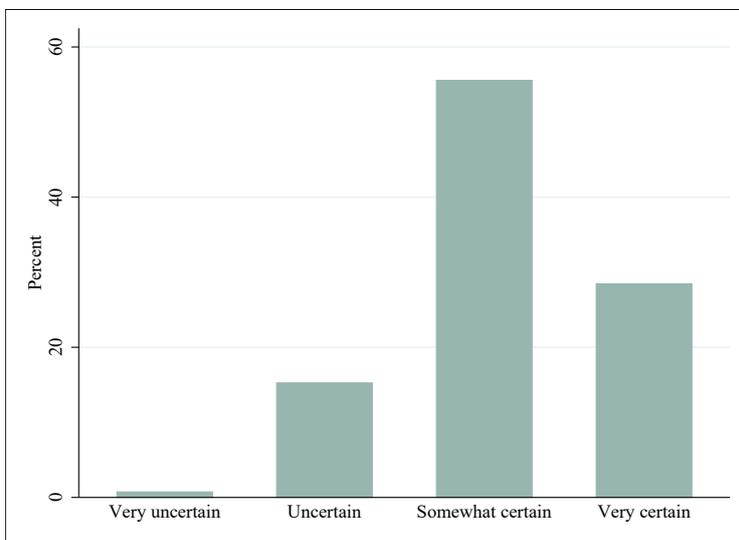


Figure 5: Income Certainty

2.4 Over-indebtedness Indicators

There is no consensus regarding a single set of indicators measuring indebtedness¹³ precisely, even less so for over-indebtedness. In general, all measures share economic, social,

¹³ Among others, [D’Alessio and Iezzi \(2013\)](#) provide a summary on different indebtedness indicators, their usage, and possible drawbacks.

temporal and psychological dimensions such as that the amount of debt exceeds income over a medium- to long-term time horizon and the household is not able to fulfill its debt commitments without increasing its income or lowering its standard of living, which might lead to stress and worry (D’Alessio and Iezzi, 2013). Furthermore, so-called objective debt measures relate to the household’s debt service capacity, subjective measures rather emphasize the psychological consequences of being indebted (Keese, 2012).

Following this line of argument, we decide to construct two measures of over-indebtedness. The first index captures different dimensions of being “objectively” over-indebted (based on best practices from the literature) while the second index rather refers to “subjectively” felt factors related to financial distress.

Objective Over-Indebtedness Index The objective over-indebtedness measure is an aggregated and standardized index and combines four dummy variables. We include the following components in the index: an indicator variable if the debt service to income ratio (DSR) is greater than 0.4, another indicator variable if the overall remaining debt service to income ratio exceeds 0.4, a dummy variable for whether the household holds more than two loans at the same time and a dummy for whether the household paid late or defaulted on a loan in the last 12 months. Each component is well established in the literature (see, for example D’Alessio and Iezzi, 2013). Among these variables, the DSR is especially widely recognized as standard measure to capture indebtedness. The threshold we set for the DSR to indicate over-indebtedness is based on considerations from the literature where a range between 0.3 and 0.5 is used (Chichaibelu and Waibel, 2017; D’Alessio and Iezzi, 2013). In constructing the objective over-indebtedness index we follow Kling et al. (2007). We explain how the index and its components are derived in Appendix II. When deriving our debt measures, we include all types of loans that households report. Those can be formal or informal loans, as well as loans taken from friends and family members. During the interview, respondents were highly encouraged to report all loans regardless of the loan source. We are therefore confident that we capture a household’s true debt level.

Subjective Over-Indebtedness Index While objective debt indicators may provide numerically accurate debt measures, they are criticized for various reasons, such as failing to account either for the reasons why households overborrow or for the household’s undisclosed ability to pay back debt. Therefore, we also include subjective “respondent driven” over-indebtedness measures in our analysis. As before, we derive a standardized index aggregating different components of subjective over-indebtedness. The components include an assessment of whether the household feels it has too much debt, whether it has difficulties paying them off, and the so-called “sacrifice index.”¹⁴ The index and its

¹⁴ We closely follow Schicks (2013) in constructing the sacrifice index.

components are explained in detail in Appendix II. Schicks (2013) prefers to use subjective debt measures over objective ones in her work analyzing over-indebtedness from a customer-protection point of view in microfinance. D’Alessio and Iezzi (2013) also rely heavily on a subjective measure to study over-indebtedness in Italy. In line with Keese (2012) and Lusardi and Tufano (2015), we argue that these measures describe a situation of severe financial distress for the respective households such that the subjective over-indebtedness index should not be used without considering objective debt indicators as well. All indices derived point to accumulating more debt the higher the household scores.

Table 2 depicts the corresponding summary statistics of the objective and subjective over-indebtedness indices. The objective index ranges from -1 to 3 with higher values indicating a more severe level of over-indebtedness. While the average DSR lies at 0.23, about 18% of the households have a DSR which is higher than 0.4. More strikingly, about 23% of our sample households have more than two loans. The subjective index’ range is between -2 and 3 again oriented in a way that higher numbers point to higher indebtedness. On average, households state that they have the “right amount of debt” (Mean = -0.02 for the debt position variable) and that they have no difficulties paying off debt. However, the average household admits to have made at least some sacrifices regarding household needs due to lack of money as the average value is -0.08 and a household with no sacrifices would be found at the lowest end of the sacrifice index distribution.

Table 2: Summary Statistics - Over-Indebtedness Variables

	Mean	S.D.	Min	Max	Observ.
Objective Index	0.00	1	-1	3	688
DSR > 0.4 (=1)	0.18	0.39	0	1	688
Holds > 2 Loans (=1)	0.23	0.42	0	1	688
RDSR > 0.4 (=1)	0.40	0.49	0	1	688
Paid Late/Default	0.15	0.36	0	1	685
Subjective Index	0.00	1	-2	3	688
Debt Position	-0.02	0.87	-2	1	688
Diff. Paying Debt	1.37	0.60	1	3	686
Sacrifice Index	-0.08	1.19	-2	4	688

Note: The debt index variables are standardized. The components of the indices are given in non-standardized real terms.

Furthermore, Table A.1 presents correlations between all our debt indicators. Naturally, the objective and subjective indices are significantly correlated with their respective sub-indicators. However, our objective and subjective measures also correlate significantly with each other. This is encouraging, since it rebuts criticism with respect to objective over-indebtedness measures neglecting important dimensions of financial distress.

3 Survey Results

This research examines the link between the accuracy of income expectations and over-indebtedness. In the following, we relate the derived quantitative forecast error to the over-indebtedness indices. We run simple OLS regressions estimating correlations between the variables in question.

3.1 Estimation Strategy

The regressions we run take the following form:

$$\text{Over} - \text{Indebtedness Index}_i = \beta_0 + \beta_1 \text{Quant.FE}_i + X_i' \beta_2 + \epsilon_i \quad (2)$$

The dependent variable *Over – Indebtedness Index*_{*i*} represents the debt measures we apply to mirror the financial situation of the household as clearly as possible. It contains the objective over-indebtedness index,¹⁵ and the subjective over-indebtedness index.¹⁶ The main variable of interest is *Quant.FE*_{*i*}. It represents the income accuracy measure (quantitative forecast error) we derived in Section 2.3. We cluster our standard errors at the district level.¹⁷

The vector X_i controls for household and respondent specific characteristics that are likely to determine over-indebtedness of the household. Precisely, these are occupation dummies for farming, self-employment, and wage employment, monthly household income in 2016 and 2017, the number of children between 0-6 years, 7-10 years, and 11-16 years old, the number of elders and of working members in the household, total household education (sum of all educational levels of its members), age and age squared of the respondent, and respondent’s financial literacy score. The vector X_i also captures the monetary loss from past shocks. We use detailed information from the past year about monetary losses directly related to a shock. We differentiate between losses from farming related shocks, environmental shocks, economic shocks, crime shocks and other shocks.

¹⁵ Standardized average of a dummy turning one if the debt service to income ratio is greater than 0.4, a dummy turning one if the remaining debt to income ratio is greater than 0.4, a dummy regarding whether the household paid late or defaulted on a loan and a dummy turning one if the household has more than two loans

¹⁶ Standardized average of the sacrifice index, answers to questions on debt position and whether the household has difficulties paying off debt

¹⁷ Cameron and Miller (2015) advice to cluster at least at the primary sampling unit, which is the district level in our case. Since this gives us a small number of clusters, as a robustness check, we use wild cluster bootstrap. This does not change our main findings. Results are available on request.

3.2 Main Results

To begin with, we relate the quantitative forecast error to each over-indebtedness index (OI-Index). In a second step, we add the aforementioned control variables to our regression as the indices depend on other respondent and household specific characteristics as well. Tables 3 and 4 provide results for the objective and subjective OI-Indices. The tables show results for the four forecast error categories as well as for the shock loss control variables. Tables presenting results for all covariates included in the regression analysis can be found in the Online Appendix I. Results for the qualitative forecast error are presented in Appendix A. The first column in each table represents the standardized and averaged index whereas the subsequent columns depict results for the single non-standardized components of the indices.

Objective Over-Indebtedness We find a strong, statistically significant relation between a positive forecast error and the objective OI-Index. Households having very high future income expectations compared to their actual income are more likely to be over-indebted. The over-indebtedness index increases by 0.29 - 0.31 points if respondents exhibit positive income expectations based on their expected future median income (columns (1) and (2), Table 3). This effect is mainly driven by the remaining debt ratio and the dummy on whether the household paid late or defaulted on a loan. The debt service to income ratio has a minor effect on the OI-Index and having more than two loans has no significant effect at all. The RDSR increases by 18.7 - 20.7 percentage points for households with a positive forecast error (columns (5) and (6)) and the probability that a household paid late or defaulted on a loan increases by 10.9 - 12.4 percentage points if a household's expected future median income is greater than the current income (columns (7) and (8)). Furthermore, the variable indicating a DSR greater than 0.4 increases by 8.4 - 9.8 percentage points (columns (3) and (4)) for those households.

With regards to the other forecast error categories we do not find consistent results. Having a very negative, negative or a neutral forecast error seems to have no significant lasting impact on the over-indebtedness index. While the probability of a household defaulting on a loan or paying late slightly increases for households with a negative forecast error, overall results for the non-positive forecast error categories are insignificant if not showing a negative sign. Therefore, a significant and robust effect on over-indebtedness can only be found for households with high positive future income expectations.

Table 3: Objective Over-Indebtedness

	Obj. Index		DSR > 0.4 (=1)		RDSR > 0.4 (=1)		Paid Late/Default		> 2 Loans (=1)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Very Negative	-0.125 (0.151)	-0.004 (0.143)	-0.097* (0.047)	-0.020 (0.050)	-0.073 (0.081)	0.016 (0.078)	0.017 (0.033)	-0.010 (0.035)	0.001 (0.059)	0.014 (0.059)
Negative	0.050 (0.134)	0.065 (0.133)	-0.067 (0.045)	-0.052 (0.048)	0.075 (0.058)	0.103* (0.058)	0.081** (0.032)	0.068** (0.028)	-0.029 (0.057)	-0.036 (0.059)
Neutral	0.153 (0.153)	0.130 (0.166)	0.025 (0.050)	0.002 (0.059)	0.079 (0.058)	0.067 (0.063)	0.074 (0.045)	0.092* (0.050)	-0.002 (0.061)	-0.012 (0.062)
Positive	0.289** (0.134)	0.314** (0.135)	0.098** (0.042)	0.084* (0.046)	0.187** (0.072)	0.207*** (0.068)	0.109*** (0.038)	0.124*** (0.040)	-0.054 (0.055)	-0.044 (0.059)
Farming Shocks		-0.000 (0.002)		-0.000 (0.000)		0.000 (0.001)		-0.000 (0.001)		0.000 (0.001)
Environ. Shocks		0.005*** (0.001)		-0.000 (0.001)		0.002*** (0.000)		0.002* (0.001)		0.002*** (0.001)
Economic Shocks		0.003*** (0.001)		0.000 (0.000)		0.002*** (0.001)		0.001* (0.001)		0.000 (0.001)
Crime Shocks		-0.015 (0.009)		-0.003 (0.002)		-0.012*** (0.003)		-0.002 (0.004)		-0.001 (0.004)
Other Shocks		-0.000 (0.000)		-0.000 (0.000)		-0.000 (0.000)		0.000** (0.000)		-0.000 (0.000)
Constant	-0.073 (0.144)	-1.731*** (0.537)	0.189*** (0.048)	0.074 (0.285)	0.343*** (0.072)	-0.678** (0.278)	0.099*** (0.019)	-0.139 (0.255)	0.245*** (0.063)	-0.404 (0.242)
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	688	680	688	680	688	680	685	677	688	680
Adj. R-squared	0.014	0.096	0.025	0.048	0.025	0.128	0.007	0.038	-0.003	0.050

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Clustered standard errors in parentheses. Households with a mildly negative forecast error serve as the reference group. Additional controls: Monthly Household Income 2017, Age, Age squared, Financial Literacy Score, Risk Aversion, Self-control, Main Income Farming, Main Income Employed, Main Income Self-Employment, Main Income Remittances, Children (0-6), Children (7-10), Children (11-16), Number of Elders in HH, Number of Working Members in HH, Total HH Education

We account for monetary losses from various shock events, specifically because a shock might influence both the level of over-indebtedness and income expectations at the same time (i.e. positive expectation to return to pre-shock-level income). The results indicate that higher losses are associated with higher debt levels. However, while we find some statistically significant effects, these effects are economically rather small. For example, if an environmental shock loss increases by 1000 Thai Baht¹⁸, the objective OI-Index increases by 0.05 points. The main take away is the following: We account for monetary losses induced by shocks, but the relationship between positive forecast errors and over-indebtedness remains significant, confirming a robust relationship between the two.

¹⁸ 1000 Thai Baht equalled around 31 U.S. Dollar in November 2017

Concerning additional control variables, household income significantly affects household over-indebtedness. Furthermore, age and age squared are both highly significant, suggesting a hump-shaped pattern in line with life-cycle-income-smoothing. Furthermore, over-indebtedness remains largely unaffected by household composition and education.

