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From Classroom to Portfolio: Examining the Link Between Financial Education, Financial Literacy, and Risk-taking

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Abstract: This paper examines a panel dataset spanning the years 2010 to 2020 across ten countries, investigating the intricate relationship between financial assets and financial literacy. Two prominent trends surface:First, an intriguing inverse association is observed between higher rates of tertiary education attainment within a nation's population and individual financial assets. Second, an upsurge in the employment rate among individuals aged 25-64 corresponds with a decline in individual financial assets. These findings defy conventional research and call for comprehensive exploration within the framework of economic principles and broader economic awareness. As educational attainment and employment rates rise, heightened labor market competition, especially among individuals holding undergraduate or advanced degrees, leads to relatively reduced wages for those with similar qualifications, impacting their financial assets. Furthermore, this study corroborates that while increased income aligns with greater risk aversion, risk preferences display dynamic fluctuations over time and in response to personal experiences, contradicting neoclassical economic theory's concept of perfect stability. These findings underscore the necessity for a nuanced understanding of financial behavior. In summary, this research challenges established assumptions concerning the determinants of individual financial assets, highlighting the significance of multifaceted socio-economic variables and evolving risk perceptions in comprehending contemporary financial behaviors.

Keywords: Financial education, financial risk preference, international financial market

1. Introduction

In the ever-evolving landscape of global finance, individuals' ability to make informed decisions regarding their financial assets holds paramount significance. As financial markets continue to expand and diversify, the imperative for individuals to possess a robust understanding of financial principles and to exhibit prudent risk management practices becomes increasingly evident. Many prior studies have indicated a close relationship between a nation's prosperity and its government's investment in financial education. However, with the proliferation of the internet, people's educational levels have significantly improved, and they can access information about the financial markets in their daily lives. Factors such as digital financial literacy, demographic characteristics, and social media usage patterns contribute significantly to financial literacy [1]. As access to financial information has become easier, cases of financial fraud are also better understood among the general population. Therefore, financial education programs should emphasize taking action and encourage consumers

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to avoid risky financial behavior [2]. Beyond the societal awareness of financial knowledge, family plays a crucial role in socialization. Research into the early contribution of one's family in shaping a child's financial cognition directly affects a child's future ability to recognize financial information and exercise behavioral control [3]. Additionally, besides influencing a child's future decisions, the family, as a unit, also impacts individuals' current choices [4].

Furthermore, when examining risk preferences, an individual's past experiences with financial difficulties can influence their attitude towards risk, making them more likely to exhibit risk aversion. However, if individuals have a better understanding of finance from societal sources or have received more financial education, it can alleviate their preference for risk aversion [5].

Taking a broader perspective, previous research can be summarized into three main areas [6]. The first area examines people's financial knowledge from a demographic standpoint, with studies indicating significant variations in financial literacy across different age, ethnic, and educational demographics [7]. Furthermore, consistent findings from previous research have demonstrated that women tend to possess a lower level of financial literacy compared to men [8]. The second area investigates how financial literacy impacts individuals' decisions regarding wealth management, including their attitudes towards financial products and various consumer styles [9]. The third area explores when financial education should commence in people's lives, with research suggesting that financial literacy education should begin in childhood or as early as possible [10].

Since 2010, there has been significant development in the realm of internet, bringing about substantial transformations in the field of education. Building upon this foundation, this paper utilizes OECD data spanning from 2010 to 2020 to investigate two primary facets: firstly, the impact of education on financial literacy, and secondly, the relationship between the level of financial literacy and individuals' choices in financial actions, specifically, whether they lean towards being more risk-averse or maintain a neutral stance. This study contributes to the existing literature in the following ways. Firstly, it employs a broader spectrum of socio-relevant factors in Ordinary Least Squares (OLS) analysis, such as the proportion of disposable income allocated to insurance expenditure, enabling a more precise estimation of causal effects. Secondly, the analysis encompasses ten countries marked by significant disparities in financial education offerings. Consequently, the analysis of this paper is conducted within varying contexts and incorporates time-series relationships, thereby enhancing its external validity. Furthermore, another highlight in this essay compared to prior research lies in its incorporation of theories related to microeconomics into the final results. To elaborate, it delves into consumers' intertemporal choices under identical life incomes." To summarize, the research inquiry we endeavor to address is: How does financial literacy influence a propensity for riskier financial investment behavior?

