MULTIDISCIPLINARY SCIENCE JOURNAL

RESEARCH ARTICLE
Published Online: November 21, 2023
https://doi.org/10.31893/multiscience.2024077

The evolving financial landscape: analyzing uncertainty, risks, and growth in G7 economies of the 21st century

Atdhetar Gara[a] | **Vesa Qehaja-Keka**[b] | **Arber Hoti**[b] | **Driton Qehaja**[b]

[a]South East European University, Faculty of Economics, North Macedonia.
[b]University of Prishtina, Faculty of Economics, Kosovo.

Abstract This study provides a comprehensive analysis of the financial markets in the 21'st century; focusing on the G7 countries: Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States. The justification for this research originates from the significant role these markets plays in the global economy and the need to understand their complexities in relation to risk, uncertainty, and economic growth. The primary objective is to empiricaly investigate the dynamics and correlations of these aspects within the financial markets of the countries selected in this study. The study is based on secondary data spanning 12 years, from 2010 to 2021, covering all 7 countries, and making it a panel data analysis. Methodologically, the research employs various econometric models and techniques, including Ordinary Least Squares, OLS Robust, and fixed and random effects models. The empirical results suggest that the fixed effects model is the most suitable for this study, as confirmed by the Hausman test. According to this model, a 1% increase in stock market capitalization relative to GDP positively impacts GDP growth by 0.06. Furthermore, stock market value trades were found to have a positive correlation with economic growth. In contrast, stock price volatility and pension fund assets negatively impact economic growth. Notably, these findings diverge from some previous studies in the field. In conclusion, the research provides valuable insights into the relationship between financial markets and economic indicators in the G7 countries, thereby offering policy-makers a more nuanced understanding of how to foster economic growth while mitigating risks.

Keywords: financial markets, risk, growth, economies of 21st century

1. Introduction

In the ever-evolving landscape of the global economy, financial markets play a pivotal role as the driving force behind economic growth and stability. The 21st century has witnessed unprecedented changes, both in the structure of financial markets and the challenges they face. During the current century, a numerous of challenges confront the financial world. These chalanges include not only the shifts and changes in economic power, and the emergence of new financial centers but also the new technological advancements that can both bolster and threaten traditional financial systems. Moreover, the rapid increase of fin-tech companies and peer-to-peer platforms is challenging the dominance of traditional banking systems. In addition to that, geopolitical events like Brexit, trade wars initiated by major economic powers, and the unpredictability of global politics have injected substantial volatility into the markets.

As technological advancements continue to reshape the way we conduct business and communicate, financial markets are confronted with new uncertainties and risks that demand careful examination and analysis. The purpose of this paper is to delve into the intricacies of the contemporary financial markets and explore the interplay between uncertainty, risks, and growth. In this era of heightened interconnectedness, where global events can have instantaneous and far-reaching effects on financial systems worldwide, it is crucial to comprehend the mechanisms through which uncertainties materialize and propagate, and the consequent impact on market performance and economic growth. The 21st century has been marked by several significant financial events that have reshaped the way we perceive and understand financial markets. The global financial crisis of 2008 and subsequent recessions, the rise of digital currencies and blockchain technology, the growing influence of algorithmic trading, and the emergence of new regulatory frameworks are just a few examples of the factors that have reshaped the financial landscape. Furthermore, the financial world is now more susceptible to non-traditional risks. Environmental, social, and governance (ESG) factors have become central to investment decisions, making climate change risks, social inequalities, and governance issues critical areas of concern for investors and regulators alike.

 Received: August 31, 2023 | Accepted: November 14, 2023

In this paper, we will explore the key drivers of uncertainty in financial markets, such as geopolitical tensions, trade disputes, technological disruptions, and policy changes. We will examine how these uncertainties manifest themselves in market behavior, impacting asset prices, investor sentiment, and market volatility. Additionally, we will analyze the different types of risks that financial markets encounter, including credit risk, market risk, liquidity risk, and systemic risk, and their implications for financial stability. Understanding the complex dynamics between uncertainty, risks, and growth is paramount for policymakers, market participants, and researchers alike. By shedding light on these intricate relationships, this thesis aims to contribute to the existing body of knowledge and provide insights into the challenges and opportunities faced by financial markets in the 21st century.

Through a comprehensive review of relevant literature, data analysis, and empirical research, this thesis will endeavor to provide a holistic understanding of the multifaceted nature of financial markets and their intricate connection to economic growth. By studying the interdependencies between uncertainties, risks, and growth, we aim to offer valuable insights that can help inform policy decisions, guide investment strategies, and contribute to the development of more resilient and sustainable financial systems in the years to come.

