



National Bank  
of Ukraine

NBU Working Papers

02/2024

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# The Role of Financial Literacy in Anchoring Inflation Expectations: The Case of Ukraine

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## Abstract

Using survey data from the USAID Financial Sector Transformation Project (USAID, 2021), this paper examines whether or not financial literacy influences households' expectations about future prices and whether or not it anchors inflation expectations to the central bank's target. We find that higher financial literacy lowers average uncertainty about one-year inflation, but increases three-year inflation expectations. The results from quantile regressions confirm the asymmetric effects of financial literacy and its components on inflation. Inverse effects of financial literacy on expected inflation are at work for the upper end of the distribution (unanchored expectations), while positive effects are seen in the lower end of the distribution (anchored expectations). Our findings also suggest that financial literacy significantly improves inflation perceptions and the accuracy of individuals' predictions about inflation. The conclusions from this research are beneficial and have strong policy implications for the central bank's monetary policy.

**JEL Classification Codes:** C81, D80, D82, E31, E52, E58.

**Keywords:** inflation expectations, inflation perceptions, financial literacy, monetary policy.

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## 1. Introduction

Inflation expectations are acknowledged as a key tool of monetary policy for affecting current and future inflation, while changes in expectations show whether or not expectations are anchored to the central bank's inflation target. Economic agents can predict inflation more accurately if they are familiar with the key determinants of inflation and understand how a central bank manages inflation. Given the significant role of inflation expectations in monetary policy, central banks tend to analyze them thoroughly.

To maintain price stability central banks need to understand which factors drive inflation expectations and recognize the source of unanchored expectations. Unanchored inflation expectations can be explained by a lack of trust in the central bank and the banking system in general, or by the low financial literacy of economic agents, who are not aware of how the central bank controls prices.

Some recent findings in the empirical literature offer evidence that current inflation and inflation expectations are explained by specific economic or financial knowledge rather than by general educational attainments or income (van der Crujisen et al., 2021). Concerned about low saving propensity and potential financial vulnerability research studies on the role of financial knowledge first pay attention to the measurement of financial literacy and show that financial literacy can be considered as a strong predictor of wealth (Lusardi and Mitchell, 2007). Clark et al. (2017) argue that financial literacy yields better investment as more financially literate people earn higher risk-adjusted returns on their investments. More financially literate people are shown to manage their debt better (Lusardi et al., 2020). Related literature also took considerable efforts to explain some of the demographic, gender, and age differences in financial literacy that shape financial decision-making (Hsu, 2016; Driva et al., 2016; Finke et al., 2017; Klapper and Lusardi, 2019; Muñoz-Murillo, et al., 2020).

Recent works on financial literacy and inflation in both the US and Europe draw attention to the potential of financial literacy to restrain inflation expectations and hence affect prices (Rumler and Valderrama, 2020; Yakoboski et al., 2023; Beckmann and Kiesl-Reiter, 2023; Coibion et al., 2022).

Despite inflation being what people know best among the fundamental financial concepts (Beckmann and Kiesl-Reiter, 2023), there is still scarce evidence on the potential influence of financial literacy on inflation in emerging markets, where the problem may be even more acute because they have less developed financial sectors and exhibit lower literacy levels (Hastings et al., 2013; USAID, 2021). A volatile environment in such countries complicates effective

communications, as a result of which inflation targeters face greater obstacles on the way to gaining credence and anchoring expectations.

Note also that the inflation expectations of economic agents, both professional forecasters, and households, have so far been much less studied due to the lack of the required data. Moreover, so far the related literature has paid little attention to such an essential feature of expectations as the skewness of inflation expectations, which becomes more relevant in volatile markets. This skewness indicates a key problem for inflation-targeting central banks – the unanchored inflation expectations of economic agents.

The goal of our research is to present further evidence of the significant role financial literacy plays in anchoring inflation expectations in emerging markets. We employ microdata from a representative survey of Ukrainian households conducted by Info Sapiens in 2021 on behalf of USAID, to test whether or not a higher level of financial literacy could help lower expectations about price growth, especially for those households whose inflation expectations are above the central bank's target. We also aim to examine whether or not higher financial literacy or its components translate into better inflation perceptions and more accurate inflation forecasts in the case of an emerging market.

Our empirical analysis engages a set of different, but complementary methods. First, to address possible endogeneity issues we use the 2SLS and IV approach to learn how households perceive current inflation, and how their short-term inflation predictions deviate from the consensus forecast. Second, to gain deeper insights into the process of forming anchored inflation expectations, we use quantile regression techniques, which are more appropriate than a standard linear regression in the case of the skewed distributions attributed to emerging markets. Such a combination of different estimation techniques allows us to focus on the questions that are relevant to a central bank's monetary policy under shocks and raised uncertainty.

This paper additionally investigates the following issues. First, to obtain consistent estimates and conclusions it is important to find out if the relationship between financial literacy and the inflation rate may suffer from reverse causality or potential endogeneity caused by potential measurement error or unobserved variable bias. Consumers in developing markets may struggle with high inflation more frequently and such experience can contribute to financial literacy.

Second, the effects of asymmetric information in emerging markets could distort inflation perceptions and prevent economic agents from making accurate forecasts. Therefore, given high uncertainty, distributions for individual assessments or predictions and the accuracy of forecasts

are more likely to be skewed. Under such circumstances, central banks face greater difficulty with anchoring consumers' expectations and, as a result, a careful study of the impact of extreme values on the outcomes will be of interest to them.

Third, as our analysis is closely related to the anchoring of inflation expectations, it is crucial to learn whether individual trust in banking institutions contributes to reducing inflation perceptions and expectations, despite the specific features of emerging markets (Christelis et al., 2020).

Our main takeaways can be summarized as follows. This research confirms there are inflation expectations anchoring in the short-run period, but the link is not uniform across different percentiles of the distribution. Specifically, we find that higher financial literacy and confidence in the banking sector significantly decrease one-year inflation expectations. These relationships work mainly at the higher percentiles of the distribution of inflation expectations, which are unanchored to the central bank's target.

In contrast, over the medium-term horizon, consumers with higher financial literacy predict significantly higher prices in three years, setting an additional risk premium to their forecasts for the longer period of prediction. It is also worth noting that financial literacy significantly increases inflation expectations solely for the percentile of the distribution of expectations that is close to the central bank's target. Trust in banks reduces three-year inflation expectations, but the respective estimated coefficients vary across different percentiles and remain highly significant.

Financial literacy also contributes to inflation perceptions and improves the accuracy of individuals' predictions about future prices. The refinement effects generated by financial literacy are observable at the upper end of the sample distribution where inflation expectations are considered as unanchored. Note that different components of financial literacy (such as financial attitude, financial knowledge, and financial behavior) improve accuracy, and are very important at different percentiles.

The paper proceeds as follows. Section 2 presents the data set, while Section 3 describes our empirical methodology. Section 4 reports estimation results, together with several robustness checks. And Section 5 concludes.

## 2. Data

This study employs data obtained from a nationwide statistically representative survey of financial literacy and financial inclusion in Ukraine, which was carried out according to OECD methodology in August 2021 as part of the USAID Financial Sector Transformation Project and in cooperation with the National Bank of Ukraine (the NBU). The OECD report describes the methodology and contains actual survey questions.<sup>3</sup> USAID required survey agencies to have an original full sample of 1,700 valid contacts (individuals), while also allowing the survey agencies to form larger sample sizes if they wanted to increase the precision of their estimates.<sup>4</sup> In contrast to the OECD research, this study analyzes a full representative sample to account for the impact of outliers, and to learn the asymmetric impact of financial literacy on inflation expectations. However, we winsorize dependent and key variables of interest at the top and bottom 1% of the observations to mitigate the influence of outliers, while running OLS regressions.

This survey evaluates financial literacy, financial inclusion, and financial well-being in Ukraine in 2021 and reports significant differences in financial literacy by age, place of residence, education, and income, but no differences by gender. The survey concludes that Ukrainians have a lower income and, therefore, suffer from greater financial stress in comparison to their peers in more advanced countries (USAID, 2021).<sup>5</sup>

Anonymized individual survey responses cover questions to evaluate financial literacy and its components: financial attitudes, financial knowledge, and financial behaviors related to budgeting, planning, and managing finances. The financial literacy score in Ukraine had increased by 6.0% in less than 3 years and equaled 12.3 points in 2021 (58% of its maximum value according to OECD methodology). USAID emphasized that all components of the indicator had improved since the previous round of the survey. Meanwhile, the growth rate of the financial literacy score in the countries for comparison that participated in the OECD surveys in 2016 and 2020 (Georgia, Estonia, Poland, Russia, Hungary, Croatia, and the Czech Republic) amounted to only 2.4%.

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<sup>3</sup> OECD (2022). OECD/INFE Toolkit for Measuring Financial Literacy and Financial Inclusion 2022. Retrieved from [www.oecd.org/financial/education/2022-INFE-Toolkit-Measuring-Finlit-Financial-Inclusion.pdf](http://www.oecd.org/financial/education/2022-INFE-Toolkit-Measuring-Finlit-Financial-Inclusion.pdf) (accessed 18 October 2022).

<sup>4</sup> The survey is representative of adults aged between 18 and 79 in Ukraine. In order to make international comparisons and to analyze the representativeness of national data by key socio-demographics, such as gender and age, survey agencies randomly drew 1,000 participants (the minimum sample size) for interview.

<sup>5</sup> The countries for comparison were selected according to the following four criteria: 1) the presence of the country in two OECD studies on financial literacy (2016 and 2020); 2) its index of financial development being less than 0.5; 3) being located in Europe; 4) having a lower-middle, upper-middle or high level of GDP per capita according to World Bank methodology.

Similarly, Ukraine came close to those countries in percentage terms compared to the maximum (60%).

On the NBU request, the USAID 2021 survey also includes a set of open-ended extra-questions about individual perceptions of the current inflation rate and inflation predictions for short-term (one year) and medium-term (three years) horizons. Specifically, the respondents were asked additionally:

- (1) How much do you think the prices of consumer goods and services have changed over the past 12 months?
- (2) How do you think the prices of consumer goods and services will change in the next 12 months?
- (3) How, in your opinion, will the prices of consumer goods and services change in the next 3 years?

The latter parts of the questions allow us to investigate how financial literacy or its specific components link to past and future inflation. In particular, this research explores perceptions of the current inflation rate, short-term (one year) and medium-term (three years) inflation expectations, as well as the accuracy of short-term predictions. For this aim, we analyze the variations of four dependent variables, with two of them being the absolute deviations of individual perceptions or forecasts from the value of present inflation, or the consensus inflation forecast respectively. The descriptive statistics for the variables used in this analysis are shown in Table 1 (Appendix A). Note that the distributions of all dependent variables mentioned above are skewed because the mean and median values are significantly different.

