

THE ROLE OF EDUCATION IN INFLUENCING CAPITAL MARKETS' LIQUIDITY IN THE CEE COUNTRIES

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Abstract

Capital markets serve an essential role in the efficient allocation of resources in an economy, with their liquidity and stability being critical indicators of operational efficiency. The influence of education in cultivating financial literacy, shaping investment behaviours, and thereby promoting market efficiency, financial development, and sustainable economic growth, is increasingly becoming the focus of research in this field. This study specifically explores the relationship between education levels and capital market liquidity in the Central and Eastern European countries across the period 2013-2021 via a panel regression methodology. Our findings show a significant relationship between education and enhanced capital market liquidity, highlighting the importance of investing in both primary and secondary education to improve market efficiency. Primary education enrollment seems to exert a negative impact on market spread and illiquidity, while secondary enrollment is associated with a diminishing effect on market spread. These patterns persist for both male and female enrollment alike. By furthering the understanding of the association between education and capital market activity, this research paper extends the current studies in this domain and reinforces the idea that education plays an instrumental role in capital market liquidity. This adds to the body of knowledge on the role of education in influencing capital market activity and offers a nuanced view of its impact on market liquidity in the CEE region.

Keywords

Capital markets, Education, CEE countries, Panel regression methodology, Market liquidity, Economic growth

JEL Classification

O11, D53, E44

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Introduction

Capital markets play a crucial role in the distribution of resources within an economy. Their influence has been significantly amplified in recent years, particularly in the context of developing countries. As these nations progress and develop economically, they start to diversify, offering a broader spectrum of investment opportunities. This, in turn, boosts the importance and impact of their capital markets in resource allocation and overall economic advancement (Levine & Zervos, 1998).

Within the scope of these transforming capital markets, the liquidity and stability they offer have a direct bearing on both economic efficiency and certainty. Healthy capital markets that strongly function and are characterized by adequate liquidity and stability foster operational efficiency, which in turn drives economic growth. This cycle ultimately contributes to the development and prosperity of economies. The role of performant processes, facilitated by a stable and liquid capital market, cannot be oversimplified in powering such thriving economies.

In recent years, countries are aiming to maximise their growth potential, part of which is linked to financial development, both through the advancement of the banking system as well as through enhancing the functionality of capital markets (Rousseau & Wachtel, 2000). To achieve this, it's essential that the right market conditions are created, and individuals have the skills and capability to invest in and trade securities. Consequently, recent research papers have pivoted towards assessing the role of education. Studies are now focusing on the influence of education in cultivating financial literacy and shaping investment behaviours (Van Rooij et al., 2011).

Individuals with higher levels of education possess the analytical skills and knowledge necessary to navigate complex financial systems adeptly. By fostering a financially literate populace, nations can ensure informed investment and trading decisions, thereby strengthening their market efficiency, financial development and overall economic growth (Kaiser & Menkhoff, 2017). Moreover, education has broader macroeconomic implications in fostering economic growth and development, considering that a well-educated workforce fuels innovation, productivity, and entrepreneurial activity, thereby driving overall economic prosperity (Hanushek et al., 2008).

The present paper aims to investigate the relationship between education levels and the liquidity of the capital markets in Central and Eastern European countries using a panel regression methodology. The research question of this paper refers to “The level of education is linked to the activity and liquidity of the capital markets from the CEE countries?”.

The research contributes to the scientific literature by studying the influence of both primary and secondary education on the capital market liquidity through the application of a panel regression methodology incorporating multiple variables. Focusing on the Central and Eastern European countries, the study aims to underscore, by using the proposed methodology, the critical role of education in shaping the financial landscape of developing European economies. The findings of the paper could contribute to the public policies in the region by advocating for strategic investments in education to cultivate efficient financial systems, thereby fostering individual prosperity and bolstering overall economic growth.

The remainder of the paper is structured as follows: Section 2 delves into the literature review on the subject, examining the influence of the level of education on the liquidity of capital markets. Section 3 provides an in-depth description of the data utilized for this study and outlines the methodology used. Lastly, Section 4 presents an explanation of the study's findings and results.

1. Review of the scientific literature

Recently, a shift in focus from solely economic growth to overall economic development has been observable among multiple countries, their main objective being the improvement of the living standard for their citizens. As such, government authorities are striving to formulate and implement policies that address various aspects of the nation's development. This includes infrastructure enhancement, healthcare improvement, education system advancement, and financial sector growth. Each of these aspects of development that the governments are concentrating on is inherently interconnected, collectively contributing to the goal of economic development.