The research questions of the paper are:

1. How have risks in financial markets changed during the 21st century?
2. What are the strategies and policies that can help manage risk in financial markets?
3. How can supervision and regulation of financial markets be improved to address uncertainty and risk?
4. What are the opportunities and challenges for the growth of financial markets in the 21st century, taking into account the global context and new technologies?
5. How can economic growth be improved through risk management in financial markets?

The following hypotheses were raised:

Hypothesis 1: Systematic risk is a key factor that affects the stability of financial markets and has a significant impact on economic growth.

Hypothesis 2: The risk of financial markets is reduced with economic growth.

To evaluate the presented RQs and hypothesis, different econometric models were used, starting with the OLS and OLS Robust models. Since the data used in this study belong to the panel type, four additional models were used: OLS, OLS Robust fixed effects method, and random effects. The empirical analysis was based on data from reputable sources such as the World Bank, The Global Economy, FRED, and CEIC data. In cases where data were missing, information was obtained from the statistical entities of the eleven countries under investigation.

The paper is structured into five parts, where the next part presents the review of the literature which contains scientific publications relevant to our research, emphasizing the findings of other authors who have theoretically and empirically examined the effect of fiscal policy on economic growth. The third part of the study contains methodology, the fourth part presents empirical results, and the fifth part includes the conclusions derived from the results.

2. Literature review

Many works research the financial markets of the 21st century, in the following a summary of these works is presented in a critical review of the literature.

The author Yulu (2011) provides a summary of 30 years of financial development reform, the research takes place in the state of China (Chen et al., 2011). The author provides a triangulated analysis of the financial markets' past, present, and future performance. The author stresses that banks are at the center of China's monetary system, with the framework of property rights, spearheaded by state-owned banks, being the system's defining characteristic. There has been tremendous growth in the stock, bond, money, currency, and property markets, but the rates of growth have varied widely and institutional development has often lagged behind market growth. The government-led financial structure in China is comprised of three parts: a monetary policy that strikes a balance between inflation control and economic growth; the expansion of bank credit backed by an implicit state guarantee; and a pegged exchange rate system based on capital controls. First, to further improve corporate governance and the mixed operation of financial institutions; second, to build the institution of a financial market system and improve the effectiveness of financial markets; third, to reintegrate regulatory resources, combine prudent macro and micro views, and create a comprehensive framework for financial stability; and fourth, to promote the liberalization of the financial sector in China.

According to Libich (2022), the evidence presented in his study suggests that a developed financial system can certainly contribute to increasing the prosperity of individuals and societies as a whole (Libich & Lenten, 2022). This type of system, consisting of traditional financial institutions such as banks and insurance, play a key role in supporting economic activity and investment in infrastructure, manufacturing, and other important sectors. However, the author also points out the danger of an overly large and poorly regulated financial system. One of the problems that can arise from such a financial system is the possibility of financial crises. If financial institutions are not carefully monitored and regulated, they can be part

of speculative actions and pose a risk to the stability of the economy. In these cases, the negative consequences of financial crises can be much greater than the benefits provided by a developed financial system. In addition to the differences between traditional finance and modern finance, as the author mentions, another aspect worth mentioning is asset trading. This phenomenon has come to the attention of many economists and financial researchers in recent years. Asset trading involves buying and selling securities, and participating in the markets for stocks, currencies, cryptocurrencies, and other financial products to realize capital gains. This type of financial activity is influenced by technological developments and globalization and has brought substantial changes to the financial landscape.

Information systems have set in motion a revolution like markets, fundamentally affecting the way they operate. In the past, markets typically consisted of the strategic interaction of only traders. However, in modern times, automated trading agents are responsible for a significant portion of trading volume, reaching at least 60% of US trading in the stock financial markets. This fundamental change in the dynamics of the markets is the result of technological progress and the automation of trading processes. Automated trading agents, known as trading algorithms or robot-traders, use mathematical models and complex algorithms to carry out buying and selling of stocks in the markets. They react automatically based on future information and their predictions to optimize investment performance. This profound change in the dynamics of markets and the involvement of automated agents has fueled discussions and concerns about the potential risks it may bring. In this context, there is a significant need for research and studies to determine the effects of automated trading agents on market efficiency and their impact on human traders. The author's Zhang et al. present a market framework that aims to explain the interaction between human traders and automated trading agents (Zhang et al., 2021). This framework is applied to a case study of a financial market scenario to investigate and analyze the effects and impact of automated agents. Through the analysis and simulations carried out, the author aims to shed light on how the interaction between automated agents and human traders affects the performance and efficiency of the financial market.

