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THE IDES OF MARCH. DID ITALIAN COVID-19 CRISIS FUEL US ECONOMIC POLICY UNCERTAINTY?

ABSTRACT

This paper empirically investigates the possibility the Italian severe hit from the COVID-19 pandemic increased the US's Economic Policy Uncertainty (EPU) index. Using Johansen cointegration and Granger causality econometric techniques, we conclude that the above relationship holds. It seems that the recent COVID-19 disaster occurred in Italy (due to high death toll) fueled the economic uncertainty in the US. It is high possible, the anxiety of US citizens propelled this pattern. These results show that the policy makers should be more cautious for the global propagation of COVID-19, in order to improve their political decisions, even in the US.

Keywords: Economic Uncertainty, VAR, Cointegration, Granger Causality, COVID-19
JEL Classification: D80, E66, F68

RIASSUNTO

Le Idi di marzo. La crisi in Italia a seguito del Covid-19 ha alimentato l'incertezza politica degli Stati Uniti?

In questo articolo si esamina empiricamente la possibilità che il drammatico impatto della pandemia di Covid-19 in Italia abbia accresciuto l'indice EPU (Economic Policy Uncertainty) negli USA. L'utilizzo delle tecniche di cointegrazione di Johansen e di causalità econometrica di Granger supporta questa affermazione. Vi è evidenza che la drammatica situazione in Italia a seguito della diffusione del Covid-19 (dovuta ad un alto tasso di mortalità) ha alimentato l'incertezza economica negli Stati Uniti. È possibile che l'ansietà degli americani abbia incrementato questa tendenza. Questi risultati mostrano che a causa della propagazione del Corona-virus i governi dovrebbero essere più cauti per migliorare le loro decisioni politiche, persino negli Stati Uniti.

1. INTRODUCTION

Julius Caesar was warned by the soothsayer to "*beware the Ides of March*" (Shakespeare, 1984, p.103). This is one of the most popular quotes from William Shakespeare's well-known play, "*The Tragedy of Julius Caesar*". Although, the soothsayer warned Caesar that death awaited him in mid-March, the latter decided not to stay at home, and this led to his assassination. About two thousand years later, another tragedy took place in Italy in the mid-March of 2020. Nowadays, the Italian government is the one warning the citizens of Italy to stay at home because of the coronavirus pandemic. The Italian government imposed a nationwide lockdown on March 9, which was enriched with extended restrictions on March 21 by closing all non-essential businesses and banning any movement inside the country except for certain emergencies.

The literature on the economic impact of COVID-19 is still extremely limited as it is in-progress. A recent work from Yilmazkuday (March 17, 2020) investigates the impact of COVID-19 new deaths on the reduction of S&P500 index. Another novel work from Yilmazkuday (March 16, 2020) discovers that a weekly increase of 1,000 in daily global COVID-19 deaths will reduce the global economic activity, measured by the Baltic Exchange Dry Index (BDI), by 10% after one week, and by 22% after three months. Furthermore, the empirical work of Corbet *et al.* (2020) indicates the volatility relationship between the main Chinese stock markets and Bitcoin evolved significantly during this period of enormous financial stress.

The COVID-19 pandemic has increased uncertainty in various aspects. As expected, it caused uncertainty about the symptoms of the disease, the mortality, the spread of the virus and many more. In the field of economics, assessing the impact of the COVID-19 on the economic uncertainty is essential for policymakers. Thus, Baker *et al.* (2020) use three indicators of economic uncertainty (stock market volatility, economic policy uncertainty indices and uncertainty in business expectation surveys) in order to conclude that more than half of the forecasted output contraction can be caused by COVID-19 induced uncertainty. However, Albulesco (March 12, 2020) finds that the impact of the announcement of new COVID-19 cases on oil prices was relatively small compared to the impact of financial volatility and economic policy uncertainty on oil prices. This is most likely due to spillover effects, as COVID-19 pandemic indirectly affects oil prices by increasing economic and financial uncertainty.

