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Impact of Coronavirus on Global Financial Markets

Undergraduate thesis

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Course: Financial Institution and Markets , Department of Finance

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Abstract: The wealth of a an economy and society in general is determined by the productive capacity of the economy. While real assets generate net income, financial assets allocates the income or wealth among investors. However, financial assets and the markets in which they trade play major roles in developed economies. Stock prices gives an overview of investors collective evaluation of a firm's current performance and future prospects. When the market is optimistic about the firm, its share price will rise. Higher prices means firms easily raise capital and therefore encourages investment. Nevertheless, stock prices are major determinants in the allocation of capital in market economies, directing capital to the corporates and individuals with the greatest perceived potential. At the times, markets appear to fail miserably. Companies or the entire industry may be 'hot' for a period of time but then still fail after only a few years. But market signals will help determine how efficiently to allocate capital, but only if investors are acting on accurate information. Although, markets need to be transparent for investors to make informed decisions. If firms can mislead the public about their prospects, then something might go wrong. The purpose of this paper is to analyse the impact of the Covid-19 outbreak on financial market stability in the aftermath of financial crisis which no previous disease outbreak has impacted it so powerfully. The research will point out lessons gained from financial crisis and point at key international initiatives and necessary expansion in the field of regulation and conduct of economies and its financial markets.

Keywords: Financial market stability, financial crisis, regulatory changes, Covid-19 outbreak.

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1. Introduction

One exogenous shock the world is facing currently is the shock caused by health crisis or impact of Covid-19. The shock has placed the entire financial system under strain. Steep revisions of anticipated economic activities and increasing risk aversion have taken individuals to major re-pricing and re-positioning in global financial markets. Nonetheless, given this unexpected scale of the shock, key funding markets have faced stress and authorities needed to take action in terms of regulatory changes and measures to sustain the supply of credit to the real economy and support financial intermediation. The Covid-19 pandemic imposes the biggest threat of the post-crisis financial system to date. There are several implications the global economy is facing right now, including major re-pricing and re-positioning in global financial markets, pressures on the supply of credit to the real economy, many financial intermediaries and markets are facing challenges in lending and funding, operating financial firms in contingency mode may add to vulnerabilities and more. There are also doubts of the ability of market participants around the world to obtain US dollar funding, especially in developing market economies, or the ability of financial intermediaries, such as investment funds, to effectively manage liquidity risk and so forth. There is a large uncertainty about this crisis severity and duration. However the global financial system is more resilient and in better position to finance and protect the economy, due to the G20 regulatory reforms in the aftermath of the 2008 global financial crisis. Central banks have a major role in safeguarding the stability of the world financial markets and sustain the flow of credit to the economy. However, this crisis is not only reflected to liquidity. It also takes into account solvency, where fiscal policy has a vital role. Financial, fiscal and monetary policies should aim to mitigate the impact of the Covid-19 shock and promise a sustainable recovery in the aftermath of the pandemic. Through this research we will analyse how strong has the global economy faced the impact of the health crisis, what are necessary measures and how did different governments and central banks reacted to this type of shock. Moreover, we will determine what shape of shock it is and what will the recovery look like in the aftermath. There are several weaknesses that we will mention through the research paper that could impact the provision of financial services and potentially the stability of the financial system.

1.1. The aim of the paper

The aim of the paper is to provide an overview of a Covid-19 outbreak on financial markets. Moreover, define how financial stability is measured and what are the signals or indicators of an unstable market. This topic is highly important because measuring the risks helps monitoring effectiveness of regulations and responses of governments and central banks worldwide. Therefore, focuses on financial stability and virus outbreak are based on world statistics on financial markets and tools used in response to the epidemic and changing environment. They represent the essential tool to monitor the progress.

1.2. Methodology

The purpose of this study is to gain the insights on trending crisis caused by Covid-19 health crisis. We will answer questions on how did this health crisis affected the financial markets and financial system stability, what are the main drivers and implications of financial system stability, as well as define how financial market reacted to different impacts whether endogenous or exogenous like as an example of the current situation. The primary data will be collected from Croatian and International publishers, those resources include monographs, scientific and professional articles, statistical data and certain reliable internet sources.

1.3. Structure of the paper

This research is divided into 8 chapters. At the beginning, we give you the report on importance of financial market and its measures, provided with theoretical framework, historical development and financial stability indicators. In further chapters, we will examine different impacts of historical crisis on financial markets and compare it to the current situation of Covid-19 impacting the markets and global economy. Moreover, key regulatory initiatives and other market initiatives are suggested, from perspective of governments and central banks in certain countries. Lastly, we would like to determine what could the recovery path be and what scenarios the global economy could confront with. The conclusion gives you some subjective opinion of us, as a contribution to the research and personal perspective, that might help visually better understand the topic itself.

2. General Overview of financial market and its measures

At the beginning of the overview, we will firstly analyze what financial market is and what are some of its key components. Afterwards, we will turn to one of the main causes of volatility, instability and what are the consequences and how to deal with it. Lastly, we are going to give what are the desirable steps to take in dealing with the issues.

