Vol. 03 No. 01. January-March 2025

Advance Social Science Archive Journal



#### Advance Social Science Archive Journal Available Online: <u>https://assajournal.com</u> Vol.3 No.1, January-March, 2025. Page No. 865-880

Print ISSN: <u>3006-2497</u> Online ISSN: <u>3006-2500</u> Platform & Workflow by: Open Journal Systems



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### ABSTRACT

The objective of this research is to determine spillover effects of Russia Ukraine war on stock market returns of Russia's trading partner countries. Trading partner countries are taken as per report of world bank 2022. Apart from this, secondary data from march 2022 to may 2023 with daily frequency is taken. Further, unit root, lag selection criteria, impulse response function and variance decomposition is used for analysis. The results indicated that United Kingdom stock market returns is less responsive to war, whereas China, Germany, Italy and Kazakhstan are parallel responsive towards war of Russia. Russia contributes 1.02% spillover effects on China, 2.45% spillover effects for Germany, 2.8% spillover effects for Italy and 1.17% spillover effects on Kazakhstan throughout war period indicating short and long run spillover effects. Furthermore, first lag was selected based on results and data was stationary at first level as well as returns of stock markets were taken. Hence, this report reveals that partner countries of Russia have respond towards this war and their stock markets are influenced with this war.

**Key Words:** Russia Ukraine War, Spillover Effects, Stock Market Returns, Impulse Response Functions and Variance Decomposition Model.

#### **1.0Introduction**

World leaders have labelled regions of Ukraine are independent both Luhansk and Donetsk on 11-2-2022, according to recognition of Russia, as commencement of conflict. The result, western nations such as the "United Kingdom (UK) & United States (US)", as well as European Union (EU) participants began imposing a wave of penalties

on commercials of Russia. As per the United States, the United Kingdom, nations of European Union, as well as different countries' governments, Australia also strongly opposed 'Russia's illegitimate operations in eastern Ukraine.

In the response of this political turmoil the stock market fell significantly in world. The US S&P 500, for example, sank by 1%, European stocks (STOXX) fell by 1.3%, the stock market of Australia fell by 1.4%, and China index fell by 1.2%. The research investigates how Australia's stock stockholders reacted to the Russia-Ukraine situation, also known as the "Donetsk and Luhansk" areas of Ukraine being recognized as separate entities. We also look into whether firm- and industry-level heterogeneity affects how Australian investors respond to this crisis.

The returns of stock market impacted significantly due to political fear, as well as financial assets profiles of risk in this cause, according to earlier research into the nexus of administrative uncertainty and financial market outcomes (Gemmill 1992, Nippani and Medlin 2002, Mei and Guo 2004, Li and Born 2006, Jones and Banning 2009, Berkman, Jacobsen et al. 2011, Dimic, Orlov et al. 2015, Kapar and Buigut 2020), emphasize signifiance of such crises by defining volalitity and mean on returns of stock market globally by consuming numerous worldwide governmental crises. (Lehkonen and Heimonen 2015) similarly demonstrate an adverse association of partypolitical instability and market returns using data from 49 developing economies. The power of Russia-Ukraine conflict on stock markets is examined a few recent research in various circumstances. For instance, the Russia-Ukraine situation had major performance impacted negatively and caused markets globally, according to (Boungou and Yatié 2022). According to (Boubaker, Goodell et al. 2022), stock market indexes in settled economies witnessed severely and negatively impacted than those in emerging markets

#### 1.2. Research Objectives

This research aims to identify how does stock markets of top trading partner countries of Russia respond to Russia and Ukraine War and to what extinct stock markets of partner countries have respond to shocks of Russian Stock Market.

#### 2.0. Literature Review

Many countries have imposed different sanctions against Russia and limited trade against them in favor of issue .The EU Council adopted punitive actions against five people on our event day, February 21. US launched its first sanction on Russia on February 22 in order to restrict its access to financial resources. On 23<sup>rd</sup> February, a unique measures of set were unveiled by European Council, On 24<sup>th</sup> February, leaders of Europe certain to apply further endorsements against Russia in the banking, energy, and transportation industries, as well as limitations on products with dual uses, controls of export, financing for trade, and regulations for issuing visas. In fact, Russia

faced different sanctions against trade due to Ukraine invasion and forced seized Crimea by Russia