Another work of Albulesco (2020a) explores the implications of the COVID-19 pandemic in the financial market volatility index (VIX, hereafter) and finds that the propagation of the coronavirus outside China has a greater impact on VIX and the financial instability increases as the number of affected countries increases. Moreover, Albulesco (2020b) points out that the new cases of infection that have been reported globally and the total death rate do not have a significant impact on the US's Economic Policy Uncertainty index (EPU, hereafter). However, if they apply in their model the numbers recorded outside of China, they find a positive effect on the EPU.

The current research examines the relationship between US's EUP index and a group of variables, namely: the distribution of Google searches for the coronavirus in US (GT), the death rate from COVID-19 in US (DR) and the daily new confirmed COVID-19 deaths in Italy (ND). The data sample covers the period from February 23 until April 6, 2020.

The empirical findings outlined in this paper contribute novel insights. In particular, our empirical findings indicate that: i) a cointegrating vector exists among proxies of the COVID-19 development and EPU, ii) in the short run a unidirectional causality runs from Google trends and new COVID-19 deaths in Italy to EPU and iii) there is no Granger causality relationship between US COVID-19 death rate and EPU. All these findings combined, conclude that the COVID-19 disaster in Italy, seriously affected the political uncertainty to US.

The paper proceeds as follows. First, the data set details utilized throughout the study are described in Section 2. The empirical methodology and econometric results are presented in Section 3. Finally, conclusions are presented in Section 4.

2. DATA OVERVIEW

On March of 2020 Italy has suffered the world's deadliest outbreak of coronavirus. Figure 1 shows that around mid-March, more than half of the new deaths from the COVID-19 has been recorded in Italy[1]. Italy, with a population of only 60 million people approximately, "achieved" this sad word record and shocked the whole world including the US. The outbreak of the

[1] Data for COVID-19 pandemic were obtained from Coronavirus Source Data by Hannah Ritchie available at https://covid.ourworldindata.org.

pandemic in Italy was so intense and tragic that awakened the public opinion and monopolized the interest of the media.