Inflation perceptions deviate from the actual inflation rate by about 14%, with some respondents allowing extremely high deviations of up to 90%. The accuracy of one-year predictions estimated from the consensus forecast over the one-year horizon becomes even worse (more than 14%) and has a higher range of deviation. It is crucial to note that all dependent variables demonstrate a significantly right-skewed distribution, which indicates there are problems with unanchored expectations (see Appendix B: figures 1-4).

Approximately 30% of the sample live in the countryside and about 30% reside in big cities. The average respondent is 45 years old, earns circa UAH 6,600, and tends to save about 9% of their income, while only 10% of the sample trust the banking system.

In Table 2 (Appendix A) we split our full sample and focus on the characteristics of those subsets that have extreme inflation expectations – below the 25th percentile (corresponding to anchored



expectations) and over the 75th percentile (corresponding to unanchored expectations). We use the nonparametric Wilcoxon rank-sum of z-statistics to test the differences between the groups. Note that the key characteristics of the subsamples differ significantly. Individuals with lower inflation expectations and who are likely to have anchored expectations have a higher monthly income (UAH 7,781 vs UAH 6,080), and are more prone to avoid risk, yet have more investment experience despite being considerably younger (42 vs 47 years old on average). They are better educated and demonstrate higher financial literacy.

### 3. Methodology

#### 3.1. Dealing with Skewed Distributions

This paper employs a set of complementary methods to explore perceptions of current actual inflation and the determinants of individuals' inflation expectations. Following other empirical papers in the field, we begin with OLS estimates, while also paying special attention to some essential issues that prevent hypothesis testing and could lead to inconsistent inferences. One of the key assumptions of linear regression is that residual errors would follow a normal distribution. Meeting this requirement when a continuous variable is skewed requires the log-transformation of the variable of interest and the subsequent transformation of the linear regression of the transformed variable. As can be seen from Figures 2 and 3 (Appendix B), the distribution of inflation expectations is positively skewed but looks approximately normal after log-transformations.

Outcomes like those that we might obtain in the case of inflation perceptions and inflation deviations from the consensus forecast show right-skewed distributions with a number of zero values (Appendix B: figures 4, 5). A considerable number of zero observations in similar data sets prevent the similar transformation of the distribution into a normal one because the log of zero is undefined. Thus, when the outcome has many zero values, a log-linear regression could be infeasible in practice.

These features of the distributions make simple linear regressions inefficient. The common practice of running linear regressions of the log of one plus the outcome allows for the retention of observations with zero-valued outcomes but produces biased estimates (frequently with the wrong sign), and hence makes interpretations unclear (Cohn et al., 2022).<sup>6</sup>

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<sup>6</sup> Cohn et al. (2022) identify specific sources of bias of regressions with one plus outcome transformation and demonstrate that their drawbacks have a practical importance for empirical researchers.

Rather than relying on a linear regression of a transformed variable to get consistent estimates, researchers can use other models that can also account for outcomes with zero values. For example, the Poisson regression (generalized linear model), which aims at modeling count data, works well even when the outcome variable is continuous or exhibits many zero values (Santos Silva and Tenreiro, 2011). However, in certain circumstances, zero-inflated models or censored regressions produce more efficient estimates in comparison to the Poisson model.

Given the potential endogeneity that could be caused by the educational effect of frequent and excessive inflation combined with the higher uncertainty attributed to less developed emerging markets, it looks reasonable to apply estimation techniques that allow endogeneity concerns to be addressed.

### 3.2. Endogeneity Issues and the IV Approach

The relationship between financial literacy and inflation may suffer from endogeneity issues, which could arise due to omitted variables or reverse causality, and could bias OLS estimates.

This study applies the IV technique and estimates the following regressions:

$$y_i = \alpha_0 + \alpha_1 FL + \sum_{j=1}^k \gamma_j X_j + \varepsilon_i \quad (1)$$

$$FL_i = \beta_0 + \beta_1 risk\_aversion + \beta_2 experience + \sum_{j=1}^k \gamma_j X_j + \vartheta_i \quad (2)$$

where  $y_i$  corresponds to one of the four dependent variables: (1) expected inflation for respondent  $i$  in one year, or (2) expected inflation for respondent  $i$  in three years; (3) individual inflation perceptions; (4) the deviation of expected inflation from the consensus forecast for respondent  $i$  in one year.

$FL_i$  refers to the key variable of interest to us – the level of the inflation literacy of individual  $i$ ;  $X_j$  contains control variables, which could potentially influence the current or future inflation rate; and  $\varepsilon_i$  is an i.i.d. referring to the error term. The controls are respondents' sociodemographic characteristics, like age, sex, marital status, and residence. Note that we also add trust in financial institutions (banks) as a control variable.

The relevance of the endogeneity issue in the regressions, which is estimated using the instrumental variables technique, is determined by making a Hausman test. The null hypothesis of this test assumes that any endogeneity of independent variables would not have any harmful influence on OLS estimates and that the OLS estimator would produce consistent estimates.

To address endogeneity concerns, our main task is to find valid instruments that correlate with financial literacy (financial attitudes, specific financial knowledge, and financial behavior) after all exogenous controls have been accounted for, but are unlikely to have any direct effect on inflation expectations. These instruments should be relevant but not correlated with the errors of the second-stage regressions. For this aim, we exploit the variations in the key components of human capital, such as fraud resistance, and gained investment experience to instrument financial literacy.

Lusardi et al. (2017) offer a model, where financial knowledge (a key component of financial literacy) is seen as a human capital investment. The idea is that individuals accumulate financial knowledge through direct investment in financial education or through “learning-by-doing” over their life cycle. In addition, it is worth keeping in mind that higher risk aversion is associated with better financial literacy (Davoli and Rodríguez-Planas, 2020; Riepe et al., 2022). Based on the above findings, we construct instruments that could be good at modeling financial literacy but do not determine the inflation rate directly.

The first instrument, which measures individual risk aversion, should be positively associated with attained education, but negatively related to credulity or to superstition. Note that Lusardi et al. (2017) believe that better-educated individuals have the most to gain from investing in financial knowledge. Hence, the first instrumental variable for financial literacy is constructed as the highest attained education level minus the number of cases where respondents became victims of financial fraud.<sup>7</sup> The number of fraud cases (over the last two years) is obtained from questionnaires (see Appendix C).

The second instrument represents individual investment experience (see Appendix C), which is most likely relevant because the acquisition of such experience covariates with financial literacy. Both instruments mentioned above are based on past individual experiences related to the formation of human capital while using past values boosts the validity of the instruments. To test the under-identification assumption and the validity of our instruments, we use the Kleibergen-Paap rk LM statistic and the Hansen test for overidentifying restrictions respectively.

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<sup>7</sup> Cappellari et al., 2017; Thomas and Spataro, 2018; Lusardi, 2019 use the highest attained education level of respondents to instrument financial decision making.

### **3.3. The Asymmetric Effects of Financial Literacy. The Quantile Regression Framework**

In the context of this study, it is crucial to investigate more precisely households that have enormous inflation expectations, as well as those whose predictions are anchored to the central bank target. However, using the traditional OLS method in this case could pose a risk that such observations would be dismissed as outliers. To tackle this problem, researchers can introduce the segmentation of the response variable into subsets according to the unconditional distribution and then apply the OLS technique. An alternative approach, which relies on the quantile regression method, appears more preferable (Koenker and Hallock, 2001; Kaplan and Sun, 2017; Kaplan, 2022). Estimating linear models using quantile regressions could be preferable to the usual regression methods for several reasons. First, quantile regression results are characteristically robust to outliers and heavy-tailed distributions. Second, the quantile regression technique avoids the restrictive assumption that the error terms are identically distributed over all points of the conditional distribution. Not making this assumption allows us to factor in households' heterogeneity and address the situation where estimated slope parameters vary at different quantiles. Thus, having skewed or not normally distributed variables is another reason for using quantile regression methodology. The value of the estimated parameters varies over the conditional inflation rate distribution. The coefficients could be interpreted as a marginal change in regressand at a certain quartile due to a marginal change in a particular regressor.

This study draws on the instrumental variable quantile regression model introduced by Chernozhukov and Hansen (2005). We apply the estimation technique that implements the smoothed estimator suggested by Kaplan and Sun (2017), who demonstrate that smoothing improves statistical accuracy.

## **4. Empirical Results**

### **4.1. The Impact of Financial Literacy on Inflation Expectations**

The correlation matrix is shown in Table 3 (Appendix A). As can be seen, financial literacy is negatively correlated with short-term (one-year) inflation, while being positively correlated with medium-term (three-year) inflation. Even preliminary analysis shows that the potential instruments mentioned above (investment experience and fraud resistance) are associated with financial literacy but not with inflation perception and expectations that justify the choice of these instruments (see Table 2 in Appendix A).

Table 3 demonstrates the estimation results for 1-year inflation expectations. As discussed above, the results in column 1 are obtained for the model, which does not satisfy the OLS underlying

assumptions. In addition, the received value of the variance inflation factor (equals 6) confirms substantial multicollinearity and inefficient estimations.

The estimation outcome provided in column 2 of Table 3 (Appendix A) also looks controversial. Despite the application of logarithmic transformation, which could have mitigated the mentioned problem of inefficiency, the wrong sign of the significant coefficients shows there is a misspecification or an omitted variable, resulting in biased estimates and misleading interpretations.

Finally, after correcting for possible endogeneity we gain results with predicted and significant coefficients for the key variables of interest. The corresponding coefficients for other included fundamental variables are also in line with the literature (see, for instance, Rumler and Valderrama, 2020), and remain highly significant (5% level of significance or better). The Hausman test for endogeneity suggests that the null of exogeneity of financial literacy can be rejected at the 5% significance level, making the IV estimation shown in column (3) preferable in this case. Our instruments are strong enough because both the F-test statistic (72.09) obtained from the first-stage regressions and the t-statistics of the estimated coefficients for employed instruments substantially exceed critical values. In addition, the Hansen J-test (which is used for testing over-identifying restrictions) fails to reject the null hypothesis of joint instrument validity.

Our findings show that a one-point increase in financial literacy leads to a 3.27% decrease in one-year inflation expectations. Another important finding is that trust in banks also reduces short-term inflation expectations, but a one-point increase in credence is associated with a 2.23% drop in expectations. Additionally, the age of respondents affects their expectations of prices in one year. As the model estimates show, one-year inflation expectations increase significantly until respondents reach on average 50.5 years of age, after which expectations start to go down.

In contrast to short-term expectations of future price growth, medium-term inflation expectations (three years) rise as soon as financial literacy starts to increase (see Table 4 in Appendix A). Apparently, consumers with higher financial literacy estimate future price growth more carefully over longer horizons. Note that a log-linear regression (column 2) is advisable here, since the Hausman test fails to confirm endogeneity in the model for three-year inflation expectations. We conclude that a one-point higher financial literacy index implies that a respondent will on average expect 0.93% higher inflation in three years. However, trust in the banking sector still lowers average inflation expectations by 2.54% at the one percent level of significance. Note also that the age of respondents is not a significant determinant of medium-term inflation expectations.