In this context, boosting the education system stands as a crucial task, as the knowledge people gain, how it is delivered and how it is used can have significant implications on the activity of the capital markets (Lusardi, 2019). This is because well-educated individuals are more likely to make informed financial decisions, leading to a healthier and more liquid capital market, which helps to mobilize savings and direct them to productive projects.

Cole et al. (2014) investigate the impact of education on personal financial success. The research problem is focused on determining whether education plays a significant role in people's financial outcomes, which could affect strategies for national education policies and personal financial management. The authors use a unique methodology, employing policy shifts in state-level school laws as an instrument to isolate variation in education. They examine different financial outcomes like wage earnings, stock market participation, credit constraints, and saving for retirement across individuals with varying education levels.

The study's findings reveal that individuals with higher levels of education generally have better financial outcomes. They earn higher wages, participate more in the stock market, face fewer credit constraints, and save more for retirement. The policy implications refer to how governments can improve individual financial well-being and overall economic health by promoting education.

Furthermore, Black et al. (2018) explore the relationship between education and risk-taking behaviour in financial markets. The research questions the influence of education on individuals' willingness to take financial risks. The researchers use an analytical methodology involving comprehensive data from Sweden, taking advantage of reforms in national compulsory schooling as a way to isolate the distinct influence of education from other confounding variables. The detailed data allows them to trace individuals' education levels and their subsequent risk-taking behaviours in financial markets.

The study's findings indicate that higher levels of education lead to increased participation in the stock market and a greater likelihood of holding riskier assets. This supports the argument that education influences individuals to engage with and take calculated risks in financial markets, bolstering financial participation and literacy. The

findings could guide educational and economic policy interventions to promote a financially informed and active population.

In a previous paper, Hanushek et al. (2008) examine the role of quality education in fostering economic growth. The researchers confront a critical question on whether it's merely the act of attending school or the actual acquisition of knowledge and skills that significantly contributes to a nation's economic growth. To disentangle this issue, the authors employ an innovative methodology where they compare the impact of both school attainment and cognitive skills – assessed through international student achievement tests – on the economic growth rates of various countries between 1960 and 2000.

The study's findings reveal that it is indeed the quality of education, defined by students' cognitive skills, rather than the mere quantity of schooling, that drives economic growth. Countries where students learn more in school, demonstrated by higher scores on standardized tests, experienced significantly faster economic growth during the study period. The authors conclude that the focus of education policies should not just be on expanding access to schools, but more crucially, on improving the quality of education students receive once they are there.

Moreover, Van Rooij et al. (2011) explore the connection between financial literacy and engagement in the stock market. The research paper addresses the role which financial literacy plays in influencing people's decision to participate in the stock market. The study uses a robust methodology involving a unique dataset from the Dutch Central Bank's Household Survey to investigate the relationship between respondents' levels of financial literacy, assessed through a series of knowledge-based questions, and their involvement in the stock market.

The findings of the study indicate that individuals with higher levels of financial literacy are notably more likely to participate in the stock market. Consequently, the authors suggest that policies aimed at improving financial literacy could lead to increased participation in the stock market.

Additionally, on the subject of stock market participation, Munir et al. (2020) assess the role of gender in the relationship between financial literacy and stock market participation using survey data from 300 individuals residing in Islamabad, aiming to understand whether differences exist between men and women in terms of how financial literacy affects their involvement in the stock market. The study's findings reveal that financial literacy significantly impacts stock market participation for both men and women. However, it also reveals a stark gender gap where, in the presence of financial literacy, males participate more frequently in the stock market compared to females. This highlights the role of socio-cultural factors that act as barriers to female participation. The study infers that policy emphasis should not only revolve around improving financial literacy but also focus on addressing gender-specific constraints to ensure increased and equal market participation.

Kaiser and Menkhoff (2017) investigate how, and at what point, financial education affects financial literacy and behaviour. The authors implement a robust methodology utilizing meta-analysis for 126 highlighted cases derived from 87 studies on financial education effectiveness.

Their findings demonstrate a substantial impact of financial education on financial literacy. However, they also find a significant decay in effects as the delay after education increases. In conclusion, the study links financial education to key improvements in both financial literacy and behaviour, stressing its importance. It also suggests policy implications: it emphasizes the timing of financial education, recommending its delivery to align closely with financial decision-making moments.