Subjective Over-Indebtedness Our analysis of subjective over-indebtedness only reveals a mildly positive relationship to the positive quantitative forecast error. However, as shown in Appendix A, the qualitative forecast error is more consistently related to the subjective OI-Index. This hints at two possible explanations:

Table 4: Subjective Over-Indebtedness

	Subj. Index		Debt Position		Diff. Pay off Debt		Sacrifice Index	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Very Negative	0.123 (0.113)	0.170 (0.129)	0.043 (0.106)	0.038 (0.111)	0.084 (0.069)	0.087 (0.081)	0.118 (0.106)	0.250** (0.103)
Negative	0.118 (0.157)	0.119 (0.139)	0.056 (0.122)	0.011 (0.130)	0.072 (0.082)	0.073 (0.066)	0.108 (0.174)	0.171 (0.157)
Neutral	-0.038 (0.124)	-0.006 (0.114)	-0.029 (0.089)	-0.008 (0.090)	0.014 (0.070)	0.034 (0.067)	-0.098 (0.128)	-0.077 (0.102)
Positive	0.131 (0.084)	0.189* (0.095)	0.088 (0.074)	0.139* (0.079)	0.066 (0.053)	0.086 (0.055)	0.113 (0.120)	0.167 (0.122)
Farming Shocks		-0.001 (0.001)		0.001 (0.001)		-0.001 (0.001)		-0.002 (0.002)
Environmental Shocks		0.005*** (0.001)		0.003*** (0.001)		0.004** (0.001)		0.003 (0.002)
Economic Shocks		0.001 (0.001)		0.003** (0.001)		-0.000 (0.001)		-0.000 (0.002)
Crime Shocks		-0.003 (0.014)		-0.008 (0.009)		0.002 (0.007)		-0.003 (0.016)
Other Shocks		0.001*** (0.000)		0.000 (0.000)		0.001** (0.000)		0.002*** (0.000)
Constant	-0.087 (0.093)	-1.341** (0.607)	-0.056 (0.085)	-1.971*** (0.494)	1.324*** (0.047)	1.011** (0.372)	-0.131 (0.111)	-0.426 (0.732)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	688	680	688	680	686	678	688	680
Adj. R-squared	-0.001	0.089	-0.004	0.083	-0.003	0.051	-0.001	0.084

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Clustered standard errors in parentheses. Households with a mildly negative forecast error serve as the reference group. Additional controls: Monthly Household Income 2017, Age, Age squared, Financial Literacy Score, Risk Aversion, Self-control, Main Income Farming, Main Income Employed, Main Income Self-Employment, Main Income Remittances, Children (0-6), Children (7-10), Children (11-16), Number of Elders in HH, Number of Working Members in HH, Total HH Education

One, the subjective OI-Index is rather a concept of perceived financial distress and thus more related to the more “subjectively” elicited qualitative forecast error and two, financial distress may not only be determined by the household’s true debt situation but more so by respondent characteristics. When analyzing the control variables, we, for example, find that risk seeking is positively related to the subjective OI-Index. Delving deeper into respondent characteristics, we run regressions including the Big Five measures¹⁹ as additional controls (results can be found in the Online Appendix). If a respondent scores high on openness and neuroticism, her subjective OI-Index and the underlying components are affected positively.²⁰ Furthermore, shocks affect subjective over-indebtedness in a similar way as objective over-indebtedness: if households experience an environmental shock, their perceived debt level rises significantly.

Income Certainty In an additional exercise, we add our income certainty measure (i.e. overprecision) to investigate whether certainty about future household income development is related to over-indebtedness. Tables 5 and 6 present results.

Table 5: Certainty Measure - Objective Over-Indebtedness

	Obj. Index	DSR > 0.4	RDSR > 0.4	Paid Late	> 2 Loans
	(1)	(2)	(3)	(4)	(5)
Very Negative	-0.008 (0.145)	-0.021 (0.050)	0.014 (0.079)	-0.013 (0.035)	0.016 (0.062)
Negative	0.048 (0.131)	-0.061 (0.044)	0.104* (0.055)	0.058* (0.029)	-0.035 (0.058)
Neutral	0.111 (0.165)	-0.004 (0.059)	0.060 (0.063)	0.088* (0.050)	-0.018 (0.062)
Positive	0.294** (0.138)	0.079 (0.049)	0.196*** (0.068)	0.121*** (0.042)	-0.049 (0.060)
Overprecision	0.108* (0.061)	0.048** (0.022)	0.042 (0.027)	-0.015 (0.024)	0.053** (0.021)
Constant	-1.834*** (0.507)	0.024 (0.290)	-0.758** (0.270)	-0.031 (0.280)	-0.518** (0.238)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	667	667	667	664	667
Adj. R-squared	0.096	0.054	0.128	0.035	0.055

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Clustered standard errors in parentheses. Households with a mildly negative forecast error serve as the reference group.

¹⁹ The Big Five comprise the following personality traits: openness, conscientiousness, extraversion, agreeableness, and neuroticism. More details on their construction are found in the Online Appendix II.

²⁰ Openness is the only trait of the Big Five that is related to over-indebtedness in almost all specifications. Individuals with a high level of openness are potentially also over-confident persons.

There is no effect of certainty about future income on subjective over-indebtedness. However, we find that higher income certainty is related to objective over-indebtedness: If a respondent is very certain about the development of future household income, this is linked to an augmented over-indebtedness index. This result is mainly driven by the debt to service ratio and by having more than two loans (columns (2) and (5), Table 5). Thus, certainty is likely to constitute a part of the forecast error we derived.

Table 6: Certainty Measure - Subjective Over-Indebtedness

	Subj. Index	Debt Position	Diff. Pay off Debt	Sacrifice Index
	(1)	(2)	(3)	(4)
Very Negative	0.172 (0.138)	0.042 (0.120)	0.085 (0.085)	0.252** (0.107)
Negative	0.104 (0.141)	0.006 (0.132)	0.062 (0.069)	0.155 (0.151)
Neutral	-0.012 (0.117)	-0.008 (0.094)	0.033 (0.068)	-0.091 (0.104)
Positive	0.156 (0.102)	0.128 (0.092)	0.060 (0.057)	0.140 (0.122)
Overprecision	0.000 (0.092)	0.088 (0.071)	-0.053 (0.053)	-0.019 (0.097)
Constant	-1.335** (0.624)	-2.318*** (0.541)	1.207*** (0.378)	-0.305 (0.827)
Controls	Yes	Yes	Yes	Yes
Observations	667	667	665	667
Adj. R-squared	0.087	0.086	0.054	0.080

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Clustered standard errors in parentheses. Households with a mildly negative forecast error serve as the reference group.

Overall, we conclude, (i) that there is indeed a significant positive and robust relationship between making a positive quantitative forecast error and objective over-indebtedness; (ii) We are also reassured that, although correlated to each other, subjective and objective over-indebtedness indicators measure different dimensions of indebtedness. While the “hard” objective OI-Index is clearly related to the quantitative forecast error, the subjective OI-Index is only mildly related to very positive future income expectations. (iii) Certainty about the household’s income development is also related to over-indebtedness, primarily objective over-indebtedness.

3.3 Robustness

Excluding Possibly Confounding Observations. Before eliciting the subjective expected income of respondents, we ask two questions testing the understanding of the concept of probability. We re-run the analysis for only those respondents that correctly answer the probability probing question and examine whether our main results hold. Results are presented in Tables A.2 and A.3 in the Appendix. The effects for this sub-sample stay highly significant and almost all coefficients increase in size emphasizing the link between a positive forecast error and objective over-indebtedness.

In order to verify that respondents have an actual understanding of their household's finances, we again re-run the regressions, including only those individuals who are in charge of the household's financial decisions either alone or together with someone else (see Tables A.4 and A.5). Overall, the results stay virtually unchanged with regard to the significance of our coefficients of interest. Point estimates change slightly.

Interacting the Bias with Personality Traits. We do not claim to show a causal effect because among other reasons we acknowledge that the relation between over-indebtedness and inaccurate income expectations may also work in the reverse. For example, if people are indebted, they might have a great bias regarding future expected income as they plan to work harder in the future to pay down their debt. We expect such people to exhibit a high level of conscientiousness, the personality marker describing achievement oriented (McClelland et al., 1953), hard-working, effective, and dutiful characters (Barrick and Mount, 1991). Hence, we interact our forecast error measure with this character trait, expecting to find significant effects for conscientious people. Results for the aggregated indices as dependent variables are presented in Table A.6. The interaction is not significant for the positive forecast error and any of the OI-Indices. This counteracts the assumption that the achieving respondents with distorted expectations drive the relationship between our forecast error and debt status. Hence, the results from the interaction show that reversed causality issues are highly unlikely.

4 The Experiment

The preceding section shows that inaccurately high expectations and over-indebtedness are strongly related to each other, even when controlling for important socio-economic characteristics and shocks. However, methodologically, the implemented regression analysis only represents correlations. Furthermore, we are interested whether overconfidence, a systematic behavioral bias that might be responsible for having too high expectations in the first place, can actually cause overborrowing. In what follows, we try to prove that

biased expectations are one potential *cause* why persons in our sample spend more than they can actually pay for.

4.1 Experimental Design

As final part of the survey, we play a market game in which respondents can buy different kinds of goods for a discounted price with money they earn in the experiment. They can buy packs of coffee, chips, dried mango, or detergent for 10 THB (ca. 25 euro cents) each instead of the 20 THB list price.²¹ Each participant receives an endowment of 40 THB. Additional money can be earned by answering questions in a trivia game. The amount earned depends on how many questions the participant answers correctly in comparison to the other participants. We rank them from 1-10, where rank ten corresponds to answering the most questions correctly and rank one to answering the least number of questions correctly.²² Participants ranked 1-4 do not earn anything additionally to their endowment, those ranked 5-6 earn 10 THB, those ranked 7-8 20 THB and those ranked 9-10 earn 40 THB additionally. Thus, participants can earn up to 80 THB and can buy at most eight goods.

We make expectations a crucial factor in the game by requiring participants to decide how much and what to buy before they take the pay-off relevant quiz, i.e. before they know their final payoff. We divide participants in two treatment groups; one group faces a “hard” quiz and the other one an “easy” trivia quiz. To convey the difficulty of each quiz and to exogenously vary expectations about relative performance, participants do a test quiz with seven questions upfront where difficulty again depends on treatment. Based on the test quiz participants infer how good they will be in the pay-off relevant main quiz and form expectations about the performance of the others and, thereby, their relative rank. They are ranked within each treatment group and they are told that everybody they are ranked against took the exact the same quiz. With this design, we can exploit the so-called hard-easy gap analogous to [Dargnies et al. \(n.d.\)](#) and very similar to [Grohmann et al. \(2019\)](#). Much research finds that people tend to overplace themselves in easy

²¹ At least for the bag of chips, it is common knowledge that they usually cost 20 THB as, for a long time, they had the price printed on their front. To further convince participants that the products are truly discounted, we attached “20 THB” price tags to each product.

²² In the field, participants from the first villages were ranked against participants from our pilot villages and our interviewers who also took the quizzes. For later villages, we replaced our interviewer data with data from the previous villages and told participants that they are ranked against ten persons who live in a village similar to theirs. For the final analysis, we use all the observations to create a ranking. In each treatment, we have two accumulation points in the number of correctly answered questions that are next to each other and around the mean. We set these two points as rank five and six. Each one point deviation in correctly answered question then constitutes a one point deviation in rank (e.g. if rank five means nine questions answered correctly, rank four means eight questions answered correctly). Since there are more questions than possible ranks, we have some bunching of correctly answered questions around rank one and rank ten, the boundaries of the ranking.

tasks and to underplace themselves in hard tasks (for example [Merkle and Weber, 2011](#); [Hartwig and Dunlosky, 2014](#); [Benoit et al., 2015](#)). Over-(under-)placing is a form of over-(under-)confidence in which individuals over-(under-)estimate their relative performance in comparison to others. Thus, by assigning participants to two different treatments, we exogenously vary their expectations through varying self-confidence (see [Figure 6](#)).²³ We subsequently measure confidence as difference between expected rank and actual rank:

$$confidence = rank_{exp} - rank_{act} \tag{3}$$

Theoretically, upward biased expectations can arise for two reasons; either an individual is overly optimistic or overly confident. We follow [Heger and Papageorge \(2018\)](#) in defining overoptimism as the tendency to overestimate the probability of preferred outcomes and overconfidence as the tendency to overestimate one’s own performance. For our experiment, we decide to concentrate on overconfidence because numerous studies show that overconfidence is related to important life and financial decisions.²⁴

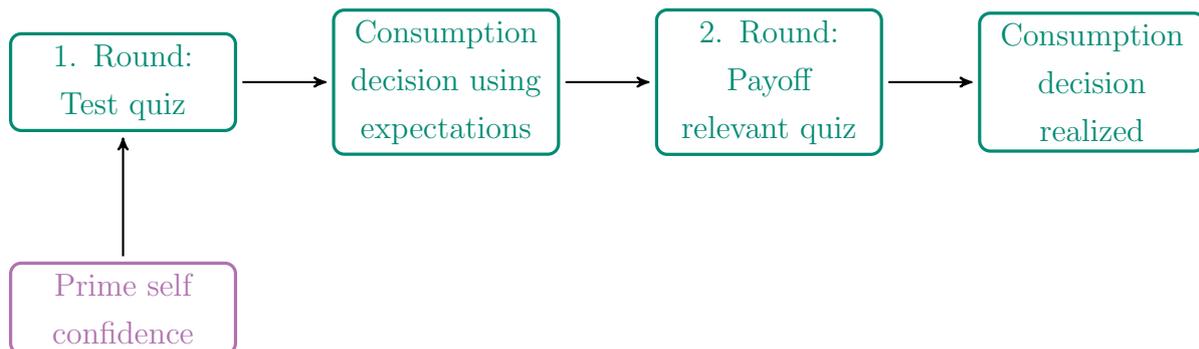


Figure 6: Experimental Flow

Except for the difference in difficulty, the procedure is the same for every participant: If participants agree to play the game, the interviewer prepares the set-up and starts reading out the instructions. The instructions include comprehension questions to test whether participants understand how their rank is determined and how much they can earn. If participants do not answer these questions correctly, the interviewer does not continue with the instructions.²⁵ After they have finished the instructions, the participants start

²³ The exogenous variation is one of the reasons why we do not include this measure for self-confidence in our survey regressions as a measure for expectation bias. Another reason is that self-confidence is domain dependent, which can also later be seen comparing the on average observed under-confidence in financial literacy and the overconfidence we find here.

