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**RESEARCH METHODOLOGY**

**RESULTS & DISCUSSION**

**FINDINGS**

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# IMPACT OF FINANCIAL KNOWLEDGE AND SOCIO-ECONOMIC VARIABLES ON SAVINGS BEHAVIOR OF THE COLLEGE STUDENTS IN THE SULTANATE OF OMAN: BASIS FOR PROPOSED SAVINGS PROGRAM

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## ABSTRACT
*Young people are in a crucial situation nowadays since it is very easy for them to purchase everything, especially online selling is now common and rampant; in just a click of the mouse they can buy everything online, so they are prone to over- spending. It is important for college students to have financial knowledge, and be conscious of saving money for their future use; and if they lack knowledge, then who can influence them? This study identified the family and friends as influential factors in the savings behavior of the college students. Future concern, gender, age and Allowance have influence on attitude of the respondents towards savings. In our study, financial knowledge did not affect their savings behavior. This is because certain variables like knowledge of interest and their knowledge on investment avenues were not considered in this study. Thus, this study recommends adding other variables like knowledge of interest, investment avenues to further investigate the impact of financial knowledge on savings behavior.*

## KEYWORDS
college students, financial knowledge, savings behavior, socio- economic variables.

## JEL CODES
G11, D14, G51.

## INTRODUCTION
Financial knowledge is the ability of a person to understand, determine, and evaluate the importance and usefulness of money. When someone is financially knowledgeable, he has confidence in managing his finances. It will help in making decisions on how to prioritize the expenses, on how to determine which is the most needed and how to be practical and sensible in spending the money. As pointed out by Ergum (2018,) financial education is important for the students to have commercial awareness and in this way, they can be good in managing their finances. Along this notion, Vitt et. al. (2000) explained how important for a person to be financially literate, so that he will have the capability to understand his financial situation and interpret the factors that brought him to a that situation like why he is having funds or less. In addition, the person will have ability to make intelligent financial decision for their future that will guide him in confronting economic and life's challenges.

Young people are in a crucial situation nowadays since it is very easy for them to purchase everything, especially online selling is now common and rampant; in just a click of the mouse they can buy everything online, so they are prone to over- spending. If the young people are not guided today, what then will happen in the future when they become leaders and managers? Jiang and Dunn (2013), disclosed financial problems are confronted by young people due to easier access on credit cards and they have higher level of debts and they are paying their dues relatively slow compared to the previous generations due to low income. These findings about youth's way of managing funds are also supported by Shim et. al. (2010) who described them as impulsive spenders since they have more access to credit cards and most of them did not have deep understanding of the value of money, they are more focused on spending on their wants instead of savings funds for future use.

It is important for college students to have financial knowledge, and be conscious of saving money for their future use; and if they lack knowledge, then who can influence them? This study identified the family and friends as influential factors in the savings behavior of the college students. Peer groups and parents who are considered non- formal socialization agents can help in increasing financial capability as explained by Fan and Chaterjee (2018). One argument however, was raised by Shim et.al. (2010) that it is not only financial knowledge that can be developed by parents; or by schools they can also be enhanced in workplaces, he further added that attitudes and behavior can be improved through influence of people in workplace. A strong point was provided by Jorgensen (2007), that those who have financial influence from parents got a better score of financial knowledge, attitudes, and behavior. So, it is very important for parents to discuss money and management with their children and for them to be wise in spending (Johnson and Sherraden,2006).

This study identified self- control on spending as one of the determinants of savings. As disclosed by Baumeister (2002) self-control is dependent on three things: standards, monitoring process and operational capacity to change one's behavior, which indicated that main ingredient of self-control is the ability to resist the temptation on their impulsive buying tendencies. Aligned with the findings of Zulfaris, et.al (2020) that self- control has negative relationship with money management they the students have lack of control on handling their funds.

Future concern was considered as a determinant of savings behavior, if the students are thinking on the unfavorable events that will happen in the future. For example, the loss of income of the family, or if they wanted to acquire later on some assets like car or if they would like to improve their way of living for their family; would they consider saving now? The youth should educate themselves about savings and investment for a better future as revealed by Birari et. al, (2014)
The last identified determinants of savings behavior of students in this study is their attitude towards money. How students handle them, and what is their feelings if they don't have money, how do they respond on this situation?
These scenarios inspired the researchers to explore the issues confronted by College students in Oman by assessing their financial knowledge, and to determine the socio-economic variables that may affect their savings behavior. Knowing their savings behavior in terms of self-control, future concern and their attitude towards money may lead to deeper understanding and an appropriate savings program can be recommended for them.