2. Method

2.1. Data

This research aims to examine the impact of education on financial literacy and individuals' risk preferences. To comprehensively investigate the correlations among various factors on a global scale, This paper utilized data from the Organization for Economic Cooperation and Development (OECD) website. Since its establishment in 2008, the OECD has played a pivotal role in developing one of the world's most successful large-scale financial literacy surveys, covering 51,650 adults aged 18 to 79 across 30 countries and economies, including G20 nations. Undoubtedly, the OECD serves as the ideal data source for this paper [11].

From the data collection spanning 2010 to 2020, This paper selected countries that actively participated, forming our sample. This paper excluded countries lacking financial literacy data, resulting in a final sample of 10 countries.

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Firstly, to investigate the influence of education on financial literacy, This paper employed 'household financial assets' as a representation of financial literacy. Additionally, the educational level was a crucial factor, quantified by the percentage of the population in each country with tertiary-level education, offering a straightforward measure. Furthermore, to gauge the extent to which higher education contributes to financial awareness, we utilized variables reflecting the population aged 18 and above who received secondary and tertiary education over the past decade (2010-2020).

Incorporating variables assessing access to financial resources through education, we also considered factors detecting employment rates by education level among individuals aged 25-64. This indicates their ability to apply financial knowledge in real-life situations, given their disposable income. To enhance the sociological relevance of our variables, we examined the unemployment rate among individuals aged 15-24, because longer work experience correlates higher financial literacy, while unemployed individuals exhibit less desirable financial attitudes [12].

Secondly, this paper utilized 'household net financial transactions' as a proxy for individual risk preferences. This indicator represents the balance in household financial accounts and is expressed as a percentage of net household disposable income. This variable is characterized by its persistence, allowing us to observe whether individuals maintain higher levels of debt (mortgages and consumer loans) during economic downturns or shift towards safer financial products (savings deposits, equities, and bonds).

Risk preferences were assessed using four items related to household disposable income, savings, household debt ratios, and insurance expenditures. Household disposable income, savings, and debt ratios are three essential factors influencing individuals' risk preferences. Insurance spending can predict an individual's risk aversion; when individuals allocate more resources to insurance, they tend to exhibit a heightened awareness of risk compared to their peers [13].

2.2. Empirical Model

To thoroughly investigate the impact of variables on the two focal points discussed in this paper employed Ordinary Least Squares regression analysis and divided the data into two groups. The first group aimed to discern which variable had a more significant influence on financial literacy, while the second group sought to explore which variable had a more substantial effect on risk preference. Therefore, this paper employed the following variables:, The regression for financial literacy takes following form equation (1):

$$FAST_{i,t} = \beta_0 + \beta_1 EDUL_{i,t} + \beta_2 ERM_{i,t} + \beta_3 EPL_{i,t} + \beta_4 UEPL_{i,t} + \varepsilon_{i,t} \quad (1)$$

Where FAST represent the important part of overall wealth of households, such as living deposits, investment in equity, shares and bonds. EDUL denotes the number of individuals in each country who have received tertiary education, ERM indicates the proportion of individuals aged 18 and above underwent secondary and tertiary education, EPL reflect the number of individuals aged 25-64 who have attained higher education and are employed, and UEPL signifies the population of individuals aged 15-24 who are unemployed. The regression for risk preference takes following form equation (2):

$$FNT_{i,t} = \beta_0 + \beta_1 HHS_{i,t} + \beta_2 ISR_{i,t} + \beta_3 HHD_{i,t} + \beta_4 HHI_{i,t} + \varepsilon_{i,t} \quad (2)$$

Where FNT is the household net financial transaction, HHS is the household saving, ISR is the insurance spending, as the ratio of direct gross premiums to GDP. HHD is the household debt includes all household liabilities, like loans and accounts payable, requiring future payments, measured as a percentage of net disposable income.and HHI is the household income.