In 2014, the sanctions which were enforced on Russia were directed due to interactions largely with Crimea but showed little influence towards Russia directly. Due to conflict, many penalties were forced on Russia and it became international sanctions target as top candidate. Contrast to wars, the supply chain globally targeted situation of Russia-Ukraine. According to views of Russia, affected country in this war is important metal source such as "sunflower oil, maize and wheat" as well as gas and oil along with essential commodities significantly result in decreased because of the crisis. Due to this conflict the supply chain interrupted globally and which leads to exports of Russia to be banned and global shipments stuck in mid of waterways and airways due to Russia's refusal which cause to increase prices of commodities dramatically. With reference to previous wars, the scenario of Russia and Ukraine, the supply chain of entire world got affected specially the commodities like "sunflower oil, maize and wheat" got decreased entirely along with oil and gas as well as other important commodities.

The refusal of Russia for international cargos to transfer with its airspace and marine routes and exports of Russia which were banned and restricted which in result decreased the global supply-chain. Due to this disruption, the pricing levels of said commodities increased significantly which created difficulties for the trade and businesses around the globe and created inverse effects on the performance of business in the European economy (Sack 2005). Therefore, Russia-Ukraine war could create volatility in the values of European corporation's shares. Additionally, the Eurozone's geopolitical risk and dangers have grown as a result of the Crisis between Russia and Ukraine. The Ukrainian migrants who got asylum in nations of Europe reached over 6.8 million as well as these nations and their businesses got impacted directly because of their relation and ties closely just because of this war. Additionally, due to the high degree of ambiguity. These economic effects of the crisis are uncertain and long term and depend on how long this battle lasts. The risk in Euro Zone got increased, as investors are becoming more hesitant, which lowers company confidence and lowers stock prices (Caldara and Iacoviello 2022).

Since the World War II, it is first invasion in nations and geopolitical region of Europe, and has huge volatility on the geopolitically and continents economy. This entire scenario has made stock market of continent ramped and created fluctuations in prices of stocks of these companies of region. After announcing of two independent state in Ukraine eastern region on 21<sup>st</sup> February 2022, a study was conducted to test the intensity of responses of stock market to war, using companies which are part of

Europe 600 index, which are key representative of publically traded companies with capital ranging from small to large a sample from major countries of Europe.

Our results show that, with the exception of the 1<sup>st</sup> day after the said event there are considerably adverse average abnormal returns (AARs) nearby the brief event windows. The most significant decline in prices of stocks throughout the said event windows is observed on the day of event, when we detect a destructive AAR of 0.41%. Additionally, we see undesirable and substantial cumulative abnormal returns (CARs) before to, during, and after the event, which is compelling indication of long-lasting adverse effects on stock market of Europe due to crises of war. Out of eleven industries, 7 industries including, staples consumers, basic material, healthcare, financial, telecommunications and utilities faced adverse and momentous AAR on day of incidence, according to our analysis, stock prices faced reactions due to industry level differences because of crisis. Additionally, sector of consumer staples got intensively worse AAR on day of incidence. The sector of energy had a negligible increase in AAR. Additionally, across all event periods, the pecuniary services sector saw the maximum unadorned impact. When CAR is employed in the study, we consistently see considerable industry-level variance (Ozili 2021).

Moreover, we observed that prices of stock took reactions to the crisis display significant country-level variation. firms domiciled in Denmark and Switzerland suffered substantial undesirable CAR round the day of incidence as well as period of pre-event, whilst multinationals in the Netherlands incurred greatest undesirable AAR. Companies of UK also knowledgeable a progressive and considerable AAR on day of incidence. Finally, we note that said day small scale and medium scale enterprises had adverse AAR (CAR) compared to large scale companies. As per our research it contributes significantly in literature. We expand research scope that politically and geopolitically concerning overall influence of returns of stock (Narayan 2022, Long, Morgan et al. 2023).

While most previous examination directs that governmental actions have adverse effects on returns and volatility of market (Rigobon and Sack 2005, Choudhry 2010, Smales 2017, Buigut and Kapar 2020, Kapar and Buigut 2020). Others show a shaky correlation between military occasions and market dynamics (Hudson and Urquhart 2015), while some contend that there are confident benefits (Guidolin and La Ferrara 2010). Given these contradictory results, this is the first study to response that how the Russia-Ukraine situation has exaggerated stock prices in European nations. Our model nations are indirect participants of conflict, in contrast to other research (Rigobon and Sack 2005, Choudhry 2010), however they do assist Ukraine militarily and with humanitarian aid, and they impose sanctions on Russia.