## REVIEW OF RELATED LITERATURE

Sabri, M.F. and MacDonald, M. (2010) found out that more than fifty percent of the students had no savings from the scholarship or educational loans they received. They either used the money for shopping, repaid the debts or gave the money to their family. The result showed that students with higher financial knowledge tried to save more while those with more inspiration from socialization agents and who got late experience did not engage in savings. Financial literacy was associated with better savings of the students.
Jamal, A.A.A, et al. (2016), examined the influence of savings behavior of students from higher learning institutions. It was disclosed that savings behavior is positively influenced by family, peers as well as self-control. Likewise, financial literacy also plays a major role in savings behavior and retirement planning. On the other hand, financial attitude has no impact on financial literacy and savings behavior. The findings also suggest that financial education must be given to the students during the primary and secondary levels, which will enable them to have sufficient financial knowledge and in turn will help them to manage their earnings and debt efficiently. The financial authorities also should make sure that a structured approach to augment the people understanding on personal financial management.
Cole,S. and Shastry,G.K (2010), showed that financial literacy does not have any influence on savings. They think that online videos on education, giving information at point of sale and counselling on finance will be highly effective and cost effective. They also opine that teaching mathematics skill in high school found to show a positive impact on financial behavior.
Sherraden,M., Schreiner,M & Beverly,S. (2003) in their article examined the income and savings performance in individual development accounts. The results show that increase in income did not increase the level of savings. People used to save the same amount of money, despite increase in income. There is no relation between income and savings. Lesser income does not mean that there will be less savings.
N S Syahrom, et al. (2017) studied the relationship between knowledge of financial management, parental socialization, peer influence, self - control and savings habit and the results showed that the higher the knowledge of financial management, the higher is the tendency to save more. Parental socialization and peer influence also influenced them to save more. However, self- control has no effect on the savings habit of the students.
Shaliza Alwi, et al. (2015), results of their study show that self- dominance as the major factor influencing savings habit among the students. Financial literacy also is a major influence also plays a main role in influencing the students to save more. They concluded that financial literacy must be provided to improve the savings habit among the students.
Balint,A. & Horvathne,A.K (2013), are of the opinion that financial literacy should be introduced in the primary school itself, as it will familiarize the students about the benefit of savings, which will help them to boost their savings.
Birari, A. & Patil, U (2014), observed the spending and savings habit of youth in Aurangabad. It showed that the youth are spending more money on shopping of branded items. They are of the opinion that the youth should reduce the spending and save money. The youth are spending money because they lack knowledge on the importance as well as avenues of savings and investment.
Manju, R (2016), scrutinized the spending pattern of students and the results proved that the students spend money only on absolutely essential things like transportation, mobile recharge etc., He showed that the student's income is mostly from the parents in the form of pocket money and whatever money is left after spending on the essential items they tend to save for any contingency or for shopping.
Furnham,A (1999), analysed the sources of personal income of young people and how they saved their money. The following are his main findings: most of the income came from pocket money or gifts or from part time jobs, the male and older children received more pocket money from parents than female and younger children; and lastly most of them tried to save more to purchase something special or to maintain their money safe so they are considered they are active savers.
Gutter, M.S., Garrison, S. & Copur, Z. (2010), evaluated financial social learning opportunities and financial behaviors of college students. They revealed that financial behaviors are influenced by age, race, marital status, school rank, income level, loan amount, and qualification for financial aid.
Wagner,J.F., (2015) investigated the level of financial education and its effect on the savings behaviour. They showed that the impact of financial education on short term has a mixed impact whereas in the long-term financial education plays a wider role on financial behaviours.
Robb, C. A., & Woodyard, A. S. (2011), found out the association between personal financial knowledge (both objective and subjective), financial contentment, and a few demographic characteristics. Financial contentment, income, education, age, race, and ethnicity are some of the other factors that influence financial behavior.
Jonubi, A., & Abad, S. (2013**),** investigated the impact of financial literacy on individual saving in Malaysia. They revealed that the extent of economic literacy had a major, positive impact on individual saving. They suggest that it is important for policymakers to extend financial literacy of households by implementing various financial education programs to improve the saving rates of individuals at the national level.
Thapa, B. S. (2015), showed that most of the scholars have basic level of monetary knowledge, but they lack in understanding of credit, taxes, share market, financial plan and insurance. The study further identified income, age, stream of education, styles of college, and attitude of scholars as determinants of economic knowledge; and financial knowledge is unaffected by gender, university affiliation, financial behavior, and influence.
Gaisina, S., & Kaidarova, L. (2017), they have shown that financial literacy may be a vital determinant of the saving level. If people could better understand the basic financial concepts such as rate, inflation, note value of cash, they will be wiser in using their financial resources and they would be ready to save more from the income.
Bhabha, J. I., et al. (2014), explored the financial literacy of working women in developing countries as significant factor, which affects the saving-investment behavior of female workforce in developing countries like Pakistan. They concluded that working-women in Pakistan are financially illiterate; they are depositing money in various institutions but they don't know what exactly they are doing which they are ignorant about the functions and existence of financial markets. It's also concluded that saving-investment behavior of working women in Pakistan heavily depends on the financial literacy.
Delafrooz, N., & Paim, L. (2011), spotted the link of selected demographic variables, (i.e., gender, ethnic, age, education, income, and financial literacy) with saving behavior and to figure out factors affecting saving behavior among Malaysian's employees. Results of the study indicated significant differences of economic behavior in keeping with age, education, income and financial literacy. Furthermore, financial literacy, income, and status were found to be the foremost influential predictors of saving behavior.
Remble, A. A., et al. (2014), focused on the lifecycle income objective of business-owning (farm and nonfarm) households and hypothesized that the complex relationship between household and business management decisions had the potential to challenge predictions from standard household savings theory. Specifically, they tested for differences in saving behavior of those entrepreneurial households relative to the common US household. The estimation results indicated that, along with standard demographic influences of savings models, households owning a farm or nonfarm business had a significantly higher likelihood of maintaining private saving in the same given year.
Firmansyah, D. (2014)**,** identified the variables like parents' motivation, parents' experience, and family lifestyle. He found a high correlation between parents' support and parents' experience of saving toward students' saving behavior. Therefore, university students' saving behavior is influenced by their parents' support.