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Subsequently, this paper made the assumption that in the first group, the relationships among educational level, enrollment, unemployment, and employment, and household saving and household income in the second group were not unidirectional and might involve endogeneity bias. Due to the strong association between financial literacy and educational attainment, individuals with higher financial literacy levels tend to seek advanced education. Regions with greater accessibility to higher education typically exhibit higher employment rates and lower unemployment rates. Consequently, a high level of financial literacy may also result in increased opportunities for employment. Besides, risk appetite is intricately linked to individuals' past experiences, occupations, and age, influenced by their personal bounded rationality. Consequently, individuals may opt to invest in high-risk financial products as a means of arbitrage, potentially resulting in higher income. Therefore, this paper proceeded to omit certain variables from both groups and ran four new regression analyses to address this concern, including 3 regressions for financial literacy and 1 for risk preference. Equation (3), equation (4) and equation (5) for financial literacy take following form:

$$\mathrm{FAST}_{i,t} = \beta_0 + \beta_1 \mathrm{EPL}_{i,t} + \varepsilon_{i,t} \tag{3}$$

$$\mathrm{FAST}_{i,t} = \beta_0 + \beta_1 \mathrm{UEPL}_{i,t} + \varepsilon_{i,t} \tag{4}$$

$$\mathrm{FAST}_{i,t} = \beta_0 + \beta_1 \mathrm{EPL}_{i,t} + \beta_2 \mathrm{UEPL}_{i,t} + \varepsilon_{i,t} \tag{5}$$

Conducting separate regression analyses for "employment" and "unemployment" was undertaken not only to eliminate endogeneity but also to corroborate the assertions made in the previous paper. Specifically, it aimed to substantiate the claim that individuals who are employed are better equipped to effectively apply financial knowledge in real-life scenarios, while unemployed individuals tend to exhibit less favorable financial attitudes. The third new regression analysis conducted for financial literacy was intended to provide comprehensive evidence regarding the impact of broader societal factors. This approach was undertaken to strengthen the validity of the findings by considering a wider array of relevant social factors. The new regression for risk preference takes following equation (6):

$$\mathrm{FNT}_{i,t} = \beta_0 + \beta_1 \mathrm{HHI}_{i,t} + \varepsilon_{i,t} \tag{6}$$

3. Result

The results are reported in table 1-6. The results for financial literacy are shown in table 1-4. In table 1 indicated that edulevel coefficients is significantly negative at the 5% level, indicating that an increase in the number of individuals over 18 with secondary and tertiary education is linked to a decrease in personal financial assets. Excluding education level, the variables in Table 1 validate the hypothesis of endogeneity, displaying insignificance. Nonetheless, when considering employment and unemployment separately in Tables 2 and 3, both prove significant at the 5% level. The coefficient for employment (-0.38) implies that higher employment rates are associated with lower individual financial assets, while the coefficient for unemployment (0.12) suggests that increased unemployment among 15-24-year-olds leads to higher individual financial assets. However, Table 4 shows insignificance when both variables are included simultaneously, indicating endogeneity issues.

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Table 1: Random-effects GLS regression for financial literacy

Random-effects GLS regression		**Number of obs = 110**					
Group variable: region		Number of groups =	10				
R-squared:							
Within = 0.1009							
Between = 0.1761							
Overall = 0.1691							
financiala~t	Coefficient	Std. err.	z	P>z		[95% conf.	interval]
edulevel	-0.1507207	0.0711496	2.12	0.034		-0.2901714	-0.0112699
enrollment	0.045346	0.0663286	0.68	0.494		-0.0846556	0.1753477
employment	-0.0742406	0.2098412	0.35	0.723		-0.4855218	0.3370405
unemployment	0.0773772	0.0668294	1.16	0.247		-0.053606	0.2083605
_cons	33.1474	18.67501	1.77	0.076		-3.454949	69.74975

Table 2: Examine relationship between employment and household financial asset

R-squared:	**Obs per group:**						
Within = 0.0682	min	=	11				
Between = 0.0570	avg	=	11				
Overall = 0.0437	max	=	11				
financiala~t	Coefficient	Std. err.		z	P>z	[95% conf.	interval]
employment	-0.3896477	0.1525216		2.55	0.011	-0.6885846	-0.0907109
_cons	59.31971	13.16836		4.5	0.000	33.51019	85.12923

Table 3: Examine the relationship between unemployment and household financial asset

R-squared:							
Within = 0.0494							
Between = 0.2150							
Overall = 0.2026							
financiala~t	Coefficient	Std. err.		z	P>z	[95% conf.	interval]
unemployment	0.1269726	0.0505383		2.51	0.012	0.0279193	0.2260259
_cons	24.4092	3.181064		7.67	0.000	18.17443	30.64397

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Table 4: Combination of employment and unemployment

R-squared:							
Within = 0.0658							
Between = 0.0744							
Overall = 0.0730							
financiala~t	Coefficient	Std. err.		z	P>z	[95% conf.	interval]
unemployment	0.1011277	0.067777		1.49	0.136	-0.0317129	0.2339682
employment	-0.1592137	0.2068028		0.77	0.441	-0.5645397	0.2461123
_cons	38.18907	18.26537		2.09	0.037	2.389599	73.98854