In the contemporary business landscape, global enterprises, with a particular focus on small and medium enterprises (SMEs) in emerging markets, confront a multitude of challenges stemming from evolving customer demands, globalization, pandemics, and geopolitical conflicts such as the Russia-Ukraine war. These challenges have introduced heightened levels of complexity, uncertainty, and risk, thereby necessitating a comprehensive understanding of supply chain risk (SCR) dynamics. Such comprehension is imperative for fostering the sustainability and resilience of supply chains, which bear significant implications for economic growth, employment generation, and poverty alleviation (Kamarker et al., 2023)

Kolte et al.'s goal is to categorize the factors that led to past financial crises so that they might be used as predictors for the present and future (Kolte et al., 2021). The study spans the years 2001 and 2020. In this study, we look back at past financial crises and analyze their causes. In it, terms like "crisis," "bank," "debt," "currency," and "other types," such "depression" and "sudden stops," are defined. The global financial industry has seen exceptional growth and important structural changes in the 21st century, both of which have facilitated the internationalization of the financial market. Due of the short time duration and few interactions, the study has certain inherent limitations. The stock markets of developing and emerging nations are taken into account as part of this paper's examination of the crisis's macro element. International financiers will be able to place the situation and plan accordingly. The delivery of both local and international financial policy has been significantly impacted by the rapid cross-border movement of money made possible by the globalization of financial markets.

This work seeks to predictability, stability, the long-term character of benefits, and coverage of pension income, building on research by Clark (Clark, 2003). Pension safety is also examined in light of the development of international financial markets. It is argued that pension security is a problem of institutional stability, in addition to challenges of national budgetary capacity and the effects of the speculative bubble in the technology, media, and telecommunications industries on stock market returns. The ultimate worth of pension payments is considered to be something that can no longer be guaranteed by any public or private organization (even major enterprises). Guaranteed pension benefit value is a pipe dream, a phantom on the horizon of nation-state politics that cannot be maintained despite the dedication of many to intergenerational equity and solidarity.

The writers of Al-Awadhi conducted research during the pandemic and examined whether or whether the numerous pandemic illnesses affected the performance of global capital markets (Al-Awadhi et al., 2020). The authors employ panel data analysis to examine whether or not the highly contagious COVID-19 virus has an impact on the financial markets. According to the authors' findings, there has been a statistically significant negative influence on stock returns across all firms due to the rise in the number of confirmed cases of COVID-19 and the rise in the number of fatalities from this illness. In a related study, Mazur et al. examine how the stock market in the United States of America fared amid the crisis brought on by the COVID-19 pandemic (Mazur et al., 2021). Stocks in the natural gas, food, and healthcare industries do well, while those in the oil, real estate, entertainment, and hotel industries perform poorly, as reported by the authors. Extreme asymmetric volatility is also correlated adversely with stock returns, which is another feature of losing stocks. Companies' responses to the decline in income caused by COVID-19 vary widely.

The study carried out by the authors Odo et al. examined the impact of capital market indicators on economic growth in Nigeria from 1986 – 2016 (Idenyi et al., 2017). The study adopted autoregressive distributed lag frontier testing and VAR

Granger causality estimation tools to test the variables in the model. The result of the ARDL model revealed that market capitalization has a positive and significant relationship with economic growth; Also, the total traded value of stocks showed an insignificant negative relationship with economic growth, all in the short run. Further, the findings revealed that the market capitalization percentage of GDP and the total value traded in shares as a percentage of GDP exhibited an insignificant negative relationship with long-term economic growth within the study period. The authors recommend that the focus of the policy should be on increasing the money supply as this will stimulate the growth of the capital market, especially through increasing market capitalization. Moreover, there should be a deliberate policy to promote the development of domestic capital formation through the deliberate growth of domestic investments, to benefit from their positive relationship with economic growth.

According to the study conducted by Zaremba et al., the world economy and financial markets have been profoundly affected by the unprecedented non-pharmaceutical efforts aimed at preventing the spread of COVID-19 (Zaremba et al., 2021). This research is the first to examine how various policy responses from governments have affected liquidity on global stock markets. The authors achieve this by analyzing daily data from 49 nations during the time span of January 2020 to April 2020. The study undertaken shows that the treatments have a small, localized effect. In developing markets, job and school closures impair liquidity, while attempts to educate the public about the new coronavirus boost trade activity.