## **4.2. The Impact of Financial Literacy on Inflation Perceptions and Forecasting Accuracy**

The next step of our research is to analyze inflation perceptions and the accuracy of inflation predictions. With that in mind, we model the deviation of perceived inflation from actual inflation for the same period, and the deviation of households' predictions from the one-year ahead consensus forecast.

The considerable number of zero values in dependent variables could adversely affect the results due to the inconsistency of OLS estimations and subsequent conclusions. As discussed above, a censored regression (a Tobit regression) could be a solution in this case; and we apply this regression to estimate inflation perceptions.<sup>8</sup>

We provide regression outcomes for inflation perceptions in Table 5 (Appendix A). It is worth noting that the results are sensitive to the estimation method used. In the case of the Tobit model with endogenous financial literacy, we conclude that each point of financial literacy improves the accuracy of individual inflation perceptions by 1.38%.

As in the case of short-term inflation expectations, trust in banks and respondent age are significant variables for perceiving past prices. However, the place of residence is the most economically significant determinant. Extreme cases, like living in a big city or in a small village, provide households with valuable experience for comprehending past inflation much better.

All of these factors, apart from living in the countryside, also allow consumers to better forecast one-year inflation (Appendix A, table 6). Living in a big city has the greatest importance for predicting one-year price growth. The residents of a metropolis predict inflation more accurately by 31.6%. Financial literacy is the second important contributor to forecast accuracy. The impact of the latter is estimated at about 5.08% of improvement for each point increase in literacy. In addition, trust in banking institutions makes inflation expectations more accurate, by about 2.4%.

## **4.3. The Asymmetric Effects of Financial Literacy and Financial Literacy Components**

The pre-final section of the paper is devoted to an analysis of the possible varying effects that financial literacy and its components could have on inflation perceptions, expectations, and predictions. So far, our results have shown that higher financial literacy can on average lower inflation expectations in the short-term, while increasing inflation expectations over longer horizons. However, these effects may not be symmetric. This effect could be asymmetric across

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<sup>8</sup> See Cameron and Trivedi (2013) for the respective discussion.

the distribution of expected inflation. It could also vary across individuals who have higher or lower expectations about future prices.

To gain a deeper insight into the process of forming potentially unanchored inflation expectations, we employ the quantile regression technique and treat financial literacy as endogenous (Kaplan and Sun, 2017; Kaplan, 2022). This approach is considered more appropriate than the standard linear regression in the case of skewed distributions attributed to highly volatile markets. Such a combination of estimation techniques also has considerable policy implications for central banks that conduct monetary policy with inflation targeting under persistent shocks.

The estimation results of the quantile regressions are presented in Tables 7-10 (Appendix A).<sup>9</sup> To gain the benefits of the quantile regressions we do not screen outliers while processing as we did before when we were using other (OLS) regressions. One should keep in mind that lower percentiles (the lower end of inflation expectation distributions) produce values that are close to the central bank's target and are, therefore, considered to be values with anchored inflation expectations. In contrast, upper percentiles produce exorbitant values and, thus, are treated as a sample with unanchored expectations.

As mentioned above, financial literacy, trust in banks, age, and living in a big city can reduce short-term inflation expectations. However, as can be seen from Table 7 in Appendix A (see also Figure 6 in Appendix B), these effects apply to households that have unanchored inflation expectations with a fifth significance level or even higher (depending on the factors).

Importantly, the results of the quantile regressions confirm a positive link between financial literacy and three-year inflation expectations, albeit for the lower end of the distribution, i.e. for those consumers who have expectations close to the inflation target of the central bank (see Table 8 Appendix A and figure 7 in Appendix B). This is a plausible and justified outcome given that a longer forecasting period implies greater uncertainty and consumers with the highest literacy level tend to be more careful in their predictions and are less certain in their estimates of future inflation (Rumler and Valderrama, 2020). Thus, our study provides findings that the expectations of three-year price growth increase by about 1.12% for every one-point increase in the financial literacy of consumers that have anchored inflation expectations of the 10% level of significance.

What is more, although the influence of trust in banks fades away as expectations get closer to the central bank's target, it remains a significant factor in three-year inflation expectations

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<sup>9</sup> We use individual risk aversion and investment experience to instrument financial literacy.

throughout sample segments. Finally, living in a big city is found to be the most influential determinant of the medium-term expectations of three-year prices.

In terms of inflation perceptions and inflation deviation from the consensus forecast, the lower the percentile, the smaller the deviation from the actual value of inflation and the more accurate the individual forecast respectively. Table 9 (Appendix A) shows the results of the quantile regressions for one-year inflation perceptions (figure 8 in Appendix B). First, it is important to point out that the explanatory power of the models increases for households that predict the highest inflation, and that are most likely associated with unanchored inflation expectations. Almost all variables included in the models (including financial literacy but excluding income) contribute significantly to the inflation perceptions of households with unanchored inflation expectations.

The quality of inflation forecasting mainly depends on living in a city, financial literacy, and trust in banks (listed in order of decreasing economic and statistical significance). These effects are observable for the subsets of respondents with extremely high expectations of short-term price growth (table 10 in Appendix A, figure 9 in Appendix B). Specifically, a one-point increase in financial literacy improves the accuracy of predicted inflation expectations by between 0.97% and 2.03% for the 75<sup>th</sup> and the 90<sup>th</sup> percentiles of the distribution.

Finally, we propose another exercise to enable the better management of inflation expectations via financial literacy. In particular, we split the financial literacy index into its components to better learn their exact impact on price growth perceptions, expectations, and the accuracy of predictions. The subsequent estimation results are shown in Tables 11 to 14 in Appendix A. For the sake of brevity, only estimated coefficients of the key variables that interest us (financial literacy and trust in banks) were kept in the tables. We emphasize that each structural component of financial literacy has an influence on inflation perceptions, expectations, and predictions, and these effects vary in their own ways. The outcomes delivered here are compatible with our early conclusions, strengthen our arguments, and provide data for improving the financial literacy strategy initiated by the National Bank of Ukraine (NBU, 2019).



## 5. Conclusions

This study highlights the role of financial literacy in anchoring households' inflation expectations around the central bank's inflation target. We examine the effects of financial literacy on inflation perceptions and inflation expectations in Ukraine, an emerging market where the central bank was targeting inflation on the eve of Russia's full-scale invasion.

First, we show that in the volatile environment of emerging markets, it is crucially important to account for the skewed distributions of dependent variables. Using a survey that was conducted in 2021 as part of the USAID's Financial Sector Transformation Project, in cooperation with the National Bank of Ukraine, we obtain and transform this available data to discover the problem, and then apply an array of complementary methods (OLS, 2SLS, Tobit, and quantile regressions) to get appropriate coefficient estimates.

Second, the endogeneity arising from the reverse causality between inflation and financial literacy is shown to produce biased estimates, as a result of which the estimation technique needs to be corrected to address this issue. For this purpose, we offer and test a set of instruments (measuring risk aversion and investment experience), which appear to be relevant for gaining financial literacy.

The third part of this study focuses on uncovering the asymmetric effects of financial literacy and its components on individual perceptions and expectations about price growth. The results of the quantile regression analysis make it possible to highlight the role of financial literacy for individuals with anchored and unanchored inflation expectations. We believe that the conclusions drawn in this study would be of benefit to central bank policymakers who target inflation.

More specifically, we find that higher financial literacy, trust in banks, living in a city, and the age of respondents reduce households' expectations about one-year price growth. These findings are generally compatible with the existing literature (van der Cruysen et al., 2015, Rumler and Valderrama, 2020). However, the results of quantile regressions also show the asymmetric influence of financial literacy and corroborate findings that financial literacy reduces expected inflation for unanchored expectations.

Consumers with higher financial literacy, while having lower short-term inflation expectations, expect higher inflation over the three-year horizon, which is rather surprising. Moreover, this effect is only confirmed for the lower end of the distribution, which corresponds to the subset of households with anchored expectations. The latter conclusion can be explained by the fact that

consumers with higher levels of financial literacy tend to be more careful in their estimates of future inflation for longer periods implying greater uncertainty (Rumler and Valderrama, 2020).

Our analysis also shows that financial literacy significantly improves inflation perceptions and lowers average uncertainty about one-year inflation. The results of the employed quantile regressions confirm the varying effects of financial literacy and credence in banking institutions on inflation perceptions and prediction accuracy, but it works only for the upper end of the distribution – consumers with unanchored expectations.

Now that the links between financial literacy and price inflation for anchored and unanchored subgroups have been established, a promising task for future research is an in-depth study of the influence of the structural components of the financial literacy index. This could provide grounds for further developing the NBU's financial literacy strategy, which was first introduced in 2019 (NBU, 2019). We believe that our findings offer valuable evidence of the effects of financial literacy, which could help manage inflation expectations, and thus have quite strong policy implications for central banks that target prices in emerging markets in a turbulent environment.

Given the vital role of credibility in shaping inflation expectations (Savolchuk and Yukhymenko, 2023) and the evidence on the benign effect of the trust in financial institutions on individual inflation expectations provided by this study, from a monetary policy perspective this line of research will gain if the survey on financial literacy will collect extra information on central bank credibility. Moreover, it would be a great deal of promise to explore the impact of financial literacy on exchange rate expectations, since we know about a strong correlation between expectations of exchange rate changes and expectations of inflation over time (Coibon and Gorodnichenko, 2015) and the fact that the exchange rate channel is important for the transmission of monetary policy in Ukraine in wartime (NBU, 2023).

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## APPENDICES

### Appendix A. Tables

**Table 1.** Descriptive Statistics

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
IE1	1,977	21.278	15	16.659	0.9	100
IE3	1,985	37.600	30	26.460	1	100
IP	1,978	13.756	10	17.387	0	90
Deviation from the Consensus Forecast	1,977	14.218	7.5	16.285	0	92.5
Financial Literacy Index (FLI)	1,985	6.506	6	2.961	0	17.5
Financial attitude	1,985	0.601	0	0.710	0	3
Financial knowledge	1,985	1.887	2	1.305	0	6
Financial behavior	1,985	4.019	4	2.069	0	12
Education	1,985	3.122	3	0.784	1	4
Investment experience	1,985	1.268	1	0.567	1	7
Risk aversion	1,985	3.060	3	0.835	-1	4
Trust	1,985	2.744	2	2.088	0	8
Age	1,985	45.372	45	16.066	18	79
Male	1,985	0.462	0	0.499	0	1
Metropolis	1,985	0.307	0	0.461	0	1
Rural area	1,985	0.307	0	0.462	0	1

Notes: *IE1* denotes one-year inflation expectations. *IE3* denotes three-year inflation expectations. *IP* is one-year inflation perceptions. *Education* is the highest attained educational level. *FLI* stands for the *Financial Literacy Index*. *Risk aversion* measures individual risk aversion, which is constructed as the highest attained education level reduced by the number of cases when a respondent became the victim of financial fraud (see Appendix C). *Investment experience* is the number of investment types made by a person in the past (see Appendix C). *Trust* is an indicator that measures trust in financial institutions (banks). *Age* is the age of the respondent, years. *Metropolis* is a dummy variable that takes the value of one if a respondent lives in a big city (more than 700,000 inhabitants). *Rural area* is a dummy variable that takes the value of one if a respondent lives in the countryside.