Additionally, Lusardi (2019) analyzes the significance and impact of financial literacy, the necessity of financial education, and the effect on people's lives and the subsequent implications for the need for financial education. The paper uses multi-country data collected from standardized financial literacy surveys and reveals a relatively low level of financial literacy globally, which is related to adverse financial behaviours such as limited savings, high indebtedness, and suboptimal financial planning. The study concludes that there is an urgent need for effective financial education to equip individuals with the necessary tools to navigate financial matters.

In a recent paper, Aharon et al. (2023) investigate the influence of education on capital markets' liquidity collecting data from 39 countries and analyzing American Depository Receipts, using a multi-variate regression methodology. The paper uses the innovative 'illiquidity measure' proposed previously by Amihud (2002) to show that stock returns are related positively to the illiquidity level, denoting that stocks of companies with higher illiquidity offer higher returns to compensate for the trading cost. The measure is computed as the daily ratio of absolute stock return to its trading volume. The analysis of Aharon et al. shows that countries with higher education levels tend to have more liquid capital markets, indicating that greater knowledge likely reduces uncertainty and increases trading volumes. The research found that this positive effect is consistent across various degrees of education and genders, and it is resilient across different liquidity measures. With these findings, the authors argue that policies increasing educational involvement could also enhance capital markets' liquidity and functioning. This, in turn, leads to a more stable financial infrastructure, beneficial for the growth of firms and investor welfare.

Thus, based on the above research papers, the level of education has a significant impact on people's financial literacy and stock market participation, affecting the activity and liquidity of capital markets leading eventually to driving economic growth. Starting from these, the present paper aims to investigate the relationship between education levels and the liquidity and activity of the capital markets in the Central and Eastern European countries.

2. Research methodology

The following graph outlines the government expenditure on education as a percent of each country's GDP for the Central and Eastern European countries for the period between 2000 and 2021. Romania has the lowest expenditure on education, with the government's budget for education accounting for 2.87% of the Gross Domestic Product (GDP) in 2000 and merely 3.25% of the GDP in 2021. From 2000 to 2021, education spending averaged at 3.40% of the GDP. In close succession is Bulgaria, which also showed a relatively low commitment to education. The country's average education expenditure for the same period stood at 3.97% of its GDP, marking Bulgaria and

Romania as the only two nations with an average spending that fell below 4% of their GDP.

Conversely, countries like Slovenia, Estonia, and Latvia demonstrate a much stronger emphasis on education. Slovenia tops the list with its average education expenditure amounting to 5.39% of its GDP. Estonia closely follows with an average government spending on education appropriating 5.21% of GDP. Latvia is not far behind, with an average allocation of 5.17% of GDP going towards education expenditure. This data establishes an intriguing inverse link between the commitment to financial development and education expenditure among these nations. It accentuates the potential causality that prudent investment in education could, in fact, underpin robust financial development and economic progression (Benos & Zotou, 2014).

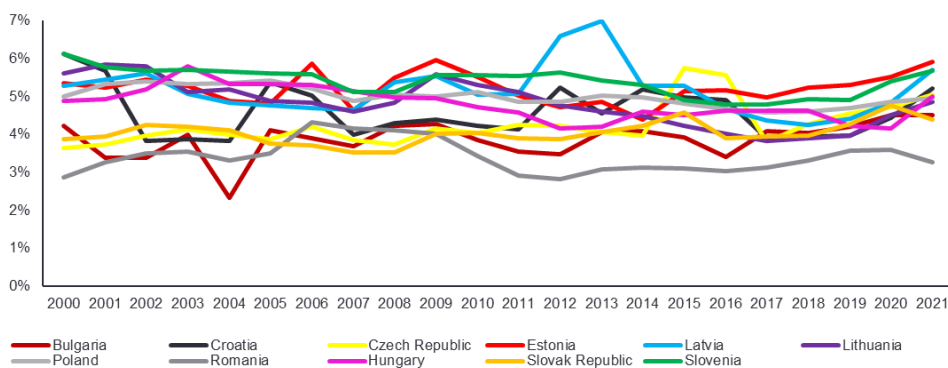


Figure no 1. – Government expenditure on education in CEE countries during 2000-2021

Source: World Bank DataBank – World Development Indicators

To investigate the relationship between education levels and the liquidity of the capital markets, the data regarding the daily price of the representative capital market index of each Central and Eastern European country (based on the list of CEE countries of OECD) was retrieved from Investing.com. For Albania, the Tirana stock market does not have a defined market index.

