

IMPACT OF FINANCIAL CONTAGION ON DEVELOPED AND EMERGING ECONOMIES IN THE WAKE OF THE COVID-19 PANDEMIC AND THE RUSSIA-UKRAINE CONFLICT

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ABSTRACT

The world economy has been experiencing two double difficulties including the Covid - 19 pandemic and the war of Russia - Ukraine. The Russia-Ukraine war, accompanied by strong Western economic sanctions as well as Russia's reactions, have had a comprehensive and profound negative impact on the world economy. With the openness of the economy as high as it is today, the influence between different economies is understandable. The research results focus on analyzing the financial contagion between mature and emerging markets in post-Covid pandemic and the war of Russia - Ukraine. The study collected random stock index data from 5 developed and 5 developing countries from 2015 to the end of January 2023. The study uses the GARCH(1,1)-M model to find the financial spread between selected countries. Research results show that developed countries have a larger financial spread than developing countries, especially during the post-Covid pandemic and the war of Russia - Ukraine period.

Keywords: Financial Contagion, Volatility Spillovers.

1. INTRODUCTION

Together with the extensive integration of the global economy and finance, there is a strong relationship between the various stock markets. Strong external shocks to stock markets brought on by global unrest, such financial crises and the COVID-19 pandemic, hasten risk spillover (Duong et al, 2023). To assess contagion across stock markets, it is crucial to distinguish between cross-market independence and contagion impact. Correlations between various periods are studied after dividing a turbulent timeline into a stable period and a crisis phase. If there is a moderate connection between two stock markets in an environment of stability, the moderate correlation will climb significantly in an environment of unrest (Jebri, Jilani & Liouane, 2013). Pairwise correlation is another name for this pair of cross-market correlations before and after a crisis. A contagion is characterized as a large increase in pairwise correlations between stock markets before and after a crisis. Interdependence is defined as the absence of a discernible increase in paired cross-market correlations during a crisis. So, after a major external shock to one stock market, contagion refers to a fundamental change in cross-market relationships. Contrarily, cross-market independence denotes the absence of any significant modifications to the relationships across stock markets.

Global crises have led to financial market swings, economic losses, and economic disruption. The balance of the market has recently been jeopardized by the COVID-19 epidemic. Several nations enacted social-distancing policies and partial or total lockdowns, which disrupted economic activity. The world economy shrank by 4.3% in 2020, according to the World Bank's conservative estimate of economic costs, suffering a setback comparable to that brought on by the two world wars and the Great Depression. Financial markets have collapsed as a result of the mounting concern over the social and economic effects of the COVID-19 pandemic. The S&P 500 index of US equities fell 3.4% on February 24, 2020, the largest one-day drop in the previous two years (Rathnayake et al, 2022). A study by Ali et al. (2020) revealed that when the COVID-19 epidemic moved from China to Europe and then the US, financial markets throughout the world suffered considerably. In addition, the war between Ukraine and Russia also significantly affected the economies and finances of many countries around the world.

The objective of this study was to find out the influence of financial contagion between mature and emerging markets in post-Covid pandemic and the war of Russia - Ukraine. The research findings can provide useful suggestions to authorities on market regulations as well as to investors on risk diversification.

2. LITERATURE REVIEW

2.1. Mechanism of Crises

An economy's production might vary up and down or even cycle during "normal" periods. Yet the abrupt damage that causes 'suffering' among homes or businesses is what qualifies as a crisis. In other terms, a crisis is a sudden event that causes businesses to fail and families to lose their employment. In contrast to normal times, crises fluctuate dramatically and increase unemployment rates as a result of unexpected bankruptcies. It is not appropriate to refer to the situation as a "crisis" absent significantly rising unemployment rates or bankruptcies. If it happens over the medium or long term, the entire economy is able to adjust to the new circumstances, preventing bankruptcies and significant unemployment rates from occurring.

Insanity, panic, and collapse are the three stages that Kindleberger categorizes catastrophes under. Every crises go through these stages. In the era of insanity, prices rose unreasonably for specific items or industries, and consumers increased demand; in the period of panic, it is recognized that prices are not logical and that quick sales are about to occur. In fact, the insane behavior that occurred when prices "crashed swiftly" coincided with the collapse (Kindleberger & Aliber, 2005). In a global economy, the absence of efficient resource allocation slows down economic development and recovery takes a long time because it impacts the entire system. As a result, economic crises make capitalism a chaotic system. First off, as Kindelbergen argued in 2005, price bubbles brought on by speculative or misinformed behavior constitute the manias phase of crises. Another kind of asymmetric information is speculation. Speculative bubbles deviate from the intrinsic value of some assets (Xiao, 2010). When there is speculation, the pricing system, which relies on fully and accurately informed economic agents, does not function as it should and, as a result, misleads supply and demand. It is anticipated that there would be an increase in insolvent debt stocks during this period due to rising prices and profitable investing possibilities. This results in the wasteful use of resources, the expansion of bubbles, and an increase

in debt. Last but not least, the economy collapses quickly as a result of unsustainable demand and debt, resulting in bankruptcies and a sharp rise in unemployment. An economic crisis is this brief period and adaptation to "new," well-informed conditions. In other words, economic crises mark the onset of symmetric information.

The internal dynamics of the economy and regulations and interventions are the two fundamental components of economic growth and contraction cycles (Anwar, 2018). The ratio, amount, or absence of these two will significantly affect the result. The goal of all orthodox economic theories and systems is to improve human welfare since doing so makes resource allocation more efficient. Allocative efficiency ensures that these resources are distributed effectively. Resources may not be allocated properly in particular situations or systems, according to criticisms. These accusations are based on current economic difficulties. Marx highlighted that capitalism occasionally causes crises and that these crises appear to be systemic. Crises and issues appear in many forms, and with each crisis, new theoretical stances are produced, just as economic theory generates new prescriptions. Although the nature and scope of the crises vary, they consistently worsen the way resources are allocated, eventually leading to unemployment. A crisis is typically an unanticipated, undesirable, and harmful circumstance that is managed or has to be managed. Despite a well-managed crisis, the current optimization research is far from the old optimum without crises. A break must thus always be mentioned in an adaptation. Bankruptcies are another sign that the system is failing. The system's flaws or shortfalls are what cause the breakdowns, namely the crises. These flaws lead to disaster. What impact do these destructions have on the entire economy then? In other words, it's apparent that a crisis is causing unemployment and depression. A catastrophe in an economy where everyone is employed and earning a living wage is unthinkable. There cannot be a crisis that does not result in unemployment since the crisis is brought on by deterioration in resource allocation. As a result, the household experiences a "sharp" loss of money, and the crisis manifests itself in a variety of ways, including bankruptcies, suicides, murders, and robberies.