Puspasari, E., et al., (2018), their study aims to research and identify the saving behavior of scholars of State Vocational Schools in Tegal Regency. The results of path analysis show financial literacy and family environment directly influence attitude behavior, subjective norms, behavioral control, and behavioral intention. Financial literacy and family environment have an indirect influence on saving behavior through subjective norms, perceived behavioral control and behavioral intention

Dangol, J., & Maharjan, S. (2018), explored the parental and peer factors which influence the saving behavior of the youth. There is significant relationship between peer and parental influences and savings behavior. Independence, control, habit formation, encouraging saving are mechanisms that influences saving behavior. They concluded that, receiving financial teaching from parents ensures a sound savings behavior.

Ariffin, M. R., et al. (2017), determined the financial literacy level and students' perception towards saving behavior at University Putra, Malaysia. Their findings showed that saving behavior, parental socialization and peer influence had correlation with financial literacy, whereas self-control showed indirect correlation with financial literacy. Parents always play the central role in facilitating and promoting their children's saving or investment.

Tang, N., et al. (2015), disclosed that financial knowledge could be a necessary component in financial decision-making; however, knowledge is insufficient to verify responsible financial behavior. They found weak association between financial knowledge and behavior by simultaneously testing the roles financial knowledge, parental influence, and individual psychological characteristics (self-discipline and thoroughness) play in young adults' financial behaviors. They gave highlight on the importance of adopting tailored financial education to suit gender differences and financial teaching programs could improve the efficiency.

Rai, K., Dua, S., & Yadav, M. (2019), they aimed to point out factors related to a very low financial literacy of working women in India. The three main factors—financial knowledge, financial behavior and financial attitude were recognized as important factors to look at financial literacy. They found out that financial literacy helps them however, despite sound educational background and hefty amount of remuneration; they are unable to be financially independent.

Capuano, A., & Ramsay, I. (2011), they identified factors that contribute to a broader understanding of the role of economic literacy and consumer behavior in Australia. They concluded that financial literacy means a monetary knowledge, which is important because of its benefits for consumers, the community, and for the economy.

Johan, I., et al. (2021), their findings showed that attending a personal finance course for 14 weeks of University students in Indonesia have an impact on their financial knowledge. It did not have an impact on financial attitude and behavior of the students. Another factor affecting their financial knowledge, behavior and attitudes is their family. Their discussion of money matters with friends, work experience, income and the year/ field of study are affecting the financial behavior.

Chong, K. F., et al. (2021) – Their findings showed that the emerging adults in Malaysia are not good in management of funds and they lack financial literacy. Their self -efficacy has strongest impact compared to financial literacy and self-copying in financial behavior model. They stressed that the emerging working adults must exercise proper budgeting and control on their spending, monitor their expenses regularly, should live within their means and should start saving and planning for their future when they grow old and for their immediate needs in the future.

## METHODOLOGY

The study was conducted with the college students to find out their level of financial knowledge and their attitude towards savings in Sultanate of Oman. The questionnaire consists of demographic profile in the first part, the second part consists of questions related to financial knowledge and the third part consists of their attitude towards savings. The questionnaire was uploaded in Google forms and it was distributed among the college students. For this study, the researchers were able to collect 179 responses from college students.

## ANALYSIS AND FINDINGS

**TABLE 1: DEMOGRAPHIC PROFILE OF RESPONDENTS**

| Demographic profile | | Frequency | Percent |
|---|---|---|---|
| Gender | Male | 88 | 49.2 |
| | Female | 91 | 50.8 |
| Age | 18 to 21 years | 86 | 48.0 |
| | 22 to 26 years | 88 | 49.2 |
| | 27 years and above | 5 | 2.8 |
| Education | Diploma | 95 | 53.1 |
| | Advanced Diploma | 53 | 29.6 |
| | Bachelor | 31 | 17.3 |
| Allowance per month (Omani Rials) | Less than OMR 50 | 53 | 29.6 |
| | More than OMR 50 but less than OMR 100 | 106 | 59.2 |
| | More than OMR 100 | 20 | 11.2 |

Source: Primary data (Questionnaire)

Table 1 shows the demographic profile of respondents. Both female and male are equal in numbers. Only 5 respondents belong to the age group of 27 years and above. Others are below 27 years of age. Majority of the respondents (53.1%) are diploma holders, 29.6% are Advanced diploma and 17.3% are Bachelor students. 106 respondents out of 179 respondents receive an allowance of more than Omani Rial (OMR) 50 but less than OMR 100. 53 students receive less than 50 Omani Rial per month. Only 20 students are receiving more than OMR 100 per month

**TABLE 2: LEVEL OF FINANCIAL KNOWLEDGE**

| Level of financial Knowledge | Frequency | Percent |
|---|---|---|
| Low financial Knowledge | 14 | 7.8 |
| Average financial knowledge | 48 | 26.8 |
| High Financial Knowledge | 117 | 65.4 |
| Total | 179 | 100.0 |

Source: Authors' calculation based on primary data

Table 2 reveals the level of knowledge of college students. 65.4% of the respondents have good financial knowledge on the benefits of savings. This is in contrast to the findings of Lusardi et. al. (2010), which says that the financial literacy is very poor among the youth. 26.8% of the students have average financial knowledge and only 7.8 % of the students have low financial knowledge.

