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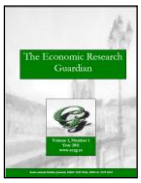

Does Cognitive Reflection Matter for Economic Literacy?

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Abstract

Economic literacy is an important competence in contemporary societies, as individuals are increasingly exposed to economic information that affects everyday decisions, public debates and understanding of economic policies. This paper examines whether cognitive reflection predicts economic literacy among sample. The study is based on a quantitative cross-sectional survey. Economic literacy was measured with a short seven-item economic knowledge test, while cognitive reflection was measured using the six-item CRT-Long. The empirical analysis included descriptive statistics, correlations, group comparisons and hierarchical multiple regression. Results showed a moderate positive association between cognitive reflection and economic knowledge. Hierarchical regression indicated that CRT-Long explained substantial additional variance beyond demographic characteristics, income, interest in economics and prior exposure to economic education. The findings suggest that economic knowledge is not only an educational outcome, but may reflect underlying cognitive abilities.

Keywords: Economic literacy, Cognitive reflection, CRT-Long, Economic education

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1. Introduction

Economic literacy has become an increasingly important competence in contemporary societies. Individuals are regularly exposed to economic information concerning inflation, interest rates, taxation, fiscal policy, public debt, wages, pensions, financial markets and household financial decisions. This is particularly relevant in contexts where economic knowledge is distributed unevenly across educational pathways. While students in economics-oriented secondary schools and study programmes receive systematic exposure to economic content, many individuals encounter economics only indirectly through general education, the media or through everyday financial decisions. However, the ability to interpret such information cannot be taken for granted. A person may be exposed to economic news or may have attended courses containing economic content, but this does not necessarily mean that they are able to understand basic economic mechanisms or apply them in practical decision-making situations. Daily life is intertwined with diverse challenges that are often (in)directly related to economics, and an economically literate individual is better equipped to act thoughtfully in such complex and broader societal contexts. Although economic literacy can be mistaken for financial literacy, it is worth noticing that it is a broader concept, because it includes both personal financial decision-making and understanding of wider economic processes (McCowage and Dwyer, 2022). This distinction is also relevant in light of recent research showing that financial and digital financial literacy are important for financial inclusion in increasingly digital economies (Do et al., 2025).

Previous review research by Konc (2025a) has shown that economic literacy is affected by various demographic characteristics (gender, age, ethnicity, income), educational background (field of study, teacher quality, learning methods), and broader socioeconomic factors. However, the relative importance of these predictors remains open to empirical investigation. The present study builds on previous author's empirical work on economic literacy and economic knowledge, and tries to develop an empirical model linking economic literacy with cognitive reflection. Cognitive reflection refers to the ability to resist an intuitive but incorrect answer and engage in more deliberate reasoning. The Cognitive Reflection Test (in short CRT) was originally developed to measure this tendency by Frederick in 2005, while the CRT-Long proposed by Primi et al. (2016) expands the original version and advances investigation of its psychometric properties. The theoretical rationale is supported by Lin and Bates (2022), who argue that economic knowledge is substantially associated with cognitive ability and that cognitive ability may explain economic knowledge more strongly than exposure to economics courses alone. Although the CRT is not a direct measure of intelligence, it captures an important aspect of reflective thinking that is conceptually related to analytical problem solving. Similarly, Orlov and Roufagalas (2012) show that cognitive reflection is related to performance in undergraduate economics classes. Gignac and Stevens (2024) discovered that cognitive reflection explained additional variance in financial literacy beyond general intelligence. Additionally, correlations have been found between CRT performance and a range of other cognitive abilities (Frederick, 2005; Otero et al., 2022; Doz and Sliško, 2024; Dolz et al., 2026; Rubio-Sánchez et al., 2026).

