

THE IMPACT OF COVID-19 ON EUROPEAN FINANCIAL MARKETS AND ECONOMIC SENTIMENT

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Abstract

COVID-19 pandemic created a lot of challenges not only for society but also for financial markets and economics. Various authors analysed different financial crisis and discussed spillover effects using two different approaches of micro and macro level. The main object of this study is to identify the relationship between COVID-19 pandemic, financial markets and economic sentiment. Authors analysed the main impact of COVID-19 pandemic using two different frameworks: micro and macro. Micro-level is focused on the sentiment of different sectors and the macro level is focused on broad economic sentiment and tendencies in financial markets. The object of the research is the European financial markets and economies. Based on the research results, it became obvious that different countries react in different ways to the COVID-19 pandemic. Also different tendencies in the construction sector compared with broad economic sentiment have been noticed. The research has shown that the mood of consumers is not as volatile as in the business segment.

Keywords: *COVID-19, economic sentiment, financial markets*

1. INTRODUCTION

The coronavirus (COVID-19) infection caused a global crisis. The infection spread worldwide 3 months after the first case of new virus was registered and it affected more than 110 countries (Harris et al., 2020). COVID-19 is not only a global pandemic and public health crisis; it has also severely affected the global economy and financial markets. The World Health Organization (WHO) first declared COVID-19 a world health emergency in January 2020. Since then, the emergency has evolved into a global public health and economic crisis that has affected the \$90 trillion global economy (Jackon et al., 2020). The infection has sickened more than 8.3 million people, with over 440,000 fatalities. At one point, more than 80 countries had closed their borders to arrivals from countries with infections, ordered businesses to close, instructed their populations to self-quarantine, and limited access to schools for about 1.5 billion children (Powell, 2020).

Experts in the field of economic processes, as a prerequisite, often called recapitalization of existing markets and strengthening monopolization of economic space (Baret et al., 2020). However, the spread of coronavirus infection COVID-19 as trigger for the growing economic crisis in the world began in late 2019 in China. Under the light of socio-economic problems caused by the pandemic, such political and economic processes like the Brexit of the United Kingdom from the European Union and the USA trade war with China, were perceived as less important (Horowit et al., 2020). Therefore, the COVID-19 pandemic became a kind of “trigger”, a switch of socio-economic, as well as partially political process in the world economic space. This crisis caused by the pandemic is significantly different from others that have ever existed, because majority of the world's population facing one of the greatest fears - the fear of death.

Many countries have already taken or will eventually take action to mitigate its spread, through social isolation policies, such as shutting educational institutions, limiting work and restricting the mobility of people. The preventive actions have had an immediate and significant impact on all economies through business and domestic consumption (Horowit et al., 2020).

Although the cause of the current crisis does not lie in the financial markets (Boot et al., 2020), the spreading of COVID-19 undoubtedly leads to some turmoil in them.

For example, according to initial assessment, the negative impact on European capital markets was as follows: (i) subdued IPO market, (ii) widened equity spreads; (iii) significantly declined company valuations; (iv) rapidly and significantly increased equity market volatility; (v) some degree of stress and credit losses priced in the corporate bond and loan markets; (vi) increased price volatility and risk premium of sovereign bond markets (AFME, 2020). The major stock markets in the world have demonstrated the first signs of reaction in the beginning of February, after it became evident that the outbreak of COVID-19 is spilling over (CEIC, 2020). In global terms, around 30 percent decrease of stock markets is observed, along with increased implied volatility and credit spreads of non-investment grade debt (OECD, 2020).

In the last decade, numerous studies have paid much attention to the financial crisis of 2007–2008. The researchers have been discussing the spillover effects of the crisis on different economies of countries. Two approaches to the analysed issue could be distinguished. According to the theoretical analysis of Zhao, Jiang and Li (2015), most of the studies have focused on macro-level impacts through the channels of income, price, and exchange rates (for example, Hale et al. (2012) find that “the European debt crisis has affected the global corporate debt market, leading to increased borrowing costs for US corporations”). On the other hand, the focus on the effects of crisis from a micro-level perspective is possible (Ferrero-Ferrero, Fernández-Izquierdo, and Muñoz-Torres, 2012; Bourletidis and Triantafyllopoulos 2014, Filbeck, Louie and Zhao, 2014; Siakas et al. 2014; Zhao, Jiang and Li, 2015). For instance, Zhao, Jiang and Li (2015) have investigated the impact of the 2007–2008 economic crisis on the financial performance of multinational corporations and their research results have shown that multinational corporations have almost doubled (1.9 times) their sales in Asia and 13.7 times have increased their sales in China from 1999 to 2012.

The investigation of the COVID-19 pandemic’s effect from a macro and micro-level perspective also is used. For instance, Napierała, Leśniewska-Napierała, and Burski (2020) have used a micro-level perspective by analysing the short-term impacts of reported new cases and deaths of the COVID-19 disease on hotels’ performances in the nine major Polish urban hotel markets by using micro-variables, i.e., the determinants of hotel performances (occupancy, revenue per available room, and the average daily rate). Kraus et al. (2020) have examined the impacts of COVID-19 on family companies. They have shown how companies in all industries and of all sizes have adapted their business models to changing environmental conditions within a short period of time. Some researchers (Sokol and Pataccini, 2020; Wojcik and Ioannou, 2020) have used both the macro-level and micro-level approaches. For instance, Sokol and Pataccini (2020) (i) have pointed out which companies are winners and which ones are losers: this is the micro-level approach; (ii) and they have highlighted that “the emerging map of winners and losers will most likely further aggravate the existing inequalities in the global economy” – here, the macro-level approach has been employed.

Furthermore, to some extent Covid-19 could be identified not only as a health anomaly, but also as an information bubble and even as a financial market anomaly. Despite of the limited research available in this area, it is possible to assume that wide spread of fake, reality non-reflecting data on Covid-19, biased and framed approach providing statistical information could contribute to the increase level of anxiety in the society and as a result, could be reflected in business and households expectations and market sentiment.

This research aims to identify the impact of COVID-19 pandemic on financial markets and sentiment indicators in Europe.

To reach the goal of this research, the micro-level and macro-level approaches were used. For the micro-level approach, we used sentiment indicators such as consumer confidence indicator, construction confidence indicator, industrial confidence, and retail confidence indicator. For the macro-level approach, we used the economic sentiment indicator, equity market indices, and data related to COVID-19 infection.

2. THE IMPACT OF COVID-19 ON THE FINANCIAL MARKETS

The turbulence in the financial markets leads to a consistently increasing scope of the scientific studies on COVID-19 impact on financial markets (for example, Albulescu 2020; Quing et al. 2020; Schoenfeld 2020; Zhang et al. 2020; Sansa 2020; Rameli and Wagner 2020 b; Gormsen and Kojien 2020, and others).

One of the first, Albulescu (2020), using the data of 40 days after starting the international monitoring of COVID-19, has analysed the impact of COVID-19 official announcements (including new reported cases, COVID-19 death ratio and number of affected countries) on the financial volatility expressed as financial markets volatility index (VIX). The research revealed that: (i) new cases reported outside China have positive effect on financial volatility; (ii) the death ratio has positive effect on financial volatility; and (iii) the increasing number of COVID-19 affected countries increased financial volatility (Albulescu 2020). Moreover, the same study has shown interesting results indicating that “the financial markets were more sensitive to COVID-19 spillover to Europe and US than to spread inside China” (Albulescu 2020).