2.1. Definitions of financial markets and volatility

Financial markets have a major role in creating a liquidity for businesses and the economy. The stock market is one of the key types of financial markets which defines buying and selling numerous of financial instruments as equities, currencies, bonds and derivatives. Informational transparency is the engine that drives the appropriate and efficient set of market prices. However, market prices may not always be reliable and indicative mostly because many macroeconomic forces affecting them. Nowadays, financial markets have reached far-reaching changes comparing to what it was like the last few decades. Three main updates are size, technology and the independence of central bank money from a fixed value, which are closely related. Another characteristic of today's core financial markets is the in time perception of the key participants in the financial markets. There always exists a need to react, in real time, to all necessary changes of prices.

Today dealers show a market preference for immediacy and conform to the specific behaviour patterns induced by this preference for immediacy. However, it does play a significant role in functioning of the markets. It develops a path for self-validating price moves with potentially changing outcomes in the economy. It allows volatility to be created and to be self-sustaining. In other words, prediction of financial volatility is crucial to all market participants because it helps them make arguable decisions with their portfolio of assets. It measures the risk exposure in their investments. Moreover, it has a vital role for the global economy as well. Policy makers very often rely on market estimates of volatility as a measure of the vulnerability of financial markets and the economy. In the financial markets there are two characteristics of volatility, one of them is the asymmetrical reaction of prices to good and bad news and the other is the existence of volatility spillovers between financial markets and asset diversification. The

asymmetrical behaviour of volatility refers to which a negative return shock or the drop in the value of the stock results in an increase in volatility compared to positive return shock. In the financial literature there are two definitions of asymmetric effect of news on volatility. One of them is the leverage effect. According to this definition a negative return on the the stock increases the financial leverage, which therefore increases the volatility and makes the stock riskier. The another definition is known as the volatility feedback hypothesis. This hypothesis explains that the change in volatility and returns may be a result of existence of time-varying risk premiums. If, for instance, the volatility in prices, the expected raise in volatility increases the required return on equity, following the immediate stock price decline.

If we consider that the volatility is persistent and that there exists a timely correspondence between expected returns and conditional variances, it is easily possible to the the outcomes of the news in the market. For example, the continuous volume of negative news on future dividends which defines the persistent volatility will eventually increase the required rate of return on stocks and lower the stock prices. In contrary, there is a similar effect with the positive news on the market. The result of consistent positive news will still have a an increase in the required rate of return and therefore lower the stock price. From which we conclude that volatility of the market increases more after negative news than positive news. Transmission mechanisms between volatility give meaningful decisions for portfolio management, where knowing the return spillover effects may be of use when it comes to asset allocation. What is more, volatility spillover effects gives useful information in financial markets that rely on estimates of conditional volatility, such as option pricing, portfolio organization, Value-at-Risk calculations and hedging.

2.2. Financial stability – theoretical framework

(Michael Foot, U.K. Financial Service Authority) defines a stable financial system where there is a) monetary stability, b) employment levels close to the economy's natural rate, c) confidence in the operation of the generality of key financial institutions and markets in the economy and d) where there are no deviations in relative prices of either real or financial assets within the economy that will undermine. In respect to a) and b) it seems impossible to describe financial stability especially in 1930s when there was low inflation and high employment. According to c), it is hard to believe that the economy was stable in time of bank failures or when long term saving and borrowings in either personal or corporate sectors were

malfunctioning. It means that economic growth was crashed unavailability or relative high costs of financial intermediations. Moreover, deviations in relative prices could be described through four phases, by changes in households wealth and consumption, changes in equity prices and their impact on firms balance sheets which that defects corporate spendings and by their impact on cash flows.

Financial stability is achieved through continuous functioning of all sections of the financial system in the process of allocation, risk assessment and management, payment system and resilience to sudden shocks. Financial stability is based mostly in the confidence of financial markets' participants, or their contribution by cyclic fluctuations in their behaviour and expectations. Since financial crises result in a great economic and social costs, maintaining financial stability is seen as public good and as an important goal of economic policy (HND, 2020, p.3). Financial crisis were the starting point in changing and reforming the financial system regulations and supervision in order to achieve financial stability, decrease systemic risk and avoid procyclicality. As a result of the reform is a microprudential policy imposed in the system whose goal was to maintain financial stability. Financial stability, during the financial crisis did not function well due to the inadequate monetary policies of central banks and supervisory authorities in the field of financial institutions microprudential supervision. Therefore, macroprudential regulation and supervision is a key assumption of regulatory changes during financial crisis setting a goal to insure financial stability and allocation and transfer of financial savings.

Financial stability and soundness of financial system can be evaluated and examined through Financial Soundness Indicators (FSIs). FSIs were developed by the IMF in cooperation with the international community, to support analysis and assessing strengths and vulnerabilities of financial system. The need for Financial Soundness Indicators arose from crisis and common view of policymakers requiring new base of information upon which they make decisions. These indicators are the indicators of the current financial health and soundness of the entire sector of financial institutions in a country, as well as their clients the household and corporate sectors. They include both aggregated data from individual institutions and indicators that are representative of the markets the financial institutions operate in. FSIs are calculated and distributed to support macroprudential analysis. This is an assessment and monitoring of the strengths and vulnerabilities of financial systems, with the aim of increasing financial stability and, in particular, limiting the likelihood of financial system failure. (IMF, 2006, 1-1.2)

What is more, central banks' responsibility for financial stability was lacking in the time of financial crisis of 2007-8. In developed countries, the dual approach theory, where central-bank inflation targeting combined with robust risk management by market institutions, would be enough of measures for protection against the widespread financial instability and crisis (Borio 2011). One of the most important developments since the crisis is that an intellectual framing and terminology, which individuals of the Bank for International Settlements (BIS) played a major role in developing, now directly informs the design of national and international policy frameworks. The approach examines the long-run financial cycles and the buildup of systemic financial risks as primary cause of financial crisis. In the field of financial stability policy, which involves monitoring the variety of conditions that cause crisis, it is of significant importance that the international economy is protected by an international institution that is prepared to challenge market and policymaking consensus.