Despite the growing literature on economic and financial literacy, relatively little empirical work has examined the role of cognitive reflection or intelligence in explaining economic knowledge, particularly in smaller European economies. The present paper addresses this research gap by examining whether cognitive reflection predicts economic literacy among surveyed Slovenians. The main research question is: to what extent does cognitive reflection predict economic literacy among the surveyed Slovenian adults? By introducing CRT-Long into the analysis, the study extends previous Slovenian research on economic literacy and connects it with the wider international literature on cognitive ability and economic knowledge. This is important because economic literacy may require more than factual exposure to economic concepts.

The paper is structured as follows: Section 2 presents the methodological framework, including the research design, measures, sample and analytical strategy. Section 3 describes the empirical results, including descriptive statistics, correlations, group differences and regression models. Section 4 discusses the implications of the findings, while the final section summarises the main conclusions, limitations and implications for future research.

3. Methodology

3.1. Research design

The study uses a quantitative cross-sectional survey design. Data were collected using an online questionnaire administered in Slovenian. We recruited majority of participants through Positly, a well-known research recruitment platform, in June of 2026. Participants recruited through this platform received symbolic monetary compensation for their time. A small share of participants was additionally recruited through the distribution of the questionnaire on social media. All participants were at least 18 years old, took part voluntarily while remained anonymous. The questionnaire included three sets of variables: demographic and background information and test-based measures of cognitive reflection and economic literacy. Following Green's (1991)

guideline ($N \geq 104 + m$), a minimum sample size of 110 participants was required for a multiple regression model with 6 predictors. Our final sample consisted of 120 participants, after excluding questionnaires with evidently invalid or inappropriate response patterns. This sample size satisfied the required criterion.

The questionnaire collected the following demographic and background information:
• gender: male, female;
• age category: 18–25, 26–35, 36–45, 45+;
• average net monthly income: below 1000 EUR, 1001–1500 EUR, 1501–2000 EUR, 2001–2500 EUR, above 2501 EUR;
• interest in economics (1-5): 1 = very uninteresting, 5 = very interesting;
• previous exposure to economic content in secondary school or higher education: no, yes.

3.2. Measures

Economic literacy was measured using seven multiple-choice questions (from now on 7Q EconTest) based on Konc (2025b) with modifications. The items cover selected areas of basic economic knowledge. The total economic literacy score ranged from 0 to 7, with higher scores indicating higher economic literacy. Internal consistency of the 7Q EconTest yielded a McDonald's omega of .560. Given the concise structure of the seven-item dichotomous test and the broad conceptual framework of economic literacy, this can still be considered acceptable for exploratory and predictive regression purposes, although the results should be interpreted cautiously with regard to strict unidimensionality.

The relevance of cognitive reflection for economic literacy can be theoretically justified in our opinion. Many economic concepts require individuals to move beyond intuitive reasoning. For example, inflation targeting, interest-rate changes, diversification and fiscal rules all involve causal mechanisms that may conflict with immediate intuitive thoughts. Individuals with higher cognitive reflection may therefore be better able to understand economic mechanisms and avoid simplistic or misleading interpretations. Primi et al. (2016) argue that the original version of CRT may not be suitable for lower ability or less educated participants, which would limit generalizability of the findings. Because the original CRT has been widely used (Doz and Sliško, 2024), some participants may already be familiar with its items and correct answers. Such familiarity could weaken its validity as a measure of cognitive reflection, since correct responses may reflect recall rather than reflective reasoning.

The use of additional and less familiar items can also improve score variability and support a more appropriate distribution of results. Therefore, cognitive reflection in this study was measured using the six-item CRT-Long developed and tested by Primi et al. (2016). It was confirmed that the CRT-L is also a reliable and powerful predictor of a person's ability. The items require respondents to solve short reasoning problems in which the intuitive answer is incorrect. The total CRT-Long score ranged from 0 to 6, with higher scores indicating higher cognitive reflection. In the present sample, the CRT-Long scale demonstrated solid internal consistency, with a McDonald's omega of .780. This reliability aligns well with prior validation research (Primi et al., 2016), confirming the instrument's robustness as our principal explanatory variable. Additionally, it should also be emphasised that in the present study CRT-Long is not treated as a direct measure of intelligence, but as a theoretically relevant indicator of reflective and analytical reasoning that may contribute to economic literacy.