²⁴ For example, [Camerer and Lovallo \(1999\)](#), who experimentally test the effect of overconfidence on entrepreneurial decision-making (this relationship is a well-researched field of study), conclude that excess entry in a market game is strongly related to overconfidence and not to overoptimism.

²⁵ Still, there are participants who had serious difficulties in understanding the game such that we exclude them from the main analysis

to answer the test quiz, which has seven trivia questions. They have five minutes to answer all the questions. For each question, four possible answers are given. When the time is up or participants have finished answering, they receive a decision sheet. On the decision sheet, they first have to write down the rank and the earnings they expect to reach in the following main quiz. Then, they have to indicate their buying decision based on their expected earnings. Afterwards, participants continue with the main quiz where they have to answer 15 questions in ten minutes. Following the quiz, there are three debriefing questions including a question on the expected rank after the second quiz has actually been taken (such that we can check for belief updating). Finally, the interviewer calculates the rank and earnings, then hands over the products and money, if applicable.

In most cases, participants could read, write, and answer the quizzes on their own. Sometimes, especially older people needed assistance in reading and writing, which was provided by the interviewer. The supplemental material for the experiment can be found in Appendix III in English (for the experiment everything was translated to Thai).

Rational Decisions

If participants want to buy more than they can afford, including their endowment, their consumption has to be restricted. They receive at most as many goods as they can buy with their earnings and nothing beyond that amount. Participants are aware of that fact.

We implicitly assume that expectations influence buying decisions. If this does not hold, the aforementioned design feature seriously distorts our results as follows. If it was the case that “rational” participants strictly prefer goods over money because, for example, they are cheaper than list price and can be stockpiled, expectations would become meaningless for the consumption decision. Indicating to buy eight goods is weakly dominating any other number of goods for this kind of participants, since they clearly prefer goods over money independent of the budget.²⁶

Eventually about 4% of our participants decided to buy eight goods even though they expect to earn less. An additional 3% wanted to buy more than they expected to earn but less than eight goods. In our main analysis, these observations are excluded because i) we already know that expectations do not impact consumption in this setting for them and ii) they could artificially inflate our results. We present additional analyses on this sub-sample in the Appendix Section “The Rationals” (A.14) and discuss whether they truly acted in a rational way or rather had difficulties understanding the game.

For the other 93%, we still assume that in general respondents prefer a bundle out of products and cash. The exact composition depends on individual preferences but also

²⁶ If the participant expects less than 80 THB, there is a potential loss in indicating to buy less than eight goods because the prediction might be under-confident. However, given our setting, there is no loss if she indicates to buy eight goods but actual earnings are lower than 80 THB.

expected earnings. Thus, being overconfident (or underconfident) creates a distortion in utility. Following these reflections, we derive the following hypotheses:

Hypothesis 1: *On average, individuals in the easy treatment will buy more than individuals in the hard treatment.*

Hypothesis 2: *A great level of overconfidence will lead to excessive spending.*

Hypothesis 1 is implied by the finding on the hard-easy gap. Hypothesis 2 follows from the fact that we define respondents to be overconfident if their expected rank is higher than their actual rank, which implies that they earn less than expected. Since we cannot allow respondents to pay from personal money if experimental money is insufficient, restricting consumption in some cases is necessary. Therefore, they cannot accumulate debt. Nevertheless, this is what would actually happen in real life and, therefore, we opted for this experimental design to estimate the effect of overconfidence on (over-)indebtedness.

4.2 Experimental Results

Overall, 604 respondents participated in the game. Since participation is self-selected, participants and non-participants are compared in Table A.11 in the Appendix. As can be seen, participants and non-participants significantly differ in some variables.²⁷ In all these variables, the difference is in the expected direction: female, older, less occupied, less educated, financial illiterate and less numerate and more financial risk averse respondents are less likely to participate in the game. Several of these variables are significantly correlated with each other. Running a simple regression on the likelihood to participate, we find that some of these variables are insignificant and that the time of day is one of the strongest predictors of game participation (see A.12). Since the time of day at which we visited households for the interviews is mostly exogenous,²⁸ self-selection into the game is less pronounced than initially expected.

Out of the 604, seven observations are excluded because either treatments for them are mixed up, personal information is missing, or a third person helped them answer the questions. We exclude 44 observations that are also excluded from the survey regression analysis because they are outliers in income or the debt service to income ratio (see Section 2.1).²⁹ Additionally, 84 observations are excluded because it can be inferred from the data

²⁷ A complete list of all variables and their explanation is provided in the Online Appendix II.

²⁸ We interviewed households according to a schedule we designed together with our interview team manager, which tried to minimize travel distances for each interview team. Hence, this schedule was exogenous to individual household characteristics, except for the village that the household resides in. However, a few houses were empty the first time we visited them and we had to reschedule another date with the household itself.

²⁹ The results are robust to this exclusion.

that comprehension was insufficient³⁰ or because they want to buy more than they expect to earn in total (see previous Sub-Section on these special cases). Those 84 cases differ only in their number of children between 7-10 years.

In Table 7 characteristics of the remaining 471 participants are compared across treatments. The significantly unequal number of participants per treatment is due to fact that we slightly over-sampled the easy treatment. Results from previous studies suggest that the effect of easy tasks on self-confidence is generally stronger than the effect of hard tasks (see for example [Dargnies et al., n.d.](#)). The characteristics depicted here might be important for the general level of self-confidence and the willingness to buy products.

Table 7: Descriptive Statistics across Treatments

	(1) Full Sample	(2) Hard Treatment	(3) Easy Treatment	(4) Difference
Sex	1.64	1.60	1.67	-0.07
Age	56.16	55.23	56.93	-1.70
Relation to HH Head	1.70	1.69	1.71	-0.02
Marital Status	2.13	2.09	2.16	-0.07
Main Occupation	4.79	4.29	5.20	-0.90
Years of Schooling	5.92	6.08	5.79	0.28
Children (0-6 years)	0.33	0.37	0.29	0.08
Children (7-10 years)	0.26	0.26	0.26	0.01
Numeracy	2.14	2.09	2.19	-0.10
Health Status	1.38	1.32	1.43	-0.11**
BMI	23.58	23.25	23.86	-0.61
Fin. Decision Maker	1.57	1.55	1.59	-0.03
Self Control	20.94	21.19	20.75	0.44
Risk Taking	4.02	3.96	4.07	-0.12
Fin. Risk Taking	4.06	3.99	4.12	-0.13
FL-Score	5.66	5.55	5.75	-0.20
Monthly Inc. 2017	18653.06	20802.79	16893.44	3909.35**
Obj. OI-Index	0.01	-0.09	0.09	-0.18**
Subj. OI-Index	-0.04	-0.03	-0.05	0.03
Morning	0.53	0.51	0.54	-0.03
Midday	0.27	0.26	0.28	-0.02
Read Alone	1.44	1.44	1.44	-0.00
Difficulties in Game	1.14	1.15	1.13	0.01
Observations	471	212	259	471

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels.

³⁰ For example, one participant writes that he expects to earn 30 Baht from the game, which is, however, not an possible option. Another one wants to buy 35 products although the maximum affordable number is eight.

Given the sample size and the number of variables analyzed, randomizing participants into the treatments worked well; the two groups only significantly differ with regard to their health status, their monthly household income, and their (objective) over-indebtedness index. Controlling for these variables leaves our results virtually unchanged.

Shift in Beliefs

On average, participants answered 9.07 out of 15 trivia questions correctly in the easy treatment and 5.09 out of 15 in the hard treatment. Thus, it can be assumed that for our sample the easy treatment is truly “easier” than the hard treatment. The average expected rank in the hard treatment is 6.89 whereas the average expected rank in the easy treatment is 7.22. In Figure 7 the cumulative distribution functions of the expected ranks for both treatments are plotted. It seems that there is only a small shift in beliefs, since the distributions are still almost overlapping.³¹ Indeed, if we compare the distributions of the “second” expectations that are elicited after respondents actually took the main quiz, we find a much larger shift (see Appendix Figure A.2). Thus, either our test quizzes are not as hard or easy as the main quizzes and, therefore, the shift in first beliefs is smaller or participants have such strong beliefs that they only gradually update their beliefs. Still, the distributions of first beliefs are significantly different from each other (Kolmogorov-Smirnov one-sided $p=0.056$; Wilcoxon rank-sum two-sided $p=0.041$). The t-test for mean expectations is significant at the 5% level (one-sided) as well (see Figure 10).

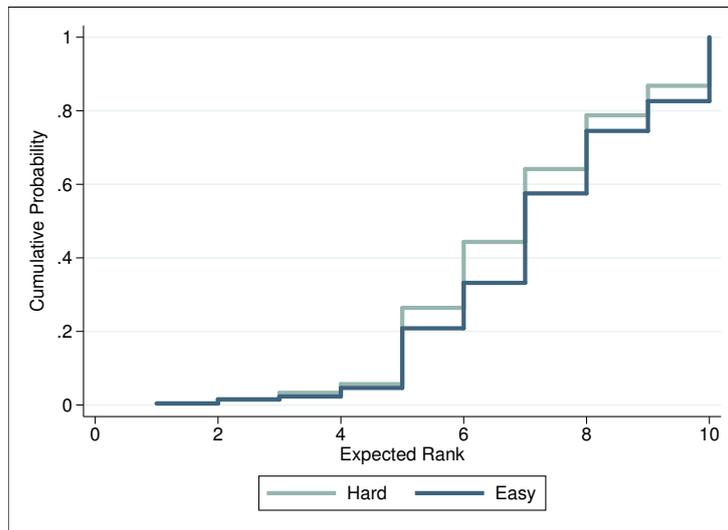


Figure 7: Cumulative Density Distribution of Expected Rank by Treatment

³¹ We focus on the expected rank in our analysis but everything holds analogously for expected earnings.

The difference in self-confidence is larger than the difference in expected rank (see Figure 8). This might be driven by our ranking procedure or by the fact that the easy quiz is not a perfect shift of the hard quiz with respect to the number of questions answered correctly. In any case, this suggests that our manipulation via the treatments to shift the level of beliefs and thereby self-confidence worked.

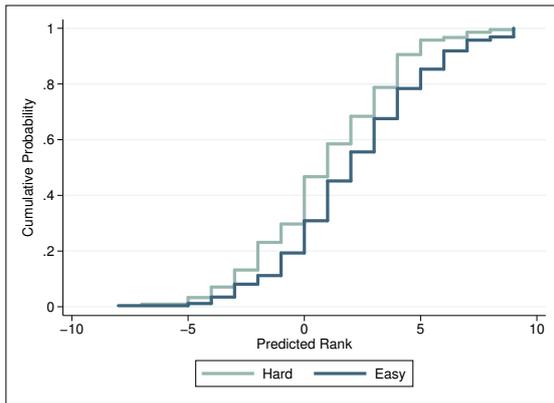


Figure 8: CDFs of Self-Confidence

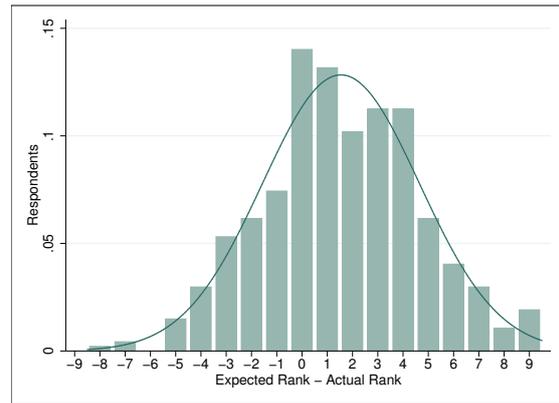


Figure 9: Histogram for Self-Confidence

As seen in Figure 9, across both treatments the mean and median respondents are slightly overconfident (even in the hard treatment). The whole distribution is a little bit skewed to the left but still resembles a normal distribution. Over 14% of the sample have perfectly accurate beliefs and have a self-confidence of “0.” Small deviations from 0 could be considered accurate as well because they could present a form of Bayesian updating.³² Still, a substantial fraction of participants seems to be tremendously overconfident.

Buying Decision

We find a significant positive correlation between expected rank (earnings) and the amount of goods participants want to buy. However, there is no significant relation between the treatment itself and mean desired consumption as presented in Figure 11.

³² On this discussion see [Merkle and Weber \(2011\)](#).

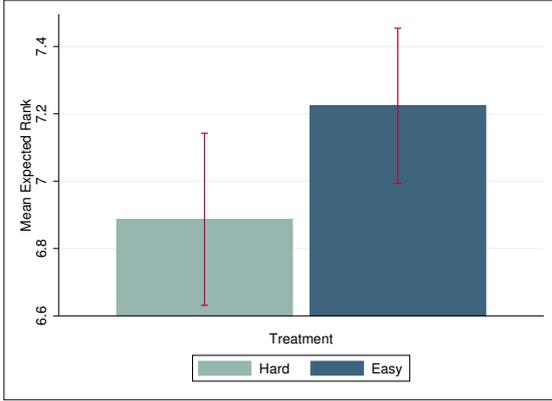


Figure 10: Mean Expected Rank by Treatment

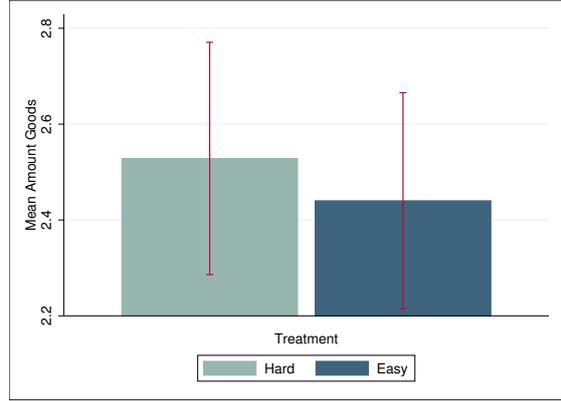


Figure 11: Mean Consumption by Treatment

If we run regressions where we can control for the variables that are unbalanced across treatments, the picture stays the same: the treatment is positively related to the expected rank, the expected rank is positively related to the desired amount of goods, but the treatment is not related to the amount of goods (see Table 8).

Table 8: Consumption Decision

	Exp. Rank		No. Goods	
	(1)	(2)	(3)	(4)
Treatment	0.377** (0.175)	-0.133 (0.173)		-0.189 (0.171)
Exp. Rank			0.144*** (0.046)	0.149*** (0.046)
Controls	Yes	Yes	Yes	Yes
Observations	470	470	470	470

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Robust standard errors in parentheses. Treatment: 0=Hard Quiz, 1=Easy Quiz; A higher expected rank corresponds to a higher expected performance. Controls: Health Status, Monthly HH income and Objective OI-Index.