Similar results for stock markets are also provided by Zhang et. al. (2020) – the comparison of standard deviations of stock market daily returns revealed the strong COVID-19 influence on stock market volatility. Moreover, the authors emphasizes that such changes in uncertainty and risk “cannot simply because of long-term expectations, instead, it is almost certain that sentimental factors play important roles” (Zhang et al., 2020).

The results of the research conducted by Quing et. al (2020) has also showed that “(i) COVID-19 has a negative but short-term impact on stock markets of affected countries and that (ii) the impact of COVID-19 on stock markets has bidirectional spill-over effects between Asian countries and European and American countries”. The significant short term effect on stock markets has been also proved by Sansa (2020), which applied a regression technique to assess the impact of COVID-19 on Shanghai and New York stock exchanges.

Accordingly, the results of N. J. Gormsen and R. S. Kojien (2020) research demonstrates negative short term COVID-19 impact on stock and bond markets. However, these authors emphasizes the temporal nature of COVID-19 pandemic and temporal response of stock and bond markets as markets demonstrates some signs of recovery.

Awadhi et al., (2020) conducted a study of the China stock market, investigating the impact of the COVID-19 on stock returns. It was found that the increase in the number of infection cases, as well as the increase in the number of mortality cases, appeared to have a significant negative impact on the stock return. In addition, the authors received important results in examining the impact of the pandemic on companies in terms of their capitalization: the COVID-19 outbreak has a greater negative impact on the prices of larger-cap companies than on smaller-cap companies stocks.

After analysing the changes in the values of bonds, commodities and currencies, triggered by COVID-19 pandemic, Schoenfeld (2020) states that pandemics such as caused by COVID-19 are systemically important to financial markets. Moreover, Baker et al., (2020) have quantified the role of COVID-19 and other infectious diseases in U.S. stock market volatility and have demonstrated unprecedentedly powerful effect of COVID-19 on stock market. This extraordinary effect is explained by “the role of government restrictions on individual mobility and commercial activity plus voluntary social distancing – all of which have powerful effects in a service-oriented economy” (Baker et al., 2020).

As it is stated by Rameli and Wagner (2020 a), “early results suggest that the market fairly quickly began to respond to concerns about the possible economic consequences of the novel coronavirus. <...> the cross-section of stocks reveals that investors started to become concerned about potential amplifications of the COVID-19 shock through financial channels”. Finally, it is likely that “investors will presumably continue to keep an eye on a potential resurgence of COVID-19, the emergence of future pandemics, and perhaps even disaster risks more generally” (Rameli and Wagner, 2020 b).

In this research, three dependent and twenty independent variables are collected (Table 1), the election of which is based on the analysis of scientific literature provided above.

Table 1. Variables of panel model, abbreviations and description.

Variable		Description
Abbreviation	Full Name	
Dependent variables:		
SXXP _t	STOXX Europe 600 Index	SXXP _t is index of 600 components, representing large, mid and small capitalization companies across 17 countries of European region for a period <i>t</i> .
VIX _t	CBOE Volatility Index	VIX _t is a real-time market index, representing the market expectation of 30-day forward-looking volatility, derived from the price inputs of S&P 500 index options, measuring market risk and investors' sentiments for a period <i>t</i> .
FESX00 _t	EURO STOXX 50 Index Continuous Contract	FESX00 _t is historical the price of EURO STOXX 50 Index future contract based on spot-month continuous contract calculations (points).
Independent variables:		
CA _t	Countries affected	CA _t is measured by a number of countries that have confirmed coronavirus cases a period <i>t</i>
NCw _t	New cases world	NCw _t is measured by a number of new cases of coronavirus reported in a world since the previous day for a period <i>t</i> (a number of cases per day).
TCw _t	Total cases world	TCw _t is measured by a number of total cases of coronavirus reported in a world for a period <i>t</i> (a cumulative number of cases).
NDw _t	New deaths world	NDw _t is measured by a number of new deaths caused by coronavirus reported in a world since the previous day for a period <i>t</i> (a number of deaths per day).
TDw _t	Total deaths world	TDw _t is measured by a number of total deaths caused by coronavirus reported in a world for a period <i>t</i> (a cumulative number of deaths).
FRw _t	Case fatality rate world	FRw _t is measured by a ratio between confirmed deaths and confirmed cases in a world for a period <i>t</i> (percent)
NCc _t	New cases China	NCc _t is measured by a number of new cases of coronavirus reported in China since the previous day for a period <i>t</i> (a number of cases per day).
TCc _t	Total cases China	TCc _t is measured by a number of total cases of coronavirus reported in China for a period <i>t</i> (a cumulative number of cases).
NDc _t	New deaths China	TDc _t is measured by a number of total deaths caused by coronavirus reported in China for a period <i>t</i> (a cumulative number of deaths).
TDc _t	Total deaths China	TDc _t is measured by a number of total deaths caused by coronavirus reported in China for a period <i>t</i> (a cumulative number of deaths).
FRC _t	Case fatality rate China	FRC _t is measured by a ratio between confirmed deaths and confirmed cases in China for a period <i>t</i> (percent)
NCec _t	New cases excl. China	NCec _t is measured by a number of new cases of coronavirus reported in a world excluding China since the previous day for a period <i>t</i> (a number of cases per day).
TCec _t	Total cases excl. China	TCec _t is measured by a number of total cases of coronavirus reported in a world excluding China for a period <i>t</i> (a cumulative number of cases).
NDec _t	New deaths excl. China	TDec _t is measured by a number of total deaths caused by coronavirus reported in a world excluding China for a period <i>t</i> (a cumulative number of deaths).
TDec _t	Total deaths excl. China	TDec _t is measured by a number of total deaths caused by coronavirus reported in a world excluding China for a period <i>t</i> (a cumulative number of deaths).
NCe _t	New cases Europe	NCe _t is measured by a number of new cases of coronavirus reported in Europe since the previous day for a period <i>t</i> (a number of cases per day).
TCe _t	Total cases Europe	TCe _t is measured by a number of total cases of coronavirus reported in Europe for a period <i>t</i> (a cumulative number of cases).
NDe _t	New deaths Europe	TDe _t is measured by a number of total deaths caused by coronavirus reported in Europe for a period <i>t</i> (a cumulative number of deaths).
TDe _t	Total deaths Europe	TDe _t is measured by a number of total deaths caused by coronavirus reported in Europe for a period <i>t</i> (a cumulative number of deaths).
FRe _t	Case fatality rate Europe	FRe _t is measured by a ratio between confirmed deaths and confirmed cases in Europe for a period <i>t</i> (percent)

Source: compiled by the authors.

The descriptive statistics of independent and control variables is provided in Table 2. Dynamics of those variables is depicted in Appendix 1.

Table 2. Summary of descriptive statistics of model variables.

Variable	Observations	Minimum	Maximum	Mean	Median	Standard Deviation
SXXP _t	127	279.66	433.90	365.3202	358.3200	43.5539
VIX _t	127	12.10	82.69	32.6715	31.7700	16.3559
FESX00 _t	123	2389.00	3859.00	3194.398	3178.000	439.8854
CA _t	127	1.00	210.00	133.7480	198.0000	88.3962
NCw _t	127	0.00	530000.00	80865.93	70000.00	104458.5
TCw _t	127	27.00	10270000	2503507	799674.0	3049538
NDw _t	124	0.00	31169.00	4037.339	3382.500	5079.142
TDw _t	125	0.00	505309	151323.0	43707.00	173983.7
FRw _t	115	1.25	7.30	4.8437	5.1700	1.7745
NCc _t	127	0.00	15141.00	667.3465	43.000	1909.951
TCc _t	127	27.00	84780.00	64865.54	82241.00	31911.03
NDc _t	127	0.00	1290.00	36.5433	1.0000	128.4148
TDc _t	127	0.00	4641.00	3004.748	3309.00	1763.532
FRc _t	115	1.28	5.54	4.3129	4.0300	1.2649
NCec _t	126	0.00	529944	80835.13	69959.50	105087.2
TCec _t	126	0.00	10185220	2457994	754108.5	3038004
NDec _t	125	0.00	45069.00	4328.544	3391.000	6260.929
TDec _t	125	0.00	500668	148323.1	40400.00	172618.3
NCE _t	127	0.00	151820.0	18818.90	12383.00	23941.94
TCE _t	127	0.00	2390000	809225.9	4297585	870198.3
NDE _t	127	0.00	18759.00	1502.134	691.0000	2546.008
TDE _t	127	0.00	190771.0	72623.35	27935.00	78014.45
FRE _t	91	1.67	10.34	7.5188	8.6100	2.6859

Note: SXXP_t = STOXX Europe 600 Index; VIX_t = CBOE Volatility Index; FESX00_t = EURO STOXX 50 Index Continuous Contract; CA_t = Countries affected; NCw_t = New cases world; TCw_t = Total cases world; NDw_t = New deaths world; TDw_t = Total deaths world; FRw_t = Case fatality rate world; NCc_t = New cases China; TCc_t = Total cases China; NDc_t = New deaths China; TDc_t = Total deaths China; FRc_t = Case fatality rate China; NCec_t = New cases excl. China; TCec_t = Total cases excl. China; NDec_t = New deaths excl. China; TDec_t = Total deaths excl. China; NCE_t = New cases Europe; TCE_t = Total cases Europe; NDE_t = New deaths Europe; TDE_t = Total deaths Europe; FRE_t = Case fatality rate Europe (see Table 1).

The correlation analysis of selected variables is conducted (Table 3).

Table 3. Correlation of selected financial market indexes and COVID-19 related variables

Variable	Correlation	Probability	Correlation	Probability	Correlation	Probability
	SXXP _t		VIX _t		FESX00 _t	
CA _t	-0.8576	0.0000*	0.5368	0.0000*	-0.8928	0.0000*
NCw _t	-0.3519	0.0000*	0.1067	0.2326***	-0.3202	0.0003*
TCw _t	-0.2657	0.0025*	-0.0032	0.9726***	-0.2223	0.0135**
NDw _t	-0.4783	0.0000*	0.2059	0.0218**	-0.4582	0.0000*
TDw _t	-0.3294	0.0003*	0.0055	0.9514***	-0.2869	0.0014*
FRw _t	-0.6465	0.0000*	0.2243	0.0159**	-0.6512	0.0000*
NCc _t	0.4283	0.0000*	-0.3149	0.0003*	0.4185	0.0000*
TCc _t	-0.7222	0.0000*	0.6285	0.0000*	-0.7388	0.0000*
NDC _t	0.1502	0.9019***	-0.0841	0.3472***	0.1250	0.1680***
TDc _t	-0.7262	0.0000*	0.4982	0.0000*	-0.7298	0.0000*
FRc _t	-0.5971	0.0000*	0.2566	0.0056*	-0.5912	0.0000*
NCec _t	-0.3532	0.0000*	0.1061	0.2371***	-0.3213	0.0003*
TCec _t	-0.2532	0.0042*	-0.0168	0.8520***	-0.2088	0.0210**
NDec _t	-0.4528	0.0000*	0.2145	0.0163**	-0.4289	0.0000*
TDec _t	-0.3144	0.0004*	0.0004	0.9966***	-0.2816	0.0018*
NCE _t	-0.5663	0.0000*	0.3454	0.0001*	-0.5427	0.0000*
TCE _t	-0.3691	0.0000*	0.0319	0.7219***	-0.3362	0.0001*
NDE _t	-0.4712	0.0000*	0.2938	0.0008*	-0.4565	0.0000*
TDE _t	-0.3753	0.0000*	0.0151	0.8660***	-0.3509	0.0001*
FR _{e,t}	-0.1537	0.1459***	-0.4882	0.0000*	-0.0791	0.4663***

*99% c.l., ** 95% c.l, *** insignificant.

Note: SXXP_t = STOXX Europe 600 Index; VIX_t = CBOE Volatility Index; FESX00_t = EURO STOXX 50 Index Continuous Contract; CA_t = Countries affected; NCw_t = New cases world; TCw_t = Total cases world; NDw_t = New deaths world; TDw_t = Total deaths world; FRw_t = Case fatality rate world; NCC_t = New cases China; TCC_t = Total cases China; NDC_t = New deaths China; TDC_t = Total deaths China; FRC_t = Case fatality rate China; NCE_t = New cases excl. China; TCE_t = Total cases excl. China; NDE_t = New deaths excl. China; TDE_t = Total deaths excl. China; NCE_t = New cases Europe; TCE_t = Total cases Europe; NDE_t = New deaths Europe; TDE_t = Total deaths Europe; FRE_t = Case fatality rate Europe (see Table 1). Model Const. = Model constant; Coef. = Coefficient; p-Stat = p-Statistics; Observ. = Observations.

Based on the results of Table 3 (correlation coefficients and probabilities): (i) only two COVID-19 related variables (NDC_t and FRE_t) are not statistically related to movements of STOXX Europe 600 Index (proved to be insignificant); (ii) all other COVID-19 related variables are statistically significantly related to STOXX Europe 600 Index (99 % confidence) (inverse relationship, except NCC_t); (iii) nine variables (NCw_t, TCw_t, TDw_t, NDC_t, NCE_t, TCE_t, TDec_t, TCE_t, and TDE_t) are not statistically related to movements of CBOE Volatility Index; (iv) nine variables are directly related to CBOE Volatility Index, six on them (CA_t, TCC_t, TDC_t, FRC_t, NCE_t and NDE_t) at 99 % confidence level and three (NDw_t, FRw_t, NDec_t) – at 95 % confidence level; (v) two variables (NCC_t and FRE_t) are inversely related to CBOE Volatility Index (99 % confidence); (vi) only two COVID-19 related variables (NDC_t and FRE_t) are not related to the prices of EURO STOXX 50 Index Futures; (vii) all other COVID-19 related variables are statistically significantly related to the prices of EURO STOXX 50 Index Futures (inverse relationship, except NCC_t).

3. THE IMPACT OF COVID-19 ON ECONOMIC SENTIMENT

Consumer behaviour is drastically changing in the current situation, because they have been to do so. However, these habits, emotions, and expectations will affect their behavioural changes in the short term, and may lead to the establishment of certain habits in the end. Therefore, we would not be wrong to say that after the crisis, the world will no longer be what it was before. However, the new world may also offer some opportunities. Consumers who are motivated by such emotions usually seek a security experience that restores a sense of control and, with it, comfort. Thus, consumers affected by deep emotions become more attentive to the environment, more rational in making decisions. Market research Company AC Nielsen Baltics studied consumer behaviour during a pandemic (COVID-19...). The study's results allowed submitting general conclusions about the impact of the pandemic to the consumption habits and expectations. Changes of consumer behaviour and the events that led to them are depicted in a six-cycle model (Figure 1).

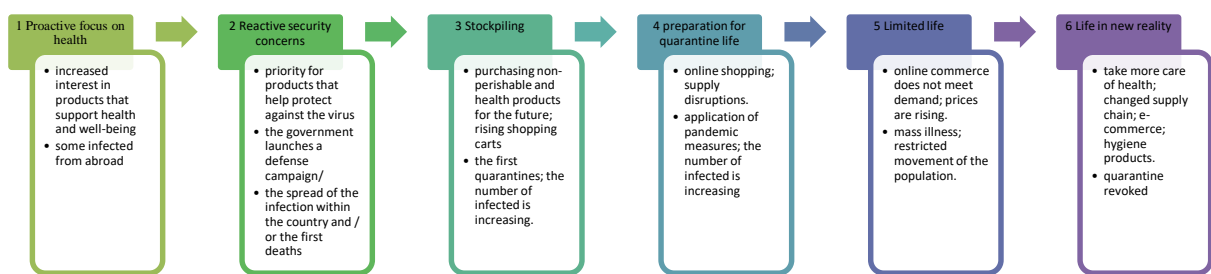


Fig. 1. Change in consumer purchases in affected by COVID - 19

Source: based on The Nielsen Company (US) LCC. Key Consumer Behaviour Thresholds Identified as the Coronavirus Outbreak Evolves. 2020 03 10

The first four stages show panic-affected purchases. People react reactively at these stages and making little rational decisions. In addition, in the fifth stage, when mass quarantine takes effect, emotions subside; new trends in human behaviour are beginning to emerge, mainly influenced by various constraints, to which most effect did various restrictions. This stage becomes important in analysing changes in consumer behaviour that will affect their thinking and expectations after quarantine. After the crisis, consumers are likely to be more inclined to choose products from socially responsible brands, with a stronger focus on environmental protection and sustainability (Figure 2). It is important to note here that paying a higher price goods, consumers will also want to be assured that the products they buy are of the highest quality and harmless to health. This will be especially relevant for the food, health and household product categories. This trend has been observed in the past, following outbreaks of SARS and MERS viruses in China and the Middle East (COVID-19...).

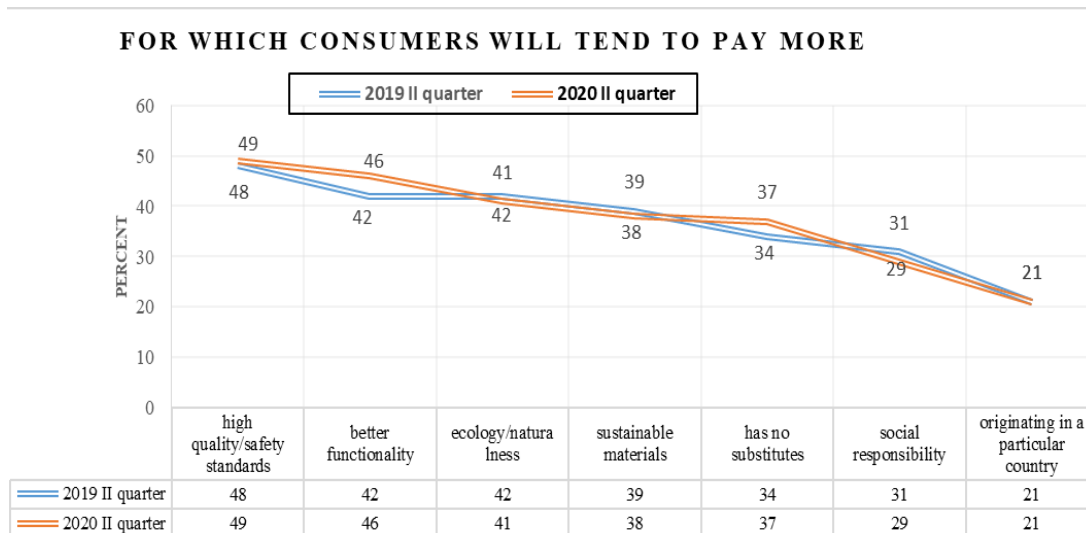


Fig. 2. The changes in the consumer goods in context of buyers

Source: based on The Nielsen Global Premiumization Survey, Q2 2020.

How strongly consumer behaviour and expectations will, change will also depend on how deep and long the crisis will be. For example, after the 2008 economic crisis, consumers felt economically vulnerable, according to various researchers, felt like for several more years (Jorda et al., 2020).

Different from earlier recession, when impacts was only local and the subprime mortgage crisis would be a relatively minor problem affecting only the US, the sudden economic disruption caused by COVID-19 is not only destructive but also has spillover implications because it created demand and supply shocks in almost every area of global economic (Elliot, 2020). Economics experts analysed that the COVID-19 will have an impact on social welfare and economy at large, particularly to the financial markets trading, general business in terms of import and exportation, production and fuel prices (Jim, 2020). Baret S. argued that the COVID-19 have significant effects to the general financial markets as recently the world witness the fall of shares, oil, equity and bonds throughout the world. He also notices that bond yields, oil, and equity prices have sharply fallen, and trillions of dollars, across almost all asset classes, have sought safety (Baret et al., 2020).

International Organizations have reported that that the measures to rebuild the economy and restore will be tough and need the world strong to overcome this COVID-19 economic impact. Euro News (2020) reported, that it's obvious that the hit to global economic activity from the measures to slow the spread of the corona virus pandemic will be massive. In the World Business perspective, companies are experiencing the low production that leads to the decline of the revenue collected and the company's revenue decreased, higher operating expenses and a significant decrease in cash flows (ICAEW, 2020).

The impact of the spread of COVID-19 coronavirus infection on the economy is difficult to assess by such familiar indicators as employment, inflation and GDP, since data on them often come late for a month. Economic analysts and authors of scientific literature emphasizes that the most important indicators of the country's development and situation are gross domestic product, unemployment, inflation, public debt, investment and interest rates (Baranov, 2014). Key economic indicators often lag behind the real situation by several months. Faster estimates may require more that current data, write the Bloomberg, 2020. Bloomberg has proposed five parameters, by which the economic effect of the spread of Covid-19 coronavirus infection can be estimating. First, experts advise evaluating the work of the hotel sector and hotel's population (Hotels). The second indicator is retail sales (Retail sales). The third and fourth indicators are quantity of sold tickets in cinemas, theatres and museums (Box office; Broadway Tickets). The cinema industry, from the biggest chains to independent owners, are reducing capacity as part of the fight against coronavirus. The fifth indicator was consumer comfort (Consumer comfort). According Bloomberg's Consumer Comfort index, the measure of how consumers view their

personal finances took a hit following the plunge in stock prices. Yet consumers are persevering and confidence remains at elevated levels compared with the last recession. According of experts, the decline in stock markets influenced consumer's trust and behaviour most of all (Matthews, 2020).

International Monetary fund in World Economic Outlook in June 2020 forecasted that global growth would be -4.9 in 2020. That prognosis was 1.9 percentage points lower comparing the level announced in April 2020.

For the analysis, we took 33 countries and two regions: EU and Euro area. The Covid-19 impact on economic growth was analysed using 5 different sentiment indicators:

1. consumer confidence;
2. construction confidence indicator;
3. economic sentiment indicator;
4. industrial confidence indicator;
5. retail confidence indicator.

Country codes used in this research are shown in appendix B.

Tendencies of consumer confidence in Europe we can see in the figure 3.



Fig. 3. Consumer confidence: Seasonally adjusted data, not calendar adjusted data

Looking at historical data in different countries we can point to some countries with quite a positive mood among consumers and some very pessimistic ones. A significant decrease in consumer optimism is seen in April but we still have some positive signs in one country and it is Serbia. The most pessimistic consumers in April was in Portugal. Bulgaria was among the most pessimistic six countries which were assigned to the interval $[-40, -30]$. The mood of consumers in Lithuania was quite above the average as the consumer confidence index was in the interval $[-20, -10]$ (intervals of consumer confidence in different countries are shown in Figure 4).

Sample: 1 35
Included observations: 34
Number of categories: 5

Value	Count	Percent	Cumulative Count	Cumulative Percent
[-40, -30)	6	17.65	6	17.65
[-30, -20)	16	47.06	22	64.71
[-20, -10)	9	26.47	31	91.18
[-10, 0)	2	5.88	33	97.06
[0, 10)	1	2.94	34	100.00
Total	34	100.00	34	100.00

Fig. 4. Consumer confidence group categories

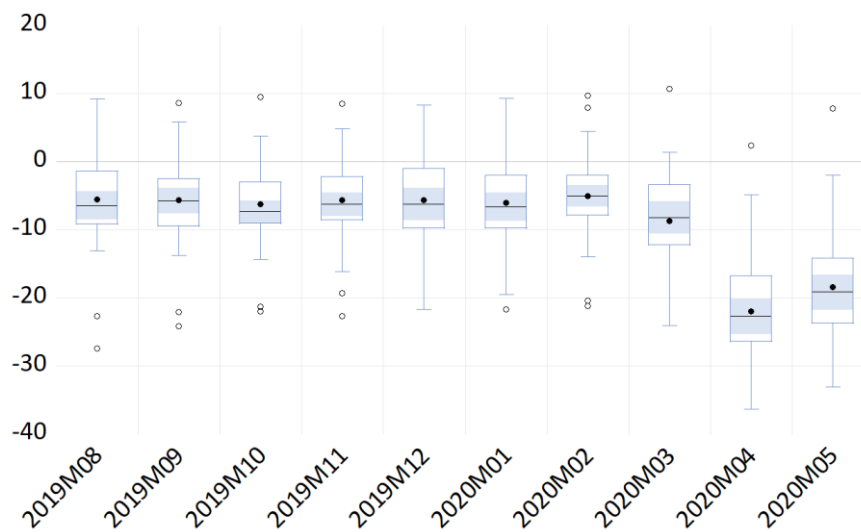


Fig. 5. Consumer confidence historical tendencies

Our results in figure 5 show that consumer confidence in March was not so bad compared with two other following months. The data in figure 6 showed that the standard deviation in May was at the highest level from the all period used in that analysis. It means that we have some countries with strong positive and strong negative views on the future. In May the most optimistic consumers were in Serbia again and the most pessimistic consumers were in Slovenia. So it would be very interesting to analyse the reasons of such tendencies. We think that those tendencies were strongly related to COVID-19 policies and tools to solve pandemic challenges in those countries.

	_2019M08	_2019M09	_2019M10	_2019M11	_2019M12	_2020M01	_2020M02	_2020M03	_2020M04	_2020M05
Mean	-5.580000	-5.628571	-6.282857	-5.662857	-5.654286	-6.025714	-5.082857	-8.731429	-22.01765	-18.40294
Median	-6.400000	-5.700000	-7.300000	-6.200000	-6.200000	-6.600000	-5.000000	-8.200000	-22.65000	-19.15000
Maximum	9.200000	8.600000	9.500000	8.500000	8.300000	9.300000	9.700000	10.70000	2.400000	7.800000
Minimum	-27.40000	-24.20000	-22.00000	-22.70000	-21.70000	-21.70000	-21.20000	-24.10000	-36.30000	-33.10000
Std. Dev.	7.712473	6.968018	6.467315	6.542444	6.699313	6.668113	6.620089	7.264489	8.785128	8.986505
Skewness	-0.389512	-0.420161	-0.129192	-0.293748	-0.150241	0.148865	-0.216327	0.036844	0.668540	0.651410
Kurtosis	3.895039	3.793813	3.721718	3.568266	2.935972	3.418554	3.680124	3.437073	3.527378	3.637544
Jarque-Bera	2.053291	1.948742	0.856974	0.974280	0.137650	0.384752	0.947563	0.286508	2.926704	2.980389
Probability	0.358207	0.377430	0.651494	0.614381	0.933490	0.824996	0.622643	0.866534	0.231459	0.225329
Sum	-195.3000	-197.0000	-219.9000	-198.2000	-197.9000	-210.9000	-177.9000	-305.6000	-748.6000	-625.7000
Sum Sq. Dev.	2022.396	1650.811	1422.090	1455.322	1525.947	1511.767	1490.070	1794.275	2546.889	2664.990
Observations	35	35	35	35	35	35	35	35	34	34

Fig. 6. Descriptive statistics of consumer index in different countries

The construction sector is very important for economic growth and it is much related to the banking sector and financial stability. Because of the mentioned factors, it is important to analyse the mood of this sector during the COVID-19 pandemic in various countries in Europe. Looking at figure 7 we can see that we again have a different group of countries in which we have different moods.

April was not so pessimistic month in the construction sector as many entities still had contracts for the future. If we categorize all the data of April into four groups (Figure 7) we can see that in the most pessimistic country group we have just one country and it is Greece. The most optimistic country as concerns the construction sector in April was Germany. The other point that we would like to stress is that even 42.42 percent of all 33 countries/regions could be assigned to the most optimistic group.

Sample (adjusted): 1 34
Included observations: 33 after adjustments
Number of categories: 4

Value	Count	Percent	Cumulative Count	Cumulative Percent
[-80, -60)	1	3.03	1	3.03
[-60, -40)	5	15.15	6	18.18
[-40, -20)	13	39.39	19	57.58
[-20, 0)	14	42.42	33	100.00
Total	33	100.00	33	100.00

Fig. 7. Construction sector confidence group categories

Looking at figure 8 we can see that in all periods the most pessimistic mood in the construction sector was in Greece so it is nothing special that this country got the lowest score of construction sector confidence during the COVID-19 pandemic.

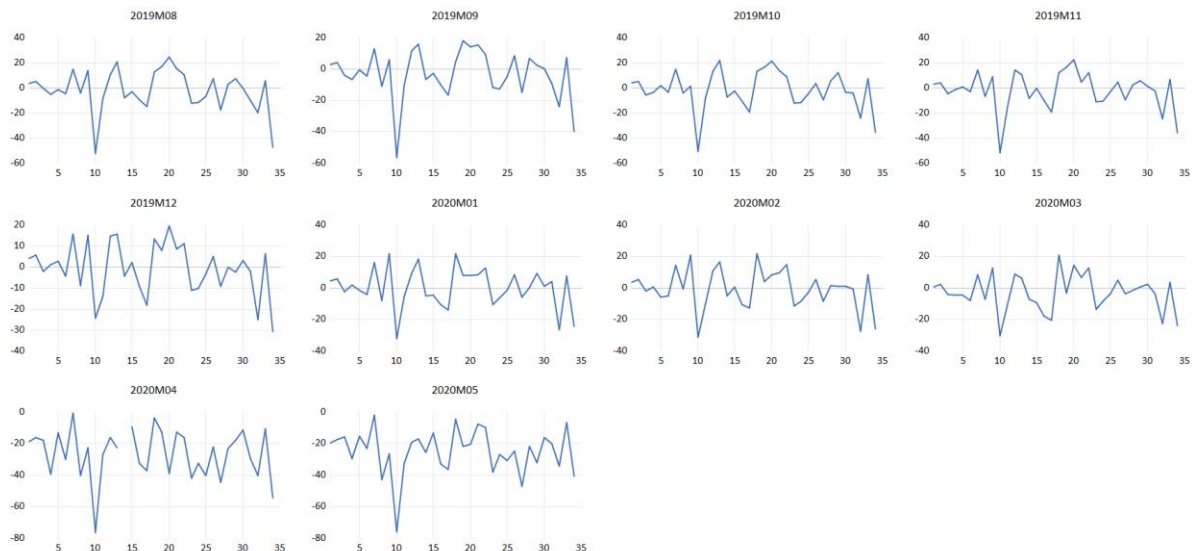


Fig. 8. Construction confidence indicator: Seasonally adjusted data, not calendar adjusted data

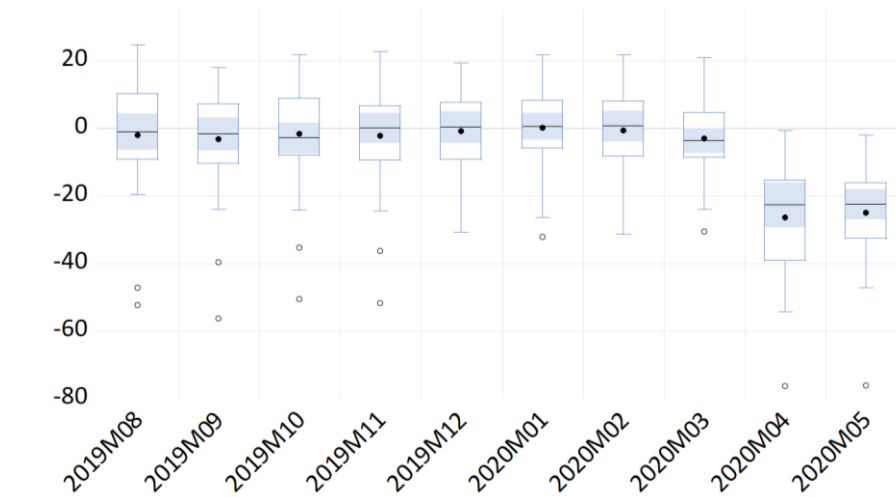


Fig. 9. Construction confidence historical tendencies

One more point which can be noticed is that lately, the broad mood in the construction sector is not changing a lot. The other aspect is that the standard deviation of this indicator in some periods in 2019 was much higher compared to the level in April which is considered as the most affected by COVID-19 pandemic month (Figure 10).

	2019M08S...	2019M09S...	2019M10S...	2019M11S...	2019M12S...	2020M01S...	2020M02S...	2020M03S...	2020M04S...	2020M05S...
Mean	-1.718182	-2.966667	-1.451515	-1.954545	-0.742424	0.266667	-0.433333	-2.915152	-26.40909	-24.91212
Median	-0.500000	-0.600000	-2.200000	0.700000	1.000000	0.900000	0.700000	-3.500000	-22.60000	-21.90000
Maximum	24.700000	18.100000	21.800000	22.700000	19.400000	21.700000	21.800000	21.000000	-0.600000	-1.900000
Minimum	-52.300000	-56.200000	-50.400000	-51.700000	-30.700000	-32.100000	-31.300000	-30.500000	-76.300000	-76.100000
Std. Dev.	16.73534	15.81539	15.50718	15.22773	12.56968	12.76958	12.71566	11.71530	15.83654	14.52336
Skewness	-1.224605	-1.405915	-1.086672	-1.290402	-0.547675	-0.598608	-0.542996	-0.335260	-0.920884	-1.244199
Kurtosis	5.025013	5.581933	4.683142	5.186266	2.734332	3.258274	3.221739	2.873562	4.203778	5.857716
Jarque-Bera	13.88655	20.03756	10.39004	15.73042	1.746763	2.062547	1.689252	0.640176	6.656641	19.74317
Probability	0.000965	0.000045	0.005544	0.000384	0.417537	0.356553	0.429718	0.726085	0.035853	0.000052
Sum	-56.70000	-97.90000	-47.90000	-64.50000	-24.50000	8.800000	-14.30000	-96.20000	-871.5000	-822.1000
Sum Sq. Dev.	8962.289	8004.053	7695.122	7420.282	5055.901	5217.993	5174.013	4391.942	8025.467	6749.695
Observations	33	33	33	33	33	33	33	33	33	33

Fig. 10. Descriptive statistics of construction confidence indicator in different countries

Broad economic sentiment is like the mirror of all sentiment in economics. If we look at figure 11 we can see that very pessimistic sentiment for a while was in Turkey but during the pandemic period, we see that the situation has changed a lot. In March the most pessimistic sentiment was in Italy but the situation during April and May has changed a lot and the most pessimistic economic sentiment was in North Macedonia and Montenegro.



Fig. 11. Economic sentiment indicator: Seasonally adjusted data, not calendar adjusted data

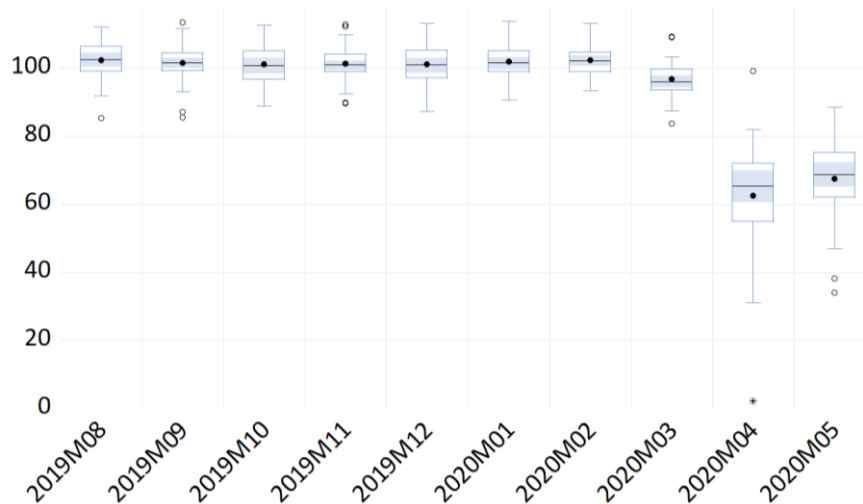


Fig. 12. Economic sentiment historical tendencies

Because of the COVID-19 pandemic in April and May, we have extremely different levels of economic sentiment (Figure 12). It is a good sign that in May we have some positive signals which means that the economy maybe will have less shock than economists thought at the beginning of the pandemic. The positive sign is that even 25 countries/regions (71.43 percent) have quite a high level of economic sentiment and it means that all Europe is recovering similarly (Figure 13).

Sample: 1 35
Included observations: 35
Number of categories: 4

Value	Count	Percent	Cumulative	
			Count	Percent
[20, 40)	2	5.71	2	5.71
[40, 60)	5	14.29	7	20.00
[60, 80)	25	71.43	32	91.43
[80, 100)	3	8.57	35	100.00
Total	35	100.00	35	100.00

Fig. 13. Economic sentiment indicator group categories

	2019M08E...	2019M09E...	2019M10E...	2019M11E...	2019M12E...	2020M01E...	2020M02E...	2020M03E...	2020M04E...	2020M05E...
Mean	102.3471	101.5647	101.1382	101.4529	101.2147	102.0029	102.3588	97.15000	62.57647	67.61765
Median	102.6500	101.6500	100.8500	100.9000	100.9000	101.5000	102.2500	96.30000	65.40000	68.95000
Maximum	112.1000	113.5000	112.6000	112.9000	113.3000	113.9000	113.2000	109.4000	99.30000	88.50000
Minimum	85.30000	85.60000	88.90000	89.70000	87.30000	90.70000	93.40000	87.50000	2.200000	34.00000
Std. Dev.	5.651829	6.025646	5.895659	5.671098	5.832310	5.121996	5.220712	5.011033	16.29811	12.39062
Skewness	-0.716534	-0.547717	-0.046564	-0.001529	-0.017231	0.302772	0.391634	0.516719	-1.413019	-0.800448
Kurtosis	3.866149	3.863992	2.529600	2.872469	2.929821	3.042270	2.685372	3.220803	7.384013	3.753850
Jarque-Bera	3.972187	2.757480	0.325761	0.023054	0.008660	0.522001	1.009373	1.582059	38.54192	4.435803
Probability	0.137230	0.251896	0.849693	0.988539	0.995679	0.770281	0.603695	0.453378	0.000000	0.108837
Sum	3479.800	3453.200	3438.700	3449.400	3441.300	3468.100	3480.200	3303.100	2127.600	2299.000
Sum Sq. Dev.	1054.125	1198.178	1147.040	1061.325	1122.523	865.7497	899.4424	828.6450	8765.741	5066.409
Observations	34	34	34	34	34	34	34	34	34	34

Fig. 14. Descriptive statistics of economic sentiment indicator in different countries

Descriptive statistics data (Figure 14) confirms, that an extremely high level of standard deviation was reached in April. In March there were no strong signs of broad pessimism in Europe.

For correlation analysis, we used five indicators. Besides those mentioned industrial sector confidence and retail sector confidence indicators were added. Correlation was calculated using March, April, and May data in 35 different countries/regions and using 5 sentiment indicators.

Sample: 1 34
Included observations: 31
Balanced sample (listwise missing value deletion)

Correlation	2020M0301	2020M0302	2020M0303	2020M0304	2020M0305	2020M0401	2020M0402	2020M0403	2020M0404	2020M0405	2020M0501	2020M0502	2020M0503	2020M0504	2020M0505
_2020M0301	1.000000														
_2020M0302	-0.088467	1.000000													
_2020M0303	-0.007886	-0.599775	1.000000												
_2020M0304	-0.065823	-0.265071	0.637236	1.000000											
_2020M0305	0.029943	-0.495234	0.532732	0.527766	1.000000										
_2020M0401	0.761821	-0.011357	-0.148667	-0.097794	-0.081603	1.000000									
_2020M0402	-0.201367	0.681400	-0.448036	-0.241033	-0.507849	-0.010006	1.000000								
_2020M0403	-0.282642	0.032707	0.112589	0.022241	-0.079209	-0.183184	0.064855	1.000000							
_2020M0404	0.014822	-0.357825	0.466992	0.515403	0.283712	0.069226	-0.308171	0.396599	1.000000						
_2020M0405	-0.086630	-0.343680	0.313499	0.358557	0.753867	-0.073128	-0.380741	0.147905	0.320735	1.000000					
_2020M0501	0.766995	-0.032344	-0.131007	-0.073771	-0.083426	0.974591	-0.005124	-0.212596	0.068816	-0.067011	1.000000				
_2020M0502	-0.116114	0.713189	-0.461879	-0.275707	-0.592030	0.065817	0.906508	-0.137397	-0.290800	-0.459559	0.106559	1.000000			
_2020M0503	-0.183166	-0.082346	0.326825	0.225608	-0.005926	-0.042830	0.019740	0.839067	0.431983	0.142580	-0.044085	-0.133944	1.000000		
_2020M0504	0.110955	-0.345498	0.576641	0.698743	0.410680	0.144777	-0.297481	-0.025980	0.700443	0.321984	0.180044	-0.234528	0.332841	1.000000	
_2020M0505	0.127005	-0.247298	0.167220	0.406219	0.654484	0.103727	-0.151267	-0.107899	0.344567	0.746853	0.163086	-0.198578	0.044947	0.502787	1.000000

Fig. 15. Correlation between five sentiment indicators in 35 countries/regions during the period March-May, 2020

Looking at the correlation matrix (Figure 15) we can see that the biggest positive correlation during the COVID-19 pandemic was between consumer confidence in April and consumer confidence in May. Quite strong correlation could be found and among other months in the consumer confidence segment. So it means that the mood of consumers is not so volatile and has continuity. The other aspect has been noticed that if the mood of consumers was pessimistic in one month it would not be very optimistic in the next month. In some periods we can see a negative correlation between the construction sector and

broad economic sentiment but it is only because we saw more positive tendencies in the construction sector comparing with the broad economic sentiment which was more pessimistic.

4. CONCLUSIONS

Some general lessons may be relevant for the current episode. First, when an epidemic reaches a global scale with a substantial loss of lives, the economic loss can also be very high and persistent. This means that confinement measures, while costly, also have economic benefits in preserving the workforce. These are relevant for the cost-benefit assessments of alternative confinement policies, in addition to the primary objective of saving lives. The literature also makes clear that the interactions between supply and demand transmission channels are not specific to Covid-19, but a feature of epidemic shocks in general.

Particular attention should be paid to the accuracy of provision Covid-19 related information. Market prices reflect on this information disclosure and investors usually over-react to this information, including unchecked (fake) information. It is possible to agree with Chan (2002) saying, that over-reaction is caused less by being informed or not being informed about some news, but mostly due to the lack of abilities to value those news adequately. Even without possibility to check information, investors sometimes behave irrationally, make wrong conclusions and decisions in a hurry under the influence of emotions.

More detailed analysis of the relationship between selected financial markets indicators and COVID-19 related variables suggests that in the short period analysed the COVID-19 pandemic proved to have a statistically significant impact on financial markets. The increase of registered COVID-19 cases and deaths, as well as a number of countries affected, had a negative impact on financial markets – declining stock market indexes and future prices, as well as increasing option prices along with implied volatility and risks. The effect on European stock indices and futures prices is far less ambiguous than the impact on overall implied volatility and risk in terms of VIX.

Because of positive signals in lots of countries in Europe the broad economy in this region maybe will have less shock than economists thought at the beginning of the pandemic. We have noticed not such a pessimistic situation in the construction sector and improving the situation in the retail and industrial sectors. We believe that consumer confidence will not improve so quickly but lately, we could see positive signs. So because of the demand channel, the broad economic sentiment will improve in the nearest future. It is obvious that the COVID-19 pandemic had a strong impact on sentiment indicators in April but in May we could see positive signs in all sectors.

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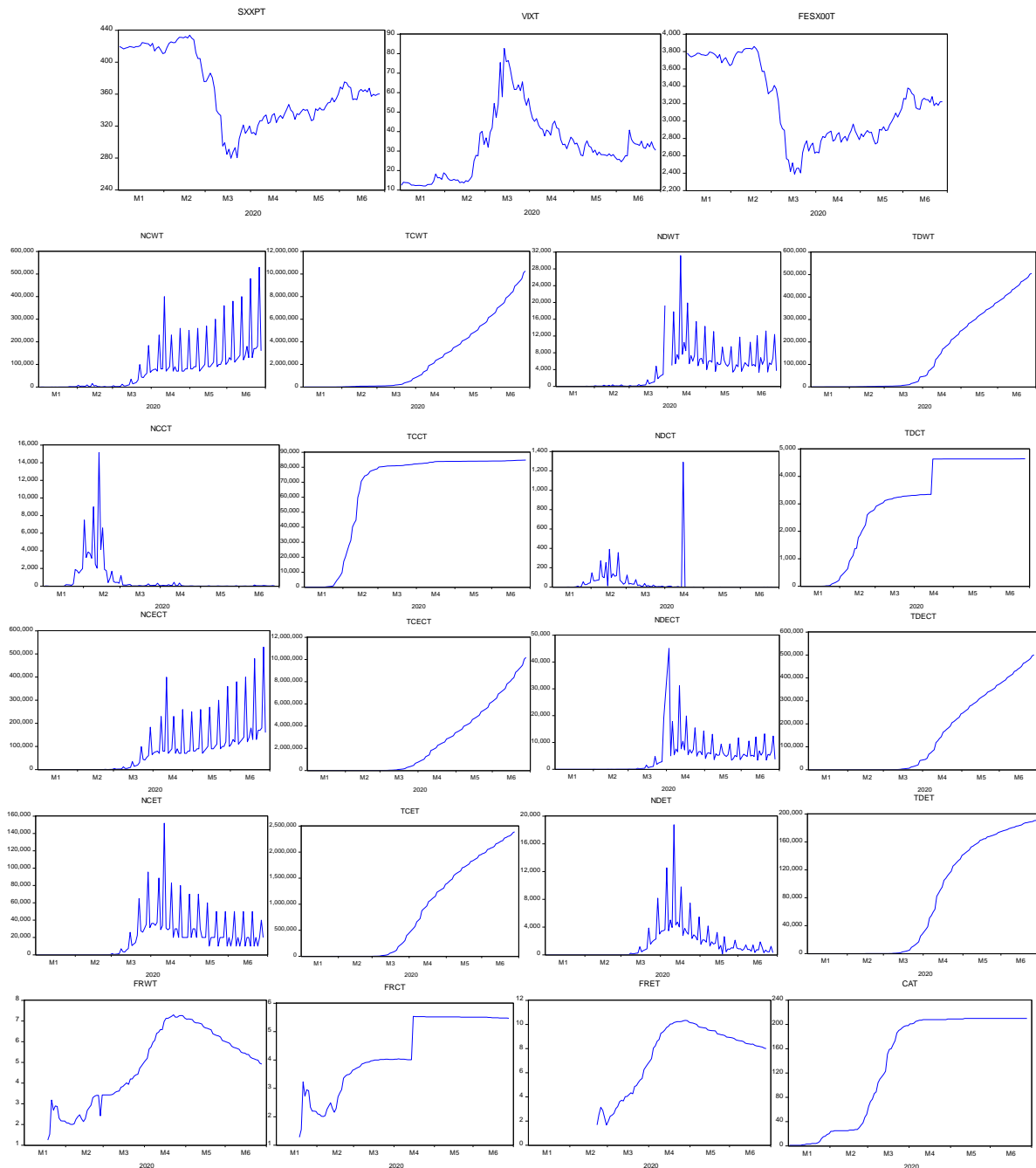
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Appendix A. Dynamics of selected financial market indexes and COVID-19 related variables, 2020/01/01-2020/06/30



Note: $SXXP_t$ = STOXX Europe 600 Index; VIX_t = CBOE Volatility Index; $FESX00_t$ = EURO STOXX 50 Index Continuous Contract; CA_t = Countries affected; NCw_t = New cases world; TCw_t = Total cases world; NDw_t = New deaths world; TDw_t = Total deaths world; FRw_t = Case fatality rate world; NCc_t = New cases China; TCc_t = Total cases China; $NDCc_t$ = New deaths China; $TDCc_t$ = Total deaths China; $FRCc_t$ = Case fatality rate China; $NCEc_t$ = New cases excl. China; $TCEc_t$ = Total cases excl. China; $NDEc_t$ = New deaths excl. China; $TDEc_t$ = Total deaths excl. China; $NCEt$ = New cases Europe; $TCeT$ = Total cases Europe; $NDEt$ = New deaths Europe; $TDEt$ = Total deaths Europe; $FRET$ = Case fatality rate Europe (see Table 1). Model Const. = Model constant; Coef. = Coefficient; p-Stat = p-Statistics; Observ. = Observations; M1 = January; M2 = February; M3 = March; M4 = April; M5 = May; M6 = July.

Appendix B. Country codes used in the research

Country code	Region/Country	Country code	Region/Country
1	European Union - 27 countries (from 2020)	19	Hungary
2	Euro area - 19 countries (from 2015)	20	Malta
3	Belgium	21	Netherlands
4	Bulgaria	22	Austria
5	Czechia	23	Poland
6	Denmark	24	Portugal
7	Germany	25	Romania
8	Estonia	26	Slovenia
9	Ireland	27	Slovakia
10	Greece	28	Finland
11	Spain	29	Sweden
12	France	30	United Kingdom
13	Croatia	31	Montenegro
14	Italy	32	North Macedonia
15	Cyprus	33	Albania
16	Latvia	34	Serbia
17	Lithuania	35	Turkey
18	Luxembourg		