Using these data, the dependent variables, namely Spread and Illiquidity were computed, based on the methodology proposed by Aharon et al. (2023). Additionally, the independent variable of Volatility was computed using stock market data for the representative index of each national stock market from the CEE countries. Country-specific data was obtained from the World Bank (World Development Indicators database and Global Financial Development database) or Eurostat. Table 1 presents the variables considered in the empirical analysis, the variables' description, and the way they were computed as well as the data source for each variable.

For our research, an increase in both spread and illiquidity measures leads to a decrease in market liquidity. This means that when the spread widens and when the market becomes more illiquid (characterized by a lack of market participants or a discrepancy between the bid and ask prices), the overall market liquidity declines. A market is considered liquid when there is a high level of trading activity, allowing transactions to

be completed rapidly without significantly impacting the price of a security. Therefore, an increase in spread and illiquidity, both representing costs to trade, tends to discourage active trading, thereby reducing overall market liquidity.

Table no. 1. List of variables

Variable	Description	Source
Dependent variables		
Spread	Spread is computed as the daily closing bid-ask spread averaged over the year for each stock market considered from the CEE countries.	Daily price of each stock market index retrieved from Investing.com
Illiquidity	Illiquidity is based on the illiquidity measure proposed by Amihud (2002). The variable is computed as the annual average of the daily price impact meaning the daily ratio of absolute stock return to its dollar volume, averaged over each year.	Daily price of each stock market index retrieved from Investing.com
Independent variables		
Volatility	Volatility is computed as the annual standard deviation in the daily returns of each stock market index.	Daily price of each stock market index retrieved from Investing.com
Turnover	The stock market turnover ratio is defined as the total value of shares traded during the period divided by the average market capitalization for the period.	World Bank - Global Financial Development database
Marketcap	Marketcap is defined as the total value of all listed shares in a stock market as a percentage of GDP.	World Bank - Global Financial Development database
Price	Price is the closing price of each stock market index on the last day of the year.	Daily price of each stock market index retrieved from Investing.com

Variable	Description	Source
GDP	GDP per capita (current US\$)	World Bank - World Development Indicators database
Unemployment	Unemployment rate as a percentage of total labor force	World Bank - World Development Indicators database
Population	Annual population growth rate	World Bank - World Development Indicators database
Education_ Expenditure	Government expenditure on education as a percent of GDP	World Bank - World Development Indicators database
Primary_ education	Primary duration refers to the number of grades (years) in primary school.	World Bank - World Development Indicators database
Primary_ enrollment	Number of students enrolled in primary education - Primary education provides children with basic reading, writing, and mathematics skills along with an elementary understanding of such subjects as history, geography, natural science, social science, art, and music.	World Bank - World Development Indicators database
Primary_ female	Number of female students enrolled in primary education - Primary education provides children with basic reading, writing, and mathematics skills along with an elementary understanding of such subjects as history, geography, natural science, social science, art, and music.	World Bank - World Development Indicators database
Primary_ male	Number of male students enrolled in primary education - Primary education provides children with basic reading, writing, and mathematics skills along with an elementary understanding of such subjects as history, geography, natural science, social science, art, and music.	World Bank - World Development Indicators database
Secondary enrollment	Number of students enrolled in secondary education - Secondary education completes the provision of basic education that began at the primary level and aims at laying the foundations for lifelong learning and human development, by offering more subject- or skill-oriented instruction using more specialized teachers.	World Bank - World Development Indicators database

Variable	Description	Source
Secondary_male	Number of students male enrolled in secondary education - Secondary education completes the provision of basic education that began at the primary level and aims at laying the foundations for lifelong learning and human development, by offering more subject- or skill-oriented instruction using more specialized teachers.	World Bank - World Development Indicators database
Secondary_female	Number of students female enrolled in secondary education - Secondary education completes the provision of basic education that began at the primary level and aims at laying the foundations for lifelong learning and human development, by offering more subject- or skill-oriented instruction using more specialized teachers.	World Bank - World Development Indicators database

Source: Author’s research

To achieve the goal of the research, the paper uses the methodology proposed by Aharon et al. (2023). Thus, to examine the influence of the level of education on capital markets liquidity, we will use multiple regressions in a data panel of the CEE countries for the period 2013-2021. The empirical models will be estimated using EViews software.