FIGURE 1 - *New Deaths in Italy as Percentage of Total New Deaths Worldwide, %*

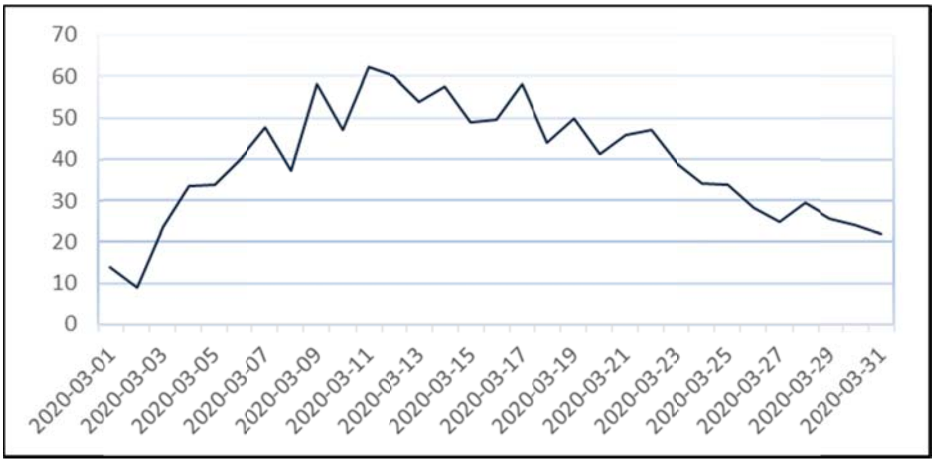
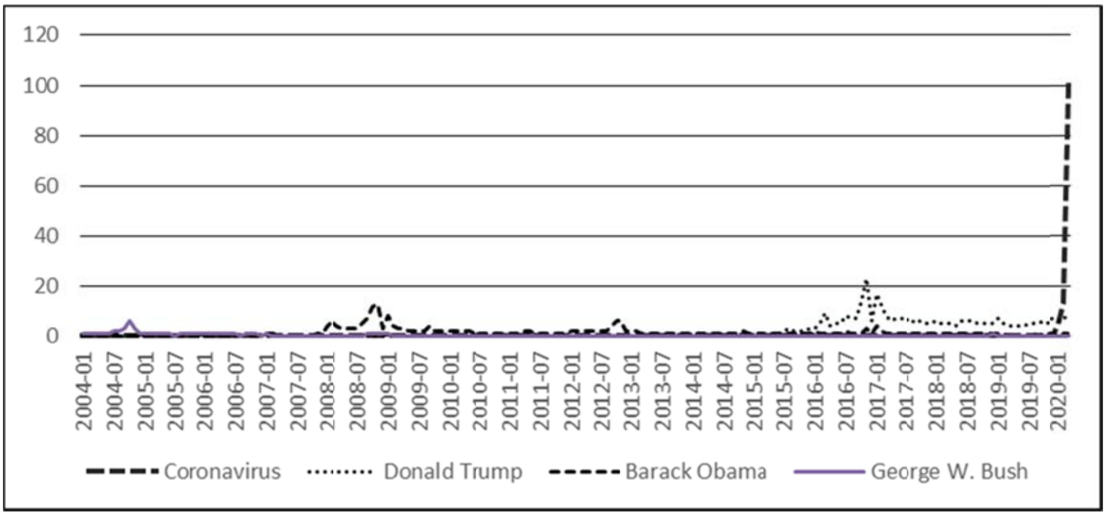


FIGURE 2 - *Google Trends Data from January 2004 to March 2020 in the USA*



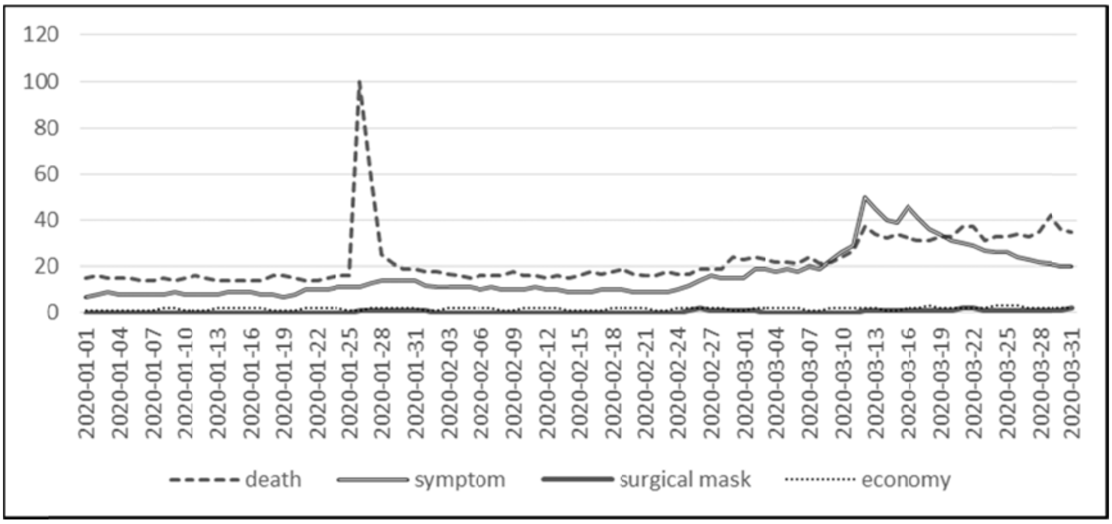
In the United States the growing interest for the pandemic is confirmed by the fact that coronavirus has been an extremely hot search topic on Google[2]. This can be easily seen by using Google trends data from 2004 till nowadays and by comparing searches for the theme of coronavirus with searches related with the former and the current presidents of the USA, i.e.