**RELATIONSHIP BETWEEN SOCIO-ECONOMIC VARIABLES AND ATTITUDE TOWARDS SAVINGS**

In order to find out the relationship between the dependent variable Attitude towards savings and the independent variables Allowance, Friends influence, Age, family income, Gender, Self-control and Future Concern, Multiple Regression Analysis was conducted. The results of the analysis is presented in tables 3, 4 and 5.

**TABLE 3: MODEL SUMMARY**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .733[a] | .537 | .513 | .53510 |

a. Predictors: (Constant), Allowance, Friends influence, Age, family income, Gender, Self-control, Future Concern, Education, Family Influence.

According to Ratner, B. (2009), Values of R between 0.7 and 1.0 signify a strong positive linear correlation. In our study, R-value is 0.733, which indicates a strong positive relationship between attitude and the independent variables Allowance, Friends influence, Age, family income, Gender, Self-control and Future Concern. R square value indicate that 53.7% of the variance is explained by the independent variables on the dependent variable Attitude towards savings.

**TABLE 4: ANOVA**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 56.161 | 9 | 6.240 | 21.793 | <.000* |
| | Residual | 48.390 | 169 | .286 | | |
| | Total | 104.551 | 178 | | | |

a. Dependent Variable: Attitude towards savings

b. Predictors: (Constant), Allowance, Friends influence, Age, Family income, Gender, Self-control, Future Concern, Education, Family Influence

*- shows significance at 1% level

Table 4 shows ANOVA results. F value is significant at 1% level, which denotes that linear relationship exists between the independent variables Allowance, Friends influence, Age, family income, Gender, Self-control and Future Concern and the dependent variable Attitude towards savings.

**TABLE 5: COEFFICIENTS**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | .301 | .324 | | .931 | .353 |
| | family income | -.026 | .050 | -.033 | -.519 | .605 |
| | Family Influence | -.050 | .065 | -.055 | -.769 | .443 |
| | Friends influence | .090 | .048 | .116 | 1.893 | .060 |
| | Self-control | .093 | .059 | .091 | 1.569 | .119 |
| | Future Concern | .553 | .056 | .595 | 9.893 | <.000* |
| | Gender | .365 | .087 | .239 | 4.214 | <.000* |
| | Age | .189 | .083 | .136 | 2.276 | .024** |
| | Education | -.039 | .061 | -.038 | -.630 | .530 |
| | Allowance | .147 | .071 | .118 | 2.088 | .038** |

a. Dependent Variable: Attitude towards savings

*- shows significance at 1% level.

**- shows significance at 5% level

Table 5 shows the level of statistical significance. It is evident that future concern ($\alpha < 0.000$) and Gender ($\alpha < 0.000$) are significant at 0.01 level, Age ($\alpha = 0.024$) and Allowance ($\alpha = 0.038$) are significant at 0.05 respectively. This clearly shows that future concern, gender, age and Allowance have influence on attitude of the respondents towards savings. Table 5 also shows the beta values. The beta values permit us to associate the relative significance of every independent variable (Carver & Nash, 2005). In our study, Future concern ($\beta = 0.553$) and Gender ($\beta = 0.365$) have a greater impact on attitude of respondents towards savings.

## CONCLUSION

This study, which was conducted to determine the financial knowledge of the College students in Oman with 179 respondents. It was found out that the students have good financial knowledge about the benefits of savings money in the bank since it is safe, would earn interest and they can avail the banks promotion. The demographic profile in terms of age, those 27 and above, and in terms of gender its female who have more financial knowledge. Demographic profile in terms age, gender and allowances received have a strong effect on savings behavior of College students According to Lusardi, et al. (2010), financial literacy is more crucial for portfolio choice as well as accumulating wealth. In our study, financial knowledge did not affect their savings behavior. This is because certain variables like knowledge of interest and their knowledge on investment avenues were not considered in this study. Thus, this study recommends to add other variables like knowledge of interest, investment avenues to further investigate the impact of financial knowledge on savings behavior. Further, the study should be conducted with all age groups and more samples to clearly understand the level of financial literacy as well as their attitude towards savings.

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# IMPACT OF RUSSIA-UKRAINE WAR ON AMERICAN STOCK MARKET - AN EVENT STUDY WITH REFERENCE TO DOW JONES INDUSTRIAL AVERAGE

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## ABSTRACT
*The world economy is barely recovering from the harsh hit of the Covid 19 pandemic and the Russia-Ukraine conflict has worsened the condition with inflation, high energy costs and global distress. For elucidating the impact of Russia-Ukraine war on US market, this study makes use of event study methodology in turn will reflect how the event of the Russia-Ukraine war has affected the US market returns beyond expectation. The data on the weekly DJIA index values are collected from Yahoo! Finance website for the event window which was tabulated and analysed using Microsoft excel and SPSS. The study concludes that Russia Ukraine war did impact on the DJIA index of US market resulting in fall in the Dow jones Industrial average along with the decline in the index values of other stock markets around the world.*

## KEYWORDS
DJIA index, Russia Ukraine war, market expectations, influence.

## JEL CODES
F51, F21, G15, D84, E22, E44.

## INTRODUCTION
The hostility between Russia and Ukraine existed years ago as a cause of border demarcation, the situation of the Russian minority in Ukraine, the annexation of Crimea, the increasing eastward expansion of NATO(North Atlantic Treaty Organization) and so on (Naveenkumar K et al., n.d.). The animosity between Russia-Ukraine pronounced due to the launching of a full-scale military invasion by Russia into Ukraine on 25th February 2022. The massing of troops by Russia at Ukraine's border escalated confrontation not only around the countries bordering Russia and Ukraine but also extended to the rest of the world. The supply of military equipment from the European and Western allies enabled Ukraine to defy the war. On the other hand, severe sanctions from the allies of Ukraine particularly the United States imposed economic pain on Russia for its violent strike.("Valuation of European Firms During the Russia-Ukraine War by Alexandros Bougias, Athanasios Episcopos, George N. Leledakis: SSRN," n.d.)