Russia acknowledged the two Ukrainian states as independent nations, and that this status persisted after the incident. We show, Russia-Ukraine situation has sustained negative reaction in the European stock markets, which is significant. Second, our research adds to other studies that demonstrate that different industries have different stock price sensitivity to political and geopolitical uncertainty (Boutchkova, Doshi et al. 2012, Buigut and Kapar 2020). We demonstrate how some sectors were more susceptible to the Russia-Ukraine situation than others, including the basic materials, consumer staples, banking, healthcare, industrial, telecommunications, and utilities sectors. We see that the user staples sector was compressed by the Russia-Ukraine conflict, notwithstanding past research screening this sector is least affected by crises (Landier and Thesmar 2020).

Thirdly, the literature on this topic has been expanded by our findings of significant country-level variation in the stock price responses to the Russia-Ukraine conflict on the European stock market (Buigut and Kapar 2020). According to our research, the degree of trade and economic linkages between a country and Russia or Ukraine has a much greater impact on stock values than physical proximity alone does. Finally, our research may help managers, legislators, and other relevant stakeholders create measures that will lessen the detrimental effects of political unpredictability on stock markets. The remainder of this essay is organized as follows. Section 2 presents the data and empirical methodology. Section 3 of the report discusses the findings. The study is finally summarized in Section 4, which also offers suggestions for future research as well as policy implications.

#### 3.0. Research Methodology

This research is causal in nature and contains quantitative method and secondary data is used from 24<sup>th</sup> March 2022 to 31<sup>st</sup> May 2023. Further, in this study Russia's stock returns are independent variable and dependent variables are stock returns of UK, China, Germany, Italy and Kazakhstan and these countries are selected because these are top trading partners of Russia according to world bank 2022. Apart from this, unit root test is used to check stationary in data, log returns are taken through vector autoregressive, Impulse response function is used to check response of partner countries to Russia during war as to determine spillover and variance decomposition is used to check magnitude of response towards the shock in Russian stock market.

### 4.0. Data Analysis and Results Table: No.1 Unit Root Table

Variable Name	Order of Integration	T-statistic	Prob. Value
RCHINA	Level	-15.5266	0
RGERMANY	Level	-15.9581	0
RITALY	Level	-16.1586	0
RKAZAKHSTAN	Level	-14.7912	0
RNETHERLAND	Level	-15.6614	0
RUK	Level	-15.6349	0
RRUSSIA	Level	-13.041	0

**Interpretation**: The unit root test table no.1 based on Augmented Dickey Fuller, ADF test is used to check stationary in data whether data is dependent on previous period or it is independent from previous period. In order to check stationarity in data we have applied ADF test of unit root and based on the results it is suggested that all variables are stationary at level as T-statistics of all variables are greater than ± 2 and probability value is less than 0.05, hence we reject null hypothesis of that data has unit root for all variables and indicating that data is free from previous periods. Further following graphs are showing independency of all variables from previous periods. Augmented Dickey Fuller test of unit root suggest that mean and variance are not equal based on following graphs as each graph showing different variable data and all graphs showing independency of data from previous period. Hence it is clear that data has no unit root at all.









RGERMANY





Table No.2 Lag Selection Criteria By VAR

Lag	LogL	LR	FPE	AIC	SC	HQ
0	4995.913	NA	4.95E-28	43.00787	-42.90387*	-42.96593*
1	5046.786	98.23894*	4.87e-28*	-43.02402*	-42.19205	-42.6885
2	5077.402	57.27162	5.71E-28	-42.86553	-41.30559	-42.2364
3	5106.481	52.6431	6.80E-28	-42.6938	-40.40588	-41.7711
4	5130.852	42.6504	8.46E-28	-42.48149	-39.46559	-41.2652
5	5164.086	56.15312	9.77E-28	-42.34557	-38.6017	-40.8357
6	5202.15	62.01889	1.09E-27	-42.2513	-37.77945	-40.4479
7	5234.389	50.58094	1.28E-27	-42.1068	-36.90698	-40.0098
8	5270.396	54.3206	1.46E-27	-41.99479	-36.067	-39.6042

**Interpretation**: The above table no.2 is about lag selection criteria is used to check the optimal lag for analysis and using Vector autoregressive test it is conducted and by default it included 8 Lags for determining optimal lag. Based on above results Schwarz information criteria "SC" and Hannan-Quinn information "HQ" suggesting that lag 0 is optimal for analysis, whereas LR test, Final Prediction Error and Akaike information criteria suggesting that lag 1 is optimal lag period for analysis and based

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on these results lag 1 is selected because three criteria were suggesting lag 1 is optimal for analysis.