[2] Data from Google trends can be found at: https://www.Google.com/trends.

George W. Bush, Barack Obama and Donald Trump. As Figure 2 shows, the amount of the interest in the coronavirus theme in the US is extremely huge as it is more than four times bigger in volume than searches for Donald Trump around his election in 2016.

Comparing the following search topics: "*death*", "*symptom*", "*surgical mask*" and "*economy*" on Google trends for the first 3 months of 2020 (see Figure 3), we observe that the relevant searches on the topic "*surgical mask*" are increasing over time and in the end of the three month period are proportionally identical to the searches related to the topic "*economy*". Trends for searches related to the theme "*death*" are increasing during March 2020 and this can be explained by the fact that in March, the first deaths from COVID-19 were registered in the US. On January 26, there was a sharp rise in searches related to the theme "*death*" due to the sudden death of Kobe Bryant.

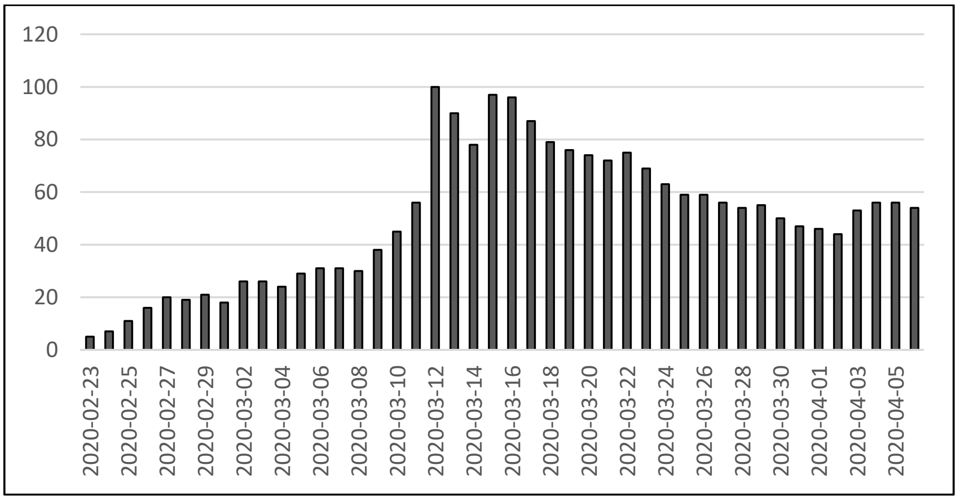
FIGURE 3 - *Google Trends Data from 2020/01/01 to 2020/03/31 in USA*



The Google searches for the theme "*symptom*" are proportionally the first between March 9 and 12, suggesting that it may have been the main concern for the internet users to be aware of the symptoms of the new coronavirus as the first deaths were recorded in US. After March 12, the frequency of the searches decreases. This may be due to the fact that the general public was well informed about all the possible symptoms. It should be also noted that users may visit health-related websites directly for their information as well as webstores to buy surgical masks. However, these assumptions only reinforce the hypothesis of the huge public concern for the COVID-19.

As seen in Figure 4 in the US the interest in coronavirus peaked on March 12, one day after the declaration by the WHO of the outbreak of the novel coronavirus to be a pandemic. A second slightly smaller peak is observed on March 16 when President Trump's announced stricter guidelines to stop the propagation of the COVID-19 and called the latter a "Chinese virus".

FIGURE 4 - *Google Searches for Coronavirus in US, 2020/02/23 - 2020/04/06*



The catalytic effect of the Italian crisis on the Google searches in the US can be also seen in the related "*Rising Searches*", i.e. in the terms that were searched for with the topic of coronavirus and had the most significant growth in volume in the examined period. Indeed, in the first place in the related rising searches is the term pharyngitis and in the second the term Italy, recording an increase of 1150% compared to the previous period.