Wars raise uncertainty which lowers the predictability of future price movements thereby creating panic and perplexity among the investors. Analogously, Russia-Ukraine's geopolitical war induced the financial market reactions, the impact of which is reflected in the global stock price movements. The world economy is barely recovering from the harsh hit of the Covid 19 pandemic and the Russia-Ukraine conflict has worsened the condition with inflation, high energy costs and global distress. The United States which has a crucial interest in the restoration of Ukraine's sovereignty is not an exception to it. The Times of India report says the impact of the crisis could be felt in sundry ways in the USA, from the price of gasoline to a hit to household wealth ("Economic impact of Russia-Ukraine War," n.d.). Russia produces 10 million barrels of oil a day and is Europe's largest supplier of natural gas to fuel power plants and households ("Global economic implications of the Russia-Ukraine war - Economist Intelligence Unit," n.d.). Russia is also a major producer of wheat and the conflict took the food prices to a new height. Although the US imports significantly less amount of supplies from Russia, global scenarios and commodity crunch have alarmed the Americans to cut back on spending and investing activities resulting in a slowdown of economic activities. ("Economic spillovers from the war in Ukraine: The proximity penalty | VOX, CEPR Policy Portal," n.d.)

Eugene Fama in his Efficient Market Hypothesis explained how the market responds quickly and accurately to the information available, both favourable and unfavourable. Equivalently, American stock indices saw substantial volatile movements as a consequence of investors fearing in response to global reactions to the Russia-Ukraine crisis in the form of sanctions and other measures to pressure Russia. This study is an attempt to understand and elucidate the response of the American Stock market to the Russia-Ukraine conflict by taking into consideration of Dow Jones Industrial Average (DJIA) index movements. Dow Jones Industrial Average is one of the oldest and the most commonly followed price-weighted stock market index of 30 listed companies on the stock exchanges in the US ("https://en.wikipedia.org/wiki/Russo-Ukrainian_War - Google Search," n.d.).

## LITERATURE REVIEW
(Mbah and Wasum, 2022) Considerable studies have been published to delineate the relationship between wars and the stock market, throw light on the impact of wars on world stock market returns and enable the investors and policymakers to design effective strategies ("Why has Russia invaded Ukraine and what does Putin want? - BBC News," n.d.). Researchers have made use of empirical approaches for the comprehensive evaluation of the stock market response to some violent events like the World War and the pro-Russian conflict
("The impact of the Ukraine–Russia war on world stock market returns - ScienceDirect," n.d.)The Russia-Ukraine war 2022 became a crucial issue triggering the reactions from countries across the world. Reports suggest the intensity of the Russia-Ukraine crisis 2022 on the global economy ("How Russia's Invasion of Ukraine Could Affect the U.S. Economy - The New York Times," n.d.). The sanctions imposed on Russia, although intended to hurt Russia, had spillover effects on the global economy. There was an increase in the global Purchasing Manager's Index and an increase in the world price of food and food ingredients ("How Russia's Invasion

of Ukraine Could Affect the U.S. Economy - The New York Times," n.d.). This invasion generated negative cumulative abnormal returns for global stock market indices, but with heterogeneous effects (Stillman, 1986). It had different impacts on stock markets across countries and sectors, depending on how deeply the countries or industries are involved in the war (Stillman, 1986). Neighbouring countries, on average, incurred an abnormal decline in equity indices of 23.1% within the four weeks around the onset of the war ("Dow Jones Industrial Average - Wikipedia," n.d.). The war led to lower corporate security and higher asset volatility in European firms. European equities and Russian bonds are the net transmitters of shocks. Researchers have investigated the impact of geopolitical risk (GPR) generated by the Russian-Ukrainian conflict on European and Russian bonds, equity, and global commodity markets. Most Asian countries, being net oil importers will be able to absorb the effects in the long run. Studies indicated that industry plays an important role in the stock market reaction.

("The pro-Russian conflict and its impact on stock returns in Russia and the Ukraine | Request PDF," n.d.)Literature review on American stock markets depicts that there has been a study that focused on large shocks in the volatility of the DJIA index. Studies analyze the US market reactions to events like presidential elections [19]. Evidence exists on valuation effects of the event of WorldCom failure. Researchers have also elucidated the consequences of the Russia-Ukraine war on major global economic players like the USA, Canada, UK, and the EU and concluded that the impact of the conflict would be felt globally with soaring inflation, supply chain disruptions, etc.

As suggested by Fama, in his book "The Capital Markets: A Review of Theory and Empirical Work", in a semi-strong form of the efficient market all the information including historical data and public information is reflected quickly and precisely into share prices considering which investors cannot earn abnormal returns. An event study is an ideal tool for testing the efficiency of a semi-strong form of EMH. An event study offers a direct test of market efficiency and is the most widely used paradigm to understand the behaviour of stock markets in response to stock split announcements, earning announcements, takeovers, etc. Event study methodology is used to demonstrate the impact of Coronavirus on stock market. The event study methodology used to examine the impact of the breakout of the conflict between Russia and Ukraine on the G20 and other selected stock markets indicated a significant and negative impact on the event day and post-event days.