A similar pattern emerges if we look explicitly at spending behavior (see Table 9). We distinguish *overborrowing*, meaning buying more than actual earnings including endowment can pay for, from *overspending*, meaning buying more than actual game earnings can pay for, but the spending can still be paid with the endowment. The expected rank as well as confidence have a significant effect on both variables, but treatment does not.³³

³³ The level of significance is higher not lower when we exclude possibly “rational” participants who want to buy more than they expect to earn in total.

Table 9: Overborrowing and Overspending

	Overconfidence		Overborrowing		Overspending
	(1)	(2)	(3)	(4)	(4)
Treatment	1.217*** (0.284)	0.010 (0.019)	-0.007 (0.019)	-0.034 (0.045)	
Overconfidence			0.014*** (0.004)	0.044*** (0.007)	
Controls	Yes	Yes	Yes	Yes	Yes
Observations	470	470	470	470	470

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Robust standard errors in parentheses. Treatment: 0=Hard Quiz, 1=Easy Quiz; Controls: Health Status, Monthly HH income and Objective OI-Index.

A supplementary result we find worth mentioning is that being over-indebted in “real life” is actually related to spending behavior in our experiment (see Table 10). Likewise, our regressions results from Section 3.2 on over-indebtedness become more precise if we only look at the persons who overspend in the game. Thus, those respondents who have problems controlling their spending in real life are also those who spend less carefully in the game. We see this as evidence that our experiment, although highly artificial, still captures aspects of real life behavior.

Table 10: Overborrowing in the Game and in Real Life

	No. Goods		Overborrowing		Overspending	
	(1)	(2)	(3)	(4)	(5)	(6)
Obj. OI-Index	-0.018 (0.081)		0.001 (0.009)		0.033 (0.022)	
Subj. OI-Index		0.138* (0.080)		-0.010 (0.009)		0.054** (0.022)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	465	465	465	465	465	465

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Robust standard errors in parentheses. Controls: Treatment and all variables listed in Table 7.

Summarized, our treatments shifted expectations in hypothesized directions; expectations are positively related to spending behavior, but the treatment has no impact on the latter. Therefore, we cannot claim that there is a causal link between expectations and overborrowing with our experiment.

4.3 Confounding Factors

The previous findings are exceptionally robust to various restrictions. For example, they are not driven by participants who are very old or have mild comprehension difficulties (we already excluded those with large difficulties in the main analysis). It is also not the case that the treatments only affect expected ranks but not expected earnings.³⁴ This suggests that there are confounding factors or “noise” interfering with our treatments. We run further analyses to rule out that the treatments affected factors other than expectations:

Frustration and Gratification. One of the most likely confounds could be that participants in the hard treatment feel frustrated because of the difficult questions and want to treat themselves with “shopping.” In contrast, some others might be proud of mastering such a hard quiz and also want to reward themselves. Both motives should lead to the result that especially participants with extreme expectations behave differently across treatments. Participants who are frustrated should rank themselves rather low whereas participants that are proud should rank themselves rather high. Subsequently, the buying behavior of participants with the same expected rank across treatments should be significantly different for the lowest and highest ranks. However, the only (marginally) significant difference we can detect is for the five participants who expected to reach rank two: here, participants in the hard treatment want to buy more than participants in the easy treatment. Excluding these observations does not change our results. For all other ranks participants in both treatments exhibit the same spending pattern. This finding is not in favor of frustration and gratification being possible confounding factors.

Temptation. Another possibility is that participants in the hard treatment are more susceptible to temptation goods. They have to exercise more cognitive effort, which decreases their self-control, so-called “ego depletion” (see, for example, [Hagger et al., 2010](#)). Running separate regressions on each product, we find a significantly different treatment effect only for dried mango. Still, self-control (measured with the scale from [Tangney et al., 2004](#)) and BMI do not have significant effects on buying mango, which opposes the ego depletion interpretation. We also do not find evidence that frustrated (more depleted) participants are more likely to buy mango. Furthermore, detergent is the most popular product and the share of detergent in all goods desired is not different across treatments, whereas mango is the least popular. Detergent is the one product we would expect to be least related to self-control issues. Summarized, we do not find convincing evidence that persons in the hard treatment are more likely to give in to temptation.

³⁴This could happen if there is a piecewise treatment effect (shifting expectations only within the same earnings category) because earnings are only piecewise increasing in ranks and not equidistant.

Based on the tests above, we argue that we can rule out the most probable confounding factors interfering with the treatments. We believe that the reason we do not find a treatment effect on spending and borrowing is that the induced shift in beliefs was not strong enough to eventually be reflected in spending. We can only speculate why the well-established hard-easy gap is so small in our setting. Consulting our interviewers and the data, we have no reason to believe that participants did not perceive the test quizzes as either hard or easy when they should. Several other studies find larger shifts in beliefs although participants had less exposure to manipulation.³⁵ The rural Thai population may have more persistent beliefs than Western populations, which makes changing these beliefs more difficult. Given the tremendous level of overconfidence we find, this circumstance might not be beneficial for our participants. It relates to our regression result that being too certain about the future income is related to over-indebtedness. “Sticky,” biased expectations bear implications for policy making. They must be taken into account when measures to reduce household over-indebtedness are designed.

5 Conclusion

Over-indebtedness can pose a serious threat to households’ welfare and the financial stability of a country, especially in emerging markets. However, the determinants of the worldwide high level of over-indebtedness are, so far, not well understood. Theoretically, as modelled in various permanent income hypotheses theories, higher income expectations should lead to a higher level of borrowing.

In this study, we analyze the relationship between inaccurately high income expectations and over-indebtedness using data from an extensive household survey and a lab-in-the-field experiment. Little financial knowledge and high income uncertainty demand for explicit research in emerging countries and not to rely on results for Western populations. Our sample belongs to a panel survey of relatively poor and rural households in Thailand. Indeed, we can confirm a low level of financial literacy in several dimensions and find substantial uncertainty in income expectations for our sample. While over-indebtedness is increasingly recognized as a growing problem in Thailand, our study sheds light on its potential drivers.

In our regression analysis, we find a strong and robust positive relationship between high expectations concerning future income and over-indebtedness controlling for various household characteristics and shocks. This finding holds for various measures of over-indebtedness but especially for objective measures, if we use a quantitative elici-

³⁵ For example, [Grohmann et al. \(2019\)](#) only use four questions they frame as “example questions” and find larger treatment effects on expectations.

tation method for expectation accuracy based on probabilistic expectations. Subjective over-indebtedness is much more related to a qualitative, more subjective forecast error, which reflects that subjective over-indebtedness indicators are likely to be influenced more heavily by the respondent's judgments on the household's financial situation and by her personality traits. Eventually, higher certainty about the future household income development is also related to more household over-indebtedness. The results are robust to a diverse set of different specifications.

We attempt to establish a causal relationship between biased expectations and over-borrowing in our experiment by exogenously biasing self-confidence via the so called hard-easy gap. Thereby, we change expectations about the future payout in the game. Our results show that in the experiment, overconfidence is related to more spending and over-borrowing but we cannot claim causality. The most probable reason why our treatments do not affect spending behavior are too "sticky" beliefs. This also suggests that rural households are too certain about their income expectations. Interestingly, we find that overspending in the experiment is related to overspending in real life, which we interpret as inaccurately high income expectations potentially being caused by behavioral biases.

Two caveats of our study warrant mentioning: First, all our results are correlations and do not show causality. Still, by accounting in detail for shocks households experienced, we can reduce the concern that over-indebtedness drives very high expectations or that both are spuriously correlated to each other. Second, although we have supportive experimental evidence, we cannot test whether inaccurately high income expectations are actually systematically biased expectations. As we will never know the true income generating process, we cannot know whether the expectations of our respondents are truly biased or inaccurate for other reasons. A systematic overestimation of future income would have much more devastating effects than a random, one-shot, inaccurate guess.

Nevertheless, we find reassuring evidence that even onetime too high expectations can lead to household over-indebtedness, thus pushing households into severe poverty. One of the potential channels why too high expectations are related to over-indebtedness is being too certain about own expectations in the highly uncertain environment that rural households in emerging markets are living in. Given the supplemental evidence for sticky beliefs from our experiment, changing beliefs or their certainty seems to be challenging. More appropriate policy measures would reduce vulnerability and uncertainty with the expansion of assistance and insurance schemes, especially for households engaged in agriculture.

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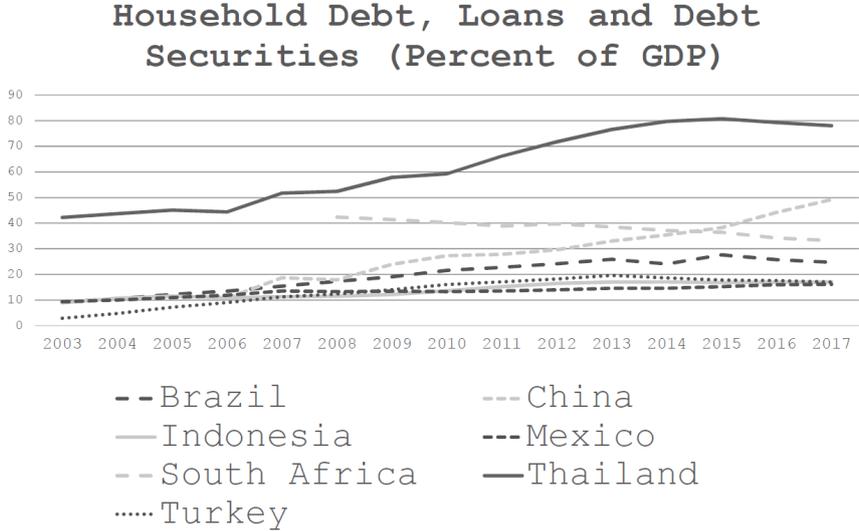
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A Appendix

Survey Appendix



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Figure A.1: Household Debt to GDP Ratio, Selected Emerging Markets

Table A.1: Correlation Matrix - Over-Indebtedness Variables

	Objective Index	DSR > 0.4 (=1)	RDSR > 0.4 (=1)	Holds > 2 Loans (=1)	Paid Late/Default	Subjective Index	Debt Position	Diff. Pay. Debt	Sacrifice Index
Objective Index	1								
DSR > 0.4 (=1)	0.733***	1							
RDSR > 0.4 (=1)	0.771***	0.481***	1						
Holds > 2 Loans (=1)	0.725***	0.426***	0.430***	1					
Paid Late/Default	0.529***	0.111***	0.212***	0.141***	1				
Subjective Index	0.502***	0.209***	0.396***	0.355***	0.426***	1			
Debt Position	0.516***	0.273***	0.458***	0.391***	0.300***	0.797***	1		
Diff. Paying Debt	0.428***	0.130***	0.307***	0.271***	0.474***	0.832***	0.544***	1	
Sacrifice Index	0.240***	0.0881**	0.169***	0.174***	0.233***	0.738***	0.333***	0.423***	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The overindebtedness index and the financial distress index are standardized with mean zero and standard deviation of one.

Table A.2: Subsample Probability Question: Objective OI-Indicators

	Obj. Index	DSR > 0.4	RDSR > 0.4	Paid Late	Holds > 2 Loans
	(1)	(2)	(3)	(4)	(5)
Very Negative	-0.087 (0.165)	-0.066 (0.052)	-0.024 (0.093)	-0.003 (0.042)	-0.007 (0.061)
Negative	0.063 (0.177)	-0.071 (0.064)	0.075 (0.075)	0.080** (0.037)	-0.008 (0.065)
Neutral	0.104 (0.196)	0.010 (0.076)	0.032 (0.066)	0.087 (0.060)	-0.015 (0.068)
Positive	0.362** (0.138)	0.103** (0.047)	0.217*** (0.063)	0.136*** (0.044)	-0.028 (0.058)
Constant	-2.117** (0.813)	-0.126 (0.311)	-0.929*** (0.313)	-0.080 (0.315)	-0.487 (0.353)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	525	525	525	522	525
Adj. R-squared	0.092	0.055	0.126	0.042	0.040

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Clustered standard errors in parentheses.

Table A.3: Subsample Probability Question: Subjective OI-Indicators

	Subj. Index	Debt Position	Diff. Pay off Debt	Sacrifice Index
	(1)	(2)	(3)	(4)
Very Negative	0.202 (0.127)	0.048 (0.110)	0.105 (0.086)	0.288** (0.104)
Negative	0.112 (0.147)	0.008 (0.154)	0.038 (0.079)	0.217 (0.156)
Neutral	0.008 (0.131)	0.063 (0.113)	0.010 (0.079)	-0.095 (0.102)
Positive	0.315*** (0.088)	0.234*** (0.079)	0.128** (0.050)	0.305** (0.129)
Constant	-1.410* (0.786)	-2.073*** (0.621)	0.991** (0.455)	-0.432 (0.748)
Controls	Yes	Yes	Yes	Yes
Observations	525	525	523	525
Adj. R-squared	0.085	0.067	0.049	0.096

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Clustered standard errors in parentheses.

Table A.4: Subsample Financial Decision Makers: Objective OI-Indicators

	Obj. Index	DSR > 0.4	RDSR > 0.4	Paid Late	> 2 Loans
	(1)	(2)	(3)	(4)	(5)
Very Negative	-0.087 (0.159)	-0.022 (0.055)	-0.028 (0.086)	-0.024 (0.038)	-0.028 (0.068)
Negative	0.007 (0.147)	-0.059 (0.051)	0.084 (0.066)	0.052 (0.034)	-0.061 (0.074)
Neutral	0.089 (0.195)	0.001 (0.069)	0.042 (0.067)	0.081 (0.059)	-0.025 (0.077)
Positive	0.331** (0.153)	0.089 (0.053)	0.208*** (0.072)	0.126*** (0.042)	-0.032 (0.064)
Constant	-1.782** (0.693)	0.002 (0.343)	-0.737** (0.289)	-0.030 (0.250)	-0.454 (0.279)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	579	579	579	576	579
Adj. R-squared	0.088	0.040	0.143	0.042	0.040

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Clustered standard errors in parentheses.