3.3. Analytical strategy

The analysis proceed in several steps. Firstly, descriptive statistics were calculated for all variables. This included frequencies and percentages for categorical variables, as well as means and standard deviations for the 7Q EconTest and CRT-Long score. Then, correlations were used to assess associations between main variables. Group differences in economic literacy were also examined. Finally, hierarchical multiple regression was used to examine predictors of economic literacy.

4. Results and discussion

4.1. Descriptive statistics

Following data screening and the exclusion of incomplete or implausible questionnaires, the final sample deemed suitable for analysis consisted of 120 participants. The descriptive statistics (Table 1) show that the average CRT-Long score among all participants was 39.72%, while the average 7Q EconTest score was 52.98%. Gender differences were small for both measures, with females scoring slightly higher on CRT-Long and males slightly higher on the economic knowledge test. Economic knowledge tended to increase with age, with the highest mean score observed in the 36–45 age group. Respondents with the highest income category achieved the highest mean score on the 7Q EconTest, although this subgroup was very small. Interest in economics was associated with higher economic knowledge, particularly among respondents who reported being very interested in economics. Participants with previous exposure to economic content in secondary school or higher education also achieved higher economic knowledge scores than those without such exposure, while their CRT-Long scores were somewhat lower.

Table 1 - Descriptive statistics for groups within the total sample

	CRT-Long			7Q EconTest		
	Mean	N	Std. Deviation	Mean	N	Std. Deviation
Gender						
M	38.00	50	30.68	53.14	50	22.36
F	40.95	70	31.81	52.86	70	26.12
Age						
18–25	40.00	50	33.84	45.71	50	24.15
26–35	41.15	32	32.79	55.36	32	22.88
36–45	39.17	20	29.26	62.86	20	21.94
45+	37.72	18	24.63	57.94	18	27.05
Average net monthly income						
<1000 EUR	41.92	33	36.35	45.45	33	26.83
1001–1500 EUR	42.78	30	30.85	59.52	30	23.15
1501–2000 EUR	35.47	39	25.70	49.82	39	22.91
2001–2500 EUR	38.10	14	32.97	60.20	14	21.83
>2501 EUR	45.83	4	43.83	71.43	4	20.20
Interest in economics						
Very uninteresting	00.00	1	.	16.67	1	.
Not interesting	35.56	15	35.00	52.38	15	19.22
Neutral	31.98	37	28.16	48.65	37	23.92
Interesting	45.93	45	31.81	52.06	45	24.20
Very interesting	43.94	22	31.52	64.94	22	25.22
Exposure to economic content in secondary school/higher education						
No	43.48	46	31.72	47.52	46	23.53
Yes	37.39	74	30.94	56.37	74	24.67
All participants	39.72	120	31.25	52.98	120	24.53

4.2. Correlations

Non-parametric Spearman correlations were applied because both performance tests violated the assumption of univariate normality. Correlations (Table 2) indicate a moderate and statistically significant positive association between CRT-Long and 7Q EconTest scores ($\varrho = .404$, $p < .01$), suggesting that respondents with higher cognitive reflection also tended to achieve higher economic knowledge scores. Age was also positively and significantly associated with economic knowledge ($\varrho = .238$, $p < .01$), while interest in economics showed a weaker but statistically significant positive correlation ($\varrho = .181$, $p < .05$). Exposure to economic content in secondary school or higher education was positively, but not significantly, associated with economic knowledge ($\varrho = .173$). Gender and monthly income were not statistically significantly associated with either cognitive reflection or economic knowledge tests scores.