# Graph No.2 Multiple Graphs of Impulse Response Function (Responses of Russia's Trading Partners towards Russia)



shock or incident. Based on other results of graphical representation of IRF it is indicated that stock market returns of Russia is influenced by its own shock and during period its mostly affected by itself. Whereas, all its major trading partners according to data of world bank 2022 have shown responses towards shocks in stock market returns of Russia. First of all, Russia has spillover effects on China in starting period of war with Ukraine as China stock market response to Russia goes parallel with Russia as shown in above graph if stock market of Russia goes up likewise stock market of China goes up and vise-versa in short run period. When it comes to long run period the results shows that Russia has minor influence on stock market returns of China. Similarly, all other countries included in research who are trading partners of Russia show that they are having spillover effects due to war with Ukraine as they have responded to stock market returns of Russia and they have shown that their stock markets have gone along with Russia because they are closely associated with Russia as importing and exporting partners of Russia therefore effects of shocks in Russia`s stock market has influenced its trading partners.

#### **Table No.3 Variance Decomposition of Russia**

Period	S.E.	RRUSSIA	RCHINA	RGERMANY	RITALY	RKAZAKHSTAN	RUK
1	0.019964	100	0	0	0	0	0
2	0.020436	98.23731	0.001283	0.035386	0.212303	0.00139	1.512324
3	0.020461	98.13211	0.030389	0.060067	0.221195	0.002152	1.554084
4	0.020462	98.12934	0.030781	0.061155	0.222288	0.002161	1.554271
5	0.020462	98.12918	0.030791	0.0612	0.222346	0.00217	1.55431
6	0.020462	98.12918	0.030792	0.061202	0.22235	0.00217	1.55431
7	0.020462	98.12918	0.030792	0.061202	0.222351	0.00217	1.55431
8	0.020462	98.12918	0.030792	0.061202	0.222351	0.00217	1.55431
9	0.020462	98.12918	0.030792	0.061202	0.222351	0.00217	1.55431
10	0.020462	98.12918	0.030792	0.061202	0.222351	0.00217	1.55431

#### Variance Decomposition of RRUSSIA:

**Interpretation**: The table no.3 Variance decomposition of Russia shows that stock returns of Russia are not influenced by other stock markets of its trading partners but it is highly affected by its own shocks during period of war since February 2022 to May 2023 in short run as well as long run period. Only stock returns of United Kingdom

slightly affect Russia in long run as results of decomposition shows 1.55% influence in Russia.

Period	S.E.	RRUSSIA	RCHINA	RGERMANY	RITALY	RKAZAKHSTAN	RUK		
1	0.013398	0.006438	99.99356	0	0	0	0		
2	0.013639	1.021434	96.49625	0.498465	0.015814	0.884777	1.083262		
3	0.013643	1.053028	96.44697	0.513396	0.015863	0.887038	1.083701		
4	0.013643	1.054132	96.44451	0.513415	0.015872	0.887018	1.08505		
5	0.013643	1.054192	96.44443	0.513421	0.015873	0.887018	1.08507		
6	0.013643	1.054193	96.44442	0.513421	0.015874	0.887018	1.08507		
7	0.013643	1.054193	96.44442	0.513421	0.015874	0.887018	1.08507		
8	0.013643	1.054193	96.44442	0.513421	0.015874	0.887018	1.08507		
9	0.013643	1.054193	96.44442	0.513421	0.015874	0.887018	1.08507		
10	0.013643	1.054193	96.44442	0.513421	0.015874	0.887018	1.08507		

## Table No.4 Variance Decomposition of China Variance Decomposition of RCHINA:

**Interpretation**: The table no.4 variance decomposition table for China shows that it's stock market returns are influenced by Russia's war in the very close period and it shows spillover effect in both short run and long run period by 1.02% to 1.05% as shown in above table. Further, stock returns of China are dominant by its own shock in short run and long run period. It is also affected by stock returns of United Kingdom since period 2 indicating short run spillover effect as well as it affected in long run period by 1.08%.