Numerous studies on stock market forecasting utilizing technical or fundamental analysis using different soft computing approaches and algorithms are presented in Nti et al.'s thorough literature review (Nti et al., 2020). The publications reviewed in this study were published between 2007 and 2018, covering a period of 11 years. According to the findings, technical analysis accounted for 66% of the evaluated papers, while basic analysis accounted for 23% and combined analysis accounted for 11%. In terms of the number of sources utilized, over ninety-three percent of the papers we examined relied on a single one. For stock market predictions, the most popular machine learning techniques were support vector machines and artificial neural networks.

The authors Baker et al. claim that the COVID-19 pandemic has had a more profound impact on the financial markets than any other infectious illness epidemic, including the Spanish flu (Baker et al., 2020). The stock market in the United States was only mildly affected by previous pandemics. These claims regarding significant intraday swings in the stock market in 1900 and broad-based volatility in 1985 are developed using textual evidence. We conclude that the main reasons the US stock market reacted much more strongly to COVID-19 than it did to previous pandemics in 1918–19, 1957–19, and 1968 are government restrictions on commercial activity and voluntary social distancing, which operate with powerful effects in a service-oriented economy.

Different Writers Changes in investor expectations for economic development and stock returns are examined by Giglio et al. during the fall of the stock market in February-March 2020 due to the COVID-19 pandemic and its subsequent partial recovery (Baker et al., 2020). The authors polled Vanguard customers three times: (i) on February 11-12, near the market's all-time high; (ii) on March 11-12, after the market's 20% drop; and (iii) on April 16-17, after the market had recovered 25% from its low. The typical investor's outlook on the stock market and the actual economy has dimmed since the slump. Investors also anticipated a sharp slowdown in near-term actual economic activity and anticipated additional dramatic stock market falls. However, investors' hopes for the economy and stock market over the next decade have stayed stable, and in some cases even improved. After the market crisis, investors' disagreement over economic and stock market outcomes grew dramatically and persisted even after the market partially recovered. Those who had the highest levels of optimism in February witnessed the biggest drops in their expectations and the largest sales of shares. Those who were the most pessimistic before the fall in February were the least likely to make any changes to their investments.

3. Methodology

The empirical analysis includes 12 years, respectively, the empirical analysis is developed with data from 2010-2021 and includes G7 countries (Canada, France, Germany, Italy, Japan, United Kingdom, and the United States). For analysis of the financial markets of these countries, we use four models; the first model executed is the model with the method of least squares (OLS), then the OLS Robust model is used, which minimizes the error term, but since the research data belong to the panel data type, then two more were executed the specific models for this data; the model with the fixed effects method and the model with the random effects method.

3.1. Research methodology

A fixed effects model assumes that the effects of independent variables remain constant for all individuals or units in the sample, implying that any variations in the dependent variable are solely attributed to differences in the values of the independent variables. This type of model is commonly employed when researchers aim to draw causal conclusions about the impact of a specific treatment or intervention. On the other hand, a random effects model posits that the effects of independent variables vary randomly among individuals or units in the sample. Consequently, the variability in the dependent variable is influenced not only by differences in the independent variables but also by unobservable factors that

differ across individuals. Random effects models are frequently used when researchers seek to generalize their findings to a larger population or when the data has a hierarchical or clustered structure.

When deciding between a fixed effects model and a random effects model, the Hausman test is often used as a means of comparison. To evaluate whether there are statistically significant differences between the two models, this test compares the estimated coefficients of the independent variables. Observing statistically significant discrepancies between the coefficients suggests that the random effects model is more appropriate for the data set. On the other hand, if there is little variation in the coefficients, the fixed effects model can be preferable. This method makes use of the Hausman test's formula.

With the Hausman test, the number of degrees of freedom in the chi-squared distribution is equal to the number of independent variables. In order to reach a conclusion on the null hypothesis, one must first compute the Hausman statistic and then compare it to the critical value of the chi-squared distribution at the level of significance of one's choosing. If the estimated Hausman statistic is more than the critical value, the null hypothesis is rejected since the two models have different coefficients. The random effects model is preferred in these situations. Instead, the null hypothesis is not rejected and the fixed effects model is preferred if the estimated Hausman statistic is less than the crucial value. In order to be valid, the Hausman test requires that the variance of estimated coefficients in the random effects model be less than or equal to the variance in the fixed effects model. The validity of the tests may be called into question if this assumption is not met (Hausman, 2015).

Table 1 Definition of research variables.

Variable	Abbreviation	Unit
Growth Domestic Product	GDP	%
Stock market capitalization	SMC	% of GDP
Stock market turnover ratio	SMT	%
Number of companies listed on SE	NCLSE	Number
Stock market value traded	SMVT	% of GDP
Stock market return	SMR	%
Stock price volatility	SPV	%
Life insurance premium volume	LIPV	% of GDP
Non-life insurance premium volume	NLIPV	% of GDP
Pension fund assets	PFA	% of GDP
Insurance company assets	ICA	% of GDP

Source: Author calculation.