2.2. Financial contagion

Financial contagion refers to "the spread of market disruptions - generally on the negative - from one nation to the other, a process observable through co-movements in exchange rates, stock prices, sovereign spreads, and capital flows". For nations attempting to connect their financial systems with global financial markets and institutions, financial contagion might be a possible problem (Dungey & Tambakis, 2010). Financial contagion happens at both the international level and the domestic level. When a domestic bank or financial intermediary fails, it often causes transmission at the domestic level when it defaults on interbank obligations and liquidates assets in a fire sale, weakening trust in other domestic banks. The ensuing upheaval in the US financial markets is an illustration of this occurrence. The spread of financial crises across financial markets for direct or indirect economies is known as international financial contagion, which can occur in both established and developing nations. While in the current financial system, with the high volume of capital movement, such as hedge funds and the cross-regional operations of big banks, financial contagion typically occurs concurrently both among local institutions and across

international borders. Typically, the source of financial contagion cannot be explained by the actual economy, such as the volume of bilateral commerce (Jebri, Jilani & Liouane, 2013).

One of the main characteristics of the global financial crisis was strong financial contagion, as localized issues in certain financial market segments quickly transformed into a crisis of global proportions. Countries are far more likely to experience a financial crisis during times when there is a big financial contagion shock than during times when there is not. A country's yearly crisis probability increases to more than 28% during these times (Ahrend and Goujard, 2011). By cleverly integrating data on banks' international lending and country credit ratings, it is possible to estimate the significance of contagion shocks. A recent global financial crisis was not the first to be caused by bank-driven financial contagion, according to new OECD study. The observed levels suggest a more than six-fold increase in the annual probability of experiencing a systemic banking crisis, which is approximately 212 percent for a typical OECD country. However, during the recent global financial crisis, bank balance-sheet driven contagion shocks have dwarfed previously observed levels of contagion (Ahrend and Goujard, 2011).

2.3. Impact of Covid-19 on the world economy

The first phase of the pandemic (from January 1, 2020 to December 31, 2021)

The COVID-19 pandemic emerged in the midst of a vigorous globalization movement, which made the spread extremely rapid and challenging to contain. The epidemic has had severe economic effects on the whole world. According to estimates, the global GDP will be about US\$84.54 trillion in 2020, representing a 4.5% reduction in economic growth and a loss of output of around \$2.96 trillion. The world economy's growth is considerably slowing down in 2021, yet it is still growing at a very low rate (Duong et al, 2023). The supply chain disruptions that interrupt production and lower demand, leaving fewer customers able to buy the goods and services offered in the global economy, are mostly to blame for the economic harm brought on by the COVID-19 pandemic. The hard-hit industries, particularly tourism and travel, clearly demonstrate this. Many individuals are unable to purchase tickets for holidays or business trips as a result of travel restrictions put in place by several nations to halt the spread of the illness. Due to the decline in customer demand, airlines are unable to generate the anticipated income and are forced to reduce the number of flights they operate in order to balance their budgets. Several governments have developed robust strategies to lessen the harm and recession of their respective national economies in response to the major challenges the global economy is experiencing and its projected 4.5% negative growth in 2020. (Rathnayake et al, 2022). The major instruments are: modifying government expenditure, interfering in fiscal and monetary policy, giving the people direct financial help, etc. Additionally, despite the widespread and pervasive difficulty, some industries continue to gain from the COVID-19 pandemic, including: e-commerce, food retail, information technology, and the care industries. These industries' improved health also contributes to some degree of economic growth, which helps to offset the loss.

Later phase of the COVID-19 pandemic (starting January 1, 2022)

If during the early phases of the COVID-19 pandemic the tale of restricted supply, decreased demand, and corporations deferring investment developed, then from the start of 2022 until the

present. People all throughout the world have nearly fully recovered from the worst of the Covid-19 epidemic thanks to the extensive use of the vaccine. At this point, the market's supply-demand dynamic changes in a more favorable way (Duong et al, 2023).

2.4. Impact of Russia – Ukraine conflict

Throughout the three decades since the fall of the Soviet Union, the war between Russia and Ukraine has had a significant impact on global politics and radically altered the European security system. The US, Europe, and some other nations have imposed a number of sanctions against Russia at the same time that are among the worst ever. The global financial, oil, and gas markets were greatly disrupted by these events, which also led to higher inflation and slower global economic development (Reuters, 2023). Ukraine's economy has been decimated by the war, resulting in a 30% decline in GDP (Reuters, 2023). The world's financial and commercial markets as well as those in Russia were immediately impacted by the war and the blockade. The ruble sharply declined against the US dollar, the Russian stock market was forced to close for many days in a row, the Central Bank of Russia increased its prime interest rate to 20%, and this year, Russia's GDP is expected to contract by 7% (or more) and inflation to exceed 20%. The National Institute of Economic and Social Research (NIESR) in the UK predicts that this war will lower global GDP by at least 1% this year and raise inflation by 3%.