**Table 2.** Descriptive Statistics: Groups of Anchored Expectations vs Groups of Unanchored Expectations

Variable	Mean	Std. Dev.	Mean	Std. Dev.	Wilcoxon (z)
	Anchored expectations		Unanchored expectations		
IE1	4.946	1.774	45.714	20.134	19.418***
IE3	14.957	14.312	65.456	29.247	17.673***
IP	6.764	12.008	32.098	22.934	15.479***
Deviation from the Consensus Forecast	2.684	1.569	38.214	20.134	19.419***
Financial Literacy Index (FLI)	6.470	3.018	5.915	2.683	-1.777*
Education	3.253	0.768	3.002	0.834	-3.421***
Income	7.781	8.865	6.080	6.782	-1.665*
Investment experience	1.349	0.734	1.173	0.430	-2.864***
Risk aversion	3.217	0.802	2.953	0.876	-3.421***
Trust	3.065	2.174	2.379	2.102	-3.644***
Age	42.059	16.073	47.821	15.603	4.035***
Male	0.467	0.500	0.451	0.498	-0.379
Metropolis	0.355	0.480	0.238	0.426	-2.948***
Rural area	0.201	0.402	0.343	0.475	3.437***

Notes: *IE1* denotes one-year inflation expectations. *IE3* denotes three-year inflation expectations. *IP* is one-year inflation perceptions. *FLI* stands for the Financial Literacy Index. *Education* is the highest attained educational level. *Risk aversion* measures individual risk aversion, which is constructed as the highest attained education level reduced by the number of cases when a respondent became the victim of financial fraud (see Appendix C). *Investment experience* is the number of investment types made by a person in the past (see Appendix C). *Income* is the monthly income per household member. *Trust* is an indicator that measures trust in financial institutions (banks). *Age* is the age of the respondent, years. *Metropolis* is a dummy variable that takes the value of one if a respondent lives in a big city (more than 700,000 inhabitants). *Rural areas* is a dummy variable that takes the value of one if a respondent lives in the countryside.

**Table 3.** Correlation Matrix

	IE12	IE36	IP	devconsensus	FLI	Trust	Inv_experience
IE1	1.0000						
IE3	0.6384	1.0000					
IP	0.6516	0.4680	1.0000				
DevConsensus	0.9956	0.6301	0.6501	1.0000			
FLI	-0.0474	0.0458	-0.0873	-0.0516	1.0000		
Trust	-0.1071	-0.1277	-0.0831	-0.1027	0.1519	1.0000	
Inv_experience	-0.0861	-0.0028	-0.0939	-0.0851	0.3607	0.1284	1.0000
Risk aversion	-0.0722	-0.0324	-0.0826	-0.0684	0.2698	0.1520	0.1576

**Table 3.** One-Year Inflation Expectations

IE1	OLS	OLS <sup>log-tr</sup>	IV
	b/(se)	b/(se)	b/(se)
	(1)	(2)	(3)
FLI	0.0410 (0.146)	0.0093* (0.005)	-0.0327** (0.015)
Trust	-0.6334*** (0.194)	-0.0254*** (0.007)	-0.0223*** (0.008)
Income	0.0305 (0.067)	-0.0011 (0.003)	0.0015 (0.003)
Age	0.3225** (0.139)	0.0166*** (0.006)	0.0202*** (0.006)
Age <sup>2</sup>	-0.0030** (0.002)	-0.0002** (0.000)	-0.0002*** (0.000)
Male	-0.4426 (0.736)	-0.0009 (0.029)	-0.0177 (0.031)
Metropolis	-4.8868*** (1.035)	-0.1994*** (0.041)	-0.1887*** (0.041)
Rural area	0.8821 (0.972)	0.0483 (0.037)	0.0506 (0.037)
Regional dummies	+	+	+
F	8.724	9.660	10.623
N	1,951	1,951	1,951
R <sup>2</sup>	0.064	0.072	
Kleibergen-Paap Wald rk F			72.09***
Hansen Jp			0.586
Hausman $\chi^2$			6.435**

Notes: Robust standard errors are reported in the parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*FLI* stands for the *Financial Literacy Index*. *Education* is the highest attained educational level. *Risk aversion* measures individual risk aversion, which is constructed as the highest attained education level reduced by the number of cases when a respondent became the victim of financial fraud (see Appendix C). *Investment experience* is the number of investment types made by a person in the past (see Appendix C). *Income* is the monthly income per household member. *Trust* is an indicator that measures trust in financial institutions (banks). *Age* is the age of the respondent, years. *Metropolis* is a dummy variable that takes the value of one if a respondent lives in a big city (more than 700,000 inhabitants). *Rural areas* is a dummy variable that takes the value of one if a respondent lives in the countryside.



**Table 4.** Three-Year Inflation Expectations

IE3	OLS	OLS <sup>log-tr</sup>	IV
	b/(se)	b/(se)	b/(se)
	(1)	(2)	(3)
FLI	0.9276*** (0.222)	0.0290*** (0.006)	0.0373** (0.017)
Trust	-1.5571*** (0.277)	-0.0382*** (0.008)	-0.0391*** (0.008)
Income	-0.0671 (0.088)	-0.0023 (0.002)	-0.0029 (0.003)
Age	0.4073* (0.221)	0.0100 (0.006)	0.0088 (0.007)
Age <sup>2</sup>	-0.0035 (0.002)	-0.0001 (0.000)	-0.0001 (0.000)
Male	-0.5820 (1.158)	-0.0090 (0.032)	-0.0040 (0.032)
Metropolis	-8.3214*** (1.616)	-0.2088*** (0.042)	-0.2068*** (0.043)
Rural area	-0.3483 (1.498)	-0.0191 (0.039)	-0.0168 (0.039)
Regional dummies	+	+	+
F	13.119	11.772	10.741
N	1,940	1,940	1,940
R <sup>2</sup>	0.089	0.078	0.077
Kleibergen-Paap Wald rk F			70.05***
Hansen Jp			0.325
Hausman $\chi^2$			0.269

Notes: Robust standard errors are reported in the parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*FLI* stands for the *Financial Literacy Index*. *Education* is the highest attained educational level. *Risk aversion* measures individual risk aversion, which is constructed as the highest attained education level reduced by the number of cases when a respondent became the victim of financial fraud (see Appendix C). *Investment experience* is the number of investment types made by a person in the past (see Appendix C). *Income* is the monthly income per household member. *Trust* is an indicator that measures trust in financial institutions (banks). *Age* is the age of the respondent, years. *Metropolis* is a dummy variable that takes the value of one if a respondent lives in a big city (more than 700,000 inhabitants). *Rural areas* is a dummy variable that takes the value of one if a respondent lives in the countryside.

**Table 5.** Inflation Perceptions

IP	OLS	Tobit	IV-Tobit
	b/(se)	b/(se)	b/(se)
	(1)	(2)	(3)
FLI	-0.2013 (0.138)	-0.1514 (0.161)	-1.3808*** (0.489)
Trust	-0.4185** (0.210)	-0.4992** (0.240)	-0.4173* (0.252)
Income	-0.0297 (0.061)	-0.0554 (0.072)	0.0160 (0.083)
Age	0.4366*** (0.147)	0.5065*** (0.173)	0.5988*** (0.186)
Age <sup>2</sup>	-0.0046*** (0.002)	-0.0053*** (0.002)	-0.0063*** (0.002)
Male	-1.0910 (0.737)	-1.1419 (0.860)	-1.5884* (0.904)
Metropolis	-5.5831*** (1.066)	-6.9990*** (1.241)	-6.5838*** (1.267)
Rural area	-2.5575*** (0.988)	-2.8840*** (1.114)	-2.7544** (1.123)
Regional dummies	+	+	+
F	12.843	12.820	
N	1,962	1,962	1,962
R <sup>2</sup>	0.118		
Uncensored			1,641
Left-censored			321
Wald test of exogeneity			5.61**

Notes: Robust standard errors are reported in the parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*FLI* stands for the *Financial Literacy Index*. *Education* is the highest attained educational level. *Risk aversion* measures individual risk aversion, which is constructed as the highest attained education level reduced by the number of cases when a respondent became the victim of financial fraud (see Appendix C). *Investment experience* is the number of investment types made by a person in the past (see Appendix C). *Income* is the monthly income per household member. *Trust* is an indicator that measures trust in financial institutions (banks). *Age* is the age of the respondent, years. *Metropolis* is a dummy variable that takes the value of one if a respondent lives in a big city (more than 700,000 inhabitants). *Rural areas* is a dummy variable that takes the value of one if a respondent lives in the countryside.

**Table 6.** Deviation from the One-Year Consensus Forecast

DevConsensus	OLS	OLS <sup>log-tr</sup>	IV
	b/(se)	b/(se)	b/(se)
	(1)	(2)	(3)
FLI	-0.0009 (0.143)	0.0088 (0.009)	-0.0508** (0.025)
Trust	-0.5905*** (0.190)	-0.0289** (0.011)	-0.0240** (0.012)
Income	0.0347 (0.065)	-0.0006 (0.004)	0.0031 (0.004)
Age	0.2969** (0.135)	0.0231** (0.009)	0.0289*** (0.010)
Age <sup>2</sup>	-0.0028* (0.001)	-0.0002** (0.000)	-0.0003*** (0.000)
Male	-0.5390 (0.719)	-0.0087 (0.046)	-0.0347 (0.047)
Metropolis	-4.7674*** (1.013)	-0.3262*** (0.064)	-0.3160*** (0.065)
Rural area	0.7598 (0.952)	0.0831 (0.056)	0.0826 (0.056)
Regional dummies	+	+	+
F	8.383	9.597	10.619
N	1,956	1,956	1,956
R <sup>2</sup>	0.061	0.073	0.050
Kleibergen-Paap Wald rk F			72.19***
jp			0.626
Hausman $\chi^2$			4.900**

Notes: Robust standard errors are reported in the parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*FLI* stands for the *Financial Literacy Index*. *Education* is the highest attained educational level. *Risk aversion* measures individual risk aversion, which is constructed as the highest attained education level reduced by the number of cases when a respondent became the victim of financial fraud (see Appendix C). *Investment experience* is the number of investment types made by a person in the past (see Appendix C). *Income* is the monthly income per household member. *Trust* is an indicator that measures trust in financial institutions (banks). *Age* is the age of the respondent, years. *Metropolis* is a dummy variable that takes the value of one if a respondent lives in a big city (more than 700,000 inhabitants). *Rural areas* is a dummy variable that takes the value of one if a respondent lives in the countryside.