Model specification:

$$GDP = a + B1(SMC) + B2(SMT) + B3(NCLSE) + B4(SMVT) + B5(SMR) + B6(SPV) + B7(LIPV) + B8(NLIPV) + B9(PFA) + B10(ICA) + Ui \quad (1)$$

The dependent variable of the study is GDP which is expressed as an percent, a represents the constant of regression and μ is a constant term. The following are the independent or explanatory variables: SMC is Stock market capitalization, SMT is Stock market turnover ratio, NCLSE is the Number of companies listed on the stock exchange, SMVT is Stock market value traded, SMR is Stock market return, SPV is Stock price volatility, LIPV is Life insurance premium volume, NLPIV is Non-life insurance premium volume, PFA is Pension fund assets and ICA is Insurance company assets.

3.2. Descriptive statistics

The descriptive statistics for the study variables are shown in Table 2, according to the data presented, the average economic growth in the 7 countries of the study during the period 2010-2021 was 1.62%, these countries are characterized by an average value of stock market capitalization of 94.50% value of the gross domestic product, while the average stock market turnover ratio is 105.41%. The number of companies listed on the stock exchange on average is about 2500 companies. The table also shows the results of Life insurance premium volume, which has an average of 5.28% of the value of the gross domestic product, while Non-life insurance premium volume has a value of only 2.23%. On average, pension assets are 60.95% of GDP, while the assets of insurance companies are 73.32% of the average value of GDP.

4. Empirical data and analysis

Table 3 shows the analysis of the correlation matrix. Based on the results presented by this stock market capitalization coefficient, there is a positive relationship with economic growth with a coefficient of r=0.15, and there is also a positive relationship with economic growth with stock market return variables (r=0.35). The stock price volatility variable has a stronger negative relationship with economic growth (r=-0.30).

Table 2 Descriptive statistics of the variables.

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP	84	1.62	4.30	-15.31	12.43
SMC	84	94.50	46.18	18.8	194.89
SMT	84	105.41	59.65	38.26	350.01
NCLSE	84	2053.89	1559.02	285	4397
SMVT	84	83.32	54.50	31.17	263.12
SMR	84	7.58	12.15	-21.37	46.11
SPV	84	19.27	5.90	8.21	33.02
LIPV	84	5.28	2.47	2.61	12.06
NLIPV	84	2.23	.56	1.41	3.39
PFA	84	60.95	58.86	5.27	179.68
ICA	84	73.32	24.77	30.21	132.04

Table 3 Correlation analysis.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) GDP	1.00										
(2) SMC	0.15	1.00									
(3) SMT	0.10	0.33	1.00								
(4)NCLSE	0.01	0.78	0.02	1.00							
(5)SMVT	0.07	0.57	0.29	0.77	1.00						
(6) SMR	0.35	0.16	0.05	0.16	0.22	1.00					
(7) SPV	0.30	0.46	0.28	0.37	0.28	0.05	1.00				
(8) LIPV	0.02	0.04	0.07	0.27	0.16	0.17	0.00	1.00			
(9) NLIPV	0.17	0.70	0.13	0.57	0.57	0.11	0.32	0.31	1.00		
(10) PFA	0.12	0.81	0.11	0.80	0.57	0.05	0.45	0.22	0.80	1.00	
(11) ICA	0.05	0.27	0.57	0.18	0.23	0.11	0.22	0.58	0.02	0.09	1.00

Table 4 shows the results of the econometric models for the G7 countries, the table shows the summarized results of 4 econometric models, where for interpretation we will take the results from the fixed effects model based on the test result Hausman (P=0.0018), so we don't have evidence to reject the null hypothesis of the test (difference in coefficients not systematic). In cases where the difference in the coefficient is systematic, then we prefer to use the model with fixed effects.

Based on the results of the Fixed Effect model presented in Table 3, an increase in stock market capitalization for 1% of GDP, will have a positive impact on GDP by 0.06, the coefficient is significant at level 5%. This result is in line with the findings of other authors (Prats & Sandoval, 2020) (Omodero, 2020) who in their research found a positive impact of SMC on economic growth. Stock market value trades also have a positive impact on economic growth, where for every 1% increase in SMR we will have economic growth of 0.09%, this coefficient is statistically significant at the 5% significance level.

Another variable that has a positive impact on economic growth is Life insurance premium volume, where for every 1% of gross domestic product growth in LIPV we will have economic growth of 0.02% on average, the coefficient is also significant at the 5% significance level. Similar findings show the results of the authors (Lee et al., 2013).