("Global Economic Consequence of Russian Invasion of Ukraine by Peterson K Ozili: SSRN," n.d.)These kinds of events provide us with an opportunity to learn more about the psychology of investors and human behaviour in the context of crises. This study tries to apply the event study methodology to reflect the relationship between the Russia-Ukraine war 2022 and the American stock market volatility by analyzing the fluctuations in the DJIA index.

## OBJECTIVE OF THE STUDY

The volatility in DJIA is unambiguous since the market grasped the potential conflict between Russia and Ukraine. While higher oil prices benefited energy shares, they had an adverse effect on consumers and many businesses. The index which was around 36000 in January 2022 has never re-touched that peak till date. As specified in the NPR report there may be some influence from other factors like inflation in the US which is at a 40-year high, the Federal Reserve's decisions to fight inflation, Covid 19 lockdowns, etc. [25]. The purpose of this study is to evaluate the impact of the Russia-Ukraine war on the American Stock Market to demonstrate the comprehensive movement of the stock prices with a focus on the DJIA.

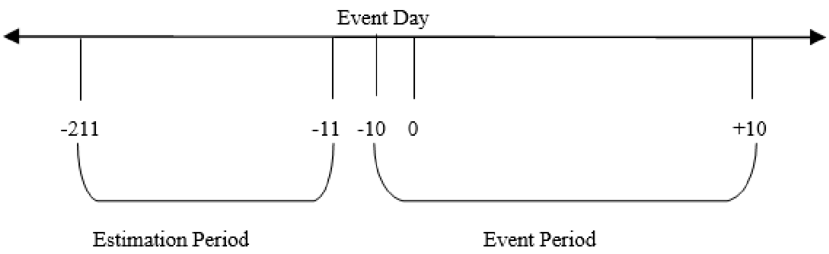
## DATA AND METHODOLOGY

This study makes use of event study methodology to analyze the change in the index prices which in turn will reflect how the event of the Russia-Ukraine war has affected the US market returns beyond expectation. The data on the weekly DJIA index values are collected from Yahoo! Finance website for the event window. According to EMH, it is not possible for any participant in the market, to outperform the market by earning abnormal returns as the stock prices quickly adjust to all the publicly available information.

Event day is the day on which a particular event took place, in this study it is the date on which Russia invaded Ukraine (24th February 2022). The estimation period is said to be a normal period preceding the event day in which we believe nothing of significance has occurred in the market to influence the performance. In this study, the estimation period begins 211 days prior to the event date and ends 11 days before (from 26th April 2021 to 8th February 2022). The estimation period is taken as the base for obtaining the average returns in DJIA index values. The event period or the event period, on the other hand, is the period in which we suspect the influence of the event on market performance. Here the event period starts 10 days prior to the event and ends 10 days after (from 9th February 2022 to 10th March 2022).

**EVENT STUDY TIMELINE**

**FIG. 1**




**Hypotheses**

For the statistical test conducted the hypotheses are stated as below:

**$H_0$:** There is no significant difference between the Abnormal Returns before and after the announcement Russia-Ukraine war in DJIA Index.

**$H_1$:** There is a significant difference between the Abnormal Returns before and after the announcement Russia-Ukraine war in DJIA Index.

The null hypothesis is tested for possible rejection, for which purpose Table 1 is used. The values in Table 1 are calculated as follows:

**Daily Returns**

$R_t = (P_t - P_{t-1})/P_{t-1}$ (1)

Where,

$R_t$ = Daily Returns

$P_t$ = Closing DJIA index value of the current day

$P_{t-1}$ = Closing DJIA index value of the previous day as on the table.

**Average Abnormal Returns:**

$AAR = R_t - R_x$ (2)

Where,

$R_t$ = Daily Returns

$R_x$ = Expected Returns

$R_x = \sum R_t/n$

Expected returns are calculated for the estimation period.

**Cumulative Average Abnormal Returns**

CAAR is the summation of all the AARs which depicts the total abnormal returns made before and after the event. CAAR acts as an effective tool of analysis in addition to the AAR by giving a comprehensive picture.

**T value**

T value (AAR) = AAR/Standard Deviation of AAR (3)

T value (CAAR) = CAAR/Standard Deviation of CAAR (4)

**TABLE 1: AVERAGE ABNORMAL RETURNS (AAR) AND CUMULATIVE AVERAGE ABNORMAL RETURNS (CAAR) OF DJIA INDEX DURING ESTIMATION PERIOD AND OBSERVATION PERIOD**