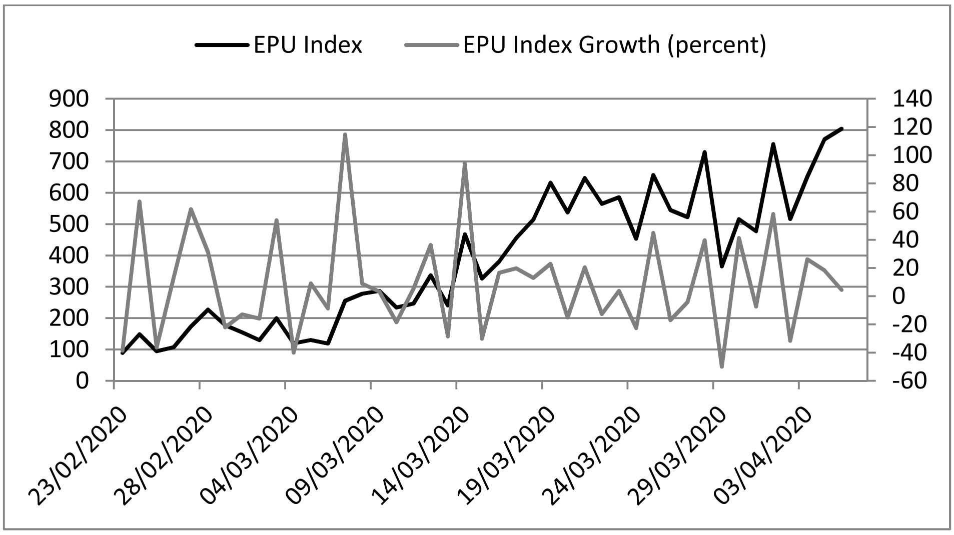
The US economic policy uncertainty is proxied by the Economic Policy Uncertainty Index for United States[3]. The EPU index:

"reflects the frequency of articles in 10 leading US newspapers that contain the following triple: 'economic' or 'economy'; 'uncertain' or 'uncertainty'; and one or more of 'congress', 'deficit', 'Federal Reserve', 'legislation', 'regulation' or 'White House' " (Baker *et al.*, 2015, p.1).

[3] Data for EPU were obtained from Baker, Scott R., Bloom, Nick and Davis, Stephen J., Economic Policy Uncertainty Index for United States [USEPUINDXD], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/USEPUINDXD, April 11, 2020.

During the examined period, the EPU index fluctuates upwards and at the end it increases by 455% compared to the beginning period. Moreover, the growth rate of the index has been rather volatile suggesting that it is subject to significant amount of shocks (see Figure 5 for more information).

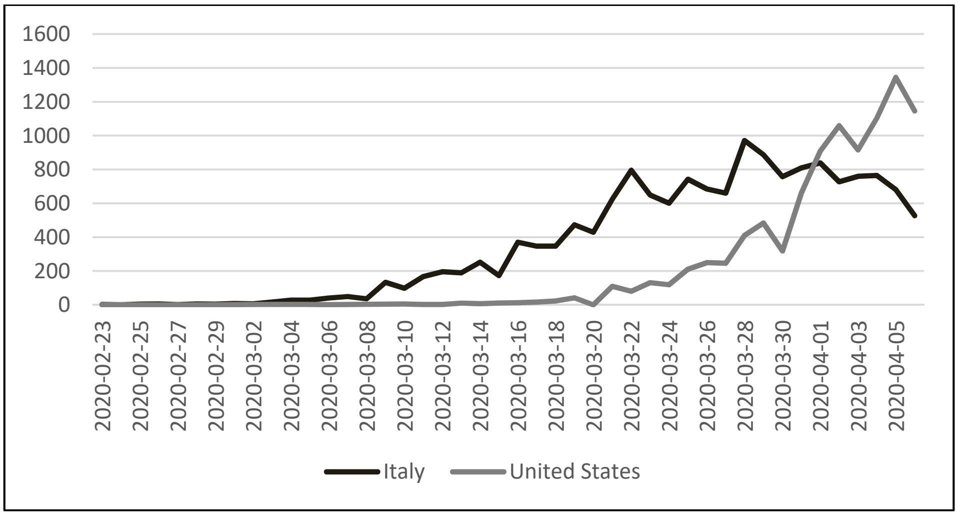
FIGURE 5 - *Economic Policy Uncertainty Index for United States, EPU Index*