On the other hand, the variables that have a negative impact on economic growth and are statistically significant are; Stock price volatility, where for every 1% increase in SPV there will be an economic decrease of 0.18% on average, and the coefficient is statistically significant at the 5% level. These findings are not compatible with the findings of other authors, where the author Tursoy and Faisal (2016) in the research conducted for the state of Turkey find a positive impact of SPV on economic growth and Huy et al. also finds a positive relationship between these variables (Huy et al., 2020). Another variable with a negative impact on economic growth is Pension fund assets, where for every 1% of the gross domestic product increase in PFA we will have an economic loss of 0.14% on average, the coefficient is statistically significant at the 10% significance level. This finding does not consist of the findings of other authors (Davis & Hu, 2005) who find a positive impact of pension funds on economic growth.

5. Discussion

In summary, the results of four econometric models suggest that the fixed effects model is preferred based on the Hausman test (P=0.0018), indicating no systematic difference in coefficients. According to this model, an increase in stock market capitalization by 1% of GDP has a positive impact of 0.06 on GDP, and similar findings are supported by other authors (Khaliq, 2013; Kuvshinov, 2022). Additionally, stock market value trades show a positive impact on economic growth, while stock price volatility and pension fund assets have a negative impact. These findings differ from some previous studies (Nwanne, 2015; Bhowmik, 2013).

Hypothesis 1: Systematic risk is a key factor that affects the stability of financial markets and has a significant impact on economic growth - the results seem to partially support this hypothesis. The positive relationship between stock market

capitalization (SMC) and economic growth suggests that a larger stock market capitalization can have a positive impact on economic growth. This could be interpreted as systematic risk being a factor that positively affects economic growth through the stock market. However, it's important to note that the relationship between stock price volatility (SPV) and economic growth is negative, indicating that higher stock price volatility has a negative impact on economic growth. This result might imply that excessive systematic risk, as represented by volatility, can indeed have a detrimental effect on economic stability.

Table 4 Econometric model results.

Variables/Models	OLS	OLSR	FE	RE
SMC	0.0277	0.0277	0.0648**	0.0277
	-1.97	-1.56	-2.81	-1.97
SMT	-0.007	-0.007	-0.00454	-0.007
	(-0.62)	(-0.45)	(-0.36)	(-0.62)
NCLSE	-0.00174	-0.00174*	0.000244	-0.00174
	(-1.87)	(-2.18)	-0.11	(-1.87)
SMVT	0.00934	0.00934	0.00472	0.00934
	-0.49	-0.42	-0.22	-0.49
SMR	0.118**	0.118**	0.0944**	0.118**
	-3.07	-2.49	-2.54	-3.07
SPV	-0.224*	-0.224*	-0.188**	-0.224*
	(-2.48)	(-2.24)	(-3.19)	(-2.48)
LIPV	0.156**	0.156**	0.0234**	0.156**
	-3.49	-3.58	-4.03	-3.49
NLIPV	0.492	0.492	-3.084	0.492
	-0.24	-0.27	(-1.04)	-0.24
PFA	0.00676	0.00676	-0.149*	0.00676
	-0.28	-0.26	(-2.21)	-0.28
ICA	-0.043	-0.043	-0.0204	-0.043
	(-1.27)	(-1.51)	(-0.34)	(-1.27)
_cons	6.806	6.806	15.31	6.806
	-1.55	-1.33	-1.75	-1.55
Hausman Test	0.0018			
Hettest	0.0093			
Mean VIF	4.77			
N	83	83	83	83

Hypothesis 2: The risk of financial markets is reduced with economic growth - the results do not seem to support this hypothesis. The negative relationship between stock price volatility (SPV) and economic growth suggests that higher risk, as represented by volatility, is associated with lower economic growth. This suggests that financial market risk does not decrease with economic growth.

In summary, the results provide some support for Hypothesis 1 in terms of the positive relationship between stock market capitalization and economic growth. However, they do not support Hypothesis 2, as higher financial market risk, as measured by stock price volatility, is associated with lower economic growth.

The study's findings present a nuanced perspective on the intricate relationship between financial markets and economic growth. The positive correlation observed between stock market capitalization (SMC) and economic growth, as indicated by a coefficient of r=0.15, aligns with prior research by Yulu (2011). This suggests that well-developed financial markets, represented by a larger SMC, can indeed have a positive impact on a nation's economic growth. This is consistent with the idea that efficient financial markets can facilitate capital allocation, investment, and economic development. However, the negative correlation between stock price volatility (SPV) and economic growth (r=-0.30) offers a counterpoint, emphasizing the potential adverse consequences of excessive market risk and instability. Libich's (2022) warnings about poorly regulated financial systems and their potential to cause financial crises become more salient in the context of this negative correlation.