3. METHODOLOGY

3.1. Data collection

In this particular piece of research, the survey is carried out by collecting weekly data from 10 countries, of which 5 are developed and 5 are developing. Countries are selected base on the size of their economies, from largest to smallest and various financial metrics for each country. For instance, the three most essential indexes in the United States are Dow Jones, Nasdaq, and S&P 500; it is similar in other nations. We choose the primary indices in which large businesses operate in the nation's economy under observation. Large businesses are those with high revenues and lead the economy. They also significantly impact how healthy the economy is in the nation being studied. The list of selected countries is as follows:

Table 1: List of chosen countries

NO	Countries	Acronym of country	Index	Acronym of index
1	United States	US	S&P 500	SP
2	Canada	CA	TSX Composite	TSX

3	United Kingdom	UK	FTSE 100	FTSE
4	Germany	GE	DAX 40	DAX
5	Switzerland	SW	Swiss Market Index	SMI
6	Brazil	BR	Bovespa Brazil 50	IBX50
7	Malaysia	MA	FTSE Malaysia KLCI	KLSE
8	Thailand	TH	Bangkok SET50 Index	Bangkok
9	Greece	GR	The Athens Stock Exchange General Index	Athens
10	Egypt	EG	EGX 30	EGX

The author gathers information for research from market indexes that reflect those nations. It is challenging to evaluate and interpret data since different indicators are used by different marketplaces. Because of this, the author has changed to weekly returns to make it easier to analyze and contrast data from other markets. The return of each market index is calculated using the log return.

Using weekly data provides more accurate information on spreads. Therefore, weekly data collection will help us to observe the dependency level more objectively and accurately. The author gathered data from 2015 to the end of January 2023 in an effort to lessen the effects of the global financial crisis that occurred between 2007 and 2008. The COVID-19 pandemic is a worldwide outbreak of an infectious disease brought on by the SARS-CoV-2 virus and its variations. began in late December 2019 with the initial epidemic in the central Chinese city of Wuhan, which was brought on by a number of individuals who had pneumonia of unknown origin (Ali, Alam & Rizvi, 2020). Russia also started a full-scale invasion of Ukraine on February 24, 2022. After a period of force concentration, the Donetsk People's Republic and the Lugansk People's Republic were recognized as independent states by Russia, and the Russian Military Forces then advanced into the Donbas area of eastern Ukraine (Balbaa, 2022).

3.2. Model

A statistical model called Generalized AutoRegressive Conditional Heteroskedasticity (GARCH) is used to examine time-series data since it is presumed that the variance error is serially linked. In GARCH models, it is believed that the variance of the error component follows an

autoregressive moving average process. To predict the volatility of returns on financial assets, the GARCH statistical modeling technique is applied. GARCH is appropriate for time series data where the variance of the error component is serially correlated after an autoregressive moving average process. GARCH is useful for assessing risk and anticipated returns for assets that exhibit clumped periods of return volatility. GARCH models are used when the error term's variance is not constant. In the world of finance, a security's return may be influenced by its volatility (risk). The GARCH-in-mean (GARCH-M) model incorporates a heteroskedasticity element into the mean equation to simulate these occurrences. It meets the requirements.

The GARCH-M(p,q) model is written as:

$$\begin{aligned}
 x_t &= \mu + \lambda \sigma_t + \alpha_t \\
 \sigma_t^2 &= \alpha_0 + \sum_{i=1}^p \alpha_i \alpha_{t-i}^2 + \sum_{j=1}^q \beta_j \sigma_{t-j}^2 \\
 \alpha_t &= \sigma_t \times \epsilon_t \\
 \epsilon_t &\sim P_v(0,1)
 \end{aligned}$$

Where:

- x_t is the time series value at time t
- μ is the mean of the GARCH model
- λ is the volatility coefficient for the mean
- α_t is the model's residual at time t
- σ_t is the conditional standard deviation (i.e. volatility) at time t
- p is the order of the ARCH component model
- $\alpha_0, \alpha_1, \alpha_2, \dots, \alpha_p$ are the parameters of the ARCH component model
- q is the order of the GARCH component model
- $\beta_1, \beta_2, \dots, \beta_q$ are the parameters of the GARCH component model
- $[\epsilon_t]$ are the standardized residuals

Therefore, in this study, the author uses the GARCH(1,1) - M model to find out the effect of the return of one country on another country. To confirm whether the financial contagion from one country to another is statistically significant, the author uses a statistical significance level of 5%.

4. FINDINGS AND DISCUSSIONS

4.1. Descriptive statistic

Descriptive Statistics are methods used to summarize or describe a set of data, a research sample in the form of numbers or visual charts. The most commonly used numerical tools for description are the mean and the standard deviation. Descriptive statistics of return indexes are as follows:

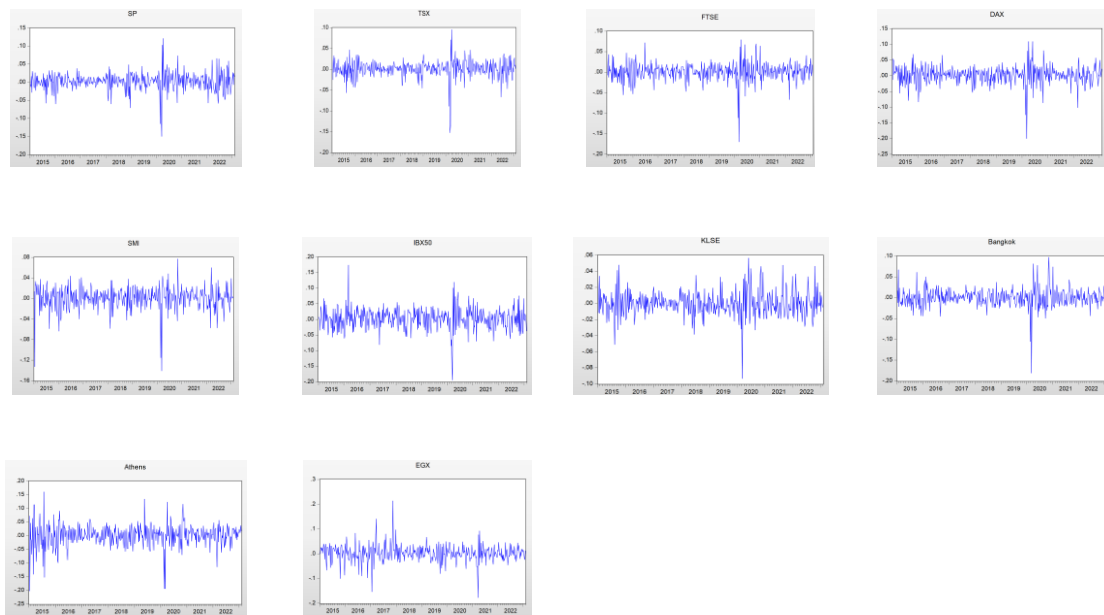
Table 2: Descriptive statistic of stock index return

	ATHENS	BANGKOK	DAX	FTSE	EGX	IBX50	KLSE	SMI	SP	TSX
Mean	0.000987	0.000247	0.001503	0.000694	0.001818	0.002458	-0.000267	0.000798	0.001956	0.001026
Median	0.003543	-0.000605	0.003237	0.001933	0.001817	0.003579	-0.000766	0.002437	0.003107	0.002006
Maximum	0.160316	0.096924	0.109069	0.078877	0.213115	0.174068	0.056392	0.076709	0.121017	0.094938
Minimum	-0.201834	-0.180711	-0.200123	-0.169661	-0.177641	-0.193913	-0.093284	-0.140627	-0.149796	-0.152005
Std. Dev.	0.039990	0.021700	0.028394	0.022085	0.033091	0.033403	0.015303	0.021829	0.024412	0.020556
Skewness	-0.839334	-1.001276	-0.997172	-1.199634	0.009909	-0.339312	-0.048910	-1.622132	-0.640775	-1.747864
Kurtosis	8.089211	16.582570	10.490070	13.043860	10.378890	7.986271	6.960475	11.681570	9.509817	15.903900
Jarque-Bera	504.958	3,314.395	1,056.381	1,875.010	957.385	445.270	275.969	1,510.318	774.020	3,142.684
Probability	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sum	0.416	0.104	0.634	0.293	0.767	1.037	-0.113	0.337	0.825	0.433
Sum Sq. Dev.	0.673	0.198	0.339	0.205	0.461	0.470	0.099	0.201	0.251	0.178
Observations	422	422	422	422	422	422	422	422	422	422

Source: Author

The table above shows descriptive statistics about weekly return of indexes in the period from 2015 to 2023. In which, the 3 indexes with the highest weekly return include: Bovespa Brazil 50 of Brazil (Average value is 0.002458), S&P 500 for the United States (Mean value is 0.001956), and EGX 30 for Egypt (Mean value is 0.001818). There are also variations between countries based on the difference in standard deviation. The three countries with the highest level of risk are Greece's ATHENS (average standard deviation 0.0399) Brazil's IBX50 (average standard deviation 0.0334) and Egypt's EGX30 (average standard deviation). deviation is 0.03309). The Jarque-Bera test was used by the author to verify the data distribution of each observed item before to running the regression model. We see that most observations do not follow a normal distribution. It is clear that the majority of indices have negative offsets and are not zero. Due to the fact that the vast majority of values have negative skewed values, these distributions are left skewed. Canada, as shown above, is ranked last since it has the lowest skewness value, -1.747864.

Figure 1: The weekly returns of all the indexes



Source: Author

In general, the data set's dispersion is not very great because no observation has a pronounced maximum or lowest value. The picture above shows the weekly returns for each index for the time period beginning in January 2015 and ending in January 2023. The charts in the aforementioned Figure provide an overview of the performance. When the market indexes of 10

different nations are combined, volatility results. Also, all charts exhibit volatility clustering, as seen in the graphic above, which illustrates how volatility in the most recent period will affect volatility in succeeding periods. It is obvious that all market indexes exhibit high levels of volatility at times of crisis, particularly during the most recent COVID-19 epidemic.

4.2 Research results

4.2.1. Effect of Financial contagion between mature and emerging market in period 2015 – 2023.

Table 3: Effect of financial contagion between mature and emerging markets in period 2015 - 2023

	TSX	SP	DAX	FTSE	SMI	IBX50	KLSE	Bangkok	Athens	EGX
TSX		0.607*	0.054	0.231*	-0.052	0.475	0.126*	0.239*	-0.115	-0.163
SP	0.445*		0.201	-0.022	0.186	0.239	-0.030	-0.074	-0.032	0.007
DAX	0.029	0.118*		0.292*	0.260	-0.015	0.038	0.135*	0.280*	0.039
FTSE	0.178*	-0.005	0.519		0.325	0.323	0.001	0.109	0.284*	0.049
SMI	-0.005	0.197*	0.338	0.246*		-0.337	-0.016	-0.082	0.239*	0.156
IBX50	0.047*	0.048*	-0.005	0.056*	-0.086		0.088*	0.048	0.090	0.027
KLSE	0.089*	-0.013	0.041	-0.013	0.005	0.452		0.397*	0.025	0.015
Bangkok	0.107*	-0.015	0.111	0.091*	-0.014	-0.001	0.267*		0.416*	0.035
Athens	0.001	0.000	0.012	0.024	0.107	0.108	0.006	0.077*		-0.094*
EGX	-0.012	0.005	-0.003	0.021	0.021	0.021	0.006	0.036	-0.072	

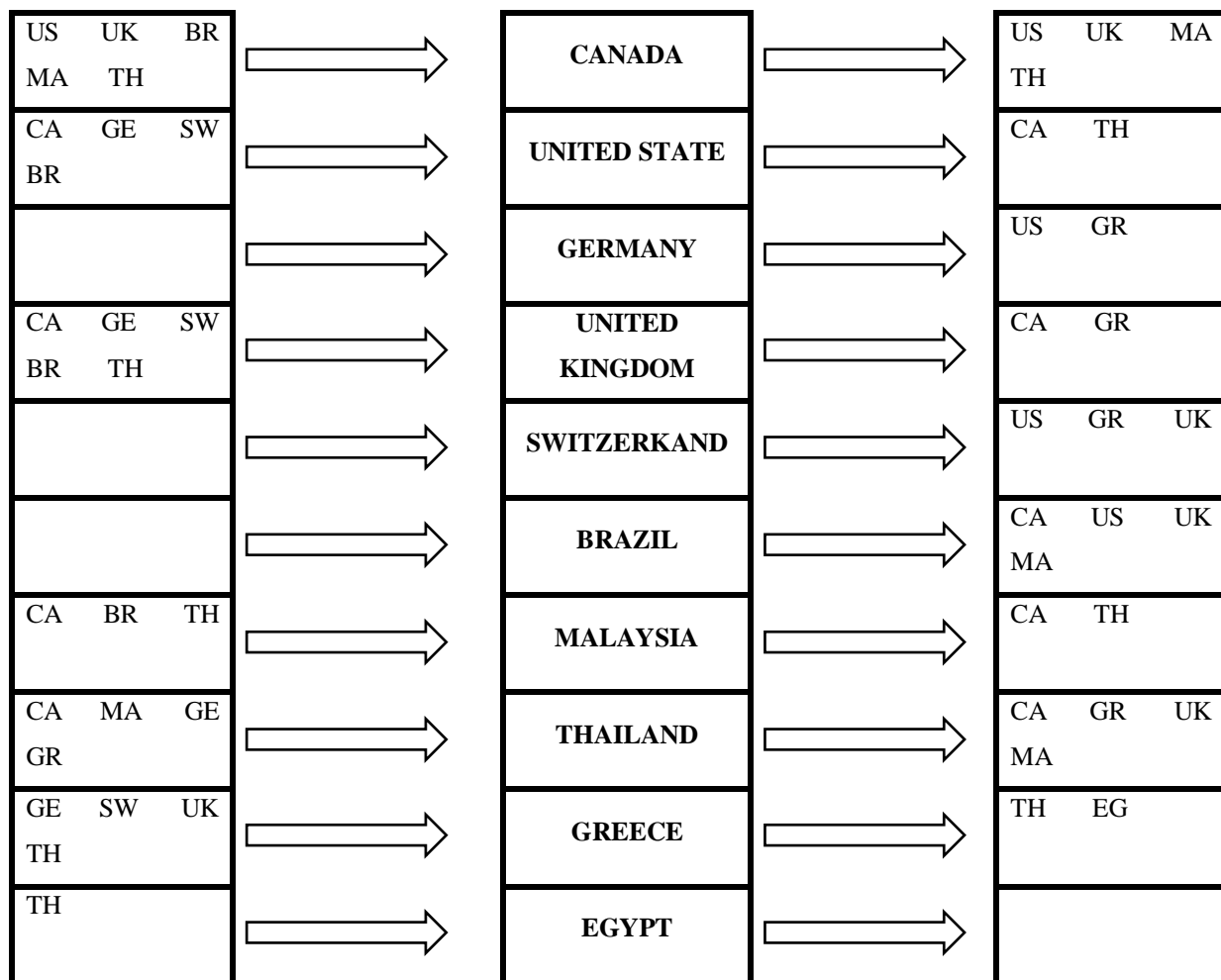
*Notes: Figures in parentheses indicate the value of t-statistics. * denote significance at the 5% level.*

The above table shows the influence of countries on finance for the entire period 2015 - 2023. The results of the study indicate that there is financial contagion between countries. Developed and developing countries interact with each other in terms of stock indexes.

Canada is the country with the largest financial contagion. In which, there are 5 countries that have a statistically significant influence on Canada's stock return, including: United States

(Regression coefficient is 0.445), United Kingdom (Regression coefficient is 0.178), Brazil (Regression coefficient is 0.047), Malaysia (Regression coefficient is 0.089) and Thailand (Regression coefficient is 0.107). All regression coefficients are positive, showing a positive impact of the above markets on Canadian stock return. Canada affects 4 countries including: United States (Regression coefficient is 0.607), United Kingdom (Regression coefficient is 0.231), Malaysia (Regression coefficient is 0.126) and Thailand (Regression coefficient is 0.239). Taken as a whole, 14 countries have a statistically significant influence on developed countries, and developed countries have a statistically significant influence on 13 countries. 12 countries have a statistically significant effect on developing countries, and developing countries have a statistically significant influence on 12 countries. Thus, it can be affirmed that developed countries have a greater degree of financial spread than developing countries.

Figure 2: Impacts between countries during the entire period



Source: Author

4.2.2. Effect of financial contagion between mature and emerging markets in covid - 19 period

Table 4: Effect of financial contagion between mature and emerging markets in Covid – 19 period

	TSX	SP	DAX	FTSE	SMI	IBX50	KLSE	Bangkok	Athens	EGX
TSX		0.934	-0.048	0.294*	0.005	0.358	0.065	0.304	-0.103	0.056
SP	0.461*		0.246	-0.108	-0.027	0.328*	-0.086	-0.256*	-0.019	-0.100
DAX	-0.062	0.263		0.281*	0.531*	0.348*	0.037	0.077	0.377	0.036
FTSE	0.225*	-0.162	0.347		0.211*	0.370*	-0.153	0.165	0.246	-0.038
SMI	0.077	-0.011	0.487	0.204*		-0.586*	0.138	0.018	0.017	0.112
IBX50	-0.014	0.105	0.112	0.161*	-0.180*		0.232*	-0.139*	0.059	0.095
KLSE	0.036	-0.068	0.004	-0.117	0.112	0.477*		0.517*	-0.156	-0.107
Bangkok	0.193*	-0.177	0.031	0.022	0.021	-0.177	0.364*		0.606	-0.141
Athens	-0.030	0.002	0.124	0.099*	-0.019	0.048	-0.098	0.414*		0.086
EGX	0.051*	-0.405	0.010	-0.011	0.012	0.035	-0.085*	0.027	-0.013	

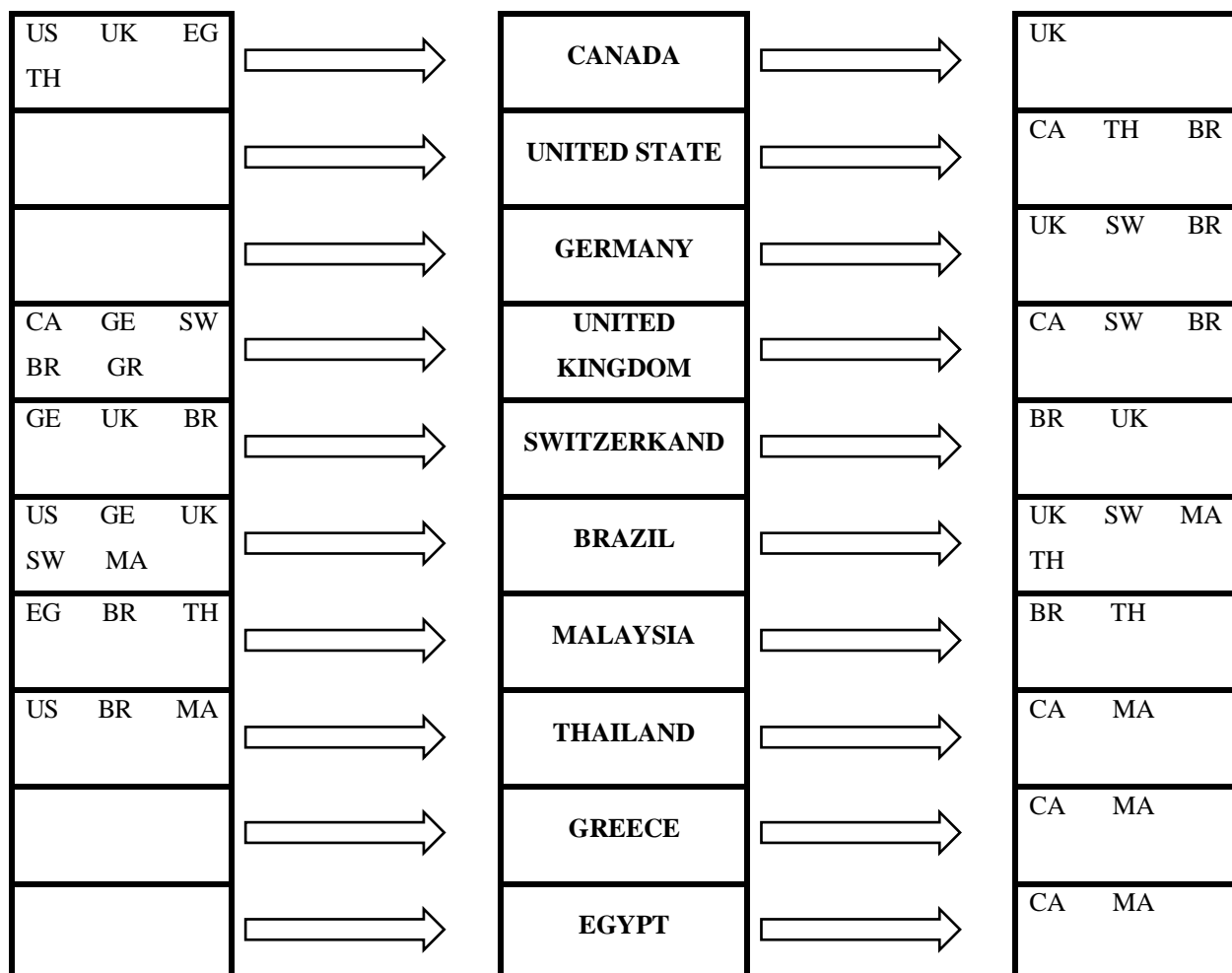
*Notes: Figures in parentheses indicate the value of t-statistics. * denote significance at the 5% level*

The table above shows the financial impact of countries during the entire Covid-19 period, from January 1, 2020 to February 23, 2022. The results of the study indicate that there is financial contagion between countries. Developed and developing countries interact with each other in terms of stock indexes.

Brazil is the country with the largest financial spread during the Covid - 19 period. In which, there are 5 countries that have a statistically significant influence on Brazil's stock return, including: United States (Regression coefficient is 0.328), Germany (Regression coefficient is 0.348), United Kingdom (Regression coefficient is 0.370), Switzerland (Regression coefficient is -0.586) and Malaysia (Regression coefficient is 0.477). The regression coefficients are all positive

indicating a positive effect of the above markets on the Brazilian stock return, however the Switzerland regression coefficient of -0.586 indicates a negative effect on the Brazilian stock return. Brazil affects 4 countries including: United Kingdom (Regression coefficient is 0.160), Switzerland (Regression coefficient is -0.180), Malaysia (Regression coefficient is 0.232) and Thailand (Regression coefficient is -0.139). In which, the correlation coefficient between Brazil and Switzerland and Thailand is negative, showing the negative influence of Brazil's economic situation on Switzerland and Thailand. Overall, 12 countries have a statistically significant effect on developed countries, and developed countries have a statistically significant influence on 12 countries. 11 countries have a statistically significant effect on developing countries, and developing countries have a statistically significant effect on 12 countries. Thus, it can be affirmed that developed countries have a greater degree of financial spread than developing countries during the Covid-19 period, but the difference is not much.

Figure 3: Impacts between countries during the covid -19 period



4.2.1. Effect of financial contagion between mature and emerging markets in post-Covid pandemic and the war of Russia - Ukraine

Table 4: Effect of financial contagion between mature and emerging markets in post-Covid pandemic and the war of Russia - Ukraine

	TSX	SP	DAX	FTSE	SMI	IBX50	KLSE	Bangkok	Athens	EGX
TSX		0.746*	-0.064	-0.084	0.166	0.395	0.139	0.230	-0.194	-0.247
SP	0.339		0.110	0.039	0.231*	0.140	0.125	0.000	-0.106	0.025
DAX	0.001	0.024		0.173*	0.210	-0.270	0.036	0.073	0.361	0.127
FTSE	0.018	0.059	0.548*		0.429*	1.019	-0.149	0.008	0.496	0.043
SMI	0.188	0.531*	0.371	0.371*		-0.638	-0.159	-0.172	0.273	-0.022
IBX50	0.071	0.022	-0.118	0.155*	-0.137		0.099	0.069	-0.043	-0.155
KLSE	0.202	0.025	-0.031	-0.086	-0.125	0.390		0.221	0.397	0.531*
Bangkok	0.288	0.072	0.094	0.107	-0.121	0.365	0.234		0.323	0.166
Athens	-0.066	-0.081	0.200*	0.161*	0.050	-0.063	0.112	0.085		-0.052
EGX	-0.092	0.072	-0.021	0.056	0.005	-0.337	0.075	0.066	0.001	

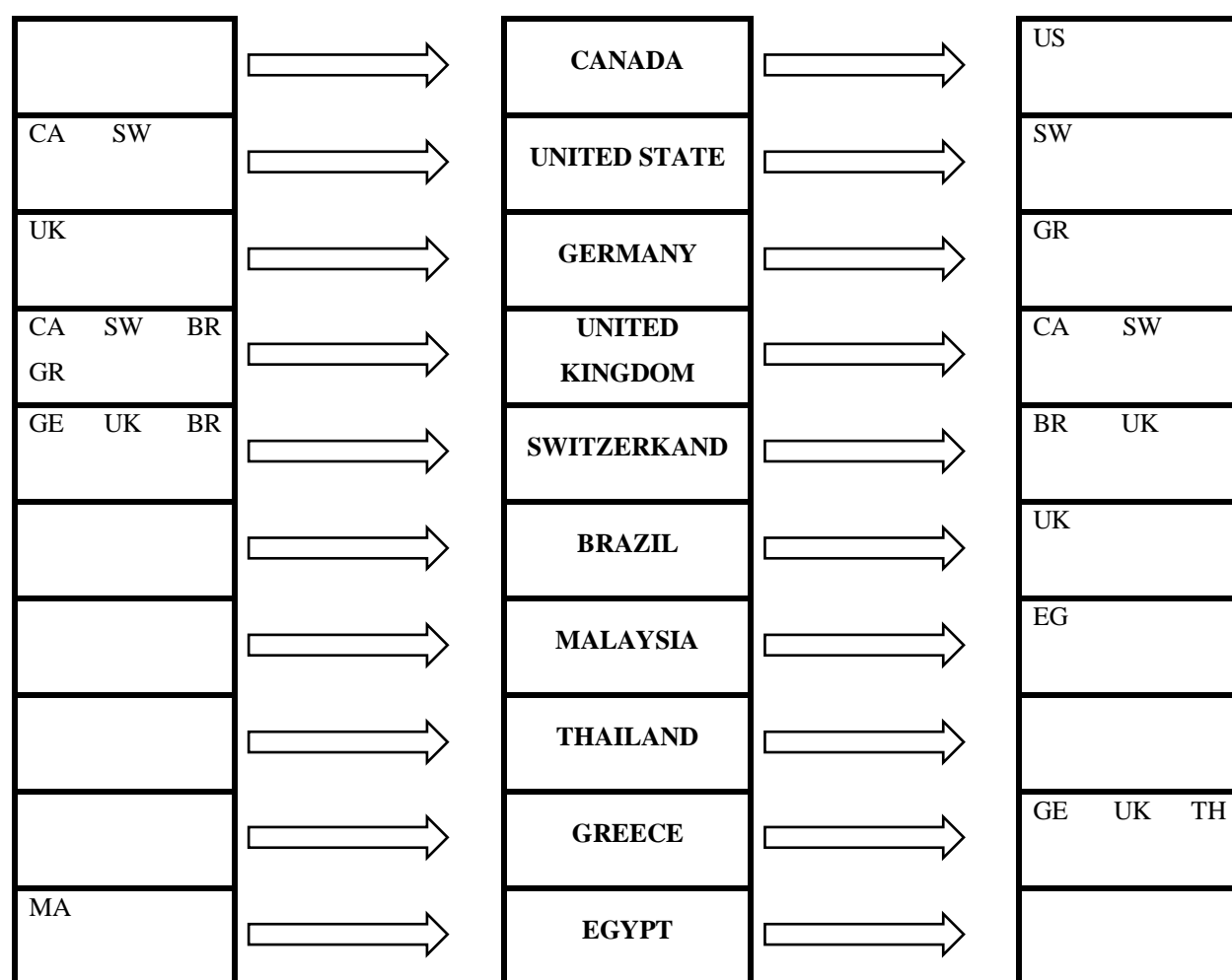
Notes: Figures in parentheses indicate the value of *t*-statistics. * denote significance at the 5% level

The table above shows the financial influence of countries in the entire post-Covid period and the war of Russia - Ukraine. The results of the study indicate that there is financial contagion between countries. Developed and developing countries interact with each other in terms of stock indexes.

The United Kingdom is the country with the largest level of financial contagion in the post-Covid period and the war of Russia - Ukraine. In which, there are 4 countries that have a statistically significant influence on the stock return of the United Kingdom, including: Germany (Regression coefficient is 0.173), Switzerland (Regression coefficient is 0.371), Brazil (Regression coefficient is 0.155) and Greece (Regression coefficient is 0.161). The regression coefficients are

all positive, showing the positive impact of the above markets on the stock return of the United Kingdom. United Kingdom has a statistically significant influence on 2 countries including: Germany (Regression coefficient is 0.548) and Switzerland (Regression coefficient is 0.429). Overall, 9 countries have a statistically significant influence on developed countries, and developed countries have a statistically significant influence on 7 countries. 1 country has a statistically significant effect on developing countries, and developing countries has a statistically significant influence on 5 countries. Thus, it can be affirmed that developed countries have a greater degree of financial contagion than developing countries in the post-Covid period and the war of Russia - Ukraine. The difference in financial contagion is relatively large among developed countries, but developing countries do not have much influence.

Figure 4: Impacts between countries in post-Covid pandemic and the war of Russia - Ukraine



Source: Author

5. CONCLUSION

Research results show that there is financial contagion between developed countries and developing countries, but there are different levels between countries in both the period of Covid - 19, after Covid - 19 and War of Russia and Ukraine. In particular, developed countries have a stronger spread than developing countries. In fact, developed countries have a high degree of specialization, so they often focus on their strengths instead of producing themselves. Developed countries regularly import goods from developing countries and export those of high economic value. Therefore, developed countries have a strong influence on other countries, especially with developing countries. The financial contagion effect mainly between developed countries but developing countries have very little financial contagion. . Unlike the Covid-19 pandemic, the War of Russia and Ukraine, although affecting the world, has different levels. Undeveloped countries have almost no direct involvement in the war but are only indirectly affected by oil prices, inflation,... Developed countries such as the US, United Kingdom,... have direct involvement such as: imposing sanctions on Russia. Therefore, it is understandable that financial contagion occurs more in developed countries.

The findings of this study are consistent with those of other earlier investigations of financial contagion. Several significant financial events, such as the 1997 Asian Financial Crisis, the 2008 Global Financial Crisis, and the 2011 European Debt Crisis, have been the subject of systematic research on financial crisis contagion and its transmission mechanism (Boyer et al., 2006; Bekaert et al., 2014; Chen et al., (2020); Sanitas, Kampouris, Umar (2020). Investor behavior is discovered to have a significant part in fueling financial contagion when looking at these early crises, which show evidence of financial contagion from a variety of approaches.

REFERENCES

- Anwar, H. (2018). *Measuring Business Cycles*. 10.13140/RG.2.2.11766.45123.
- Akhtaruzzaman, M., Boubaker, S., & Sensoy, A. (2021). Financial contagion during COVID–19 crisis. *Finance Research Letters*, 38, 101604. <https://doi.org/10.1016/j.frl.2020.101604>
- Ali, M.; Alam, N.; Rizvi (2020), *S.A.R. Coronavirus (COVID-19)–An epidemic or pandemic for financial markets*. *J. Behav. Exp. Finance.*, 27, 100341.
- Ahrend, R. and A. Goujard (2011), ‘International Capital Mobility and Financial Fragility: Part 1. Drivers of Systemic Banking Crises: The Role of Bank-Balance-Sheet Contagion and Financial Account Structure’, *OECD Economics Department Working Papers*, No. 902, OECD Publishing

Baig, T., & Goldfajn, I. (1999). *Financial market contagion in the Asian crisis*. International Monetary Fund.

Baur, D. G. (2012). Financial contagion and the real economy. *Journal of Banking and Finance*, 36(10), 2680–2692. <https://doi.org/10.1016/j.jbankfin.2011.05.019>

Balbaa, M. (2022). The Impacts of Russian-Ukrainian War on the Global Economy. 10.13140/RG.2.2.14965.24807.

Dungey, M., Fry, R., Gonz lez-Hermosillo, B., & Martin, V. L. (2004). Empirical modelling of contagion: a review of methodologies. *Quantitative Finance*, 04(78 9–24 doi:10.1080/14697680500142045).

Kharusi, S. (2016). ‘Innovation and entrepreneurship in emerging economy versus mature economies: Challenges and opportunities’. *International Journal of Applied Business and Economic Research*. 14. 8867-8875.

Corbet, S., Larkin, C., & Lucey, B. (2020). ‘The contagion effects of the COVID-19 pandemic: evidence from gold and cryptocurrencies’. *Financial Research Letters*, 35, 101554. <https://doi.org/10.1016/j.frl.2020.101554>

Dungey, M & Tambakis, D. (2010). International Financial Contagion: What Do We Know?.

Duong, et al. (2023). ‘Impacts of COVID-19 crisis and some related factors on the mental health of 37150 Vietnamese students: a cross-sectional online study’. *BMC Public Health*. 23. 10.1186/s12889-023-15317-3.

Jebri, A & Jilani, F & Liouane, N. (2013). ‘Research on the effect of financial contagion in the subprime crisis’. *International Journal of Accounting and Financial Reporting*. 3. 162. 10.5296/ijafr.v3i2.4410.

Jebran, K.; Chen, S.; Ullah, I.; Mirza, S.S (2017). ‘Does volatility spillover among stock markets varies from normal to turbulent period? evidence from emerging markets of Asia’. *J. Financ. Data Sci.*, 3, 20–30.

Kindleberger.C P., Robert Z. Aliber., (2005). ‘Manias, Panics and Crashes: A History of Financial Crises’. *Palgrave Macmillan UK*.

Morales, L.; Andreosso-O’Callaghan, B (2012). ‘The current global financial crisis: Do Asian stock markets show contagion or interdependence effects?’ *J. Asian Econ*, 23, 616–626.

Palley, T. I. (2012). ‘From financial crisis to stagnation: the destruction of shared prosperity and the role of economics’. *New York: Cambridge University Press*.

Rathnayake, C & Sachin, M & Kavindu, U & Hemachandra, C & Arachchige, Udara & Hettiarachchi, P. (2022). Impact of the Covid-19 pandemic in daily life. 27-36.

Reuters. (2023). *Analysis: Shock of war hits a world economy at the crossroads*. <https://www.reuters.com/markets/shock-war-hits-world-economy-crossroads-2023-02-10/>

Sharma, H & Jain, V & Mogaji, E. (2020). Defining Developing Countries In Higher Education Context. 10.13140/RG.2.2.28926.61769.

Stoupos, N., & Kiohos, A. (2021). Euro area stock markets integration: empirical evidence after the end of 2010 debt crisis. *Finance Research Letters*, 102423. <https://doi.org/10.1016/j.frl.2021.102423>

Syllignakis, M.N.; Kouretas, G.P (2011). Dynamic correlation analysis of financial contagion: Evidence from the central and eastern European markets. *Int. Rev. Econ. Financ*, 20, 717–732.

Xiao. Q (2010). ‘Crashes in Real Estate Prices: Causes and Predictability’. *Urban Studies*, 47(8), 1725- 1744.