Table 2 - Correlations between variables

Explanation	CRT-Long	7Q EconTest
CRT-Long	1.000	.404**
Gender	.031	-.026
Age	.018	.248**
Average net monthly income	-.036	.147
Interest in economics	.174	.197*
Exposure to economic content in secondary school/higher education	-.100	.167

Note: * correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

4.3. Group differences

To examine the differences in economic knowledge and cognitive reflection across various demographic and background groups, a series of non-parametric tests was conducted. A Kruskal-Wallis H test revealed a statistically significant effect of age on economic test (χ^2 (3)=8.766, p=.033). However, no statistically significant differences in 7Q EconTest were found based on gender, as indicated by a Mann-Whitney U test (U=1698.00, Z=-0.281, p=.778). Gender also psychological traits measured by CRT-Long did not differ significantly (U=1687.00, Z=-0.341, p=.733). Interestingly, several factors exhibited marginally significant trends approaching the standard threshold of .05 level. These included the presence of economic content in the educational program (U=1369.00, Z=-1.827, p=.068), income levels (χ^2 (4)=9.228, p=.056), and personal interest in economics (χ^2 (4)=8.818, p=.066).

4.4. Regressions

The regression models included gender, age category and income category as control variables. The dependent variable was the total score on 7Q EconTest. The modelling strategy showed whether cognitive reflection explains additional variance in economic literacy beyond other inluded variables (Table 3). The change in R-squared between models was used to evaluate the incremental explanatory power of each block of variables.

The following general model was estimated: 7Q EconTest score = $\beta 0$ + $\beta 1$ Gender + $\beta 2$ Age + $\beta 3$ Income + $\beta 4$ Economic exposure + $\beta 5$ Interest in economics + $\beta 6$ CRT-Long score + ε

Table 3 - Regression models

	(1)	(2)	(3)	(4)
Gender	.067	.027	.012	-.051
	(.214)	(.086)	(.039)	(-.181)
Age	.314*	.307*	.331*	.327*
	(2.103)	(2.071)	(2.253)	(2.433)
Average net monthly income	.167	.124	.085	.119
	(1.135)	(.834)	(.578)	(.880)
Exposure to economic content in SS/HE		.506	.348	.549
		(1.574)	(1.067)	(1.824)
Interest in economics			.332*	.184
			(2.004)	(1.190)
CRT-Long				.368**
				(4.865)
R^2	.064	.084	.115	.269

Notes: Dependent variable is the 7Q EconTest score. Four models are presented: (1) a model including only demographic and socioeconomic controls (2) model 1 additionally including economic educational exposure variable, (3) model 2 additionally including interest variable, and (4) final model using all defined variables. Unstandardized regression coefficients are shown with ***t***-statistics in parentheses. * $p < .05$, ** $p < .001$.

Diagnostic tests indicated that standard linear regression assumptions were adequately satisfied across the model specifications. For Models 1–3, Variance Inflation Factors (VIF) remained consistently below 2 and Durbin-Watson statistics were ranging also around 2. In the final model (Model 4; $F(6, 113) = 6.916$, $p < .001$), regression diagnostics confirmed robust model properties. Multicollinearity was negligible across all included predictors, with VIF values ranging strictly between 1.019 and 1.176. Residual diagnostics indicated acceptable linear model properties, with the Durbin-Watson statistic in the final model close to the optimal value of 2 (DW = 2.042). Finally, scatterplots of standardized residuals against standardized predicted values showed a random and balanced distribution across fitted scores, supporting the assumption of homoscedasticity.

In Model 1, the baseline demographic and socioeconomic control variables were introduced: gender, age category, and average net monthly income. These variables accounted for a modest share of the variance in economic literacy ($R^2 = .064$). In Model 2, exposure to economic content in secondary school or higher education was added, increasing the explained variance to 8.4% ($R^2 = .084$; $\Delta R^2 = .020$). In Model 3, interest in economics was included as a motivational predictor. This model explained 11.5% of the variance in the 7Q EconTest score ($R^2 = .115$; $\Delta R^2 = .031$). Finally, in Model 4, CRT-Long was added as a cognitive predictor. Its inclusion substantially increased the model's explanatory power, with the total explained variance more than doubling to 26.9% ($R^2 = .269$). Cognitive reflection alone explained an additional 15.4% of the variance ($\Delta R^2 = .154$) after controlling for demographic, socioeconomic, educational, and motivational factors. Across the models, age remained a statistically significant positive predictor, while CRT-Long emerged as the strongest predictor in the final model.