The study also draws attention to the role of automated trading agents in modern financial markets. These trading algorithms have gained significant influence, with approximately 60% of trading in US financial markets being executed by automated agents. The authors' call for research into the impact of automated agents on market efficiency and their interaction with human traders is both timely and critical. This development reflects the ongoing transformation of financial markets due to technological progress and globalization. To fully understand the risks and benefits associated with automated trading, it is essential to conduct in-depth research on their effects on market dynamics.

Additionally, the study underscores the impact of external factors, such as the COVID-19 pandemic, on financial markets. The findings by Al-Awadhi et al. (2020) and Mazur et al. (2021) indicate that the pandemic had a significant negative

influence on stock returns. This highlights the vulnerability of financial markets to external shocks and underscores the importance of proactive risk management and resilience planning.

Lastly, research like that by Odo et al. (2017) in Nigeria shows that market capitalization has a positive and significant relationship with economic growth. This emphasizes the role of financial markets in stimulating economic development. The need for policies that promote the growth of the capital market and domestic investments is reiterated, indicating the importance of aligning financial market development with broader economic growth strategies.

In conclusion, the study provides valuable insights into the multifaceted relationship between financial markets and economic growth. It underscores the potential benefits of well-developed financial markets, the risks associated with market volatility, the transformative impact of technology, the significance of external factors, and the importance of aligning financial market policies with broader economic goals. These findings offer valuable guidance to policymakers, investors, and researchers as they navigate the complex world of finance and its profound impact on global economies.

6. Conclusions

In the 21st century, financial markets have experienced major changes and entered a new era with developments in technology and globalization. Financial markets have become more complex and unusually connected, resulting in a significant increase in the volume of transactions and types of financial instruments. Technological innovations such as transaction automation, trading algorithms, and artificial intelligence have had a major impact on financial markets. These innovations have increased the efficiency and speed of financial trading, but have also brought new challenges, such as the risk of cyber-attacks and unexpected volatility. Financial markets are also affected by demographic changes and global economic developments. Investors must have in-depth knowledge and up-to-date skills to manage risk and take advantage of the opportunities offered in this increasingly competitive environment. To succeed in the financial markets of the 21st century, it is important that actors are aware of emerging challenges and new opportunities, have adaptive skills, use technology wisely and respect the rules and principles of financial stability.

The findings from this empirical study which was developed for G7 countries in the 12 years (2010-2021) show that these countries have faced various economic and financial crises which have damaged the stability of the financial markets and it is time that these markets to recover.

Recommendations for Policymakers and Practitioners: (i) Promote Continuous Learning: With the increasing complexity in financial markets, there's an acute need for continuous education and training programs. Policymakers should promote and perhaps even subsidize such initiatives, ensuring that professionals remain up-to-date. (ii) Enhance Cybersecurity Measures: Given the highlighted risk of cyber-attacks due to technological innovations, policymakers should set stringent cybersecurity regulations for financial institutions. This not only safeguards the institutions but also bolsters investor confidence. (iii) Regulate Trading Algorithms: The use of trading algorithms and artificial intelligence has surged. While they bring efficiency, they can also introduce systemic risks if left unchecked. Regular audits and standards for algorithmic trading can ensure they function within safe boundaries. (iv) Demographic and Global Economic Awareness: Policymakers and practitioners should be aware of and plan for demographic changes and global economic shifts. This can help preempt potential challenges and leverage new opportunities. (v) Support Market Stability: The empirical evidence from our study suggests the positive impact of stock market capitalization on GDP. Efforts should be made to support and stabilize stock markets, ensuring their growth aligns with the broader economic goals. (vi) Monitor Volatility and Pension Funds: Given that stock price volatility and pension fund assets can negatively impact economic growth, regular monitoring and, if necessary, intervention mechanisms should be in place to address any potential pitfalls.

Ethical considerations

Not applicable

Conflict of Interest

The authors declare no conflicts of interest.

Funding

This research did not receive any financial support.

References

Al-Awadh, AM, Alsaifi K, Al-Awadhi A, Alhammadi, S (2020) Death and contagious infectious diseases: Impact of the COVID-19 virus on stock market returns. Journal of Behavioral and Experimental Finance, 27. DOI: https://doi.org/10.1016/j.jbef.2020.100326

Abdul-Khaliq, S (2013) The impact of stock market liquidity on economic growth in Jordan. European Journal of Business and Management, 5(30), 154-158.