Table A.5: Subsample Financial Decision Makers: Subjective OI-Indicators

	Subj. Index	Debt Position	Diff. Pay off Debt	Sacrifice Index
	(1)	(2)	(3)	(4)
Very Negative	0.076 (0.138)	-0.042 (0.133)	0.033 (0.087)	0.199 (0.116)
Negative	0.098 (0.153)	-0.076 (0.144)	0.058 (0.068)	0.260 (0.207)
Neutral	-0.090 (0.148)	-0.075 (0.113)	-0.025 (0.085)	-0.108 (0.137)
Positive	0.179* (0.094)	0.107* (0.061)	0.069 (0.055)	0.216 (0.155)
Constant	-0.844 (0.632)	-1.688*** (0.509)	1.203*** (0.368)	0.216 (0.884)
Controls	Yes	Yes	Yes	Yes
Observations	579	579	577	579
Adj. R-squared	0.096	0.082	0.057	0.109

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Clustered standard errors in parentheses.

Table A.6: Interaction of Over-Indebtedness Indices with Conscientiousness

	Obj. Index	Subj. Debt Index
	(1)	(2)
Very Negative	-0.307 (0.756)	1.480 (0.907)
Negative	-0.763 (0.503)	0.468 (0.639)
Positive	-0.173 (0.800)	0.276 (0.539)
Very Positive	-0.053 (0.750)	1.177* (0.585)
Conscientiousness	-0.111 (0.069)	0.095 (0.081)
Very neg. x Conscient.	0.052 (0.129)	-0.229 (0.148)
Negative x Conscient.	0.144* (0.076)	-0.062 (0.099)
Neutral x Conscient.	0.053 (0.126)	-0.049 (0.090)
Positive x Conscient.	0.065 (0.118)	-0.172 (0.102)
Constant	-1.111 (0.759)	-1.884** (0.773)
Controls	Yes	Yes
Observations	680	680
Adj. R-squared	0.093	0.089

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Clustered standard errors in parentheses.

The Qualitative Forecast Error

Deriving the Qualitative Forecast Error

We develop an alternative measure of expectation accuracy closely following Souleles (2004) and Hyytinen and Putkuri (2018), which enables us to replicate the latter authors’ results. We make use of the available panel data and combine categorical answers to the question on “How do you think your average monthly income will develop in the next twelve months?” ($E_{t-1}(Inc_{i,t})$) asked in 2016 (one year prior to our survey) with responses to the question “Do you think your household is better off than last year” asked in 2017 ($A(Inc_{i,t})$).³⁶ We coin the difference between these two questions qualitative forecast error:

$$Qualitative\ Forecast\ Error = A(Inc_{i,t}) - E_{t-1}(Inc_{i,t}) \quad (4)$$

A positive qualitative forecast error occurs if the expected household situation is better than the realized one and a negative if the opposite is true. We form five categories ranging from a very negative to a very positive qualitative forecast error, which enter the regression analysis as dummy variables. The category with households making no forecast error serves as omitted group.

As the qualitative forecast error is derived at the household level, the respondent may not be the same for all three data points. Therefore, we re-run the analysis for a sub-sample with only identical respondents, which does not change the results. We assume that the household’s qualitative assessment regarding its own development stays similar for a time period of two years and, thus, is able to explain indebtedness in 2017. There are two reasons encouraging this view: We are able to control for a rich set of socio-economic variables that capture household formation and, as incomes are rather stationary, expectations may change slowly, too.

Results for the Qualitative Forecast Error

The regressions we run for the qualitative forecast error take the same form as the ones for the quantitative forecast error (standard errors are clustered at the district level):

$$Over - Indebtedness\ Index_i = \beta_0 + \beta_1 Qual.FE_i + X_i' \beta_2 + \epsilon_i \quad (5)$$

Results for the objective and subjective over-indebtedness indices are presented in Tables A.7 and A.8. With regards to the relationship between the objective OI-Index and the qualitative forecast error, we find that over-indebtedness increases by 0.42 points, if respondents exhibit a very positive forecast error. The results are driven by two components: the remaining debt to service ratio (columns (5) and (6), Table A.7) and the probability of whether people paid late or defaulted on a loan (columns (7) and (8)). The results are similar to those of the quantitative forecast error. We again find that very positive forecast errors are related to a higher probability of being objectively over-indebted. Point estimates are slightly higher for results from the qualitative forecast error. Regarding the impact of losses from shocks

³⁶ Answer options range on a scale from 1-5. For the question asked in 2016, one means “increase a lot” and five “decrease a lot”. The question asked in 2017 ranges from one being “much better off” to five “much worse off”. A valid criticism regarding the measure asked in 2017 is that it does not explicitly refer to the financial situation of the household. However, we informally ask how respondents understand the question and the majority of them think about household development in economic terms. The variable is also significantly related to the household income, which further strengthens our argument.

as well as additional control variables, results are similar to those of the quantitative forecast error. Overall, results from the qualitative forecast error confirm the findings from the quantitative forecast error: positive future income expectations are related to increasing objective over-indebtedness.

Table A.7: Qualitative Forecast Error - Main Results Objective OI-Indicators

	Obj. Index		DSR > 0.4 (=1)		RDSR > 0.4 (=1)		Paid Late/Default		> 2 Loans	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Very negative	0.267 (0.397)	0.198 (0.243)	-0.187** (0.066)	-0.070 (0.066)	0.146 (0.277)	0.150 (0.143)	0.104 (0.226)	0.117 (0.102)	0.271 (0.258)	0.042 (0.065)
Negative	-0.205 (0.286)	-0.056 (0.066)	-0.121 (0.092)	-0.030 (0.035)	-0.088 (0.089)	0.008 (0.043)	0.054 (0.184)	-0.004 (0.031)	-0.096 (0.147)	-0.035 (0.045)
Positive	0.071 (0.193)	0.077 (0.071)	-0.010 (0.074)	-0.007 (0.034)	0.090 (0.103)	0.043 (0.040)	-0.057 (0.068)	0.018 (0.036)	0.082 (0.072)	0.039 (0.038)
Very Positive	0.564 (0.399)	0.422*** (0.143)	0.117 (0.143)	0.053 (0.068)	0.168** (0.080)	0.183*** (0.049)	0.159 (0.154)	0.154** (0.067)	0.206 (0.166)	0.098 (0.057)
Farming Shocks		0.000 (0.001)		0.000 (0.000)		-0.000 (0.000)		0.000 (0.000)		0.000 (0.000)
Environ. Shocks		0.003** (0.001)		-0.000 (0.001)		0.002*** (0.001)		0.001 (0.001)		0.001** (0.001)
Economic Shocks		0.003*** (0.001)		0.001** (0.000)		0.001*** (0.000)		0.001** (0.000)		0.000 (0.000)
Crime Shocks		-0.012** (0.004)		-0.003*** (0.001)		-0.006** (0.002)		-0.002 (0.002)		-0.003 (0.002)
Other Shocks		-0.000 (0.000)		-0.000** (0.000)		-0.000 (0.000)		0.000 (0.000)		-0.000 (0.000)
Constant	-0.031 (0.167)	-1.494** (0.533)	0.188** (0.066)	0.155 (0.303)	0.354*** (0.086)	-0.520* (0.284)	0.146*** (0.042)	-0.039 (0.240)	0.229*** (0.070)	-0.463* (0.234)
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	135	680	135	680	135	680	135	677	135	680
Adj. R-squared	0.021	0.120	0.003	0.046	-0.005	0.127	0.012	0.048	0.015	0.062

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Clustered standard errors in parentheses.

We find interesting results for subjective over-indebtedness. Contrary to the results of the quantitative forecast error, we find a significant relationship between positive qualitative forecast errors and subjective over-indebtedness. Again, we only find robust effects for households in the group with the largest positive forecast error. The subjective OI-Index increases by 0.42 points if respondents exhibit very positive forecast errors (columns (1) and (2), Table A.8). Mainly, this is due to the positive effect the forecast error has on the “debt position” component of the index and the “diff. pay off debt” component. Households with a very positive error tend to state more frequently that they “have too much debt right now” (columns (3) and (4)) or that they “have difficulties paying off their debts” (column (5) and (6)). We conclude that the nature of the qualitative forecast error being more “subjectively” elicited than the calculated quantitative forecast error *per se*, might be reflected in more pronounced results regarding subjectively “felt” debt. This is also in line with our analysis from the quantitative forecast error that

subjective over-indebtedness may rather be a concept of perceived financial distress affected by not only the household's true debt situation but also by respondent characteristics.

Table A.8: Qualitative Forecast Error - Main Results Objective OI-Indicators

	Subj. Index		Debt Position		Diff. Pay off Debt		Sacrifice Index	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Very negative	0.108 (0.259)	0.105 (0.298)	-0.087 (0.258)	-0.062 (0.313)	0.091 (0.134)	0.076 (0.148)	0.243 (0.214)	0.227 (0.214)
Negative	-0.105 (0.115)	-0.028 (0.109)	-0.123* (0.066)	-0.028 (0.057)	-0.021 (0.077)	0.005 (0.079)	-0.096 (0.153)	-0.061 (0.145)
Positive	0.196** (0.087)	0.104 (0.088)	0.135* (0.078)	0.059 (0.074)	0.050 (0.045)	0.019 (0.050)	0.265* (0.150)	0.171 (0.136)
Very Positive	0.415** (0.182)	0.415** (0.158)	0.286* (0.147)	0.296** (0.127)	0.214* (0.106)	0.215** (0.094)	0.352* (0.187)	0.339* (0.165)
Farming Shocks		-0.000 (0.001)		-0.000 (0.001)		0.000 (0.001)		-0.000 (0.001)
Environ. Shocks		0.002 (0.002)		0.001 (0.001)		0.002 (0.001)		0.001 (0.001)
Economic Shocks		0.001 (0.001)		0.002*** (0.001)		-0.000 (0.000)		0.001 (0.001)
Crime Shocks		-0.004 (0.007)		-0.003 (0.007)		-0.001 (0.004)		-0.006 (0.006)
Other Shocks		0.001** (0.000)		-0.000 (0.000)		0.001*** (0.000)		0.001** (0.000)
Constant	-0.096 (0.058)	-1.315* (0.678)	-0.062 (0.046)	-1.902*** (0.527)	1.338*** (0.038)	1.008** (0.415)	-0.176** (0.072)	-0.446 (0.762)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	688	680	688	680	686	678	688	680
Adj. R-squared	0.018	0.099	0.013	0.095	0.006	0.056	0.012	0.083

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Clustered standard errors in parentheses.

Furthermore, we again add an income certainty measure to the regression. Results are presented in Tables A.9 and A.10. There is no effect of future income certainty on objective and subjective over-indebtedness. For the subjective OI-Indicators, results are in line with those from the quantitative forecast error. However, they differ for objective over-indebtedness. While we find that higher income certainty leads to higher objective over-indebtedness with respect to the quantitative forecast error, we do not find that relationship with the qualitative error. This may be due to the more subjective nature of the qualitative forecast error.

Table A.9: Objective Over-Indebtedness - Income Certainty

	Obj. Index	DSR > 0.4	RDSR > 0.4	Paid Late	Holds > 2 Loans	
	(1)	(2)	(3)	(4)	(5)	(6)
Very negative	0.197 (0.247)	-0.073 (0.066)	0.151 (0.145)	-0.073 (0.066)	0.117 (0.103)	0.043 (0.065)
Negative	-0.056 (0.065)	-0.029 (0.035)	0.008 (0.044)	-0.029 (0.035)	-0.004 (0.031)	-0.035 (0.046)
Positive	0.076 (0.069)	-0.009 (0.034)	0.043 (0.040)	-0.009 (0.034)	0.018 (0.035)	0.039 (0.038)
Very Positive	0.477*** (0.161)	0.094 (0.078)	0.186*** (0.058)	0.094 (0.078)	0.158** (0.073)	0.110* (0.059)
Overprecision	0.041 (0.049)	0.029 (0.020)	0.007 (0.017)	0.029 (0.020)	0.002 (0.019)	0.009 (0.024)
Constant	-1.669*** (0.510)	-0.023 (0.280)	-0.630** (0.287)	-0.023 (0.280)	-0.017 (0.263)	-0.406* (0.223)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	667	667	667	667	664	667
Adj. R-squared	0.119	0.052	0.126	0.052	0.044	0.056

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Clustered standard errors in parentheses.

Table A.10: Subjective Over-Indebtedness - Income Certainty

	Subj. Index	Debt Position	Diff. Pay off Debt	Sacrifice Index
	(1)	(2)	(3)	(4)
Very negative	0.115 (0.295)	-0.058 (0.311)	0.078 (0.147)	0.247 (0.209)
Negative	-0.031 (0.110)	-0.030 (0.057)	0.003 (0.079)	-0.062 (0.147)
Positive	0.111 (0.092)	0.062 (0.076)	0.021 (0.051)	0.180 (0.139)
Very Positive	0.550*** (0.177)	0.404** (0.156)	0.279** (0.114)	0.445** (0.170)
Overprecision	-0.051 (0.059)	-0.008 (0.041)	-0.013 (0.038)	-0.114 (0.072)
Constant	-1.062 (0.675)	-1.763*** (0.541)	1.142** (0.437)	-0.174 (0.811)
Controls	Yes	Yes	Yes	Yes
Observations	667	667	665	667
Adj. R-squared	0.105	0.098	0.058	0.091

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Clustered standard errors in parentheses.

Overall, results from the qualitative forecast error confirm the main findings from the quantitative forecast error: very positive forecast errors are related to a higher level of over-indebtedness. There is no such relationship for negative forecast errors and over-indebtedness. The results also support the analysis from the quantitative forecast error that subjective and objective over-indebtedness indicators measure different dimensions of indebtedness. Finally, our results from the qualitative forecast error are in line with those of [Hyytinen and Putkuri \(2018\)](#). They report that households with a very positive forecast error are more likely to be over-indebted and that such a pattern cannot be found for households with negative forecast errors. Our results show the same relationship.