3. EMPIRICAL ANALYSIS

In this session we empirically investigate the nexus between the US EPU and a group of variables, namely: the distribution of Google searches for the theme of coronavirus in US (GT), the death rate from COVID-19 in US (DR) and the daily new confirmed COVID-19 deaths in Italy (ND). We employ data covering the period from February 23, 2020 to April 6, 2020. The data sample starts from the end of February when the first deadly cases were recorded in Italy, covers the whole of March when the situation in Italy seemed uncontrollable and a part of April when the new deaths in the US surpassed those in Italy, as it is visible on Figure 6.

FIGURE 6 - *New Confirmed COVID-19 Deaths*



In order to examine the relationship between the series we are applying the cointegration approach of Johansen (1988) and Johansen and Juselius (1990) followed by Granger non causality testing. The first step is the unit root testing of the series in order to determine their order of integration. For this purpose, we are performing the ADF test (see Dickey and Fuller, 1979, 1981) in the levels and in the first orders of the series. The results, as shown in Table 2, indicate that all series are non-stationary in levels but become stationary after differencing, i.e. they are all I(1).

The following VAR model is then specified, in order to select the optimal lag length for the endogenous variables:

$$Y_t = \mu + A_1 Y_t - 1 + A_2 Y_{t-2} + ... + A_i Y_{t-1} + u_t$$

where: $Y_{t=} \left(Y_{1t}, Y_{2t}, Y_{3t} Y_{4t}\right)$

$Y_{1t} = EPU$

$Y_{2t} = GT$

$Y_{3t} = DR$

$Y_{4t} = ND$

u_t : the vector of the residuals

μ : the vector of fixed terms

and A_1 : the matrix of the coefficients

TABLE 1 - *Descriptive Statistics*

`	EPU	GT	DR	DN
Mean	380.9789	50.81395	2.233198	361.1136
Median	350.7050	55.00000	1.790577	299.5000
Max.	804.3100	100.0000	7.200000	971.0000
Min.	88.86000	5.000000	0.000000	0.000000
Std. Dev.	216.2787	26.59686	1.746663	328.3259
Skewness	0.295367	0.127024	1.288524	0.284136
Kurtosis	1.825681	2.035248	4.443711	1.500274
Jarque-Bera	3.167984	1.783221	13.81534	4.715536

TABLE 2 - *Unit Root Tests*

	p-values		
	H_0: Series has a unit root		
	ADF Tests		
	None (p-values)	Intercept (p-values)	Intercept and trend (p-values)
EPU	0.9519	0.9405	0.1828
D(EPU)	0.0000	0.0000	0.0000
GT	0.6689	0.4035	0.9023
D(GT)	0.0000	0.0000	0.0000
DR	0.3138	0.0631	0.1634
D(DR)	0.0012	0.0189	0.0238
ND	0.6331	0.7394	0.6012
D(ND)	0.0072	0.0560*	0.5160*

* We ignored C and @TREND since they are statistically insignificant.

Table 3 shows the values of the information criteria for the previous autoregressive vector. According to Akaike information criterion, three lags are optimal. In order to avoid model misspecification, we perform LM test. As Table 4 indicates there are no autocorrelation issues.