Firstly, to test the impact of educational expenditures and the number of years of primary education on the liquidity of stock market indexes, the econometric model is as follows:

$$\text{Spread}_{it} \text{ or Illiquidity}_{it} = \alpha_0 + \beta_1 \text{ Education_Expenditure}_{it} + \beta_2 \text{ Primary_Education}_{it} + \beta_3 \text{ Turnover}_{it} + \beta_4 \text{ Volatility}_{it} + \beta_5 \text{ Price}_{it} + \beta_6 \text{ Marketcap}_{it} + \beta_7 \text{ LN_GDP}_{it} + \beta_8 \text{ LN_Unemployment}_{it} + \beta_9 \text{ Population}_{it} + u_{it} \quad (1)$$

Where: $i=1, 2, \dots, 11$ countries and $t= 2013, 2014, \dots, 2021$. The variables used are explained in the table above (table no. 1).

Secondly, the econometric model used to examine if primary education influences market liquidity is as follows:

$$\text{Spread}_{it} \text{ or Illiquidity}_{it} = \alpha_0 + \beta_1 \text{ Primary_variable}_{it} + \beta_2 \text{ Turnover}_{it} + \beta_3 \text{ Volatility}_{it} + \beta_4 \text{ Price}_{it} + \beta_5 \text{ Marketcap}_{it} + \beta_6 \text{ LN_GDP}_{it} + \beta_7 \text{ LN_Unemployment}_{it} + \beta_8 \text{ Population}_{it} + u_{it} \quad (2)$$

The primary variable refers to *Primary_enrollment*, *Primary_male* or *Primary_female*. As the correlation between these variables is very high, the models use every one of them separately.

Additionally, we extend the previous models to test if secondary education influences market liquidity as follows:

$$\text{Spread}_{it} \text{ or Illiquidity}_{it} = \alpha_0 + \beta_1 \text{ Secondary_variable}_{it} + \beta_2 \text{ Turnover}_{it} + \beta_3 \text{ Volatility}_{it} + \beta_4 \text{ Price}_{it} + \beta_5 \text{ Marketcap}_{it} + \beta_6 \text{ LN_GDP}_{it} + \beta_7 \text{ LN_Unemployment}_{it} + \beta_8 \text{ Population}_{it} + u_{it} \quad (3)$$

The secondary variable refers to *Secondary_enrollment*, *Secondary_male* or *Secondary_female*. As the correlation between these variables is very high, the models use every one of them separately.

The correlation matrix was used to check multicollinearity among independent variables in our study. To avoid the effects of multicollinearity, we only introduced the model-independent variables that exhibited rather low or no correlation with each other.

Considering the specific group of countries examined in this study, namely CEE countries, it is worth noting that the findings are only applicable to these nations. The econometrics literature often favours fixed-effects regression models for such specific regional analyses. To validate the suitability of these models for our dataset, we conducted fixed-effects tests and the Hausman test. From the outcomes of these conducted tests, it seems that estimating panel regression models with time fixed effects is the best fitting approach for the data at hand.

3. Results and discussions

Table 2 below displays the impact of education expenditure and the duration of primary education on Spread and Illiquidity. The first three columns of the table present models where Spread is the dependent variable, while the last three columns present models with Illiquidity as a dependent variable.

Table no. 2. Models for investing the impact of education expenditure and years of primary education

	Model 1 Spread	Model 2 Spread	Model 3 Spread	Model 4 Illiquidity	Model 5 Illiquidity	Model 6 Illiquidity
const	0.027** [0.011]	0.019* [0.011]	0.022* [0.012]	0.001 [0.007]	0.003 [0.005]	-0.002 [0.008]
Education_ Expenditure	0.112** [0.048]		0.171*** [0.049]	-0.012 [0.030]		-0.017 [0.032]
Primary_ Education	0.001*** [0.000]	0.001*** [0.000]		0.000** [0.000]	0.000** [0.000]	
Volatility	1.032*** [0.125]	1.019*** [0.128]	1.054*** [0.135]	-0.032 [0.094]	-0.048 [0.083]	0.014 [0.096]
Turnover	0.004 [0.003]	0.004 [0.003]	0.003 [0.003]	-0.001 [0.001]	-0.001 [0.001]	0.000 [0.001]
Price	0.000*** [0.000]	0.000*** [0.000]	0.000*** [0.000]	0.000 [0.000]	0.000* [0.000]	0.000 [0.000]
Marketcap	0.011*** [0.003]	0.011*** [0.003]	0.011*** [0.003]	0.005* [0.003]	0.005* [0.003]	0.002 [0.002]
Ln_GDP	-0.006*** [0.001]	-0.004*** [0.001]	-0.005*** [0.001]	0.000 [0.001]	0.000 [0.000]	0.000 [0.001]
Ln_ Unemployment	-0.006*** [0.001]	-0.005*** [0.001]	-0.006*** [0.001]	-0.001** [0.000]	-0.001** [0.000]	-0.001*** [0.000]
Population	-0.005	-0.016	0.008	0.056	0.051	0.050