Experiment Appendix

Table A.11: Descriptive Statistics by Participation in Game

	(1) Full Sample	(2) Participating	(3) Non-Participating	(4) Difference
Sex	1.66	1.63	1.76	0.12***
Age	57.01	56.35	59.78	3.43***
Relation to HH Head	1.67	1.66	1.71	0.05
Marital Status	2.15	2.14	2.22	0.09
Main Occupation	4.97	4.66	6.29	1.64*
Years of Schooling	5.74	5.83	5.33	-0.51*
Children (0-6 years)	0.32	0.32	0.33	0.01
Children (7-10 years)	0.24	0.23	0.25	0.02
Numeracy	2.05	2.13	1.69	-0.45***
Health Status	1.40	1.38	1.46	0.08
BMI	23.64	23.70	23.41	-0.28
Fin. Decision Maker	1.57	1.56	1.60	0.03
Self Control	21.26	21.02	22.26	1.24
Risk Taking	3.95	3.99	3.78	-0.21
Fin. Risk Taking	3.94	4.04	3.57	-0.47**
FL-Score	5.50	5.63	4.95	-0.68***
Monthly Inc. 2017	19197.02	19313.71	18704.57	-609.14
Obj. OI-Index	0.00	0.00	-0.00	-0.00
Subj. OI-Index	0.00	-0.01	0.03	0.04
Morning	0.53	0.53	0.53	0.00
Midday	0.24	0.26	0.17	-0.09***
Observations	748	604	144	748

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels.

Table A.12: Linear Probability Model Participation in Game

	Participation
Sex	-0.078** (0.036)
Age	-0.003** (0.002)
Fin. Risk Taking	0.024** (0.010)
FL-Score	0.020** (0.010)
Morning	0.083** (0.040)
Midday	0.144*** (0.043)
Observations	717

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Only significant variables reported, remaining variables are the same as in Table A.11.

Table A.13: Descriptive Statistics for Excluded Sample

	(1) Full Sample	(2) In	(3) Out	(4) Difference
Sex	1.65	1.64	1.67	-0.03
Age	56.40	56.16	57.75	-1.59
Relation to HH Head	1.68	1.70	1.56	0.14
Marital Status	2.14	2.13	2.24	-0.11
Main Occupation	4.68	4.79	4.08	0.71
Years of Schooling	5.87	5.92	5.60	0.32
Children (0-6 years)	0.31	0.33	0.25	0.08
Children (7-10 years)	0.24	0.26	0.13	0.13***
Numeracy	2.13	2.14	2.04	0.11
Health Status	1.38	1.38	1.38	0.00
BMI	23.69	23.58	24.27	-0.68
Fin. Decision Maker	1.56	1.57	1.52	0.05
Self Control	21.05	20.94	21.62	-0.67
Risk Taking	3.98	4.02	3.74	0.28
Fin. Risk Taking	4.03	4.06	3.90	0.15
FL-Score	5.62	5.66	5.40	0.26
Monthly Inc. 2017	18523.65	18653.06	17798.04	855.02
Obj. OI-Index	0.01	0.01	-0.02	0.03
Subj. OI-Index	-0.03	-0.04	0.03	-0.07
Read Alone	1.45	1.44	1.49	-0.04
Difficulties	1.15	1.14	1.21	-0.08
Observations	555	471	84	555

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels.

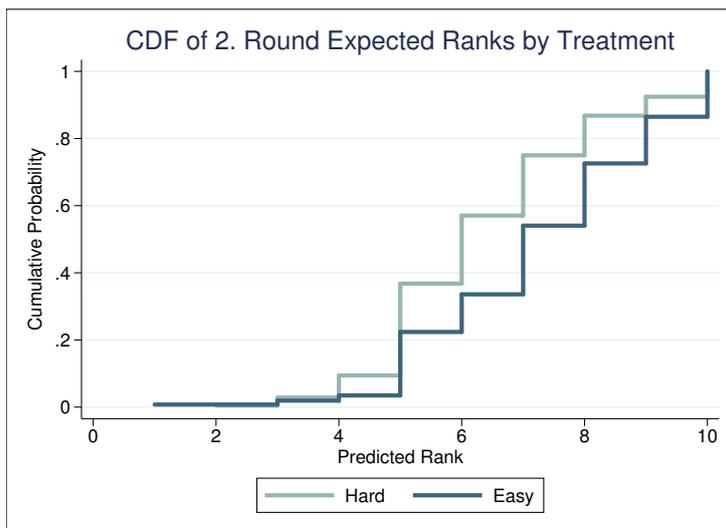


Figure A.2: CDF for the Expected Rank by Treatment, After the Main Quiz

The Rationals

As mentioned above, so far we have excluded experiment participants who want to buy more than they expect to earn. We refer to these persons as “rationals.” In this section, we discuss whether these participants are actually rational or had difficulties in understanding the experiment and how including these observations change our results. Comparing our main sample against all rationals does not yield results that differ substantially from those presented in Table A.13. However, if we divide the rationals into those participants who want to buy more than expected earnings could pay for but less than eight goods and those who want to buy exactly eight goods (which would be the “truly” rational decision), we find interesting differences. The former group has significantly lower education, numeracy, and financial literacy than the main sample (see Table A.14). We see this as evidence that they may have had difficulties understanding the game (we will refer to them as non-rationals from here on). It does not seem to be the case, however, that these are persons who generally have problems controlling their own spending behavior (also outside the lab) because their debt to service ratio is significantly smaller compared to the main sample.

Table A.14: Descriptive Statistics for Non-Rationals (only significant effects reported)

	(1) Full Sample	(2) Others	(3) Non-Rationals	(4) Difference
Years of Schooling	5.84	5.91	5.00	0.91***
Children (7-10 years)	0.24	0.26	0.12	0.14**
Numeracy	2.10	2.13	1.76	0.36*
FL-Score	5.60	5.64	5.10	0.54*
Observations	532	490	42	532

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels.

The remaining rationals, however, not only have significantly higher numeracy and financial literacy, as perceived by the interviewers, but also thought to have a better understanding of the game (see Table A.15) (for non-rationals the difference is in the opposite direction, but not significant). Thus, these

participants might have taken advantage of the set-up and reasoned that it is optimal for them to buy as many goods as possible because of the large discount.

Table A.15: Descriptive Statistics for Rationals (only significant effects reported)

	(1) Full Sample	(2) Others	(3) Rationals	(4) Difference
Main Occupation	4.70	4.76	3.48	1.28*
Numeracy	2.16	2.13	2.78	-0.66*
FL-Score	5.66	5.64	6.22	-0.58*
Difficulties in Game	1.15	1.16	1.00	0.16***
Observations	513	490	23	513

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels.

Including these two groups into the analysis, the results change as anticipated: the effect of expected rank on goods turns insignificant and negligible (see Table A.16). All other effects are almost unchanged.

Table A.16: Consumption Decision including Rationals

	Exp. Rank		No. Goods	
	(1)	(2)	(3)	(4)
Treatment	0.373** (0.168)	-0.234 (0.199)		-0.254 (0.199)
Exp. Rank			0.048 (0.052)	0.054 (0.052)
Controls	Yes	Yes	Yes	Yes
Observations	511	511	511	511

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Standard errors in parentheses. Treatment: 0=Hard Quiz, 1=Easy Quiz; A higher expected rank corresponds to a higher expected performance. Controls: Health Status, Monthly HH income and Objective OI-Index.

Online Appendix to accompany
“Don’t Expect Too Much:
High Income Expectations and Over-Indebtedness”

Contents:

I: Additional Regression Tables

II: Description of Variables

III: Instructions and additional Material for the Experiment

I Additional Regression Tables

Table A.17: Full Regression Output for Main Regression - Objective Over-Indebtedness

	Obj. Index		DSR > 0.4 (=1)		RDSR > 0.4 (=1)		Paid Late/Default		> 2 Loans (=1)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Very Negative	-0.125 (0.151)	-0.004 (0.143)	-0.097* (0.047)	-0.020 (0.050)	-0.073 (0.081)	0.016 (0.078)	0.017 (0.033)	-0.010 (0.035)	0.001 (0.059)	0.014 (0.059)
Negative	0.050 (0.134)	0.065 (0.133)	-0.067 (0.045)	-0.052 (0.048)	0.075 (0.058)	0.103* (0.058)	0.081** (0.032)	0.068** (0.028)	-0.029 (0.057)	-0.036 (0.059)
Neutral	0.153 (0.153)	0.130 (0.166)	0.025 (0.050)	0.002 (0.059)	0.079 (0.058)	0.067 (0.063)	0.074 (0.045)	0.092* (0.050)	-0.002 (0.061)	-0.012 (0.062)
Positive	0.289** (0.134)	0.314** (0.135)	0.098** (0.042)	0.084* (0.046)	0.187** (0.072)	0.207*** (0.068)	0.109*** (0.038)	0.124*** (0.040)	-0.054 (0.055)	-0.044 (0.059)
Monthly Inc.		-0.000 (0.000)		-0.000* (0.000)		-0.000*** (0.000)		0.000 (0.000)		-0.000 (0.000)
Age		0.060*** (0.017)		0.007 (0.008)		0.031*** (0.009)		0.015* (0.008)		0.019*** (0.007)
Age Squared		-0.001*** (0.000)		-0.000 (0.000)		-0.000*** (0.000)		-0.000** (0.000)		-0.000*** (0.000)
FL-Score		0.018 (0.018)		0.007 (0.008)		0.017** (0.006)		-0.011* (0.006)		0.010 (0.008)
Risk Aversion		0.052** (0.019)		0.013* (0.007)		0.026*** (0.008)		0.011 (0.008)		0.013 (0.008)
Self-Control		0.001 (0.005)		-0.002 (0.002)		-0.001 (0.002)		0.003 (0.002)		0.001 (0.002)
Inc. Farming		-0.135 (0.154)		-0.067 (0.058)		-0.009 (0.089)		-0.095 (0.057)		0.026 (0.044)
Inc. Employed		-0.219 (0.158)		-0.110* (0.057)		-0.038 (0.073)		-0.031 (0.056)		-0.072 (0.052)
Inc. Self-Emp.		-0.173 (0.213)		-0.088 (0.089)		-0.028 (0.099)		-0.029 (0.067)		-0.056 (0.062)
Inc. Remitt.		-0.164 (0.143)		-0.070 (0.059)		-0.019 (0.056)		-0.075 (0.059)		-0.020 (0.037)
Children (0-6)		-0.076 (0.047)		-0.011 (0.018)		-0.055** (0.025)		0.010 (0.026)		-0.042* (0.020)
Children (7-10)		0.093 (0.080)		0.012 (0.047)		0.078** (0.033)		0.009 (0.022)		0.019 (0.036)
Children (11-16)		0.032 (0.041)		-0.017 (0.020)		0.017 (0.021)		0.025 (0.021)		0.011 (0.019)
Elders		0.035 (0.041)		0.003 (0.024)		0.037* (0.018)		0.033 (0.020)		-0.032 (0.023)
Working Mem.		0.064 (0.040)		0.021 (0.015)		0.006 (0.019)		-0.001 (0.018)		0.048** (0.020)
HH Education		-0.000 (0.005)		-0.000 (0.002)		0.002 (0.003)		0.000 (0.002)		-0.003 (0.002)
Farming Shocks		-0.000 (0.002)		-0.000 (0.000)		0.000 (0.001)		-0.000 (0.001)		0.000 (0.001)
Environ. Shocks		0.005*** (0.001)		-0.000 (0.001)		0.002*** (0.000)		0.002* (0.001)		0.002*** (0.001)
Economic Shocks		0.003*** (0.001)		0.000 (0.000)		0.002*** (0.001)		0.001* (0.001)		0.000 (0.001)
Crime Shocks		-0.015 (0.009)		-0.003 (0.002)		-0.012*** (0.003)		-0.002 (0.004)		-0.001 (0.004)
Other Shocks		-0.000 (0.000)		-0.000 (0.000)		-0.000 (0.000)		0.000** (0.000)		-0.000 (0.000)
Constant	-0.073 (0.144)	-1.731*** (0.537)	0.189*** (0.048)	0.074 (0.285)	0.343*** (0.072)	-0.678** (0.278)	0.099*** (0.019)	-0.139 (0.255)	0.245*** (0.063)	-0.404 (0.242)
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	688	680	688	680	688	680	685	677	688	680
Adj. R-squared	0.014	0.096	0.025	0.048	0.025	0.128	0.007	0.038	-0.003	0.050

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Clustered standard errors in parentheses.

Table A.18: Full Regression Output for Main Regression - Subjective Over-Indebtedness

	Subj. Index		Debt Position		Diff. Pay off Debt		Sacrifice Index	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Very Negative	0.123 (0.113)	0.170 (0.129)	0.043 (0.106)	0.038 (0.111)	0.084 (0.069)	0.087 (0.081)	0.118 (0.106)	0.250** (0.103)
Negative	0.118 (0.157)	0.119 (0.139)	0.056 (0.122)	0.011 (0.130)	0.072 (0.082)	0.073 (0.066)	0.108 (0.174)	0.171 (0.157)
Neutral	-0.038 (0.124)	-0.006 (0.114)	-0.029 (0.089)	-0.008 (0.090)	0.014 (0.070)	0.034 (0.067)	-0.098 (0.128)	-0.077 (0.102)
Positive	0.131 (0.084)	0.189* (0.095)	0.088 (0.074)	0.139* (0.079)	0.066 (0.053)	0.086 (0.055)	0.113 (0.120)	0.167 (0.122)
Monthly Inc. 2017		-0.000 (0.000)		-0.000 (0.000)		-0.000 (0.000)		-0.000** (0.000)
Age		0.058*** (0.016)		0.062*** (0.017)		0.021* (0.011)		0.038** (0.018)
Age Squared		-0.001*** (0.000)		-0.001*** (0.000)		-0.000*** (0.000)		-0.000** (0.000)
FL-Score		-0.029** (0.013)		0.005 (0.011)		-0.017* (0.009)		-0.054*** (0.018)
Risk Aversion		0.053*** (0.015)		0.057*** (0.018)		0.029** (0.012)		0.015 (0.021)
Self-Control		0.010** (0.004)		0.004 (0.004)		0.004 (0.003)		0.016*** (0.005)
Main Inc. Farming		-0.144 (0.108)		-0.087 (0.120)		0.036 (0.065)		-0.349** (0.141)
Main Inc. Employed		-0.012 (0.143)		-0.007 (0.141)		0.081 (0.075)		-0.184 (0.177)
Main Inc. Self-Emp.		-0.029 (0.178)		0.012 (0.155)		0.045 (0.107)		-0.188 (0.175)
Main Inc. Remitt.		-0.163 (0.133)		-0.140 (0.117)		-0.038 (0.083)		-0.197 (0.155)
Children (0-6 yrs)		-0.029 (0.059)		-0.068 (0.049)		0.021 (0.038)		-0.025 (0.063)
Children (7-10 yrs)		-0.062 (0.066)		0.070 (0.063)		-0.061 (0.043)		-0.160* (0.092)
Children (11-16 yrs)		0.063 (0.063)		0.040 (0.042)		-0.004 (0.047)		0.129* (0.069)
No. of Elders		0.006 (0.042)		0.027 (0.049)		0.019 (0.028)		-0.055 (0.056)
No. of Working Mem.		0.120** (0.042)		0.112*** (0.036)		0.013 (0.030)		0.160*** (0.046)
Total HH Education		-0.011** (0.004)		-0.006* (0.003)		-0.002 (0.003)		-0.017*** (0.005)
Farming Shocks		-0.001 (0.001)		0.001 (0.001)		-0.001 (0.001)		-0.002 (0.002)
Environmental Shocks		0.005*** (0.001)		0.003*** (0.001)		0.004** (0.001)		0.003 (0.002)
Economic Shocks		0.001 (0.001)		0.003** (0.001)		-0.000 (0.001)		-0.000 (0.002)
Crime Shocks		-0.003 (0.014)		-0.008 (0.009)		0.002 (0.007)		-0.003 (0.016)
Other Shocks		0.001*** (0.000)		0.000 (0.000)		0.001** (0.000)		0.002*** (0.000)
Constant	-0.087 (0.093)	-1.341** (0.607)	-0.056 (0.085)	-1.971*** (0.494)	1.324*** (0.047)	1.011** (0.372)	-0.131 (0.111)	-0.426 (0.732)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	688	680	688	680	686	678	688	680
Adj. R-squared	-0.001	0.089	-0.004	0.083	-0.003	0.051	-0.001	0.084

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Clustered standard errors in parentheses.