Having disproportionate optimism and prevailing collective thinking can promptly become a contributory driver of unsustainable financial booms. If central banks can experience reputational damage if they get time-inconsistent to monetary policies, adopting disproportionate contrarian positions in certain circumstances may lead to the erosion of credibility and more. The Bis engages in measured contrarianism in various ways. On the one hand, it collects and analysis data that identify the level of systemic risk. Another way is by so called time-dimension aspect of risk, which by confronting complacent consensual thinking by developing account of how financial markets can be credit provision to extremes, lengthening and exaggerating upswings and downswings phases of such cycles in a phenomenon known as procyclicality (Crockett 2000b; Borio, Furfine and Lowe 2001: 2).

On the other hand, cross-sectional dimension refers to how risk is allocated in the financial system. Financial stability issues may arise when various institutions have similar vulnerabilities and institutions are highly interconnected, or when an outsized institutions have an excessive impact on the system as whole. These aspects may decrease systematic flexibility and increase the vulnerability of individual institutions in ways that are not apparent when considered on a stand-alone basis. Regulators therefore need to take in consideration to the systematic significance of institutions and their contribution to overall system-wide risk, differing with those having a greater systemic significance being subjected to tighter standards. This cross-sectional framing later informed efforts to identify global systemically important financial institutions and set prudential standards accordingly.

3. Historical consequences of endogenous and exogenous shocks on global financial markets

A financial system reacts differently when it comes to imbalances in the market and the economy that usually arises from significant adverse or unforeseen events. The financial stability shows its value in its absence, in time of financial instability. During these periods, banks become unable to finance profitable projects, asset prices vary from their intrinsic value and payments may be late on time.

Unforeseen events may lead to bank runs, hyperinflation or in stock market crash, it deviates the confidence in the financial system and economy. It becomes hard to maintain employment levels and eliminate movements of price levels in the market. In the next subchapter we will see the example of different instabilities that arose from few historical events that changed the financial market.

3.1. Spanish flu 1919

Nowadays everyone is in concern of the impact of Covid-19 virus and how will it impact the global economy. Every part of the world has been quarantined to prevent the spread of the virus the world is wondering how will it affect the supply chains and the market in general. One of similar events arrived in 1919, the spanish flu which infected 500 million people worldwide and killed between 30-50 million people, or about 1.7% of world population. That made the spanish flu one of the deadliest epidemics in history.

The virus showed in two sections. The first time lap where the world noticed the the virus and the second deadly wave that appeared months later. The fact is that the stock market reacted differently to the spanish flu in 1919 and the coronavirus in 2020. The Dow Jones Industrial Average fell for almost 2.000 points fearing the coronavirus impact the global economy. The reason for fear is that the cities will become quarantined, the economy will close the supply chains, the world trade will be in question and the growth in global economy will slow down.

The effect of Spanish flu on the stock market however was marginal. Looking the stats of Dow Jones Industrial Average from 1919, we can notice that the stock market was almost unaffected by any of the waves of Spanish Flu epidemics. Although, the epidemics developed in the time

of World War I in the Europe so the war had a larger impact on the stock market rather than the Spanish Flu. There were several supply chains affected because major supply chains were already nonexistent due to the war. The deadly section of the virus occurred right at the end of the war so probably the positive reactions of the the conclusion of war was offset by the Spanish flu epidemics concerns.

What is more, when the virus became to disappear, the market began an increase in 50%. However, due to the war and the virus correlating to each other at the same period of time it is unable to understand what caused the increase in the market at that time.

3.2. OPEC oil war

Another example of unforeseen event war when OPEC oil embargo made a decision to stop exporting oil to US. On October, 19 1973 the 12 OPEC members agreed to the embargo. Over the next few months oil prices skyrocketed and kept the level of prices even when the embargo ended in March, 1974. During the OPEC oil embargo, inflation-adjusted oil prices went up from \$25,97 per barrel to \$46,35 in 1974.

The event was caused by the decision of the current President Richard Nixon, who actually stimulated the embargo by taking the US off of the gold standard. Result to that countries could no longer buy up the U.S. dollars in their foreign exchange reserves for gold. These actions cause also the value of dollar down. The plummeting value of dollar affected OPEC countries as well since their revenue decreased along with the dollar. The oil embargo had been widely blamed for the recession appearing between 1973-1975. Due to monetary policies of FED's for wage-price controls, many companies laid off workers to reduce costs. FED's raised and lowered interest continuously making the business unable to predict the future fluctuations. As a result, companies kept prices high which potentiated the increase in inflation. The oil embargo deteriorated the inflation by raising oil prices. Higher gas prices meant less money to spend on goods and services, decrease of the confidence and slackness of demand.