Period	S.E.	RRUSSIA	RCHINA	RGERMANY	RITALY	RKAZAKHSTAN	RUK
1	0.012757	2.487961	2.01534	95.4967	0	0	0
2	0.012853	2.452413	2.141381	94.31956	0.251603	0.001125	0.833914
3	0.012854	2.451885	2.154177	94.29525	0.25811	0.001883	0.838699
4	0.012855	2.452121	2.154287	94.29408	0.258499	0.002191	0.838826
5	0.012855	2.452124	2.154286	94.29405	0.258519	0.002193	0.838826
6	0.012855	2.452124	2.154286	94.29405	0.25852	0.002193	0.838826
7	0.012855	2.452124	2.154286	94.29405	0.25852	0.002193	0.838826
8	0.012855	2.452124	2.154286	94.29405	0.25852	0.002193	0.838826
9	0.012855	2.452124	2.154286	94.29405	0.25852	0.002193	0.838826
10	0.012855	2.452124	2.154286	94.29405	0.25852	0.002193	0.838826

### Table No.5 Variance Decomposition of Germany *Variance Decomposition of RGERMANY:*

**Interpretation**: The table no.5 of variance decomposition table for Germany shows that mostly stock returns of Germany is dominant by its own shocks by 95% in period first during war and it dominance reduces to 94% because it is showing strong spillover effects by Russia`s stock market returns and China`s stock market returns in both short run period and long run period as above table indicating Russia has greater spillover effects on Germany during war in its first period of war than China which affects 2.01% spillover on Germany. Later on, after 1<sup>st</sup> period Russia`s stock returns spillover reduces to 2.45% on Germany throughout period of war from short run to long run period, as well as 2.15% spillover effect of China on Germany remains continue throughout short run and long run period. Hence it shows that Germany`s stock market returns show greater response towards Russia`s stock market returns during war period with Ukraine.

Period	S.E.	RRUSSIA	RCHINA	RGERMANY	RITALY	RKAZAKHSTAN	RUK
1	0.014023	2.848732	0.604945	38.97422	57.5721	0	0
2	0.014314	2.7692	0.708169	38.22839	57.0895	0.179007	1.025732
3	0.014332	2.762921	0.720448	38.19796	57.11431	0.180449	1.023915
4	0.014333	2.762849	0.720335	38.19802	57.11439	0.180466	1.02394
5	0.014333	2.762814	0.720326	38.19798	57.11446	0.180491	1.023931
6	0.014333	2.762812	0.720326	38.19797	57.11447	0.180493	1.023931
7	0.014333	2.762812	0.720326	38.19797	57.11447	0.180493	1.023931
8	0.014333	2.762812	0.720326	38.19797	57.11447	0.180493	1.023931
9	0.014333	2.762812	0.720326	38.19797	57.11447	0.180493	1.023931
10	0.014333	2.762812	0.720326	38.19797	57.11447	0.180493	1.023931

#### **Table No.6 Variance Decomposition of Italy**

**Interpretation**: The above table no.6 of Italy shows how does stock market returns of *Variance Decomposition of RITALY:* 

countries has respond to any shock in country or in other countries, the above results shows that Germany stock returns has strong spillover effects on Italy stock market returns than others in both short run period and long run period it is highly affected by Germany. Furthermore, Russia's stock market returns has also spillover effects on Italy stock market returns in short run it has 2.8% effects and in long run it has 2.7% spillover effects during period of war with Ukraine. Hence, during war Italy stock market has highly affected by these two countries and also United Kingdom has similarly spillover effects by 1.02% in short run and in long run as well.