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Spread	Spread	Spread	Illiquidity	Illiquidity	Illiquidity
	[0.048]	[0.049]	[0.008]	[0.037]	[0.035]	[0.039]
R-squared	75.17%	73.51%	70.67%	58.77%	58.55%	52.12%
Adjusted R-squared	69.95%	68.35%	64.94%	32.81%	34.86%	24.75%
Observations	99	99	99	45	45	45

Source: Author's research

Note: The numbers in parentheses [...] indicate the standard error of each variable in the model; (***), (**), (*) reflects the significance level of 1%, 5% and 10%; LN shows the natural logarithm of a variable.

The findings show that both independent variables, namely the government expenditure on education and the number of years of primary education, are positively associated with the capital market Spread of the CEE countries. These results are not similar to previous research papers which show a negative relation between the Spread and the education expenditure and duration of primary education. Additionally, the positive effect of education expenditure on spread is higher than the impact of primary education duration. A possible explanation for these results could be related to the level of capital market development in the group of countries analyzed. Thus, in developing countries, an increase in the number of primary education and the growth of the government spending on education could lead to an increasing stock market spread due to the increasing activity and commotion from the market. It is expected to be a rather short-term effect, while the relationship could be inverted in the medium and long term.

For Illiquidity, we find a negative association between the number of primary education years and Illiquidity. While the value of the impact is rather low, the results regarding the negative relation support the idea that more years of primary education are related to an improved market liquidity in the CEE countries. However, the negative association between education expenditure and Illiquidity is not statistically significant.

Table 3 below shows the results of the second equation. More specifically, it shows the impact of primary enrollment on the spread and illiquidity of the stock market in CEE countries. In this table, columns 1, 2, and 3 show the results when spread is the dependent variable, while columns 4, 5, and 6 show the results with illiquidity as a dependent variable.

Table no. 3. Models for investing the impact of primary education

	Model 1	Model 2	Model 3
	Spread	Spread	Spread
const	0.012 [0.011]	0.012 [0.011]	0.012 [0.011]
PRIMARY_ENROLLMENT	-0.00000002*** [0.000]		

	Model 1 Spread	Model 2 Spread	Model 3 Spread
PRIMARY_MALE	-0.000000005*** [0.000]		
PRIMARY_FEMALE	-0.000000005*** [0.000]		
VOLATILITY	1.031*** [0.137]	1.032*** [0.137]	1.031*** [0.137]
TURNOVER	0.001 [0.003]	0.001 [0.003]	0.001 [0.003]
PRICE	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
MARKETCAP	0.013*** [0.003]	0.013*** [0.003]	0.013*** [0.003]
LN_GDP	-0.003*** [0.001]	-0.003*** [0.001]	-0.003*** [0.001]
LN_UNEMPLOYMENT	-0.007*** [0.001]	-0.007*** [0.001]	-0.007*** [0.001]
POPULATION	0.006 [0.053]	0.006 [0.053]	0.006 [0.053]
R-squared	69.72%	69.72%	69.72%
Adjusted R-squared	63.81%	63.81%	63.81%
Observations	99	99	99

	Model 4 Illiquidity	Model 5 Illiquidity	Model 6 Illiquidity
const	0.004 [0.005]	0.004 [0.005]	0.004 [0.005]
PRIMARY_ENROLLMENT	-0.0000000004* [0.000]		
PRIMARY_MALE	-0.000000001* [0.000]		
PRIMARY_FEMALE	-0.000000001* [0.000]		
VOLATILITY	-0.041 [0.084]	-0.041 [0.084]	-0.040 [0.084]
TURNOVER	0.000 [0.001]	0.000 [0.001]	0.000 [0.001]
PRICE	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
MARKETCAP	0.003 [0.002]	0.003 [0.002]	0.003 [0.002]
LN_GDP	-0.001* [0.000]	-0.001* [0.000]	-0.001 [0.000]

	Model 4 Illiquidity	Model 5 Illiquidity	Model 6 Illiquidity
	[0.001]	[0.001]	[0.001]
LN_ UNEMPLOYMENT	-0.002*** [0.000]	-0.002*** [0.000]	-0.002*** [0.000]
POPULATION	0.042 [0.035]	0.042 [0.035]	0.042 [0.035]
R-squared	57.02%	57.09%	56.95%
Adjusted R-squared	32.46%	32.57%	32.35%
Observations	45	45	45

Source: Author's research

Note: The numbers in parentheses [...] indicate the standard error of each variable in the model; (***), (**), (*) reflects the significance level of 1%, 5% and 10%; LN shows the natural logarithm of a variable.