TABLE 3 - *Lag Length Criteria*

Lag pair	LR	FPE	AIC	SC	HQ
1	NA	7.73e+09	34.11591	34.82693*	34.36135*
2	26.59819*	7.41e+09*	34.04508	35.46711	34.53596
3	22.45093	7.57e+09	33.98324*	36.11628	34.71956

Notes: LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion
* indicates lag order selected by the criterion

TABLE 4 - *Autocorrelation LM Test*

VAR Residual Serial Correlation LM Tests		
Lags	LRE-Stat	Prob
1	9.715718	0.8835
2	16.40087	0.4324
3	24.55284	**0.0819**

The Johansen cointegration test proposes two statistical criteria in order to test the number of cointegrating vectors in the VAR model. These are the "*trace*" (Tr) and the "*maximum eigenvalue*" (L-max). Both tests indicate the existence of a single integrating vector (Tables 5 and 6) which means the existence of a long-run equilibrium relationship among the underlying variables. This main finding suggests that the Italy's increasing trend of the COVID-19 pandemic, fuels the increasing trend of US's EPU index. Then Granger (1969) non-causality is tested and the results (Table 7) show that the distribution of Google searches for the coronavirus in US (GT) and the new confirmed deaths from COVID-19 in Italy (ND) Granger cause EPU, whereas the COVID-19 death rate in US does not Granger cause EPU. This supports that the anxiety produced in the US is due to Italian death toll and its economic and political consequences, rather than to the concern about the propagation of the virus inside the US. This shows that increased uncertainty in a European country like Italy can play a major role in shaping the economic situation and prospects globally and in particular can drive US economic policy uncertainty.

TABLE 5 - *Johansen Cointegration Test – Trace Statistic*

null	alternative	Trace Statistic	5% critical value
$r = 0$	$r = 1$	57.80621	47.85613
$r \leq 1$	$r = 2$	24.97638	29.79707
$r \leq 2$	$r = 3$	11.67161	15.49471
$r \leq 3$	$r = 4$	5.489587	3.841466

TABLE 6 - *Johansen Cointegration Test – Maximum Eigenvalue*

null	alternative	Max eigenvalue stat.	5% critical value
$r = 0$	$r = 1$	32.82983	27.58434
$r \leq 1$	$r = 2$	13.30477	21.13162
$r \leq 2$	$r = 3$	6.182027	12.26460
$r \leq 3$	$r = 4$	5.489587	3.841466

TABLE 7 - *Granger Causality/Block Exogeneity Wald Tests*

Dependent variable: EPU			
Excluded	**Chi-sq**	**df**	**Prob.**
GT	9.075966	3	**0.0283**
DEATH_RATE	5.076328	3	0.1663
ITALY_NEWDEATHS	9.500326	3	**0.0233**

4. Conclusions

Marshall McLuhan once said:

" 'Time' has ceased, 'space' has vanished. We now live in a global village... a simultaneous happening" (1967, p.63).

The outbreak of the novel coronavirus in Wuhan, China, has undoubtedly developed anxiety to people around the world, who were constantly being informed, "*a simultaneous happening"*. The above is confirmed in the current study by analyzing Google trends data. Searches for coronavirus has become the hottest trend on Google. Additionally, US economic policy uncertainty as data reveals increases rapidly.

This paper empirically investigates the possibility the Italian severe hit by COVID-19 pandemic increased the US's EPU index. The nexus between: EPU, distribution of coronavirus web searches in US and COVID-19 death toll in Italy and US is being tested by applying Johansen cointegration test followed by Granger non causality testing. Findings indicate the existence of a long-run equilibrium relationship among the variables and a unidirectional Granger causality that runs from coronavirus web searches and the new confirmed COVID-19 deaths in Italy to EPU. There is no causality between death rates in US and EPU. This shows that the COVID-19 death rate in the US has not yet been alarming and uncertainty in the US is fueled by the propagation of the coronavirus outside the US, specifically in Italy. Future research should focus on and compare the course of US economic policy uncertainty after the outbreak of the virus in the US mainland.

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