However, when it comes to the stock market, higher oil prices provide excess income and wealth to oil-producing countries. If the surplus is transferred to the economy that would lead to higher levels of economic activity which as a result would lead to higher stock market prices. In contrary, what is happening now parallel to Covid-19, the decrease in the oil prices exhibits

the negative relationship with economic growth of oil producers and can create political and social instability, therefore putting downward pressure to financial returns. The negative impact is on recent Covid-19 epidemic hitting the world parallelly with the oil war between two major producers and exporters Russia and Saudi Arabia, while in the meantime coronavirus is undermining demand for oil in the affected countries. Saudi Arabia is boosting production of oil and slashing prices per barrel up to \$7, by which is triggering a price war with Russia. What is more, now with the stock market correction and the oil price war there is higher potential for a global recession indeed, as a result of coronavirus and responses of two major players in the oil market Saudi Arabia and Russia.

3.3. Systemic risk, crisis and macroprudential regulation

The financial and economic crises that has affected the global economy for more than two years has been a triggering point to relevance of systemic risk. Systemic risk is defined in the periods when financial instability becomes widely spread causing the malfunction of the financial system and therefore deteriorating economic growth and welfare. One way to describe it is, the risk of experiencing a strong systemic event. As a consequence of the event, it affects a number of systemically important intermediaries and markets. The event could be caused from exogenous factors which alternatively emerges endogenously within the financial system and economy. There are three dimensions of the risk which may arise independently or in conjunction with each other.

First one, contagion is an example of one bank failure causing the other bank to fail, although the other bank might have been solvent. The second dimension of the risk refers to a widespread exogenous shock that adversely affects intermediaries and markets. For instance, banks vulnerability to economic downturns. The last, third phase of the risk refers to endogenous issues as e.g. lending boom. There are a number of market imperfections behind the three types of systemic risk, such as asymmetric knowledge, externalities and the public-good character of financial stability, dysfunctional markets ect. They lead to a higher vulnerability of the financial system compared to other economic sectors, because of the information intensity and inter-temporal nature of financial contracts, the balance sheet structures of financial intermediaries (often exhibiting high leverage and maturity mismatches) and the high degree of interconnectedness of wholesale financial activities. (ECB, 2006. 135)

Following the 2008 crisis, regulators intervened in making the banking sector less vulnerable to any economic shocks. They created policies to prevent from systemic risks. They also developed micro and macro-prudential policies in order to keep the financial stability in the market. Macro-prudential policies seek to protect banks and a whole financial system, while micro-prudential policies focus more on individual financial firms as commercial banks and insurance companies, but when relying only on micro policies can make the financial system even less stable. So, the macroprudential policy with its set of tools is a complement to microprudential policy and it interacts with other types of policies that have an impact on financial stability.

The financial crisis had its origins in the housing market. Banks and other financial firms began to increase losses on their investments in home mortgages and related securities. Those losses increase more when they demanded higher interest rates on loans to risky borrowers in addition to raise profitability, causing banks and other financial institutions' instruments to decline sharply. Moreover, it caused many banks to fail, as e.g. Bear Stearns, IndyMac Federal Bank, Fannie Mae and Freddie Mac as well as Lehman Brothers, American International Group (AIG) and CitiGroup. That systemic risk resulted in FED's decision to acquire Bear Stearns, by JPMorgan Chase and take control over AIG. The Financial Crisis from 2007-2008 is the true example of how the systemic risk affects the entire economy, from a failure of a single financial firm endangering the entire U.S. financial system and economy as well as leaving marks on the European economy years later.

Following the expansion of macro-prudential policies, they were primarily used tools to limit systemic risk, therefore, limiting the incidence of disruptions in the provisions of key financial services that can adversely impact the real economy. They can be structural policies or cyclical. Structural policies are implemented to increase lenders or borrowers' resilience to harmful events in any period of time. For instance, limits to loan-to-value ratios or debt service-to-income ratios which protect borrowers from excessive debt and home values from plummeting. The cyclical policies work in a way that they increase resilience in expectation to economic downturns to diminish the supply of credit once the downturn materializes. Example of cyclical policies is the countercyclical capital buffer which works by demanding banks to increase their capital during the economic expansion when the systemic risks are rising, and then release them in economic downturns to cover the losses and stabilise the economy.

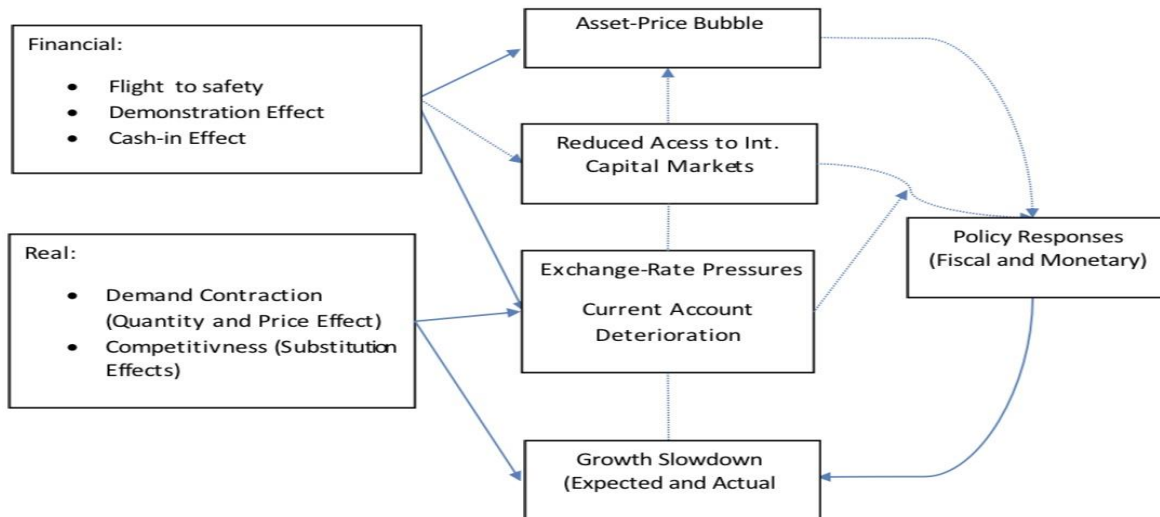
3.4. Spillover effect and contagion in financial markets

As we already concluded from an example of a financial crisis 2007-2008, the banking regulation should rely more on macro-prudential policies rather than on individual financial institutions. Financial misfortune led from the malfunctions in the banking system to the real economy to finally negatively affecting the global financial stability. The previously mentioned crisis highlighted the effect of the contagion risk on the entire economy, spreading as a virus causing the instability widely spreaded globally. Allen and Gale (2000) define contagion as an consequence of excess spillover effects taking as an example of a banking crisis in one region may spill-over to other regions. Therefore, after a few quarters of the end of financial crisis in US, consequences were noticed in the failure of the European banks and decline in their indices, it became obvious that the crisis spread to Europe. Another good example of how contagion of financial system spreads among the countries can be related to the Asian Crisis affecting the Latin America. Among some of the Asian economies there was a traditional external sector vulnerability.

The countries had been going through real exchange-rate appreciations, which were accompanied by slowdowns in export revenues and high current account deficits. Together with the need to overturn a large stock of short-term debt, that devoted to high gross borrowing requirements. Additionally, the decline in the rate of growth of export revenues warned that this external vulnerability could expand. In Thailand, the currency markets collapsed for the first time, triggered by government responses that the local currency was no longer bound to the US dollar. Thereby, currency declines spread significantly through East Asia, in turn causing stock market declines and reduced import revenues.

The Asian financial crisis has spread from Thailand to other East Asian countries and even to Latin America. Some of the channels of contagion learned from the Asian contagion are illustrated in the Figure below.

Table 1 - Contagion and Spillover effect from Asia



Source: WorldBank, illustrates Contagion and Spillovers from Asia, channels and consequences. The first column describes the channels, the second column describes the consequences from the crisis and the third column shows how the policy responses give impact cyclically.

Financial effects of contagion: Informational shocks. Updates to an emerging crisis in one country can affect the international investors to rethink about the profitability of investing in other emerging markets. When investors do not have a certain information to distinguish the fundamentals of different emerging markets, a currency crisis may lead to speculations against other emerging market currencies.

However, when investors have sufficient information, the shock accompanied with a financial crisis in one country will cause the investors to reassess their perceived risks of countries with similar financial issues. One of the informational shocks are Flight to safety under uncertainty. During the periods of high market uncertainty and volatility investors will move their fund into financial safe-havens. Another informational shock is demonstration effect, which describes the economies with similar vulnerability will probably also suffer from attacks against their currencies. The second financial effect which occurred in Asian crisis is related to institutional

investors and the cash-in effect. In case of this effect, clients withdraw their investments in diversified portfolio funds, resulting to the fund managers liquidating portions of their portfolios. Managers therefore are likely to liquidate fund investments in assets that have not been affected by the financial crisis, thereby offering opportunities to reduce portfolio risk while appreciating the fund liquidity position.

All these financial effects would cause capital outflows from emerging markets, declines in asset prices, all heading toward pressures on exchange rates and declines in market prices and reduces access to international capital markets for accepted economies. Some of the Real Effects described in the figure give additional pressure to contagion spreading rapidly. Demand contraction is one of them when economies in financial crisis deal with lower quantities of imports in crisis countries, and to declines in world prices of some commodities. Commodities as oil, copper, wheat, iron ore and other may cause a compelling financial vulnerability of countries having already high current account deficits.

A competitiveness or substitution effect, this effect will be strongly impacted by countries that in time of the Asian Crisis exported goods to Asian markets with domestic competitors, countries that import from Asian markets and countries that export goods that compete to Asian goods in third country markets. The correlation of financial and real effects led an Asian domino effect. Financial contagion effects were highlighted because of the financial vulnerabilities in certain regional economies. Knowing the fact that commercial banks are major players in developing a sustainable growth in the economy by receiving funds, providing resources to households and corporates, they are as well therefore transmitters of contagion to the real economy. Major classification of contagion can be divided by size, systemic importance, as well as geographical location and income source.

What is more, researchers explained that non-interest income banks generate more systemic risks, after all that gives them ability to spread the contagious risk to traditional banks. The fact that the banking system is interdependent is examined in the literature as the struggles the Eastern European Banks suffered by the shocks in the Western European Banks. Alternatively, contagion can be defined as an increase of the risk of crisis occurring in one country, causing a crisis in another country. The intensive relationship between a crisis market and a stable market can lead to the dissemination of the crisis elsewhere, that can be observed through co-movements of different financial indices on numerous markets or rising probabilities of default. Although, the interdependence is not the independent reason of contagion, it is also correlated

to changes in the structure of stock market linkages. The increase in the cross-market linkages during the crisis must be significant to be called contagion, not just the fundamental links between them.

4. Covid-19 pandemic on Worlds trade markets

The Covid-19 outbreak has already brought considerable impact on human suffering and major economic disruptions. Countries worldwide have imposed containment measures involving quarantines and widespread restrictions on labour market and travel. The consequences of these measures lead to high disruptions to global supply chains, weaker final demand for imported goods and services and a decline in tourism and business travel.

Nevertheless, risk aversion has increased in financial markets, with the interest rates falling to a record low and equity prices declining sharply, commodity prices have dropped and confidence between the market participants has turned down as well. Knowing the China plays the major role in global output, trade and commodity markets, this magnifies the economic spillovers worldwide from an initial adverse shock in China. The recent crash of the financial market in the late February investigates the persisting financial vulnerabilities from the tensions between slower growth, high corporate debt and diminishing credit quality. According to OECD researchers, more than half of the investment grade corporate bonds issued in 2019 were rated BBB and quarter of all non-financial corporate bonds were non-investment grade. This situation increase the risk of clear corporate stress if risk aversion reinforces from already high levels, especially in an economic downturn. That could cause all current BBB-rated bonds to be downgraded to non-investment grades, with the correlated enforced sales expending the financial effect of the initial downturns.

4.1. Covid-19 Stock Market Crash and Volatility

According to historical evidences, there was no such extraordinary surge in the stock market volatility as in case of Covid-19 outbreak. Sars epidemic and the ebola epidemic which appeared in 2003 and 2015 gave a modes, short term spikes in volatility, Bird flu and Spanish flu were barely noticed. Although, considering the mortality rate between the Spanish flu which

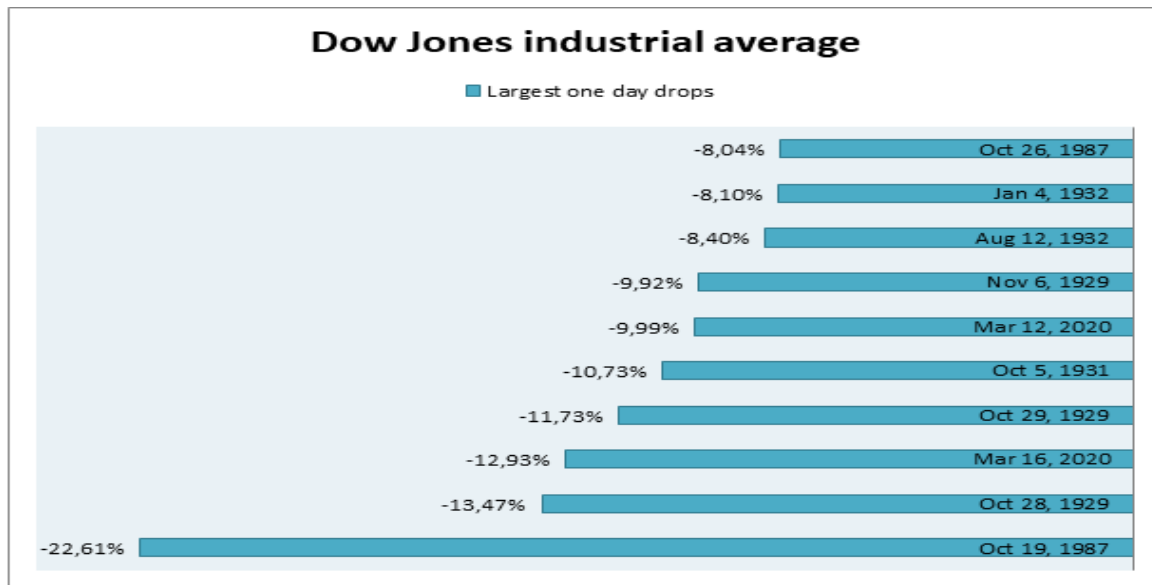
was much higher than the rate caused by Covid-19, in comparison to the Spanish Flu, the information about the outbreak is greater and it disseminates much rapidly now than a century ago. Global financial markets have reacted strongly in late February, 2020 as a result of virus spreading to Europe and Middle East including the consequences of policy responses to the pandemic, raising fears to global pandemics.

Covid-19 have been priced aggressively through various assets that many market participants are expecting a recession in the global economy as an conclusion to market volatility. According to last statistics, there is total 1,284,919 cases of Covid-19 in the World and over 70,000 deaths. The Dow and S&P 500 have both been realizing falls due to uncertainty around the global pandemic. Chicago Board of Exchange Volatility Index, has been rising steadily since than as virus has been spreading. Moreover, the Russian economy has felt the hit as well, as a consequence of the OPEC+ oil production pact between Russia and Saudi Arabia triggered together with the outbreak of the Covid-19. The turmoil has shocked traders around the world and concluded with sharp volatility on the Russian stock market. In case of Europe, STOXX 600 index ended 4.3% lower.

The lockdown of large parts of Europe has sharply worsened the economic outlook. Travel and leisure stock .SXTF continue to underperform, since the measures of closing borders and limited domestic movements have been applied.

With facts of the corporate damage caused by a fractured supply chains and consumer spendings, analysts have suggested the global economy was already in recession. In case of domestic market, Croatia has also reacted negatively especially after the virus spreaded in the neighbour country, Italy.

Figure 1 - Dow Jones Industrial Average single day drops



Source: Reuters. The Covid-19 outbreak caused two of the largest single day drops in the Dow Jones Industrial Average in March of 2020, resulting from high uncertainty.

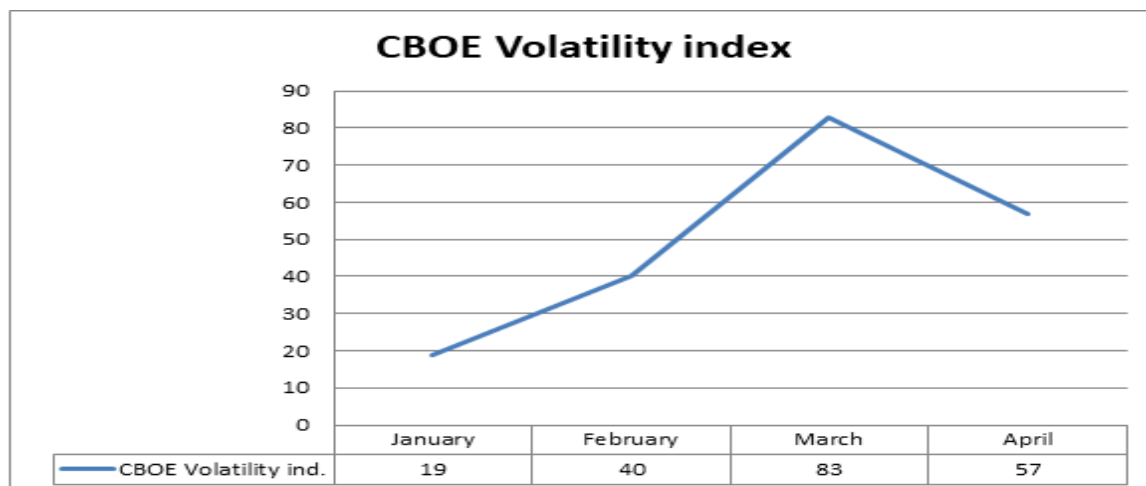
At Zagreb Stock Exchange, Crobex index has lowered by 7.9% which are te lowest since October, 2018. Investors began to completely ignore the corporate results which were published by the end of February. The highest sensitivity of the domestic market was affected in the deep reliance of Croatian economy towards tourism, which has been firstly impacted by the release of news of closing borders and limiting international trips worldwide. Moreover, low liquidity levels of the market as negatively impacted to more pressure and more exposure to panic among investors, where the biggest sell-off occured. The panic among investors shift them to reallocate their assets from riskier to safer, where yields of bonds declined and prices went up sharply.

How come that the market has reacted so strongly to the outbreak. According to Baldwin (2020) “ Covid-19 and the containment policies have directly and massively reduced the flow of labour to businesses.The result has been a sudden and massive reduction in the output of goods and services” Policy responses have been much different than in a case of Spanish Flu. They

provide the Covid-19 pandemic with the most compelling answer of its unexpected impact on the stock market. There are also several other reasons to that. We can examine it by the transmission mechanism through which the health crisis affects the economy. There are three possible transmission channels, a) Indirect hit to confidence (wealth effect), b) direct hit to consumer confidence and c) Supply-side shock. In case of a) a transmission of exogenous shocks to the real economy is through financial markets. Markets begin to fall and household wealth contracts, household savings increase and therefore consumption declines. This effect has mainly impacts in economies where household exposure to the equity asset class is high, as e.g. U.S. According to b) In the short run the correlation between the financial markets performance and consumers confidence may not have great impact on each other.

In contrary, long-run statistics show that consumer confidence can drop even when markets are up. Covid-19 appears to be described as a direct hit on confidence, keeping consumers at home, worry about spendings, and leave them pessimistic about the longer term. Another example of the shock is mentioned under c), where the outbreak of the virus shuts down the production, disables supply chains and gaps turn into problems, layoffs occur. Variability would be immense across economies and industries.

Figure 2 CBOE Volatility index, expectations of stock market volatility



Source: Reuters, VIX represents an expectation of stock market volatility based on the S&P 500.

However, such an interrupted rise in uncertainty can be risky for both economic growth and financial stability. Economic uncertainty such as equity market volatility increased greatly in countries around the world. Stock markets in US, EU and Japan fell sharply and witnessed a surge in implied volatility, as investors tried to factor in the latest risks presented by the virus.

Investors began reallocating from relatively risky to safer assets causing credit spreads to widely broaden across markets. Most hit instruments were high-yield and emerging-market bonds, which resulted in denominating the U.S. dollars sharply. Companies are facing higher funding costs when it comes to equity and bond markets. Firms postpone investment decisions as individuals postpone consumption due to being financially insecure.

4.2. Current bear market

The change in price movements across all financial markets, equity, fixed income, currencies, commodities and so forth may be unsettling for most of investors. The current sell-off will eventually produce anxiety as it reminds to the Financial Crisis in 2008. The sell-off is sharp and recession is likely to occur. Bear market is defined as when markets decline by 20% from their peak and can be diversified into three categories. One of them is cyclical bear market, these markets declines are associated with the regular fluctuations in the business cycle. Their average declines are of 31% for likely 21 months. It occurs when the FED raise rates to keep prices stable in already overwhelming economy which expands to a greater adverse impact to economic growth and is then associated with the sell-offs.