The findings display a negative and statistically significant association between the total primary enrollment and spread. While the value of the impact is rather low, the impact is significant and supports our hypothesis that primary education improves market liquidity. The results are consistent with the findings from columns 2 and 3, where the negative association between primary enrollment and spread is evident for both female primary enrollment and male primary enrollment. The negative association is economically and statistically significant for both categories, supporting our hypothesis that the number of people obtaining primary education has a negative impact on the spread of the stock market, due to the financial literacy skills gained and the ability to make informed decisions.

For the models using illiquidity as a dependent variable, the results show an economically and statistically significant negative impact of primary enrollment on the illiquidity of capital markets in the CEE countries.

Furthermore, the impact is similar and with the same sign for female primary enrollment and male primary enrollment, showing that the negative association between the number of people attending primary education has the same negative impact on the illiquidity. The results prove that primary education enrollment plays a significant role in determining the liquidity and efficiency of capital markets in CEE countries, due to the financial skills gained throughout the education years.

Additionally, Table 4 below shows the results of the third equation, and it examines the impact of secondary enrollment on the liquidity of the stock market.

Table no. 4. Models for investing the impact of secondary education

	Model 1 Spread	Model 2 Spread	Model 3 Spread
const	0.019* [0.011]	0.020* [0.011]	0.019* [0.011]
SECONDARY_ ENROLLMENT	-0.000000003***		

	Model 1 Spread	Model 2 Spread	Model 3 Spread
	[0.000]		
SECONDARY_ MALE		-0.00000001*** [0.000]	
SECONDARY_ FEMALE			-0.00000001*** [0.000]
VOLATILITY	1.083*** [0.133]	1.080*** [0.133]	1.086*** [0.133]
TURNOVER	0.001 [0.003]	0.001 [0.003]	0.001 [0.003]
PRICE	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
MARKETCAP	0.014*** [0.003]	0.014*** [0.003]	0.014*** [0.003]
LN_GDP	-0.004*** [0.001]	-0.004*** [0.001]	-0.004*** [0.001]
LN_ UNEMPLOYMENT	-0.007*** [0.001]	-0.007*** [0.001]	-0.007*** [0.001]
POPULATION	0.004 [0.051]	0.005 [0.051]	0.004 [0.051]
R-squared	71.71%	71.74%	71.68%
Adjusted R-squared	66.19%	66.22%	66.16%
Observations	99	99	99
	Model 4 Illiquidity	Model 5 Illiquidity	Model 6 Illiquidity
const	0.004 [0.005]	0.004 [0.005]	0.004 [0.005]
SECONDARY_ ENROLLMENT	-0.0000000003 [0.000]		
SECONDARY_ MALE		-0.000000001 [0.000]	
SECONDARY_ FEMALE			-0.000000001 [0.000]
VOLATILITY	-0.024 [0.086]	-0.024 [0.086]	-0.023 [0.086]
TURNOVER	0.000 [0.001]	0.000 [0.001]	0.000 [0.001]
PRICE	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]

	Model 1 Spread	Model 2 Spread	Model 3 Spread
MARKETCAP	0.002 [0.002]	0.002 [0.002]	0.002 [0.002]
LN_GDP	-0.001 [0.001]	-0.001 [0.001]	-0.001 [0.001]
LN_ UNEMPLOYMENT	-0.002*** [0.001]	-0.002*** [0.001]	-0.002*** [0.001]
POPULATION	0.040 [0.037]	0.040 [0.037]	0.040 [0.037]
R-squared	54.14%	54.14%	54.14%
Adjusted R-squared	27.93%	27.94%	27.93%
Observations	45	45	45

Source: Author's research

Note: The numbers in parentheses [...] indicate the standard error of each variable in the model; (***), (**), (*) reflects the significance level of 1%, 5% and 10%; LN shows the natural logarithm of a variable.

Therefore, delving into the results and examining the findings, we can conclude that the impact of secondary enrollment on market liquidity is worth exploring further to understand its potential implications, especially in terms of enhancing educational opportunities and promoting financial literacy among students, which could have long-term effects on their financial decision-making and economic participation. Similarly, to previous regression models presented, secondary enrollment has a low but statistically significant impact on the liquidity of the stock market.