Table A.19: Additional Regression on Big5 Measures - Objective Over-Indebtedness

	Obj. Index		DSR > 0.4 (=1)		RDSR > 0.4 (=1)		Paid Late/Default		> 2 Loans (=1)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Very Negative	-0.125 (0.151)	-0.019 (0.137)	-0.097* (0.047)	-0.024 (0.050)	-0.073 (0.081)	0.011 (0.075)	0.017 (0.033)	-0.016 (0.034)	0.001 (0.059)	0.012 (0.059)
Negative	0.050 (0.134)	0.064 (0.133)	-0.067 (0.045)	-0.050 (0.049)	0.075 (0.058)	0.101* (0.056)	0.081** (0.032)	0.065** (0.027)	-0.029 (0.057)	-0.034 (0.061)
Neutral	0.153 (0.153)	0.107 (0.159)	0.025 (0.050)	-0.002 (0.057)	0.079 (0.058)	0.060 (0.059)	0.074 (0.045)	0.084 (0.050)	-0.002 (0.061)	-0.021 (0.062)
Positive	0.289** (0.134)	0.294** (0.134)	0.098** (0.042)	0.081* (0.044)	0.187** (0.072)	0.205*** (0.070)	0.109*** (0.038)	0.120*** (0.039)	-0.054 (0.055)	-0.056 (0.060)
Openness		0.094*** (0.029)		0.027*** (0.007)		0.039** (0.015)		0.024* (0.012)		0.020 (0.015)
Conscientiousn.		-0.092*** (0.031)		-0.018 (0.013)		-0.037** (0.016)		-0.028* (0.016)		-0.024* (0.012)
Extraversion		-0.003 (0.038)		0.013 (0.013)		-0.013 (0.020)		-0.017 (0.015)		0.014 (0.014)
Agreeableness		0.044 (0.047)		0.008 (0.018)		-0.006 (0.019)		0.011 (0.020)		0.035* (0.018)
Neuroticism		0.037 (0.035)		0.001 (0.010)		0.009 (0.018)		0.004 (0.018)		0.030* (0.015)
Constant	-0.073 (0.144)	-1.770** (0.764)	0.189*** (0.048)	0.005 (0.354)	0.343*** (0.072)	-0.519 (0.350)	0.099*** (0.019)	-0.042 (0.281)	0.245*** (0.063)	-0.631** (0.284)
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	688	680	688	680	688	680	685	677	688	680
Adj. R-squared	0.014	0.105	0.025	0.048	0.025	0.132	0.007	0.040	-0.003	0.058

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Clustered standard errors in parentheses.

Table A.20: Additional Regression on Big5 Measures - Subjective Over-Indebtedness

	Subj. Index		Debt Position		Diff. Pay off Debt		Sacrifice Index	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Very Negative	0.123 (0.113)	0.165 (0.120)	0.043 (0.106)	0.030 (0.101)	0.084 (0.069)	0.082 (0.078)	0.118 (0.106)	0.259** (0.104)
Negative	0.118 (0.157)	0.097 (0.137)	0.056 (0.122)	-0.004 (0.127)	0.072 (0.082)	0.063 (0.066)	0.108 (0.174)	0.150 (0.159)
Neutral	-0.038 (0.124)	-0.036 (0.107)	-0.029 (0.089)	-0.028 (0.083)	0.014 (0.070)	0.018 (0.065)	-0.098 (0.128)	-0.104 (0.106)
Positive	0.131 (0.084)	0.155* (0.086)	0.088 (0.074)	0.116 (0.072)	0.066 (0.053)	0.073 (0.054)	0.113 (0.120)	0.129 (0.117)
Openness		0.112*** (0.034)		0.071* (0.037)		0.059*** (0.015)		0.101** (0.047)
Conscientiousness		-0.009 (0.055)		-0.005 (0.050)		-0.022 (0.034)		0.023 (0.060)
Extraversion		-0.081* (0.043)		-0.055 (0.036)		-0.042 (0.027)		-0.070* (0.038)
Agreeableness		0.009 (0.040)		0.022 (0.042)		-0.000 (0.022)		-0.009 (0.048)
Neuroticism		0.089** (0.040)		0.036 (0.032)		0.033 (0.027)		0.138** (0.048)
Constant	-0.087 (0.093)	-1.560* (0.765)	-0.056 (0.085)	-2.115*** (0.664)	1.324*** (0.047)	1.057** (0.429)	-0.131 (0.111)	-0.905 (0.970)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	688	680	688	680	686	678	688	680
Adj. R-squared	-0.001	0.112	-0.004	0.090	-0.003	0.063	-0.001	0.106

Note: *, **, and *** denote significance at the 10, 5, and 1 percent levels. Clustered standard errors in parentheses.

II Description of Variables

Debt Indices

Objective Over-Indebtedness Index

It contains the equally weighted average of z-scores of four debt indicators. The procedure of aggregating these specific outcomes is adapted from [Kling et al. \(2007\)](#). It “improves statistical power” and helps “to detect effects that go in the same direction” among indicators ([Kling et al., 2007](#), p.89). The objective over-indebtedness index captures households with a debt service to income ratio greater than 40%, a remaining debt service to income ratio greater than 40%, households, who defaulted on a loan or paid late in the last 12 months and households with more than two loans. The literature has defined (kind of arbitrary) thresholds for the DSR indicator beyond which a household is over-indebted. A household is deemed over-indebted, for example, if its DSR exceeds - depending on the study - 0.3 to 0.5 ([Chichaibelu and Waibel, 2017](#)). Hence, we set the over-indebtedness threshold at a DSR of 0.4 following what we deem is best practice among researchers ([Georgarakos et al., 2010](#)).

Subjective Over-indebtedness Index

It contains the equally weighted average of z-scores of three debt indicators: the standardized sacrifice index and two assessments on whether the household has too much debt and whether it has difficulties paying them off.

Debt Measures

Debt Service to Income Ratio

It is the ratio of all annual interest and principal payments on loans divided by all annual income generating activities of the household.

Debt Position

The question on whether the household has too much debt right now is asked twice in almost identical fashion to check for response consistency. For this reason, we combine both questions and calculate their mean. The exact formulation of both questions is the following: “I have too much debt right now” (Disagree fully, disagree strongly, disagree a little, neither agree nor disagree, agree a little, agree strongly, agree fully) and “Which of the following best describes your current debt position?” (I have too little debt; I have about the right amount of debt; I have too much debt right now.).

Difficulties to Pay Off Debt

Categorical question with answer options 1-“I have no difficulties paying off my debt”, 2-“I have some difficulties [...]”, and 3-“I have a lot of difficulties [...]”.

Remaining Debt to Income Ratio

The ratio relates a household’s actual, yearly debt burden to the average income of 2016 and 2017.

Sacrifice Index This index is adapted by [Schicks \(2013\)](#), which asks for several sacrifices households may make because they lack money. Like them, we combine these indicators into one “sacrifice index” applying polychoric principal component analysis such that a continuous index is created giving more weight to more serious sacrifices people have to make and transforming the categorical responses into a continuous measure ([Kolenikov and Angeles, 2009](#); [Smits and Günther, 2017](#)). In total, we ask respondents about ten possible sacrifices both for a shorter term (i.e. twelve months) and for a longer term (five years). Unlike [Schicks \(2013\)](#), we do not pose questions about the acceptability of sacrifices made but ask only for the frequency of distress events that occurred in the household. We added two questions introduced by [Smits and Günther \(2017\)](#) and two new questions that are more context-specific to the rural setting in North-East Thailand. Depending on the question asked, respondents could answer on a scale from 1-3 (e.g. had to work much more, more, not more) or from 1-5 (e.g. had to buy less food: never, sometimes, regularly, often, almost always, always).

Forecast Errors

Quantitative Forecast Error Relative change between expected median income from the probabilistic expectations elicitation and the actual income in 2017.

Qualitative Forecast Error Difference between expected income in 2016 and actual welfare of the household as evaluated in 2017.

Expectation Measures

Actual welfare of the household Answer to “Do you think your household is better off than last year?”, from 1- “much worse off” to 5- “much better off”.

Certainty Answer to “How certain are you that this income development will truly become reality?”. The scale ranges from 1- “Very uncertain” to 4 “Very certain”.

Expected income Answer to “How do you think your average monthly income will develop in the next twelve months?”, from 1- “Decrease a lot” to 5- “Increase a lot”.

Probabilistic expectations Probabilities assessing how individuals assess future outcomes.

**Experiment
Measures**

Treatment	1=Hard Quiz, 2=Easy Quiz.
Expected Rank	Rank that participant expects to reach after taking the test quiz from 1-“Least questions answered correctly” to 10-“Most questions answered correctly”.
Number of Goods	Amount of goods participant wants to buy.
Overconfidence	Difference between expected and actual rank of participant.
Overborrowing	Dummy variable, that takes the value 1 if participant wants to buy more than earnings including endowment can pay for.
Overspending	Dummy variable, that takes the value 1 if participant wants to buy more than earnings excluding endowment can pay for.
<hr/>	
Controls	
Age	Age of respondent in years.
Age Squared	Squared term of age.
BMI	Respondent’s Body Mass Index as of 2017.
Financial Decision Maker	Answer to question “Who is responsible for making day-to-day decisions about money in your household?” where means 1-“Myself”, 2-“Myself and someone else” and 3-“Someone else”.
Financial Literacy Score	Our index is based on seven questions eliciting financial knowledge, on nine assessments concerning financial behavior, and on three questions regarding financial attitude. The overall index is composed of the sum of the sub indices and ranges between 0 and 22 with higher numbers indicating a higher level of financial literacy.
Financial Risk Taking	Answer to “Attitudes towards risk change in different situations. When thinking about investing and borrowing are you a person who is fully prepared to take risk or do you try and avoid taking risk?”, from 1-“Fully unwilling to take risks” to 7-“Fully willing to take risks”.
Health Status	Health status of the respondent in 2017: 1-“Good”, 2-“Can manage”, 3-“Sick”

Main Income Dummies	We include four income dummies that tell us whether the main income comes from farming, off-farm employment, self employment or remittances.
Marital Status	Respondent's marital status: 1-"Unmarried", 2-"Married", 3-"Widow", 4-"Divorced/separated".
Monthly Inc. 2017	Monthly household income in 2017
Number of children	This variable is split in three age categories for the analysis. Number of children aged 0-6 years; Number of children aged 7-10 years; Number of children aged 11-16 years.
Number of Elders	Number of elder household members, defined as people older than 60 years.
Shock loss indicators	We include information on monetary losses from various shock events for 2016 and 2017. We hereby separate by five shock categories: Farming Shocks, Environmental Shocks, Economic Shocks, Crime Shocks, Other Shocks.
Number of Working Members	Number of working household members.
Numeracy	The numeracy index is based on six questions about simple arithmetic problems. It ranges between zero and six. Zero, if the respondent does not give any correct answer and six if the respondent gives only correct answers.
Optimism	We use the "Reevaluated Life Orientation Test" (LOT-R) of Scheier et al. (1994) and add up the Likert-Scale answers to one score. The scale ranges from 1-"Disagree fully" to 7-"Agree fully". The final score ranges from 1 to 23 where higher numbers indicate a higher level of optimism.
Relation to HH Head	Respondent's relation to the household head: 1-"Head", 2-"Wife/Husband", 3-"Son/Daughter", 4-"Son/Daughter in law", 5-"Father/Mother", 8-"Grandchild", 9-"Nephew/Niece", 11-"Other relatives".
Risk Aversion	Equally weighted average of risk taking and financial risk taking.
Risk Taking	Answer to "Are you generally a person who is fully prepared to take risks or do you try to avoid taking risk?", from 1-"Fully unwilling to take risks" to 7-"Fully willing to take risks".

Self-Control	We use the questions introduced by Tangney et al. (2004) and add up the Likert-Scale answers to one score. The scale ranges from 1-“Disagree fully” to 7-“Agree fully”. The final score ranges from 0 to 49 where lower numbers indicate a higher level of self-control.
Sex	Sex of respondent: 1-“Male”, 2-“Female”.
Total HH Education	Sum of years all working household members went to school.
Years of Schooling	Years respondent went to school.
Big Five - Personality Traits	
Agreeableness	A person, who scores high on Agreeableness (Item scale ranges from 1 to 7 for all items) has a forgiving nature, is considerate and kind and not rude to others.
Conscientiousness	A person, who scores high on Conscientiousnes does a thorough job, works efficiently and is not lazy.
Extraversion	A person, who scores high on Extraversion is communicative, talkative, outgoing and not reserved.
Neuroticism	A person, who scores high on Neuroticism worries a lot, gets nervous easily and is not relaxed.
Openness	A person, who scores high on Openness values artistic experiences, is original and has an active imagination.
Additional Controls Experiment	
Difficulties in Game	Answer to “Did the respondent have difficulties answering questions?” with 1-“Not at all”, 2-“Yes, a little bit”, 3-“Yes, very much”. Filled in by the enumerator.
Morning	Dummy variable that takes the value 1 if the interview took place in the morning, i.e. before 11am.
Midday	Dummy variable that takes the value 1 if the interview took place around noon, i.e. between 12am and 2pm.
Read Alone	Dummy variable that takes the value 1 if the participant could read the experimental instructions without help. Filled in by the enumerator.