**Table No.7 Variance Decomposition of Kazakhstan** 

Va	ariance Dec						
Period	S.E.	RRUSSIA	RCHINA	RGERMANY	RITALY	RKAZAKHSTAN	RUK
1	0.008853	1.036428	0.398723	2.435018	0.097585	96.03225	0
2	0.009003	1.174495	1.091209	4.664397	0.137436	92.93039	0.002077
3	0.009007	1.17843	1.093413	4.667433	0.138088	92.85762	0.065011
4	0.009007	1.178638	1.093819	4.667636	0.138087	92.85679	0.06503
5	0.009007	1.178639	1.093819	4.667644	0.138087	92.85678	0.065033
6	0.009007	1.178639	1.09382	4.667645	0.138087	92.85678	0.065033
7	0.009007	1.178639	1.09382	4.667645	0.138087	92.85678	0.065033
8	0.009007	1.178639	1.09382	4.667645	0.138087	92.85678	0.065033
9	0.009007	1.178639	1.09382	4.667645	0.138087	92.85678	0.065033
10	0.009007	1.178639	1.09382	4.667645	0.138087	92.85678	0.065033

Interpretation: The above table no.7 of Kazakhstan stock market returns shows its own stock market returns are dominant to its countries shock as 96% returns are affected by its own shocks, on the other hand, the targeted area that is stock market returns of Russia during war and based on above results of VDM it is indicated that in short run returns of stock market of Russia is 1.03% spillover effects on Kazakhstan stock market returns and during the period spillover effects increased to 1.17% on Kazakhstan stock market returns which shows that during war Kazakhstan has affected by Russia as being trading partner. Furthermore, Germany has strong spillover effects by 2.4% in short run period and it increased to 4.66% spillover effects in long run period on Kazakhstan stock market returns during war. This suggest that being close trading partner of Russia the stock market returns vary due to war with Ukraine.

Period	S.E.	RRUSSIA	RCHINA	RGERMANY	RITALY	RKAZAKHSTAN	RUK
1	0.01537	0.002683	0.256371	12.33557	0.005859	3.926218	83.4733
2	0.015592	0.158903	1.936245	12.58138	0.099889	3.892854	81.33073
3	0.015606	0.176917	1.949222	12.63718	0.116049	3.902702	81.21793
4	0.015606	0.176932	1.949121	12.63987	0.117389	3.902509	81.21418
5	0.015606	0.176935	1.94912	12.6399	0.117478	3.902509	81.21406
6	0.015606	0.176935	1.94912	12.6399	0.117483	3.902509	81.21405
7	0.015606	0.176935	1.94912	12.6399	0.117484	3.902509	81.21405
8	0.015606	0.176935	1.94912	12.6399	0.117484	3.902509	81.21405
9	0.015606	0.176935	1.94912	12.6399	0.117484	3.902509	81.21405
10	0.015606	0.176935	1.94912	12.6399	0.117484	3.902509	81.21405

**Table No.8 Variance Decomposition of UK** 

Interpretation: The above table no.8 of VDM shows that 83% in short period and 81% in long run period indicating stock market returns of United Kingdom are affected due to countries own shocks and it has spillover effects by Kazakhstan stock market returns which contributed by 3.9% towards UK stock market. Further China and Germany are also contributing spillover effects towards UK as China explains about 1.9% variance in short run and long run period for UK and Germany accounts 12% spillover variance in short run and long run period towards UK but stock market returns of Russia do not contributes much towards UK in both short and long run period as only 0.17% spillover effects are being explained by VDM. Hence it is indicated that stock market returns of UK were not influenced much by the war of Russia with Ukraine.

#### 5.0. Conclusion

The objective of this study was to determine spillover effects of Russia and Ukraine war on the trading partners of Russia during war period. The countries were selected according to world bank to check how they respond to war and how much stock markets of these countries have been influenced with Russia. The results showed that trading partners of Russia, shown greater influenced in their stock markets due to Russia and Ukraine war and returns of these countries work parallel with stock returns of Russia stock market. United Kingdom showed very less response towards Russia during war but shown greater influence by Germany towards UK. Further, all other trading partners of Russia which are China, Germany, Italy and Kazakhstan shown good amount of response towards shocks in stock market of Russia. Russia stock market shown 1.02% spillover effects on China, 2.45% spillover effects towards Germany, 2.8% spillover effects on Italy and 1.17% towards Kazakhstan. Based on this it is suggested that investor must provide an intense behavior towards shocks in partners countries otherwise their investment can cause as huge loss to them.

#### 6.0. Abbreviations

- Augmented Dickey Fuller: ADF
- Variance Decomposition Model: VDM
- Impulse Response Function: IRF
- United Kingdom: UK

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