Therefore, there's a negative association between secondary enrollment, both male students and female students, and the spread of capital markets. The findings suggest that increasing secondary enrollment may have an encouraging effect on market liquidity, potentially due to various factors such as improved financial knowledge among students or investments in education systems to foster economic understanding.

At the same time, the negative impact of secondary enrollment, whether considering the total number of people finishing school or when divided between males and females, does not exhibit statistical significance regarding its effect on market illiquidity.

The findings underscore the critical role of education in shaping the operational dynamics of capital markets within the CEE countries. According to the study outcomes, both primary and secondary education exhibit a significant negative impact on the spread and illiquidity of the market, thereby enhancing market liquidity and efficiency. These findings align with previous research papers investigating market liquidity, market behaviour, and market participation, such as Aharon et al. (2023), Black et al. (2018), and Cole et al. (2014). Collectively, these studies and the present paper emphasize the substantial impact of educational attainment levels on capital market functionality, efficiency, and investor behaviour within these markets.

Nevertheless, the findings concerning education expenditure and the number of years of primary education present a slight deviation from expectations. While prior studies like

Aharon et al. (2023) have demonstrated a negative correlation between these variables and capital market spread and illiquidity, the current research indicates a positive association. This divergence in impact may be attributed to the importance of the quality of education rather than just the quantity of schooling (Hanushek et al., 2008) or to the heightened market activity and the developing status of these markets, resulting in minor inefficiencies in the short term, as documented before by Levine (1997). It is anticipated that as these markets advance and mature, such effects will diminish, ultimately leading to improved efficiency and a correction of this impact.

Conclusions

The functioning of a robust capital market is critical to mobilising savings and channelling them into productive investments, which in turn, propels economic growth. Thus, strengthening the education system indirectly influences economic development by fostering progressively efficient and liquid capital markets.

Based on the findings regarding education expenditure and the number of years of primary education, these variables have a positive impact on the Spread and Illiquidity of the capital market due to the developing markets from the CEE countries and the slightly inefficient stock markets which can be disturbed on the short term by the increased activity. However, the impact is expected to be corrected in the medium and long term. Therefore, the increasing funds allocated to the education system and the growing duration of primary studies will converge to improving market liquidity once the stock markets from the analyzed countries further develop and mature while the investors will make rational decisions.

Taking into consideration the estimations regarding primary enrollment and secondary enrollment, it can be concluded that investing in education, particularly at primary and secondary levels, is crucial for fostering economic development and improving market efficiency. While primary enrollment appears to have a negative impact on market spread and illiquidity, secondary enrollment is associated with a negative effect on market spread. The results are similar for both female and male enrollment, with no distinct impact on the market liquidity observed from the gender difference and their school attendance. Thus, education plays a significant role in enhancing stock market liquidity.

In conclusion, directing resources towards educational investments can foster the development of a resilient and optimized financial infrastructure, yielding substantial advantages for both individuals and economies at large. The policy ramifications pertain to governmental decisions regarding resource allocation to educational systems, as well as the enhanced financial literacy imparted by schools, which can equip individuals with crucial skills for navigating financial landscapes. These policy implications underscore the importance of incorporating financial education into curricula and allocating adequate resources to educational institutions to ensure a well-prepared workforce capable of contributing to robust and efficient financial systems.

Overall, directing resources and prioritizing investments in education can lead to a more robust and efficient financial system yielding substantial advantages for both individuals and economies at large. The policy ramifications pertain to governmental decisions regarding resource allocation to educational systems, as well as the cultivation

of enhanced financial literacy within schools. This can equip individuals with crucial skills for navigating financial landscapes. These policy implications underscore the importance of incorporating financial education into curricula and allocating adequate resources to educational institutions to ensure a well-prepared workforce capable of contributing to robust and efficient financial systems.

Potential improvements in the research study include expanding the scope of educational variables and enrollment metrics considered, as well as extending the analyzed period, contingent upon the availability of additional data. Incorporating a broader range of educational indicators, such as tertiary education attainment levels or educational quality measures, could provide a more comprehensive understanding of the multifaceted relationship between education and capital market liquidity. Additionally, exploring longer time horizons or conducting longitudinal analyses could elucidate the evolving dynamics between education and financial market efficiency, capturing potential lagged effects or structural shifts. Such methodological refinements and extensions would not only strengthen the empirical robustness of the study but also contribute to advancing theoretical insights in this domain to support further policies and government decisions.

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