**Table 7.** One-Year Inflation Expectations: Quantile Regressions

IE1	(10)	(25)	(50)	(75)	(90)
	b/(se)	b/(se)	b/(se)	b/(se)	b/(se)
FLI	-0.1761 (0.266)	-0.0784 (0.274)	-0.3000 (0.449)	-1.0426** (0.493)	-2.1470*** (0.751)
Trust	-0.1244 (0.110)	-0.1411 (0.112)	-0.2308 (0.155)	-0.5060** (0.249)	-1.3186** (0.631)
Income	-0.0094 (0.045)	0.0001 (0.034)	0.0232 (0.056)	0.0736 (0.111)	0.1269 (0.165)
Age	0.1595* (0.083)	0.1096 (0.085)	0.1734 (0.116)	0.3599** (0.180)	0.6751* (0.391)
Age2	-0.0014 (0.001)	-0.0009 (0.001)	-0.0013 (0.001)	-0.0032 (0.002)	-0.0065 (0.004)
Male	0.0930 (0.431)	0.0356 (0.411)	-0.2431 (0.553)	-1.2643 (0.908)	-2.9143 (2.163)
Metropolis	-0.8558 (1.258)	-1.4834* (0.839)	-3.1129*** (0.736)	-7.5202*** (1.164)	-10.1730*** (3.651)
Rural areas	1.1002*** (0.424)	0.8744* (0.486)	-0.1211 (0.832)	-0.6437 (1.834)	1.2971 (3.566)
Regional dummies	+	+	+	+	+
N	1,983	1,983	1,983	1,983	1,983

Notes: Robust standard errors are reported in the parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*FLI* stands for the *Financial Literacy Index*. *Income* is the monthly income per household member. *Trust* is an indicator that measures trust in financial institutions (banks). *Age* is the age of the respondent, years. *Metropolis* is a dummy variable that takes the value of one if a respondent lives in a big city (more than 700,000 inhabitants). *Rural areas* is a dummy variable that takes the value of one if a respondent lives in the countryside.

**Table 8.** Three-Year Inflation Expectations: Quantile Regressions

IE3	(10)	(25)	(50)	(75)	(90)
	b/(se)	b/(se)	b/(se)	b/(se)	b/(se)
FLI	0.7640 (0.508)	1.1183* (0.613)	1.4659 (1.124)	0.8853 (0.983)	0.2223 (1.164)
Trust	-0.3472* (0.210)	-0.5475** (0.248)	-1.2371*** (0.386)	-2.4977*** (0.501)	-4.6173*** (1.012)
Income	-0.0511 (0.082)	-0.0685 (0.075)	-0.0411 (0.135)	-0.1395 (0.214)	-0.0608 (0.250)
Age	0.0671 (0.162)	0.0756 (0.189)	-0.0989 (0.287)	0.4284 (0.368)	0.5044 (0.640)
Age2	-0.0002 (0.002)	-0.0003 (0.002)	0.0020 (0.003)	-0.0035 (0.004)	-0.0044 (0.007)
Male	-0.1867 (0.863)	-0.5662 (0.919)	-0.0310 (1.321)	0.3392 (1.837)	-5.4911 (3.490)
Metropolis	-0.4508 (2.198)	-2.7727 (1.813)	-7.4251*** (1.818)	-11.6318*** (2.385)	-17.7546*** (6.081)
Rural area	0.3153 (0.870)	-0.6902 (1.087)	-0.6759 (2.056)	0.5560 (3.644)	-2.6522 (5.994)
Regional dummies	+	+	+	+	+
N	1,985	1,985	1,985	1,985	1,985

Notes: Robust standard errors are reported in the parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*FLI stands for the Financial Literacy Index. Income is the monthly income per household member. Trust is an indicator that measures trust in financial institutions (banks). Age is the age of the respondent, years. Metropolis is a dummy variable that takes the value of one if a respondent lives in a big city (more than 700,000 inhabitants). Rural areas is a dummy variable that takes the value of one if a respondent lives in the countryside.*

**Table 9.** Inflation Perceptions: Quantile Regressions

IP	(10)	(25)	(50)	(75)	(90)
	b/(se)	b/(se)	b/(se)	b/(se)	b/(se)
FLI	0.0038 (0.196)	-0.1166 (0.253)	-0.3684 (0.421)	-1.0254** (0.458)	-2.4934*** (0.654)
Trust	-0.0499 (0.083)	-0.1298 (0.104)	-0.3092** (0.147)	-0.5507** (0.225)	-1.4358** (0.585)
Income	0.0001 (0.031)	-0.0081 (0.032)	-0.0033 (0.053)	0.0293 (0.100)	0.1108 (0.145)
Age	0.0190 (0.065)	0.0986 (0.079)	0.1573 (0.110)	0.3322** (0.166)	0.6342* (0.356)
Age2	-0.0001 (0.001)	-0.0009 (0.001)	-0.0014 (0.001)	-0.0033* (0.002)	-0.0069* (0.004)
Male	-0.0891 (0.344)	-0.1747 (0.384)	-0.3169 (0.527)	-2.1326** (0.835)	-3.4621* (1.980)
Metropolis	-0.9110 (0.843)	-1.7389** (0.765)	-3.4225*** (0.685)	-8.2470*** (1.074)	-12.1106*** (3.434)
Rural areas	-0.0555 (0.357)	-0.6560 (0.453)	-2.0269** (0.796)	-4.8455*** (1.641)	-4.5358 (3.382)
Regional dummies	+	+	+	+	+
N	1,987	1,987	1,987	1,987	1,987

Notes: Robust standard errors are reported in the parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*FLI stands for the Financial Literacy Index. Income is the monthly income per household member. Trust is an indicator that measures trust in financial institutions (banks). Age is the age of the respondent, years. Metropolis is a dummy variable that takes the value of one if a respondent lives in a big city (more than 700,000 inhabitants). Rural areas is a dummy variable that takes the value of one if a respondent lives in the countryside.*

**Table 10.** Deviation from the One-Year Consensus Forecast: Quantile Regressions

DevConsensus	(10)	(25)	(50)	(75)	(90)
	b/(se)	b/(se)	b/(se)	b/(se)	b/(se)
FLI	-0.0806 (0.163)	-0.0533 (0.221)	-0.2749 (0.422)	-0.9707** (0.487)	-2.0209*** (0.772)
Trust	-0.0297 (0.070)	-0.0941 (0.092)	-0.2136 (0.146)	-0.5084** (0.250)	-1.3118** (0.645)
Income	0.0145 (0.026)	0.0035 (0.030)	0.0163 (0.053)	0.0665 (0.113)	0.1361 (0.172)
Age	0.0347 (0.055)	0.0687 (0.070)	0.1566 (0.110)	0.3314* (0.178)	0.6496 (0.395)
Age <sup>2</sup>	-0.0003 (0.001)	-0.0005 (0.001)	-0.0012 (0.001)	-0.0029 (0.002)	-0.0062 (0.004)
Male	0.0126 (0.286)	0.0323 (0.347)	-0.2239 (0.522)	-1.2092 (0.906)	-2.8127 (2.185)
Metropolis	-0.6807 (0.692)	-1.3644** (0.692)	-2.9923*** (0.703)	-7.3865*** (1.154)	-10.0092*** (3.708)
Rural area	0.4379 (0.297)	0.5870 (0.400)	-0.1117 (0.783)	-0.6875 (1.865)	1.4255 (3.568)
Regional dummies	+	+	+	+	+
N	1,983	1,983	1,983	1,983	1,983

Notes: Robust standard errors are reported in the parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*FLI* stands for the *Financial Literacy Index*. *Income* is the monthly income per household member. *Trust* is an indicator that measures trust in financial institutions (banks). *Age* is the age of the respondent, years. *Metropolis* is a dummy variable that takes the value of one if a respondent lives in a big city (more than 700,000 inhabitants). *Rural areas* is a dummy variable that takes the value of one if a respondent lives in the countryside.

**Table 11.** One-Year Inflation Expectations: Quantile Regressions

IE1	(10)	(25)	(50)	(75)	(90)
	b/(se)	b/(se)	b/(se)	b/(se)	b/(se)
FAttitude	-0.7938 (6.288)	-0.6640 (5.348)	-3.7545 (52.194)	-10.6238* (5.490)	-10.7250 (.)
Trust	-0.1526 (0.112)	-0.1585 (0.097)	-0.2751 (1.567)	-0.5965 (0.639)	-0.6798 (.)
Controls	+	+	+	+	+
Regional dummies	+	+	+	+	+
N	1,983	1,983	1,983	1,983	1,983

IE1	(10)	(25)	(50)	(75)	(90)
	b/se	b/se	b/se	b/se	b/se
FKnow	-2.0067 (1.958)	-0.2443 (1.241)	-1.5586 (1.766)	-3.3497 (2.548)	-7.1185*** (1.610)
Trust	-0.0966 (0.210)	-0.1430 (0.158)	-0.1897 (0.182)	-0.4073* (0.234)	-0.9352* (0.525)
Controls	+	+	+	+	+
Regional dummies	+	+	+	+	+
N	1,983	1,983	1,983	1,983	1,983

IE1	(10)	(25)	(50)	(75)	(90)
	b/se	b/se	b/se	b/se	b/se
FBehavior	-0.1865 (0.350)	-0.1281 (0.373)	-0.3718 (0.591)	-1.3509 (1.076)	-3.3581** (1.622)
Trust	-0.1307 (0.104)	-0.1384 (0.105)	-0.2271* (0.137)	-0.4713 (0.492)	-1.4235* (0.760)
Controls	+	+	+	+	+
Regional dummies	+	+	+	+	+
N	1,983	1,983	1,983	1,983	1,983

Notes: Robust standard errors are reported in the parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*FAttitude* is a component of the Financial Literacy Index that measures financial attitude. *FKnow* is a component of the Financial Literacy Index that measures financial knowledge. *FBehavior* is a component of the Financial Literacy Index that measures financial behavior. Trust is an indicator that measures trust in financial institutions (banks).