| Date | Day | DJIA | Actual Return | Expected return | AAR | CAAR | t value of AAR | t value of CAAR |
|---|---|---|---|---|---|---|---|---|
| Apr 26, 2021 | -211 | 33981.57 | -0.00182 | 0.000233 | -0.00205 | -0.00205 | -0.08323 | -0.08211 |
| May 11, 2021 | -200 | 34269.16 | 0.008463 | 0.000233 | 0.00823 | 0.006178 | 0.333824 | 0.247208 |
| Jun 09, 2021 | -180 | 34447.14 | 0.005194 | 0.000233 | 0.00496 | 0.011138 | 0.201205 | 0.445698 |
| Jul 08, 2021 | -160 | 34421.93 | -0.00073 | 0.000233 | -0.00097 | 0.010173 | -0.03914 | 0.407084 |
| Aug 05, 2021 | -140 | 35064.25 | 0.01866 | 0.000233 | 0.018427 | 0.0286 | 0.74744 | 1.144437 |
| Sep 02, 2021 | -120 | 35443.82 | 0.010825 | 0.000233 | 0.010592 | 0.039192 | 0.429627 | 1.568266 |
| Oct 01, 2021 | -100 | 34326.46 | -0.03152 | 0.000233 | -0.03176 | 0.007434 | -1.28817 | 0.297477 |
| Oct 29, 2021 | -80 | 35819.56 | 0.043497 | 0.000233 | 0.043264 | 0.050698 | 1.754877 | 2.028672 |
| Nov 29, 2021 | -60 | 35135.94 | -0.01909 | 0.000233 | -0.01932 | 0.03138 | -0.78359 | 1.255656 |
| Dec 28, 2021 | -40 | 36398.21 | 0.035925 | 0.000233 | 0.035692 | 0.067072 | 1.447751 | 2.683869 |
| Jan 26, 2022 | -20 | 34168.09 | -0.06127 | 0.000233 | -0.0615 | 0.005569 | -2.4947 | 0.222832 |
| Feb 09, 2022 | -10 | 35768.06 | 0.046826 | 0.000233 | 0.046593 | 0.052162 | 1.889924 | 2.087251 |
| Feb 16, 2022 | -5 | 34934.27 | -0.02331 | 0.000233 | -0.02354 | 0.028618 | -0.955 | 1.145136 |
| Feb 17, 2022 | -4 | 34312.03 | -0.01781 | 0.000233 | -0.01804 | 0.010573 | -0.73194 | 0.423073 |
| Feb 18, 2022 | -3 | 34079.18 | -0.00679 | 0.000233 | -0.00702 | 0.003554 | -0.28472 | 0.142193 |
| Feb 22, 2022 | -2 | 33596.61 | -0.01416 | 0.000233 | -0.01439 | -0.01084 | -0.58383 | -0.43376 |
| Feb 23, 2022 | -1 | 33131.76 | -0.01384 | 0.000233 | -0.01407 | -0.02491 | -0.57068 | -0.99674 |
| Feb 24, 2022 | 0 | 33223.83 | 0.002779 | 0.000233 | 0.002546 | -0.02236 | 0.103261 | -0.89487 |
| Feb 25, 2022 | 1 | 34058.75 | 0.02513 | 0.000233 | 0.024897 | 0.002533 | 1.009876 | 0.101374 |
| Feb 28, 2022 | 2 | 33892.6 | -0.00488 | 0.000233 | -0.00511 | -0.00258 | -0.20733 | -0.10316 |
| Mar 01, 2022 | 3 | 33294.95 | -0.01763 | 0.000233 | -0.01787 | -0.02044 | -0.72472 | -0.8181 |
| Mar 02, 2022 | 4 | 33891.35 | 0.017913 | 0.000233 | 0.017679 | -0.00277 | 0.717117 | -0.11066 |
| Mar 03, 2022 | 5 | 33794.66 | -0.00285 | 0.000233 | -0.00309 | -0.00585 | -0.12518 | -0.23415 |
| Mar 10, 2022 | 10 | 33174.07 | -0.01836 | 0.000233 | -0.0186 | -0.02445 | -0.75432 | -0.97829 |

Closing DJIA index values are recorded for the specified days in both the estimation as well as event period, on the basis of which daily returns are computed. The Average Abnormal Returns are obtained to know if there is any significant difference in abnormal returns between the estimation period and the event period. At the same time, to have a broad-spectrum view of the same Cumulative Abnormal Returns are also found.

The following tables (Table 2, Table 3 and Table 4) display the statistical indicators calculated for the purpose of statistical testing. The null hypothesis stated above was tested for rejection using paired t-test (p-value approach). The p-value and test statistic obtained are 0.062 and 2.056 respectively. As per the method of statistical testing, at a 0.1 (10%) level of significance, the null hypothesis is rejected when $p \leq 0.1$. The obtained p-value which is less than 0.1 paves the way for us to reject the null hypothesis and conclude that there is a significant difference between the Abnormal Returns of the estimation period and that of the event period on the DJIA Index. It is thus statistically evident that the event of the Russia-Ukraine war did have an impact on the American stock market.

**TABLE 2: PAIRED SAMPLES STATISTICS**

| | | Mean | N | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Pair 1 | Estimation period | .0196 | 13 | .02188 | .00607 |
| | observation Period | -.0013 | 13 | .02227 | .00618 |

**TABLE 3: PAIRED SAMPLES CORRELATIONS**

| | | N | Correlation | Sig. |
|---|---|---|---|---|
| Pair 1 | Estimation period & observation Period | 13 | -.383 | .197 |

**TABLE 4: PAIRED SAMPLES TEST**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 90% Confidence Interval of the Difference | | | | |
| | | | | | Lower | Upper | | | |
| Pair 1 | Estimation period- observation Period | .02093 | .03671 | .01018 | .00279 | .03908 | 2.056 | 12 | .062 |