The results pertaining to household risk preferences are presented in Tables 5 and 6. Table 5 reveals an R-squared value of 0.5558, indicating sufficient explanatory power of the selected variables. Furthermore, household savings are closely linked to risk preference and exhibit significance at the 1% level, with a positive coefficient (0.756). This suggests that an increase in household savings leads to a corresponding increase in their net transactions, signifying a risk-averse attitude. Notably, the results for household income in Table 6 show insignificance, with a p-value of 0.273. However, when regressed independently, household income demonstrates strong significance at the 1% level.

Table 5: Ramdom-effect GLS regression of individuals' risk preference

Random-effects GLS regression	**Number of obs**	**=**	**107**				
Group variable: region	Number of groups	=	10				
R-squared:							
Within = 0.3485							
Between = 0.7670							
Overall = 0.5558							
financialtran~n	Coefficient	Std. err.	z	P>z		[95% conf.	interval]
householdsaving	0.7555855	0.1029614	7.34	0		0.5537848	0.9573861
insurance	-0.1901426	0.263696	0.72	0.471		-0.7069773	0.3266921
householddebt	-0.0025299	0.0107683	0.23	0.814		-0.0236354	0.0185756
householdincome	0.0000872	0.0000795	1.1	0.273		-0.0000686	0.000243
_cons	-1.393206	2.585294	0.54	0.59		-6.460289	3.673876

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Table 6: Examine the relationship between household income and financial net transactions

R-squared:							
Within = 0.0768							
Between = 0.0374							
Overall = 0.0398							
financialtran~n	Coefficient	Std. err.	z	P>z		[95% conf.	interval]
householdincome	0.0002462	0.000092	2.68	0.007		0.000066	0.0004265
_cons	-2.2176	3.304702	0.67	0.502		-8.694697	4.259497

4. Conclusion

The overall results present a noteworthy contrast with prior research, where the quantity of an individual's financial assets no longer solely reflects their financial literacy. This is primarily evident in two aspects:

Firstly, when a greater proportion of a country's population attains higher education, individual financial assets decrease. Secondly, after an increase in the employment rate among individuals aged 25-64 within a country, individual financial assets also decrease. These contrasts with previous papers can be discussed in light of economic principles and individuals' perception of the broader economic environment. As individuals attain higher education, more of them secure employment. However, when a substantial portion of the population holds undergraduate or higher-level degrees, companies have a larger pool of talent to choose from, increasing competition in the labor market. Consequently, wages for individuals with similar qualifications may comparatively diminish [14], ultimately leading to a relative reduction in their financial assets. From the perspective of individuals' awareness of the broader economic environment, consistent with the conclusions in [1], employees have access to abundant financial information on the internet, including the proliferation of financial scams in recent years and the 2008 financial crisis. They may no longer trust certain financial products promoted by financial institutions. Instead, they may allocate more of their resources towards daily expenses or other areas, resulting in a decline in personal financial assets.

Furthermore, concerning the study of risk preference, it aligns with [5] that an increase in individual income correlates with a stronger inclination to risk avoidance. However, individuals' risk preferences do not conform rigidly to neoclassical economic theory's notion of perfect stability; they may fluctuate over time and in response to experiences.

This study has certain limitations. Notably, the OLS regression results for financial literacy yield a relatively low R-squared value, indicating that the selected control variables do not fully account for variations in financial literacy. However, this observation reinforces the notion that household financial assets may not adequately represent individuals' financial literacy.

For future empirical research, a critical avenue for improvement lies in reducing measurement errors associated with financial literacy. Incorporating individuals' economic environment perceptions and significant societal events into the measurement could enhance accuracy. Researchers should seek shorter-term panel data tests, update existing factors, and evaluate the most robust methods for measuring financial literacy.

Furthermore, recognizing that the landscape of financial education may have evolved implies that individuals now have multiple avenues to acquire financial knowledge. This raises questions about which methods are most effective, warranting government analysis. While This paper primarily focuses on financial education and risk preferences, the logical framework can be applied to other aspects of education and economic preferences.

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In conclusion, while this study provides valuable insights, it is essential to acknowledge these limitations and address them in future research endeavors to achieve a more comprehensive understanding of the complex interplay between financial literacy, education, and financial risk preferences.

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