Baker SR, Bloom, N, Davis, SJ, Kost K., Sammo M, Viratyosin T (2020) The unprecedented stock market reaction to COVID-19. In Review of Asset Pricing Studies (Vol. 10, Issue 4). DOI: https://doi.org/10.1093/rapstu/raaa008

Bhowmik D (2013) Stock market volatility: An evaluation. *International Journal of Scientific and Research Publications*, *3*(10), 1-17.

Chen Y, Ma Y, Tang K (2011) The chinese financial system at the Dawn of the 21st century: An Overview. The IEB International Journal of Finance, 2.

Clark, GL (2003) Pension security in the global economy: Markets and national institutions in the 21st century. Environment and Planning A, 35(8). DOI: https://doi.org/10.1068/a35251

Davis P, Hu YW (2005) Is there a Link between Pension-Fund Assets and Economic Growth? -A Cross-Country Study. CCISSR Forum 2004, June.

Hausman, JA (2015) Specification tests in econometrics. Applied Econometrics, 38(2). https://doi.org/10.2307/1913827

Huy DTN, Dat, PM, Anh, P (2020) Building an econometric model of selected factors' impact on stock price: A case study. Journal of Security and Sustainability Issues, 9(May). DOI: https://doi.org/10.9770/JSSI.2020.9.M(7)

Idenyi O, Ifeyinwa, A, Samuel, O., Chibuzor, C (2017) Capital Market Indicators and Economic Growth in Nigeria; An Autoregrssive Distributed Lag (ARDL) Model. Asian Journal of Economics, Business and Accounting, 2(3). DOI: https://doi.org/10.9734/ajeba/2017/32549

Karmaker CL, Al Aziz R, Palit T, Bari, AM (2023) Analyzing supply chain risk factors in the small and medium enterprises under fuzzy environment: Implications towards sustainability for emerging economies. *Sustainable Technology and Entrepreneurship*, *2*(1), 100032. DOI: https://doi.org/10.1016/j.stae.2022.100032

Kolte A, Kumar Roy J, Tulsiram Patil D, Pawar A, Sharma P (2021) Global Financial Crisis in 21stCentury: A Brief Analysis of Stock Exchanges. Proceedings of 2nd IEEE International Conference on Computational Intelligence and Knowledge Economy, ICCIKE 2021. DOI: https://doi.org/10.1109/ICCIKE51210.2021.9410680

Kuvshinov D, Zimmermann K (2022) The big bang: Stock market capitalization in the long run. *Journal of Financial Economics*, *145*(2), 527-552. DOI: https://doi.org/10.1016/j.jfineco.2021.09.008

Lee CC, Chiu Y Bin (2013) The link between life insurance activities and economic growth: Some new evidence. Journal of International Money and Finance, 32(1). https://doi.org/10.1016/j.jimonfin.2012.05.001

Libich J, & Lenten L (2022) Hero or villain? The financial system in the 21st century. Journal of Economic Surveys, 36(1). DOI: https://doi.org/10.1111/joes.12437

Mazur M, Dang M, Vega, M (2021) COVID-19 and the march 2020 stock market crash. Evidence from S&P1500. Finance Research Letters, 38. DOI: https://doi.org/10.1016/j.frl.2020.101690

Nti IK, Adekoya AF, Weyori, BA (2020) A systematic review of fundamental and technical analysis of stock market predictions. Artificial Intelligence Review, 53(4). DOI: https://doi.org/10.1007/s10462-019-09754-z

Nwanne TFI (2015) Impact of contributory pension scheme on economic growth in Nigeria. *Global Advanced Research Journal of Management and Business Studies*, *4*(8), 333-337. DOI: http://garj.org/garjmbs/index.htm

Omodero CO (2020) Capital market determinants and market capitalization in Nigeria. International Journal of Financial Research, 11(1). DOI: https://doi.org/10.5430/ijfr.v11n1p462

Prats MA, Sandoval, B (2020) Does stock market capitalization cause GDP? A causality study for central and eastern European countries. Economics, 14. DOI: https://doi.org/10.5018/economics-ejournal.ja.2020-17

Zaremba A, Aharon DY, Demir E, Kizys R, Zawadka D (2021) COVID-19, government policy responses, and stock market liquidity around the world: A note. Research in International Business and Finance, 56. DOI: https://doi.org/10.1016/j.ribaf.2020.101359

Zhang N, Wang A, Haq NU, Nosheen S (2021) The impact of COVID-19 shocks on the volatility of stock markets in technologically advanced countries. Economic Research-Ekonomska Istrazivanja. DOI: https://doi.org/10.1080/1331677X.2021.1936112