5. Conclusion

The study builds on previous research showing that economic knowledge is related to motivational and cognitive factors, and not (only) to formal educational exposure. Correlation analysis showed a moderate positive association between CRT-Long and economic knowledge,

indicating that respondents with higher cognitive reflection also tended to achieve higher scores on the 7Q EconTest. Age and interest in economics were also positively associated with economic knowledge, whereas gender and income were not meaningfully related to either CRT-Long or economic knowledge. No statistically significant gender differences were found in economic knowledge which is consistent with previous Slovenian evidence reported by Konc (2025b). Furthermore, the results did not indicate statistically significant gender differences in CRT performance, meaning that males did not outperform females on the cognitive reflection measure. Therefore, this study does not confirm findings reported in parts of the existing literature, where gender differences in CRT performance have often been observed (Primi et al., 2016; Doz and Sliško, 2024; Agnew et al., 2025). However, the findings are more consistent with Rubio-Sánchez et al. (2026), who also did not report clear gender-based differences in cognitive reflection. The descriptive statistics further showed that many respondents experienced considerable difficulties in solving the CRT items. This is not surprising, since CRT items are known to be challenging and often prompt incorrect intuitive answers (Frederick, 2005; Primi et al., 2016; Doz and Sliško, 2024). Moreover, research has shown that students often complete the CRT quickly, leaving limited time for reflection. The hierarchical regression analysis showed that demographic and socioeconomic variables explained only a modest share of variance in the 7Q EconTest score. The addition of previous exposure to economic content and interest in economics increased the explanatory power of the model only gradually. However, the inclusion of CRT-Long substantially improved the model, increasing the explained variance to 26.9%. This finding supports the view that economic literacy requires more than accumulated educational exposure. Understanding economic concepts such as inflation, interest rates, taxation, diversification or fiscal constraints often requires individuals to move beyond immediate intuitive interpretations and engage in slower, more analytical reasoning. In this respect, the results are consistent with Lin and Bates (2022), who emphasise the role of cognitive ability in economic knowledge and financial literacy, and with Orlov and Roufagalas (2012), who found that cognitive reflection is related to performance in undergraduate economics courses. The present study extends this line of research by showing that cognitive reflection is also relevant for broader economic literacy among adults outside the narrow context of economics classes. Since cognitive reflection is related to broader cognitive ability, the findings indicate that economic literacy is partly shaped by cognitive mechanisms. However, CRT-Long should not be interpreted as a direct measure of intelligence, but as an indicator of the tendency to inhibit intuitive but incorrect responses and engage in more deliberate reasoning.

Several limitations should be acknowledged. The study is based on a non-probability online sample, which limits the generalisability of the findings to the entire Slovenian adult population. Future research should use a more representative sampling design. Self-reported data may also be affected by memory bias or social desirability bias. In addition, the economic literacy test contains a limited number of items. Although the selected questions cover important areas of economic knowledge, they probably cannot capture the full complexity of economic literacy. Future research should therefore use longer and more robustly psychometrically validated instruments. Finally, readers of this study should avoid interpreting CRT-Long results as a direct measure of intelligence.

For Slovenia, the findings may be relevant for both secondary education and adult education. Economic literacy can support better individual decision-making and more informed participation in public debates on economic policies. In this sense, economic literacy is not only an educational outcome, but also a component of social and economic development. Economic education policy should not focus only on increasing exposure to economic content, but also on improving the quality of learning processes through analytical reasoning, problem-solving and

reflection-based tasks. The results suggest that simply providing students or adults with economic information may be insufficient if learners are not also trained to question intuitive but potentially incorrect interpretations of economic issues.

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Conflict of interest

The author declares no known conflicts of interest related to the authorship or publication of this research.

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