**Table 12.** Three-Year Inflation Expectations: Quantile Regressions

IE3	(10)	(25)	(50)	(75)	(90)
	b/(se)	b/(se)	b/(se)	b/(se)	b/(se)
FAttitude	14.7451 (72.499)	20.0640 (19.039)	22.9288 (97.320)	21.1536*** (7.498)	2.5670 (11.563)
Trust	-0.3730 (13.252)	-0.1187 (0.354)	-1.2218 (2.905)	-2.7080*** (0.504)	-4.5775*** (1.031)
Controls	+	+	+	+	+
Regional dummies	+	+	+	+	+
N	1,985	1,985	1,985	1,985	1,985

IE3	(10)	(25)	(50)	(75)	(90)
	b/se	b/se	b/se	b/se	b/se
FKnow	3.3599 (2.480)	5.2543* (2.897)	4.2778 (4.295)	2.0625 (5.400)	2.2758 (.)
Frust	-0.4654* (0.270)	-0.7351** (0.362)	-1.2118*** (0.451)	-2.3862*** (0.502)	-1.5920 (.)
Controls	+	+	+	+	+
Regional dummies	+	+	+	+	+
N	1,985	1,985	1,985	1,985	1,985

IE3	(10)	(25)	(50)	(75)	(90)
	b/se	b/se	b/se	b/se	b/se
FBehavior	1.0908 (0.708)	1.4532* (0.844)	2.2209 (1.503)	1.3989 (1.462)	1.5867 (.)
Trust	-0.3618* (0.209)	-0.4888** (0.236)	-1.2916*** (0.343)	-2.5472*** (0.500)	-1.6223 (.)
Controls	+	+	+	+	+
Regional dummies	+	+	+	+	+
N	1,985	1,985	1,985	1,985	1,985

Notes: Robust standard errors are reported in the parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*FAttitude* is a component of the Financial Literacy Index that measures financial attitude. *FKnow* is a component of the Financial Literacy Index that measures financial knowledge. *FBehavior* is a component of the Financial Literacy Index that measures financial behavior. Trust is an indicator that measures trust in financial institutions (banks).

**Table 13.** Inflation Perceptions: Quantile Regressions

IP	(10)	(25)	(50)	(75)	(90)
	b/(se)	b/(se)	b/(se)	b/(se)	b/(se)
FAttitude	-0.0345 (5.577)	-0.6883 (5.337)	-2.8125 (45.735)	-10.0570** (4.597)	-13.1640 (.)
Trust	-0.0499 (0.094)	-0.1503* (0.088)	-0.4031 (1.356)	-0.6478** (0.299)	-0.5278 (.)
Controls	+	+	+	+	+
Regional dummies	+	+	+	+	+
N	1,987	1,987	1,987	1,987	1,987

IP	(10)	(25)	(50)	(75)	(90)
	b/se	b/se	b/se	b/se	b/se
FKnow	0.0846 (0.789)	-0.6431 (1.172)	-1.6283 (1.621)	-5.0744** (2.569)	-9.2176*** (1.751)
Trust	-0.0549 (0.096)	-0.1220 (0.151)	-0.2843 (0.175)	-0.5690** (0.238)	-0.8976* (0.516)
Controls	+	+	+	+	+
Regional dummies	+	+	+	+	+
N	1,987	1,987	1,987	1,987	1,987

IP	(10)	(25)	(50)	(75)	(90)
	b/se	b/se	b/se	b/se	b/se
FBehavior	0.0016 (0.274)	-0.1768 (0.340)	-0.5064 (0.563)	-1.7612 (1.694)	-3.3646** (1.438)
Trust	-0.0495 (0.082)	-0.1268 (0.097)	-0.2996** (0.130)	-0.4650 (0.662)	-1.4795** (0.704)
Controls	+	+	+	+	+
Regional dummies	+	+	+	+	+
N	1,987	1,987	1,987	1,987	1,987

Notes: Robust standard errors are reported in the parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*FAttitude* is a component of Financial Literacy Index that measures financial attitude. *FKnow* is a component of Financial Literacy Index that measures financial knowledge. *FBehavior* is a component of Financial Literacy Index that measures financial behavior. Trust is an indicator that measures trust in financial institutions (banks).

**Table 14.** Deviation from the One-Year Consensus Forecast: Quantile Regressions

DevConsensus	(10)	(25)	(50)	(75)	(90)
	b/(se)	b/(se)	b/(se)	b/(se)	b/(se)
FAttitude	-0.8231 (3.947)	-0.6684 (4.942)	-3.1100 (54.513)	-10.0233* (5.119)	-10.8325 (.)
Trust	-0.0475 (0.083)	-0.1079 (0.080)	-0.2814 (1.633)	-0.5710 (0.606)	-0.6405 (.)
Controls	+	+	+	+	+
Regional dummies	+	+	+	+	+
N	1,983	1,983	1,983	1,983	1,983

DevConsensus	(10)	(25)	(50)	(75)	(90)
	b/se	b/se	b/se	b/se	b/se
FKnow	-0.2628 (0.667)	-0.0524 (0.976)	-1.5056 (1.687)	-3.3411 (2.533)	-7.1026*** (1.594)
Trust	-0.0286 (0.082)	-0.1012 (0.124)	-0.1772 (0.176)	-0.4149* (0.233)	-0.9426* (0.520)
Controls	+	+	+	+	+
Regional dummies	+	+	+	+	+
N	1,983	1,983	1,983	1,983	1,983

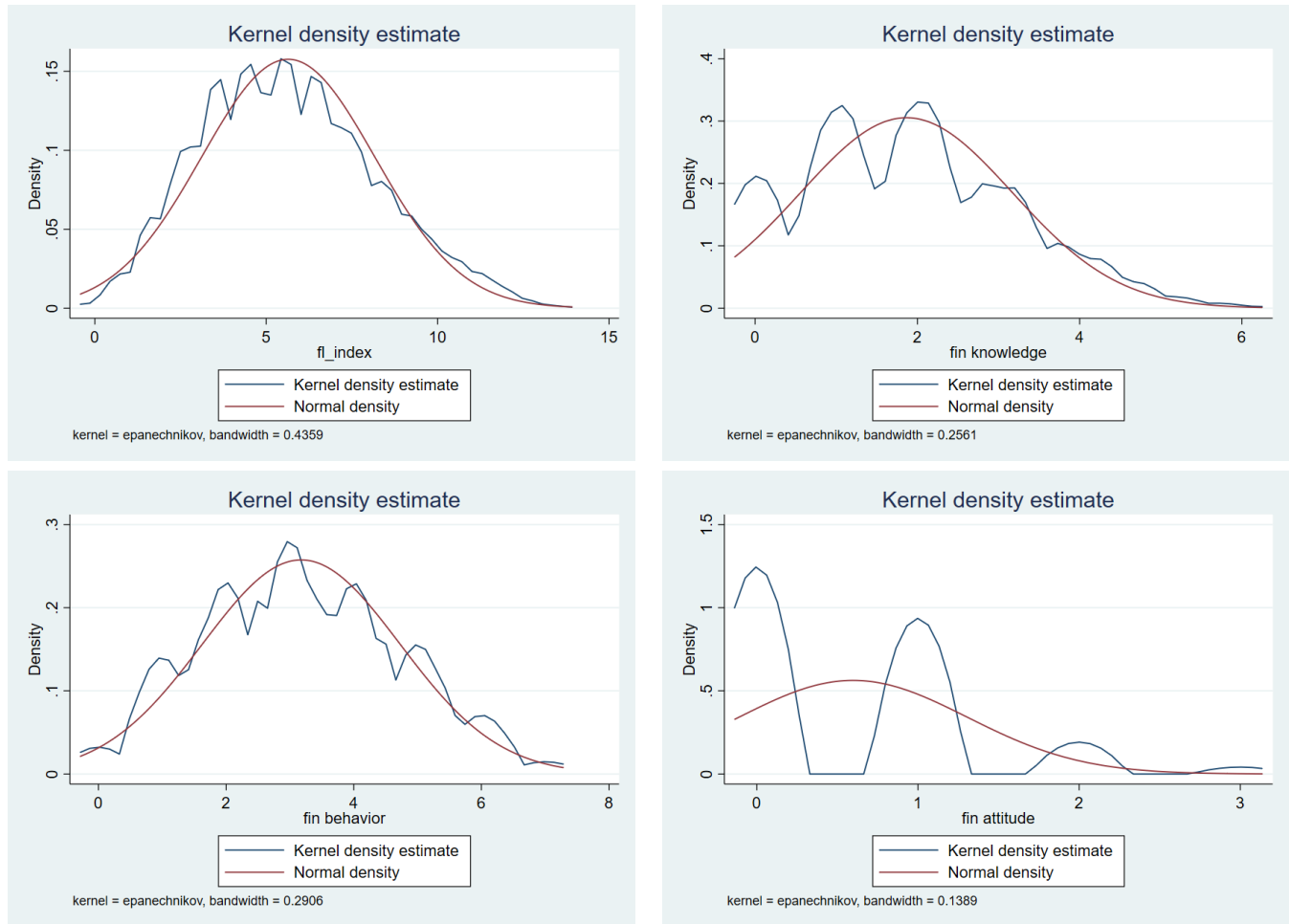
  

DevConsensus	(10)	(25)	(50)	(75)	(90)
	b/se	b/se	b/se	b/se	b/se
FBehavior	-0.1213 (0.228)	-0.0933 (0.300)	-0.3643 (0.553)	-1.3429* (0.736)	-3.2367* (1.688)
Trust	-0.0295 (0.070)	-0.0916 (0.087)	-0.2096 (0.129)	-0.5218** (0.257)	-1.3816* (0.777)
Controls	+	+	+	+	+
Regional dummies	+	+	+	+	+
N	1,983	1,983	1,983	1,983	1,983

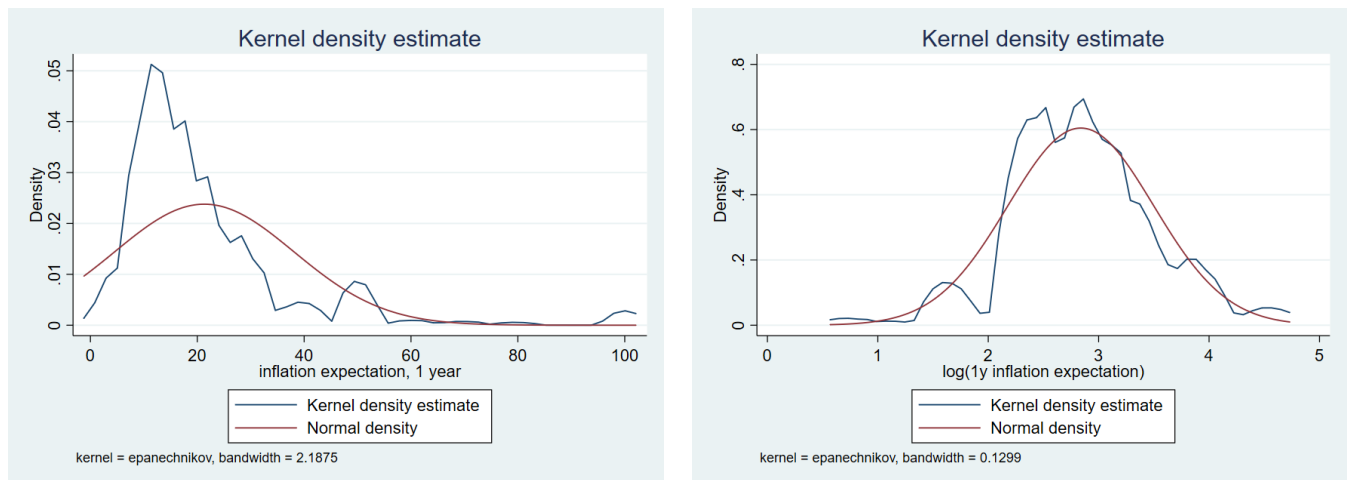
Notes: Robust standard errors are reported in the parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*FAttitude* is a component of Financial Literacy Index that measures financial attitude. *FKnow* is a component of Financial Literacy Index that measures financial knowledge. *FBehavior* is a component of Financial Literacy Index that measures financial behavior. Trust is an indicator that measures trust in financial institutions (banks).

### Appendix B. Figures



**Figure 1.** Distribution of the Financial Literacy Index and Its Components



**Figure 2.** Inflation Expectations, one year

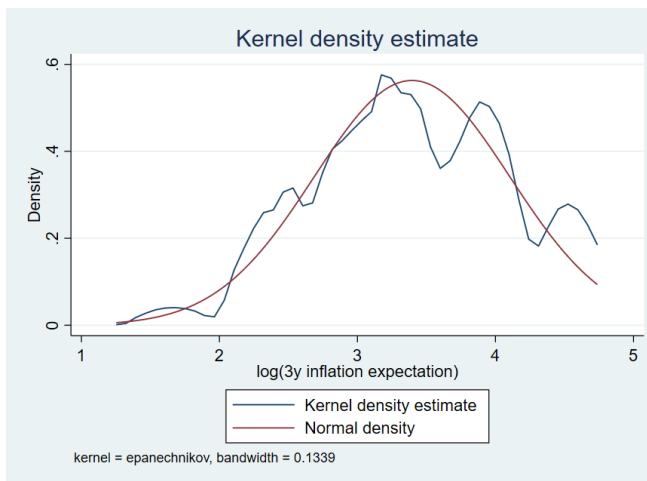
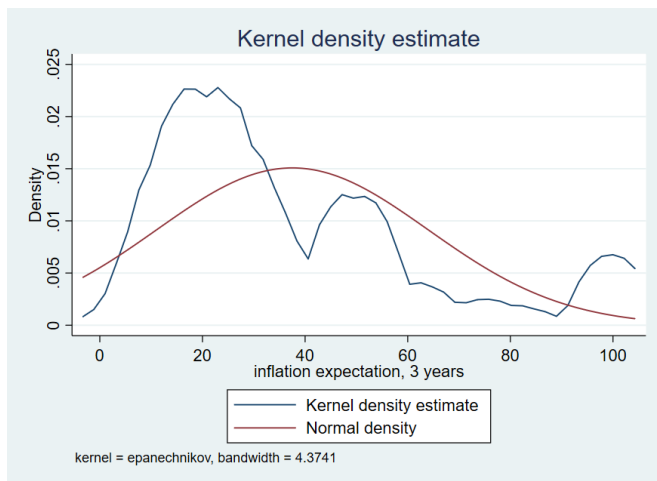


Figure 3. Inflation Expectations, three years

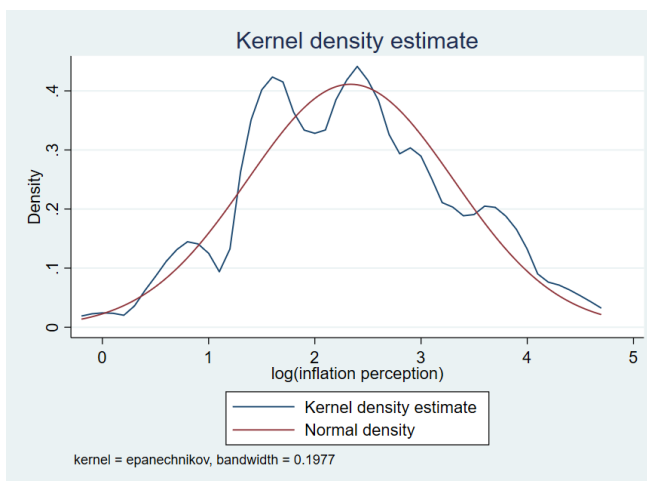
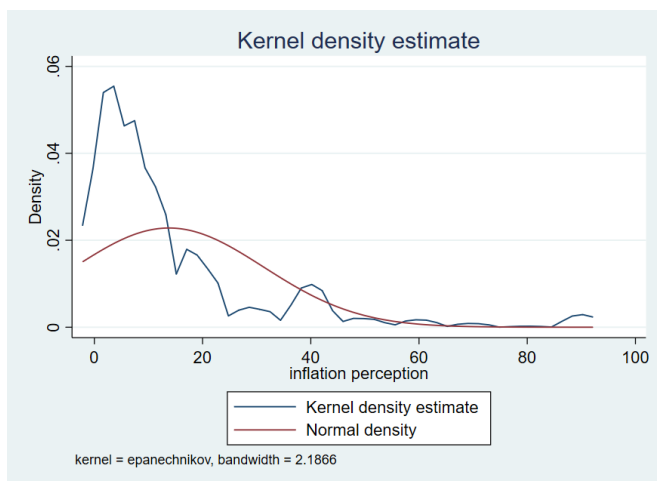


Figure 4. Inflation Perceptions

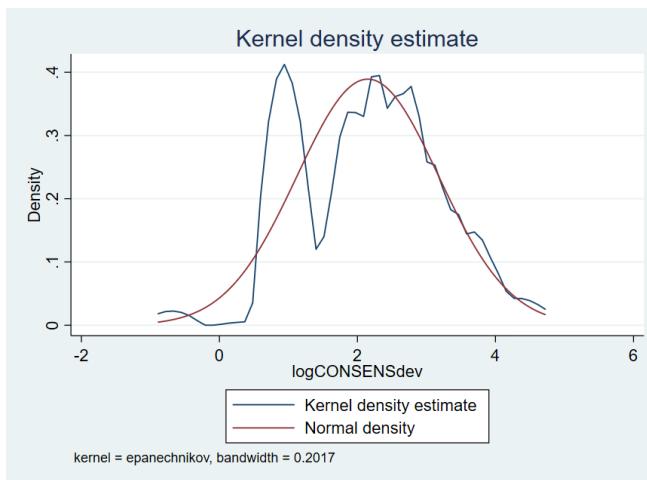
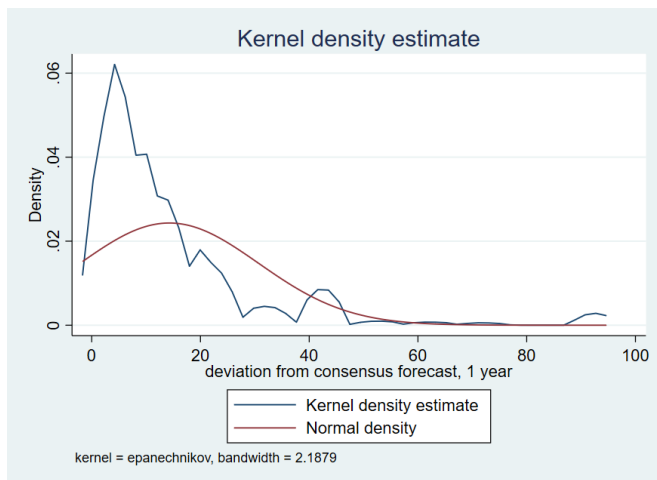
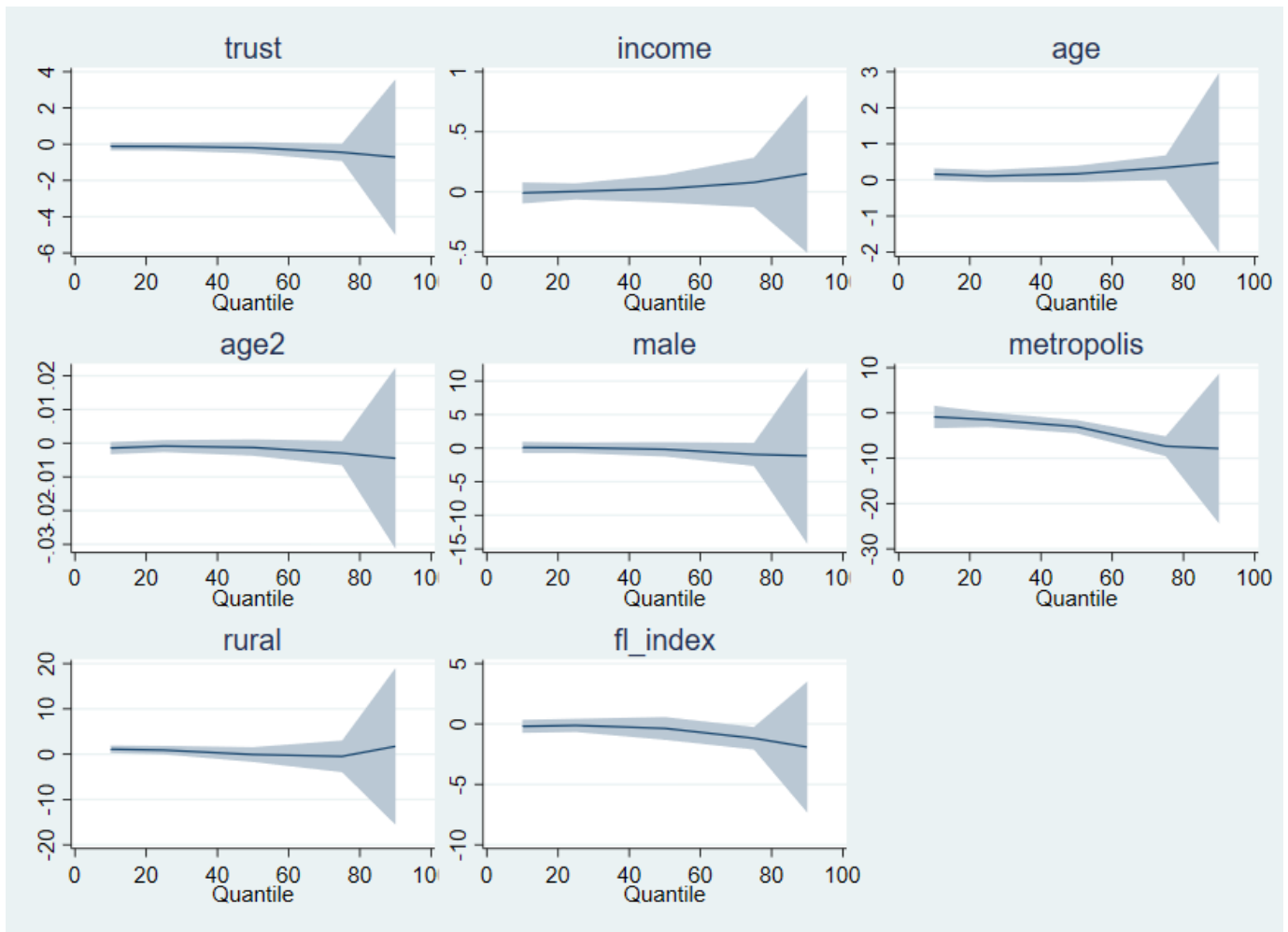


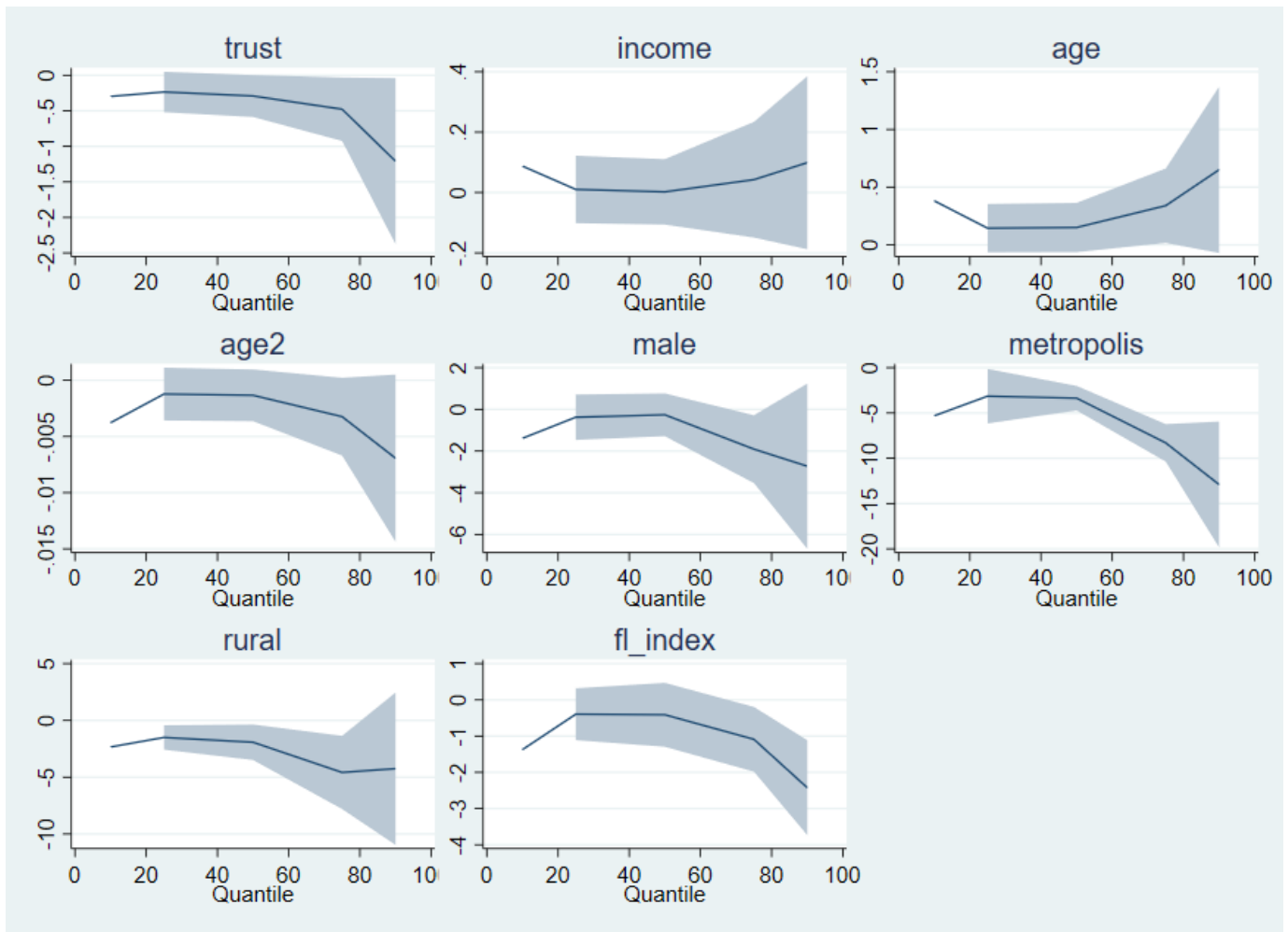
Figure 5. Deviation from the One-Year Consensus Forecast



**Figure 6.** Estimated Coefficients from Quantile Regressions: Inflation Expectation, one year

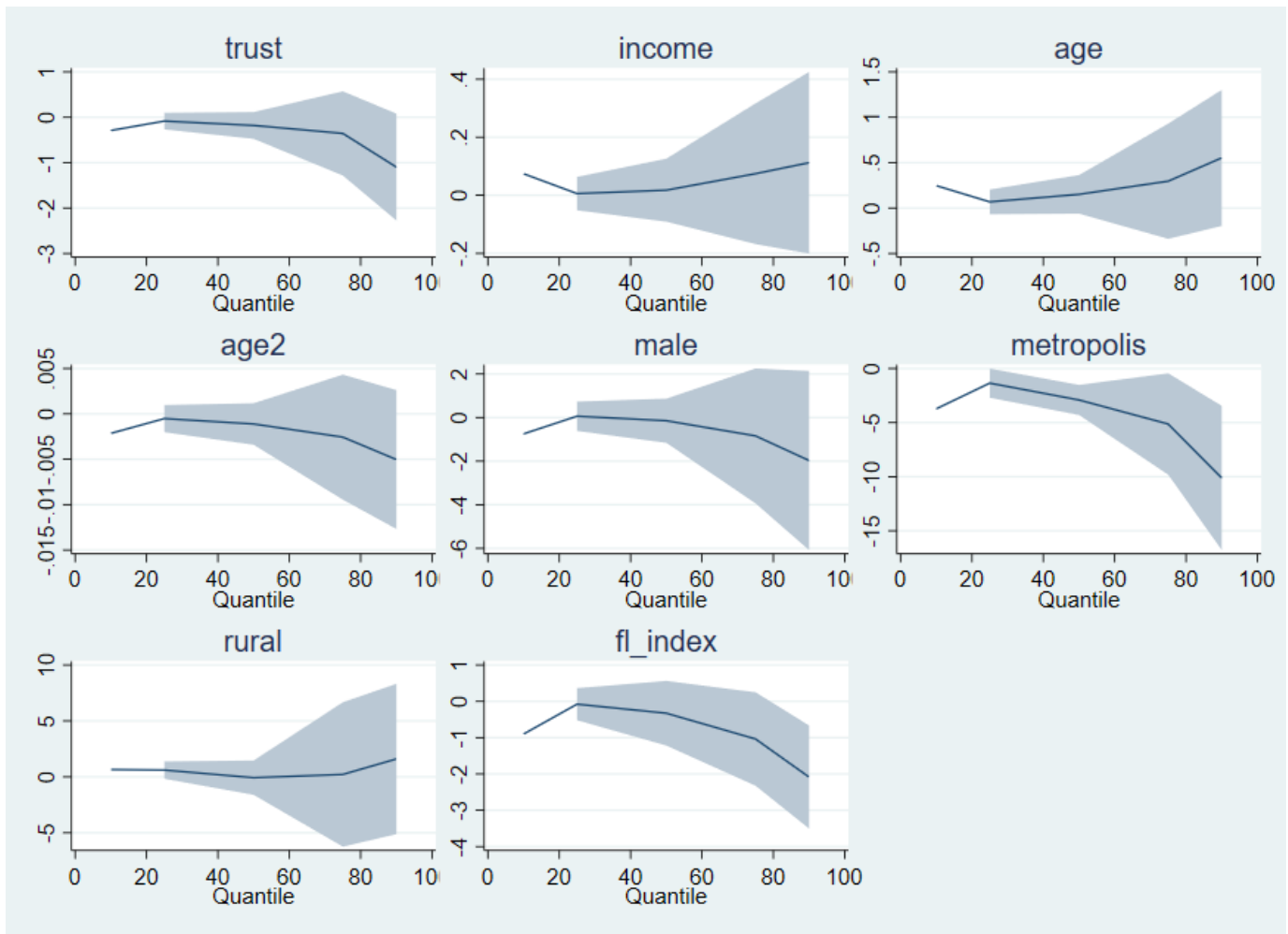


**Figure 7.** Estimated Coefficients from Quantile Regressions: Inflation Expectation, three years



**Figure 8.** Estimated Coefficients from Quantile Regressions: Inflation Perceptions





**Figure 9.** Estimated Coefficients from Quantile Regressions: Deviation from the One-Year Consensus Forecasts

### Appendix C. Instrument Constructions

**1. Individual risk aversion** is constructed as the highest attained educational level minus the number of cases when a respondent became the victim of financial fraud. To obtain the number of fraud cases we use answers to the following survey question:

*Question:* Have you had any of the listed problems with financial products over the last two years?

- 1) (You) invested in a financial product that later turned out to be a fraud, a financial pyramid, etc.
- 2) (You) provided financial information in response to an email or phone call that later turned out to be fraudulent
- 3) (You) discovered that someone had used your bank card to pay without your permission
- 4) (You) requested information about a transaction that you did not make, but that was listed on your bank or credit card statement
- 5) (You) filed an official complaint about the service of a bank or other financial institution
- 6) (You) could not open a bank account and the bank did not inform you about the reasons for the refusal
- 7) You were denied an insurance payment that you were hoping for
- 8) (You) complained about high fees for transferring or receiving money
- 9) (You) lost money due to hackers or fraud

**2. Investment experience** is constructed based on the following survey question:

*Question:* Have you (personally) saved any money in the last 12 months using any of the methods listed on this card, regardless of whether or not you had any savings? Please do not include any money saved as a result of recalculations by the Pension Fund, but think about all kinds of savings, say, savings for a rainy day or saving up for a special occasion.

- 1) Saved and kept cash at home or in my wallet
- 2) Kept money in a current account or a demand deposit account (available upon request)
- 3) Gave money to a family member to save/save on your behalf
- 4) I bought bonds or put them on a time deposit
- 5) Invested in cryptoassets, cryptocurrencies, etc.
- 6) Invested in shares
- 7) Saved or invested in any other way, with the exception of pension contributions (invested in the purchase of livestock, gold, property, etc.)