**THE CHART REPRESENTING THE MOVEMENTS OF THE DJIA INDEX BEFORE AND AFTER THE EVENT**

**CHART 1**

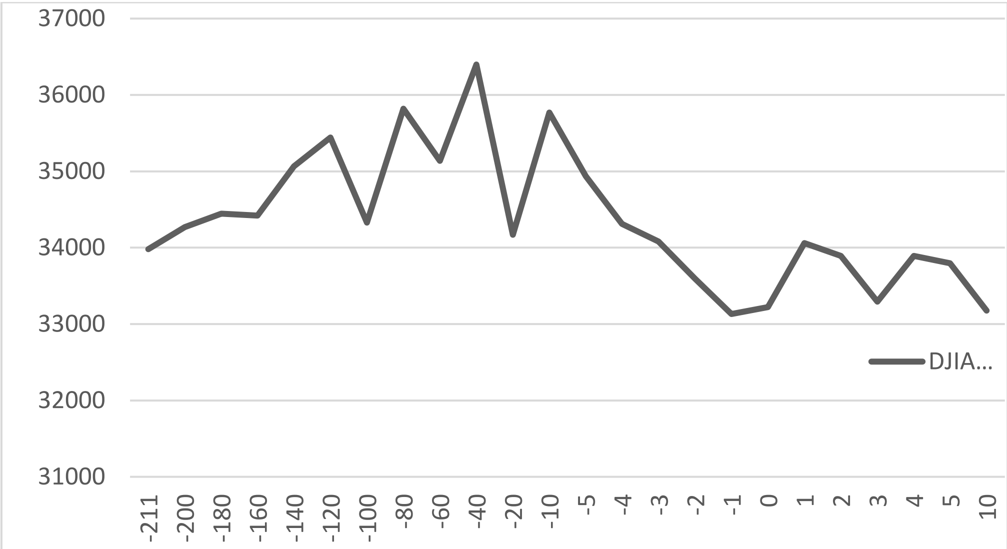
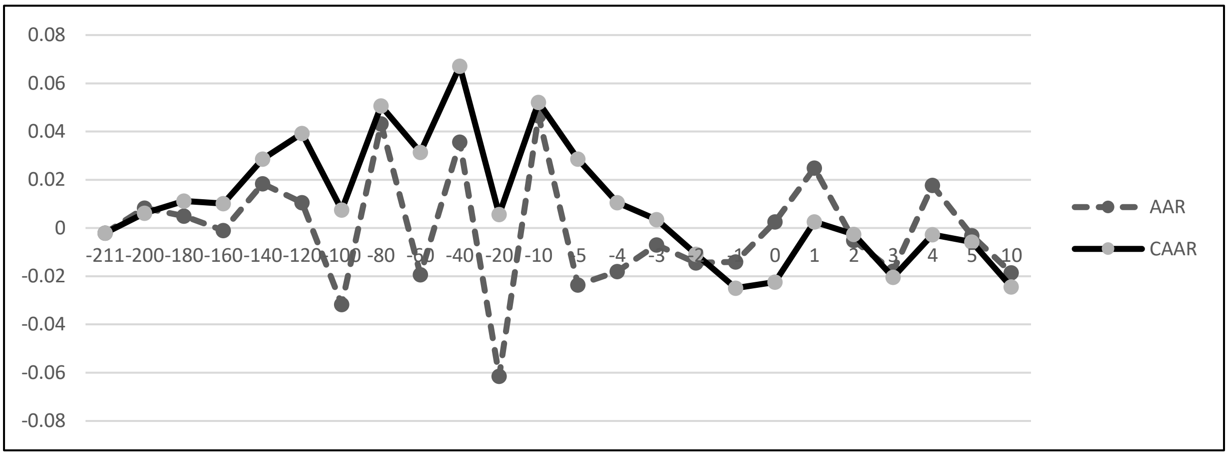



Chart 1 portrays the graphical up-down flow of the DJIA index. The horizontal axis represents the days while the vertical axis represents the closing index values. The downward flowing wave displays the plunging performance of the stock market. The index values which reached the height of 36000 in the estimation period collapsed to the range of 33000-34000 in the post-event period, markedly lower than those in the estimation period.

**THE CHART SHOWING THE MOVEMENTS OF AAR AND CAAR DURING THE ESTIMATION PERIOD AND EVENT PERIOD**

**CHART 2**




The graphical movements of AAR and CAAR in Fig.2 are a piece of clear evidence regarding the impact of the Russia-Ukraine war on the stock market. Both AAR and CAAR are on a downward trend implying that there are very less, zero or negative abnormal returns during the periods under study. Here the null hypothesis 'CAAR is equal to zero' is rejected at 0.1 (10%) level of significance, indicating that CAAR is not equal to zero and the event of the Russia-Ukraine crisis did impact the American Stock Market Index in a retreating and statistically evident manner.

## CONCLUSION

Being the economic indicator of the biggest economy in the world the Dow jones Industrial average is affected by the Russia-Ukraine Geographical tensions. The animosity between Russia-Ukraine pronounced due to the launching of a full-scale military invasion by Russia into Ukraine which extended to the rest of the world. It is empirically elucidated in this study as the null hypothesis was rejected at 0.1 level of significance. The fall in the Dow jones Industrial average along with the decline in the index values of other stock markets around the world worsened the situation creating a panic among the investors. The fear of world war and the threat of resulting inflation impacted the global economies and stock market performances. As stated in EMH the markets do reflect the available information and change accordingly. In the study rejection off hypothesis and acceptance of alternative hypothesis implies that the Russia Ukraine has pushed the US stock market to the lower ebb. Thus, it is an illustration of how a market response to the global events as we statistically understand the negative response of Dow jones index values.

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