III Experimental Material

Material II.i: Instructions Experiment

Experiment Script

Read out:

We want to play a market game with you. In this game you can earn money and buy goods. The kind of goods you can buy are placed right next to you. Each piece has a value of 20 THB, but we offer them to you for a discounted price of 10 THB. You don't have to buy one kind of product, but can buy different kinds (for example 2 chocolate bars and 1 bag of chips). If you don't like to buy anything you can keep the money you earn.

To earn money, you have to play a quiz which consists of 15 questions. 10 persons from another village, which is similar to your village, took the same quiz before. The amount of money you earn is dependent on how many questions you answered right in comparison to these villagers. In this picture, the person who has given the most correct answers is ranked 10, the person who has given the second most correct answers is ranked 9, the person who has given the third most correct answers is ranked 8, and so on. In the picture you can also see how much money you will earn dependent on your ranking. For example, if you are ranked 7 you will earn 20 THB. Please take your time to understand how you can earn money in this game.

[Show picture of ranks, payoffs and people]

I want you to ask some test question to check whether the procedure of the ranking is clear to you. If not, I will explain it again.

Test Question 1: What does it mean to be ranked 6? [Open answer; enumerator please continue if you think the respondent gave a correct answer]

Test Question 2: How much money do you earn if you are ranked 6? [Answer: 10 THB]

Test Question 3: How many goods you can buy for 10 THB? [Answer: 1]

The money you earn, will be put on your game account which already has 40 THB in it. As you can see from the picture, you can earn up to additional 40 THB. The quiz for which you will receive money will be played in the second round.

In the first round, you will get 7 test questions, which are very similar to the questions you will get in the second round. But again, you can ONLY earn money in the second round.

After you answered this first set of questions, you have to decide how many goods you want to buy. The 40 THB that are already in your account are given you as a credit that you can use to buy the goods. With the money you earn in the second round in the quiz you will pay back your credit. If you spend more money than you earned we will keep the money from your account and give you the goods you have bought. If you earned more than you bought, you pay back your credit and can keep the rest of the money and goods.

If you don't have any further questions we start with the first round. [FAQ]

[Hand respondent the first quiz (green paper). If respondent cannot read, assist in all tasks]

Please read through the questions on the green sheet of paper and try to answer as many questions as you can. You have 5 minutes to answer the questions. I will tell you when the 5 minutes are over. After you have finished the quiz, please have a look on the white piece of paper and answer these questions and make your buying decision. When you have finished the first round, I will collect the white piece of paper. You can keep the green paper with the test quiz. It is only for you, so that you know what kind of questions to expect in the quiz of the second round.

[Set your alarm clock to 5 minutes and tell the respondent to start]

The 5 minutes are over. Please, stop answering the test quiz and make your decisions on the white sheet of paper. Give me a sign when you have made your decisions, then I will collect the white paper.

[During the time the respondent takes the second quiz, evaluate the white sheet of paper and enter the numbers on the tablet]

Now, in the second round, you play the quiz that decides how much money you earn. You have 10 minutes to answer the questions. Afterwards, I will collect the quiz, calculate your earnings and hand you the goods and money.

[Hand the second quiz, set your alarm clock to 10 minutes and tell respondent to start]

The time is up. Please, hand me the second quiz. Before we conclude, I have some final questions for you.

Question 1: After taking the quiz, when 1 is the villager who gave the least correct answers and 10 is the villager who gave the most correct answers, where do you see yourself in this picture?

Question 2 [Only ask if expected earning of respondent was smaller than 40 THB]: Would you have buy more goods, if you thought your earnings would be higher?

Question 3 [Only ask if expected earning of respondent was more than 0 THB]: Would you have buy less goods, if you thought your earnings would be lower?

Thank you very much for your participation, we hope you enjoyed the game. I will now calculate your earnings and inform my STL which will bring you your payment and goods.

[Calculate rank, earnings and cash/goods payoff. Wait for STL to hand the money/goods]

{In the very unlikely case, that more goods were wanted than earnings are generated:}

I calculated your earnings and you cannot afford all the goods you want to buy. You want to buy [...] goods but can only afford [...] goods. Please, choose which goods you want to keep.

[Please note which goods were finally kept]

Material II.ii: Guideline for Interviewers to Answer Questions from Participants

Frequently Asked Questions

Respondent: "What if I don't want to buy anything?"

You: "You don't have to buy anything, you can also keep the money."

Respondent: "Can I spend all my money on buying products?"

You: "Yes you can, but if you do not earn enough money to pay all the products you wanted to buy, you will only get the part of the products you can afford."

Respondent: "Can I change my buying decision after I took the second quiz?"

You: "No, your decision is fixed. Only in the case where you wanted to buy more products than you have money available, you can decide on which products to keep"

Respondent: "What happens if I spend more money on products than I earn?"

You: "Then we will take the money from the 40 THB that are already on your virtual bank account for the game. If even this is not enough, you only get as many products as you have money. We will NOT take any out of your pocket and we will NOT take money from the 50 THB you get for the questionnaire. We only count the money you get in the game."

Respondent: "Does being on rank 7 means that I need to get 7 questions correct?"

You: "No! It means that three persons have answered more questions correctly than you and six persons have answered less questions correctly than you. The rank is always dependent on how many questions you have correct in comparison to the other 10 villagers. In this case you are as good as the villager who was ranked 7."

Respondent: "Does it make a difference which questions I answer correctly?"

You: "No, all questions count the same."

Respondent: "Do the products really cost 20 THB per piece?"

You: "Yes, if you buy them as presented here, they cost 20 THB."

[Respondent: "What if I don't know the answer to a question at all?"

You: "Just take a guess. You don't receive some sort of minus points for wrong answers."]

Respondent: "What if I cannot finish the quiz in time?"

You: "That is no problem. Please, try to answer as many questions as you can in the given time frame. There will be no minus points for unanswered questions."

Respondent: "Who are the other 10 persons who have answered the quiz before?"

You: "They are just some randomly selected persons from another village, that is similar to your village."

Material II.iii: Quiz-Hard Treatment

Test Quiz

1. What is the biggest city in Canada by population?

- Ottawa
- Vancouver
- Montreal
- Toronto

3. Which animal cannot fly?

- Chicken
- Duck
- Penguin
- Squirrel

5. How many days does Mercury need to orbit the sun?

- 144
- 94
- 88
- 126

7. Which are the Japanese cities that were hit by atomic bombs of the U.S. army during WWII?

- Hokkaido and Kyushu
- Shikoku and Hashima
- Okinawa and Okinoshima
- Hiroshima and Nagasaki

2. What is the most common blood type in the world?

- O positive
- AB positive
- B positive
- A positive

4. Which fruit contains the most amount of Vitamin C per 100g?

- Pineapple
- Mango
- Banana
- Passion Fruit

6. Which animal is not part of the Zodiac?

- Leo
- Pisces
- Dragon
- Scorpio

Quiz



1. What is the national animal of China?

Tiger

Eagle

Lion

Panda

2. If Thai currency is THB, what is the currency of Germany?

Euro

US. Dollar

Pound

Deutsche Mark

3. How many provinces does Japan have currently?

47 provinces

48 provinces

49 provinces

50 provinces

4. Which is the heaviest insect in the world?

Grasshopper

Spider

Beetle

Centipede

5. Which of these countries does NOT border Germany?

Austria

France

Sweden

Poland

6. Which is the most drank beverage in the world?

Coca Cola

Beer

Tea

Coffee

7. Which country is the origin of pizza?

Italy

France

Spain

Portugal

8. Which of these four is the biggest organ of the human body?

Lungs

Heart

Liver

Brain

9. Who is the president of Indonesia?

- Susilo Bambang Yudhoyono
- Joko Widodo
- Abdurrahman Wahid
- Megawati Sukarnoputri

11. Of which colors is the flag of Germany composed of?

- Black, Blue and Gold
- Black, Red and White
- Black, Red and Gold
- Black, Red and Blue

13. What color will you get if you mix blue, red and yellow?

- Grey
- Dark green
- Black
- Brown

15. Who is the God of Islam?

- Nabi Muhammad
- Yahweh
- Allah
- Moses

10. What color is traditionally not associated with Christmas Day?

- Red
- Gold
- Green
- Pink

12. Which fruit is blue?

- Blueberry
- Pear
- Apple
- Kiwi

14. How many seasons are there in Germany? And which ones?

- 4 seasons including spring, summer, autumn and winter.
- 3 seasons including rainy, winter and spring
- 2 seasons including rainy and winter
- 2 seasons including summer and winter

QID:

Material II.iv: Quiz-Easy Treatment

Test Quiz

1. What is the biggest city in Thailand?

Ubon Ratchathani

Chiang Mai

Bangkok

Surat Thani

3. Which animal cannot jump?

Asian Buffalo

Dog

Elephant

Tiger

5. Which of these countries does NOT border Thailand?

Vietnam

Laos

Cambodia

Myanmar

7. What is the most common eye color in the world?

Blue

Brown

Green

Hazel

2. What color will you get if you mix blue and yellow?

Grey

Green

White

Pink

4. Which fruit is prohibited in public transport around South-East Asia?

Banana

Papaya

Durian

Apple

6. Which animal is not part of the Chinese Zodiac?

Monkey

Horse

Cat

Dragon

Quiz



1. What is the national animal of Thailand?

- Elephant
- Eagle
- Lion
- Naga (Thai Dragon)

2. If Thai currency is THB, what is the currency of USA?

- Euro
- US Dollar
- Pound
- Franc

3. How many provinces does Thailand have currently?

- 76 provinces
- 77 provinces
- 78 provinces
- 79 provinces

4. Which is the biggest animal in the world?

- Blue Shark
- Killer Whale
- Blue Whale
- Elephant

5. How many months have 31 days?

- 6
- 5
- 4
- 7

6. How many seasons are there in Thailand? And which ones?

- 3 seasons including summer, rainy and winter
- 2 seasons including summer and rainy
- 2 seasons including rainy and winter
- 4 seasons including summer, rainy, autumn and winter

7. Which of these do you need to make traditional Som Tam Thai?

- Coconut Milk
- Tomatoes
- Oyster Sauce
- Chili Paste

8. Which is the biggest sense organ of the human body?

- Skin
- Eyes
- Mouth
- Ears

9. Who is currently the president of the United States of America?

Donald Trump

Barack Obama

Angela Merkel

Bill Clinton

11. Of which colors is the flag of Thailand composed of?

Green, White and Red

Green, White and Blue

Blue, White and Red

Blue, Red and Yellow

13. Which reign of Thailand abolished slavery?

4th Reign

5th Reign

6th Reign

7th Reign

15. Who is the son of god of Christianity?

Nabi Muhammad

Jesus

Guanyin

Vishu

10. What is the color of the day on Wednesday?

Red

Pink

Green

Light blue

12. Which fruit does not have thorns?

Durian

Jackfruit

Rambutan

Salak

14. Which country has the highest total rice consumption?

Thailan

Germany

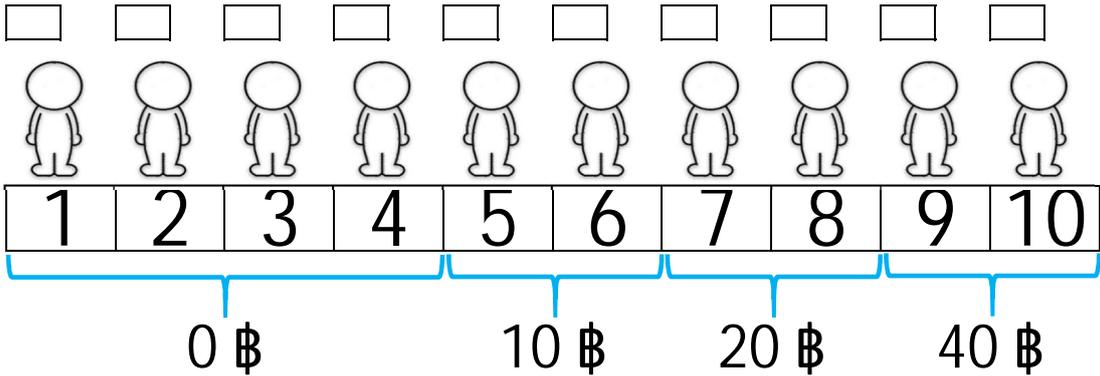
Cambodia

China

QID:

Before you take the second quiz where you can earn money, we have some questions for you and you have to decide which goods and how many you want to buy.

Question 1: As mentioned before, 10 persons from another village took the same quiz as you will have to take now. After taking the test quiz and knowing the second quiz will be similar: When the villager on the left side of this picture is the one who gave the least correct answers and the villager on the right side of this picture is the one who gave the most correct answers, where do you see yourself in this picture? Please cross the respective box.



Question 2: We told you that the money you will earn in the second quiz depends on how you actually are ranked in this picture above. For example if you are ranked 7, which means that 3 villagers gave more correct answers than you and 6 villagers gave less correct answers than you, you will get 20 THB. What do you think, how much money will you earn?

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Question 3: Now, you have to decide how many and which kind of goods you want. You have to think about how much you will possibly earn including your credit and how much you can spend on the goods. You don't have to buy anything at all. But if you want to, remember each piece has a discounted price of 10 THB and you can buy as many different kinds as you want.

Example: You think you are ranked 7, so you earn 40 THB, and you want to buy one pack of coffee and one bag of chips. That will cost you 20 THB. After you have answered the second quiz, we will calculate your earnings.

If you have earned 40 THB for example, we will give you the goods you wanted to buy and additionally 20 THB. All in all, you have two goods then and 60 THB.

If you have earned 10 THB for example, we will give you the goods you wanted to buy and we will deduct 10 THB from the 40 THB credit we gave you. All in all, you have two goods then and 30 THB.

Please indicate here how many of each good you want. If you do not want to buy some kind of good put 0 there:

Coffee	<input type="text"/>	Mango	<input type="text"/>
Chips	<input type="text"/>	Detergent	<input type="text"/>

QID: