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COVID19: A blessing in disguise for European stock markets?

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ABSTRACT

This study aims to bridge the gap that has remained unfilled after the initial scrutiny and reporting of the damaging effects of Covid-19 on financial markets. The study analyzes 10 European stock markets and compares their pre and post covid return dynamics. Our findings are surprisingly pleasant, albeit counterintuitive to some. We observe a quick and unprecedented recovery in the European stock market, yielding significantly higher returns post covid, given a reasonably large holding period. We also observe an alteration and change in the status quo of countries while transmitting or receiving cross-market spillovers.

1. Introduction

At its onset, COVID-19 pandemic imposed threatening effects on the global economic and financial activity. It created uncertainty, swooped the global economy, and exaggerated the volatility in the financial markets. There was an instant decline observed in stock indices (McKibbin and Vines, 2020) and rapid increase in financial market’s volatility reported by a large number of researchers (Mirza et al., 2020, 2020; Rizvi et al., 2020; Rizvi and Itani, 2021; Rubbaniy et al., 2021). According to the OECD report, during the lockdown period of coronavirus, risk aversion behavior has been seen in the investors (OECD, 2020) exacerbating the negative effects of shock. This report further adds that 30% of the decline in the stock markets is observed during the lockdown period (OECD, 2020). In the meantime, worldwide media was continuously highlighting the adverse sentimentalities, fear and uncertainties (Aslam et al., 2020). Due to these uncertainties and fears, investors hesitated to invest in the financial markets which resulted in vast valuation loses (Rizvi et al., 2020, 2022) with some exceptions such as Islamic funds or funds based on human capital efficiency (Hasnaoui et al., 2021; Mirza et al., 2022; Mirza et al., 2020), and financial market’s performance start drooping (The Economist, 2020). For example, Dow Jones industrial Average (DJIA) recorded the fall of 12.94% during March 2020. Similarly, Nikkei Index fall around 20% (Vishnoi et al., 2020). FTSE index in the UK face decline of more than 10% during March 2020 (Zhang et al., 2020) Japanese stock exchange also face decline of more than 20% during the lockdown period (Zhang et al., 2020). The stock market of US hit the circuit breaker contrivance four times within 10 days in march 2020, which had adverse spillovers on the Asian and European markets. Long story short, COVID imposed shocking effects on the financial markets due to which global stock markets collapsed during march 2020.
This collapse was amongst the largest collapses in stock markets since 2008’s financial crises. The question is what happened after that? This study aims to bridge the gap that has remained unfilled after the initial scrutiny of damaging effects of Covid-19. To answer this question, we focus in this paper on Europe which was the region severely hit by the Covid-19 at its inception. Our results are surprisingly interesting and show that in 2022 when the Covid-19 spread and its fatalities are not fully over, the performance of European stock markets has not only been impressive but surprising and counter intuitive to many.

We organize rest of the paper as follows. Section 2 briefly discuss the methodology. Section 3 discusses the results and Section 4 concludes.

2. Methodology

2.1. Data and sample

There exists number of geographical and economic categorization of countries within the Europe. To avoid any overlapping biasness and also to respect the inherent differences and heterogeneities among the several European countries we primarily chose largest countries from two different samples i.e. developed and eastern European in terms of their GDP. Germany, France, Italy and Spain have been chosen from the cohort of developed countries and Russia, Poland, Czechia, Ukraine, Romania and Hungary have been chosen from the category of Eastern European.

For each country, the major and representative stock market index and its daily data from August 2012 to April 2022 is obtained from Eikon Refinitive Terminal the details of which is provided below in Table 1.

3. Methodology

We first calculate annualized stock returns for each stock market on daily basis using a rolling window of 252 days rather than following a fixed calendar year. This way of estimating returns is more robust and immune to the loss of information and has been advocated by a large number of researchers (Naqvi et al., 2018).

\[ y_t = \frac{P_t}{P_{t-252}} - 1 \]  

(1)

Where \( y_t \) is the 252 days return (annualized holding period return) for each market at day \( t \).

To further understand the dynamic relationships and identify the possible spillover effects of Covid-19 on the financial performance of selected Eastern and Developed European Economies during Pre and Post Covid period, the present study employs spillover index (DY index) (Diebold and Yilmaz, 2012, 2015, 2014). DY index is originated from the variance decomposition of m variable Vector Autoregressive (VAR) Model.

The key advantage of this technique is that it has an ability to estimate the directional spillovers (Bouri et al., 2021, 2022; Chatziantoniou et al., 2021). Consider Eq. (2) to understand the mechanism of DY index.

\[ y_t = \sum_{i=1}^{n} \theta_{i \eta_{t-1}} + u_t \]  

(2)

Eq. (2) is referred as covariance stationary N variable VAR (\( \alpha \)) model, where \( u_t \sim (0, \sigma) \). The moving average (MA) depiction is \( y_t = \sum_{a=0}^{\infty} W_{i-a} + u_t \). Where: \( W_i \) is \( m \times m \) coefficient matrix which follows following recursion (see Eq. (3))

\[ W_t = \theta_1 W_{t-1} + \theta_2 W_{t-2} + \ldots + \theta_{a} W_{t-a} \]  

(3)

| Table 1 |
|---|
| Countries and Their Representative Stock Market Indices. |
| Country | Index | Category |
| GERMANY | The Dax | Developed European |
| FRANCE | CAC 40 | Developed European |
| ITALY | FTSE MIB | Developed European |
| SPAIN | IBEX 35 | Developed European |
| RUSSIA | MOEX |Eastern European |
| POLAND | WIG | Eastern European |
| CZECHIA | PX PRAGUE | Eastern European |
| UKRAINE | PFTS | Eastern European |
| ROMANIA | BET Index | Eastern European |
| HUNGARY | BUX Index | Eastern European |
4. Results

4.1. Stylized facts

4.1.1. Covid and developed European economies

Coronavirus entered in the Europe in Mid-February 2020 and the first case of this virus was reported in Italy after which it continued to spread in the entire Europe at a very fast rate. This region is critically affected with corona virus, with almost 15 out of 27 member nations reported more than twelve thousand infected cases (Mirza et al., 2020). Till now (April 2022), the cumulative reported cases of four major European economies e.g., Germany, France, Italy and Spain) are 23, 27, 15 and 11 million respectively, and the morality rate is around 32% of the global death pool. To limit the spread of coronavirus, the government of European Economies imposed strict lockdowns with limited movements and business closures across the Europe for weeks. This leads to hindered production, demand and supply issues, and eventually revenue shrinkage for the organizations. Meanwhile, entire region experienced unpredictable economic and financial loses (Chen et al., 2020). As lockdown policies were linked with many economic and financial limitations, it created uncertainty. Henceforward, the European stock markets and forex markets suffered a lot during this pandemic (Aslam et al., 2021; Aslam et al., 2020, 2020, 2020). In Fig. 1, we can see a rapid decline in all four indices during 2020. The DAX (Germany) declined from 13,556 in 2019, to 8742 during 2020. Likewise, CAC 40 (France) also dropped from 6022 to 3881 from 2019 to 2020. FTFS MIX (Italy) index also face a decline in its value from 25,478 to 14,894 from 2019 to 2020. IBEX 35 (Spain) also show the similar patterns dropping from 9803 to 6107. Surprisingly, however, the situation is reversed right after 2020. The recovery in the stock market indices quick and astonishing during 2021 in all the selected countries, except Spain.

4.1.2. Outbreak of Covid and Eastern Europe

When the first case of COVID was reported in Italy, the 3rd largest European nation in terms of GDP, its spillovers spread to the eastern Europe very rapidly because of highly connected structure of the entire Europe. The major economies of Eastern Europe (i.e., Russia, Poland, Czechia, Ukraine, Romania, and Hungary) got severely affected and till now, the number of confirmed cases in Russia,
Poland, Czechia, Ukraine, Romania and Hungary are 18, 5.9, 3.8, 4.9, 2.8, and 1.8 million respectively. The morality rate in Eastern Europe is markedly greater as compared to Developed European countries. To control the increasing spread of virus, Eastern European countries followed the same strategy of developed Europe (i.e., imposing lock down) and faced the similar uncertainty in financial markets. Fig. 2 shows that the stock indices fell rapidly in the wave of contagion. For instance, the WIG index (Poland) declined from 59,326 to 38,630 in 2020. PX Prague (Czechia) also dropped from 1100 to 709. A rapid decline in PFTS (Ukraine), BET (Romania), and BUX (Hungary) is also visible in 2020. However, right after this initial shock that prolonged merely for about couple of months, the situation reversed rapidly. During 2021, a sharp increase in almost all stock indices has been observed, except Ukraine.

4.1.3. Exploratory data analysis
First section of Table 2 highlights the overall returns and risk dynamics of selected stock markets, identifying most of the eastern European markets as highly rewarding except Poland and Czechia. However, second and third sections of Table 2 decompose the overall sample into pre and post covid period and provides an interesting insight that every stock markets’ returns improved significantly, in some cases even doubled, during post covid period except Ukraine, Spain and Hungary. This corresponds to the findings discussed above where in Fig. 1 and 2 it is visible that almost all stock markets surpass their pre covid high during post covid period after an initial shock and decline in 2020. This improved performance is generalized and cannot be linked with the inherent differences in the countries owing to their economic strength nor the intensity with which they were hit by the Covid-19. It is also important to note that this improved performance is although more pronounced if we calculate returns for a window of 252 days (annualized returns), however, the same is also observable in quarterly, monthly and weekly returns with the only exception of daily returns which in our view is merely the observed volatility in the stock market and not an outcome of investment in the form of true holding period returns.

4.1.4. Return connectedness and spillover dynamics
We further augment our analysis to see how the return connectedness and spillover dynamics have changed after the eruption of Covid-19 and the results are very interesting.

From Table 3, Table 4 and Fig. 3 it is clearly visible that all four developed European economies were the primary net contributor of the return spillovers in the entire system during pre covid period as shown by the dark blue color of the nodes representing them in Fig. 3. France and Germany respectively are the largest contributors of return spillovers towards other stock markets, with 108.58 and 99.42 respectively as also shown by the size of the nodes representing these countries. All six eastern European economies are the net recipient of the return spillovers as shown by the yellow color of the nodes representing them.

Post covid period there have been some significant changes. The first thing to note is that the average total connectedness has increased from 63.48% to 75.14%. The second significant change is the surprisingly enhanced role of Poland where the WIG index surpasses IBEX 35 of Spain and DAX of Germany and emerged as the major emitter of shocks for the entire European stock markets after France and Italy. However, if we carefully look at the Network connectedness diagram, we see that most of the shock transmission by Poland is limited to the eastern European economies with the largest net contribution towards Czechia, Hungary, Romania and Russia. Only a limited amount of net return shocks is transferred from Poland to Germany. This behaviour is interestingly different from the

![Fig. 2. Stock Price Indices of Eastern Europe Member states.](image-url)
Table 2
Annualized Returns (in%).

| Countries  | Overall Sample (August 2012 to April 2022) | Pre Covid (August 2012 to December 2019) | Post Covid (January 2020 to April 2022) |
|------------|------------------------------------------|--------------------------------------|---------------------------------------|
|            | Mean | Variance | Skewness | Ex.Kurtosis | Mean | Variance | Skewness | Ex.Kurtosis | Mean | Variance | Skewness | Ex.Kurtosis |
| CZECHIA    | 4.559 | 253.963 | 1.001*** | 1.090*** | 1.768 | 87.364 | 0.191*** | −0.426*** | 12.312 | 635.818 | 0.108 | −1.390*** |
| FRANCE     | 8.131 | 212.561 | 0.245*** | −0.278*** | 6.886 | 116.226 | −0.320*** | −0.781*** | 11.589 | 464.547 | 0.034 | −1.445*** |
| GERMANY    | 9.257 | 212.437 | 0.193*** | 0.272*** | 8.211 | 181.645 | −0.280*** | −0.986*** | 12.161 | 286.95 | 0.666*** | 0.774*** |
| HUNGARY    | 13.257 | 326.319 | 0.236*** | −0.494*** | 14.278 | 225.253 | 0.135*** | −1.040*** | 10.42 | 596.984 | 0.493*** | −0.819*** |
| ITALY      | 7.311 | 356.719 | −0.025 | −0.760*** | 6.119 | 316.779 | −0.234*** | −0.744*** | 10.625 | 453.454 | 0.172* | −1.190*** |
| POLAND     | 6.115 | 308.095 | 0.545*** | −0.276*** | 5.077 | 206.728 | 0.590*** | −0.555*** | 9.001 | 579.19 | 0.217** | −1.089*** |
| ROMANIA    | 11.408 | 224.48 | 0.366*** | −0.549*** | 8.926 | 145.678 | −0.107* | −0.724*** | 18.303 | 379.255 | 0.01 | −1.606*** |
| RUSSIA     | 11.898 | 178.608 | 0.158*** | 1.339*** | 10.673 | 91.709 | −0.104* | −0.692*** | 15.303 | 404.794 | −0.190* | −0.196 |
| SPAIN      | 2.434 | 297.56 | 0.102* | −0.925*** | 3.252 | 246.336 | 0.142*** | −0.808*** | 0.16 | 433.485 | 0.194* | −1.296*** |
| UKRAINE    | 9.879 | 1007.928 | 0.647*** | 0.056 | 13.879 | 1299.257 | 0.286*** | −0.708*** | −1.232 | 31.287 | −0.291*** | −1.113*** |
Table 3
Connectedness in Stock Market Returns (Pre Covid).

| Country   | CZECHIA | FRANCE | GERMANY | HUNGARY  | ITALY   | POLAND | ROMANIA | RUSSIA | SPAIN | UKRAINE | FROM |
|-----------|---------|--------|---------|----------|---------|--------|---------|--------|-------|---------|------|
| CZECHIA   | 26.46   | 13.3   | 11.47   | 5.21     | 12.56   | 6.19   | 4.61    | 5.35   | 13.5  | 1.36    | 73.54|
| FRANCE    | 5.75    | 23.06  | 19.76   | 3.15     | 15.93   | 7.57   | 2.85    | 4.95   | 16.38 | 0.6     | 76.94|
| GERMANY   | 5.53    | 20.21  | 24.27   | 3.7      | 14.49   | 8.52   | 2.93    | 4.98   | 14.75 | 0.62    | 75.73|
| HUNGARY   | 7.61    | 9.22   | 8.64    | 7.92     | 10.36   | 6.33   | 3.7     | 8.67   | 1.57  | 1.57    | 64.12|
| ITALY     | 6.58    | 17.06  | 15.02   | 3.23     | 25.97   | 6.32   | 3.18    | 4.13   | 17.5  | 0.99    | 74.03|
| POLAND    | 6.38    | 11.11  | 11.28   | 7.64     | 8.5     | 33.95  | 4.37    | 5.83   | 10.2  | 0.74    | 66.05|
| ROMANIA   | 6.62    | 8.25   | 7.71    | 4.53     | 6.29    | 6.74   | 45.55   | 5.25   | 7.04  | 2.01    | 54.45|
| RUSSIA    | 5.69    | 9.33   | 7.93    | 3.91     | 6.36    | 7.05   | 4.15    | 47.68  | 6.87  | 1.03    | 52.32|
| SPAIN     | 6.74    | 18.18  | 15.66   | 3.02     | 17.72   | 6.81   | 3.28    | 3.94   | 23.96 | 0.69    | 76.04|
| UKRAINE   | 1.66    | 1.92   | 1.95    | 4.07     | 2.24    | 2.31   | 1.83    | 3.09   | 2.51  | 78.42   | 21.58|
| TO        | 52.56   | 108.58 | 99.42   | 38.47    | 92.01   | 61.86  | 33.53   | 41.33  | 97.42 | 9.62    | 634.8|
| Inc.Own   | 79.02   | 131.64 | 123.69  | 74.35    | 117.97  | 95.81  | 79.09   | 89.03  | 121.37| 88.04   | cTCI/TCI|
| NET       | -20.98  | 31.64  | 23.69   | -25.65   | 17.97   | -4.19  | -20.91  | -10.99 | 21.37 | -11.96  | 70.53/63.48|
Table 4
Connectedness in Stock Market Returns (Post Covid).

|          | CZECHIA | FRANCE | GERMANY | HUNGARY | ITALY | POLAND | ROMANIA | RUSSIA | SPAIN | UKRAINE | FROM |
|----------|---------|--------|---------|---------|-------|--------|---------|--------|-------|---------|------|
| CZECHIA  | 19.83   | 10.71  | 9.67    | 10.62   | 10.91 | 12.9   | 7.77    | 6.06   | 10.27 | 1.26    | 80.17|
| FRANCE   | 7.49    | 16.85  | 14.28   | 6.9     | 15.2  | 10.9   | 6.85    | 6.24   | 14.65 | 0.64    | 83.15|
| GERMANY  | 7.52    | 14.43  | 16.46   | 6.64    | 15.72 | 11.85  | 6.39    | 7.21   | 12.91 | 0.86    | 83.54|
| HUNGARY  | 10.07   | 9.58   | 8.16    | 21.44   | 10.21 | 12.32  | 6.41    | 10.38  | 9.91  | 1.51    | 78.56|
| ITALY    | 7.56    | 14.91  | 13.89   | 6.61    | 17.5  | 11.31  | 6.08    | 6.71   | 14.58 | 0.87    | 82.5 |
| POLAND   | 7.04    | 10.73  | 10.1    | 8.4     | 12.35 | 22.02  | 6.03    | 9.91   | 12.22 | 1.2     | 77.98|
| ROMANIA  | 8.27    | 10.08  | 9.36    | 9.48    | 10.01 | 9.58   | 23.46   | 10.06  | 8.95  | 0.76    | 76.54|
| RUSSIA   | 5.85    | 9.58   | 9       | 7.01    | 12.02 | 13.94  | 4.83    | 26.07  | 10.45 | 1.25    | 73.93|
| SPAIN    | 7.16    | 15.73  | 12.88   | 7.78    | 14.99 | 9.73   | 6.23    | 6.03   | 18.87 | 0.58    | 81.13|
| UKRAINE  | 2.64    | 4.9    | 4.46    | 4.18    | 4.34  | 2.74   | 3.72    | 1.5    | 5.4   | 66.12   | 33.88|
| TO       | 63.61   | 100.64 | 91.8    | 67.62   | 105.76| 95.27  | 54.32   | 64.3   | 99.33 | 8.94    | 751.39|
| Inc.Own  | 83.44   | 117.49 | 108.26  | 89.07   | 123.26| 117.29 | 77.78   | 90.17  | 118.2 | 75.06   | cTCI/TCI|
| NET      | −16.56  | 17.49  | 8.26    | −10.93  | 23.26 | 17.29  | −22.22  | −9.83  | 18.2  | −24.94  | 83.49/75.14 |
other four net emitters of shocks, France, Italy, Spain and Germany which are all developed European economies and most of their net return shock transmission is towards eastern European economies like Romania, Ukraine, Czechia, Hungary and Russia.

Another important change visible in the post covid period is the limiting role of Germany through DAX Index. DAX which was the second largest emitter of return shocks after CAC 40 of France in pre covid period, became the smallest net emitter compared to France, Italy, Spain and Poland.

5. Conclusion and discussion

Covid-19 has shocked financial markets across the globe with its sheer and unprecedented impact that is further exacerbated by the lockdown measures imposed by most of the governments starting from the European economies. Initial findings of researchers observed and reported the sudden decline of economic and financial activities that hampered the growth projections in almost every country.

However, down the lane, after almost two years of its happening, this is probably the time to analyze how this crisis really impacted and altered the economic and financial dynamics. In this paper we analyzed 10 European stock markets and compared their pre and post covid return performance and dynamics.

Our results are surprisingly pleasant and may be counter intuitive to many. We find that in general stock markets performed way better post covid particularly if the investors’ holding period is reasonably large, 252 days in our case. However, this improved performance is not subjective to the choice of holding period and is equally visible in other holding periods of Quarter, Month or a Week. One would be tempted to attribute this improved stock market performance to the bailout packages and prompt response to deal with Covid-19 mainly exhibited by the developed European economies. However, we see in our results that there is no indication that the improved stock market performance is the feature only visible in developed European economies. Rather in some instances, the largest absolute return differentials are visible in eastern European economies which were although less severely hit by Covid in terms of infection cases but more severely hit by the Covid deaths on per capita basis.

The second important strand of our findings is related to the connectedness among the selected stock markets. Our findings do support the studies that have reported the altered behavior of the network connectedness in financial markets. The overall connectedness has gone up by around 12%, from 63% to 75% despite the fact that most of the countries followed the policies including lockdown and restricted trade flows which are isolationist in nature. We also observe the increased dominance of Poland in transmitting net return shocks to other eastern European economies as well as to Germany. Germany stock market seems to be more inward looking and its net spillovers towards other markets have gone down significantly. What has not changed is that all four developed European markets i.e. France, Germany, Italy and Spain remained the net emitter of return spillovers and shocks like they were in pre covid period.

CRediT authorship contribution statement

Chi-Wei Su: Conceptualization, Project administration, Writing – original draft. Syed Kumail Abbas Rizvi: Conceptualization, Data curation, Software, Formal analysis, Writing – review & editing. Bushra Naqvi: Conceptualization, Methodology, Project administration, Writing – review & editing. Nawazish Mirza: Conceptualization, Methodology, Project administration, Writing – review & editing. Muhammad Umar: Conceptualization, Supervision, Visualization, Investigation, Writing – original draft.

Data availability

Data will be made available on request.

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