Another type of bear market is structural which occurred in time of the Financial Crisis in 2008. These markets tend to have deeper sell-offs, on average 57% and recovery path is longer, up to 42 months. The reason for such length of recovery is because consumers suddenly feel more secure to spend more, corporates want to invest but banks are too shattered to lend., resulting in stagnation as the banks heal. The third type of the bear market is the Event-Driven Bear Market which can relate to the current situation with the outbreak of Covid-19. Sell-offs tend to be shallower, in average by 29%, and recovery tends to be faster, in average to 9 months. This describes clearly the event-driven type of bear market. The primary events are governments imposing measures around COVID-19 which is slowing the economic activity.

4.3. Covid-19 shock to emerging countries

Perspectives on potential disruptions in the economy around the world vary widely. However, it is a fact that the economy will shift to sudden stop of large swathes of activity and changes

in income in manufacturing and services, combined with adverse effects on financial markets, consumption, investment confidence, international trade and commodity prices. The main challenges in advanced economies, is the persistent fragilities surrounding highly speculative financial positions, or in other words, the already unsustainable debt burdens correlated with highly leveraged corporate loans. Additionally, the amount of cheap credit since 2008 has also spilled over to developing countries, creating more financial disruptions and vulnerabilities and undermining their debt sustainability. There has been imposed a series of stimulus packages by the major developed economies to mitigate the economic damage and respond to the health crisis. Along from financial injections, to keep the banking and corporate financial statement stable, measures also including contractions of economic activity by including government spending, enlarge unemployment benefits and cash transfers. According to UNCTAD, boost of the national incomes of advanced economies and China is about \$1.4 trillion in 2020, which is relatively smaller than the values of the stimulus packages. This will undoubtedly, have a positive impact not only on their own economies but world economy as well.

However, emerging countries face pressures which makes it harder for them to enact effective stimulus without confronting binding foreign exchange constraints. Knowing that emerging countries do not issue international reserve currencies, they can only access them through exports or sales of their reserves. Moreover, the financial turmoil has already acted in sharp currency devaluations in emerging countries, which makes them harder to service their debts and paying the necessary import costs for their industrial activities. The impact on economies has hit developing countries even harder in comparison to the 2008 global financial crisis. (UNCTAD, 2020) has evaluated both debt and equity as well as net portfolio flows from main developing economies to \$59 billion in the month since the Covid-19 crisis went global. The numbers are more than doubled compared to the aftermath of the global financial crisis (\$26.7 billion). Simultaneously, the expansion on emerging country bonds have been increasing sharply, while the value of currencies against the dollar have dropped unquestionably, since the beginning of 2020.

The real impact of the health crisis is yet to hit emerging countries. Historically, the collapse of Lehman Brothers led to 5 consecutive quarters of negative growth, at a decreasing rate after the second quarter of 2009, and even with the stimulus packages, no one will be avoided from a recession in the global economy this year. Updated disruptions have enlarged which might hold back the growth. Developing economies, have realized a boost build-up of private debt in reserve currencies and increased penetration of their markets by foreign investors, foreign

banks and other financial institutions, and allowing their own investors to invest more freely abroad. There has been changes in ownership of central government debt, including public external debt, from official to private creditors and shadow-banking actors. These updates extended emerging countries external vulnerabilities and entailed large transfers of resources to advanced economies through numerous financial channels.

The debt accumulation was already fragile before the Covid-19 outbreak, and the larger amount of foreigners in bond and equity markets has increased the possible instability of exchange rates and further exposition of domestic financial markets to global risk and liquidity conditions. One of the transmission mechanisms or channel through which the Covid-19 shock can be forecasted to increase the financial pressures on emerging economies over the upcoming period. The financial channel, the flight to safety has already done a record capital outflows from developing economies, triggering large currency depreciations against currencies and widening spreads. In these countries, where there is a large amount of foreign debt, whether it is private or public, it might put demanding pressures on their debt sustainability, by undermining future access to refinancing outstanding external debt obligations while moving up their value in foreign currency. The total developing country debt stock was at 193 per cent of their combined GDP at the end of 2018, in comparison to only 100 per cent in 2008.

Nevertheless, emerging countries also face additional repayment due on foreign-currency denominated public debt, which amount for \$2.7 trillion by the end of 2021, apart from which \$562 billion are due for repayment by government in low- and middle-income countries. Usually by just rolling over the debt as the countries often do, might lead to immediate and widespread debt crises. Therefore, as the health crisis gets under control and economic shocks mitigate, a more profound reevaluation of the multilateral system will be required to ensure the fairness among the interdependent world. Immediate steps in response to the crisis should give a perception of a new beginning for global governance.

4.4. Recovery path

How quick and strong will recovery be following the pandemic ? It's believed that the pandemic itself lasts for about a quarter. On the supply side, people are resuming work and consumers are returning to their former consumer habits. This adjustment is known from previous pandemics. This can be described from example of Spanish Flu in the retail sales

figures. In 1918 and 1919 negative retail sales were varying from -2% to -6% by the end of 1918. However, after the pandemic, sales growth jumped to 8% . How does a shock's path to economic effect, and where does Covid-19 fit? The easiest way to describe it is to take an example of global financial crisis that allows for recessions in three sample countries with vastly different progressions and recoveries.

1. V-shape type of shock is an example of Canada, which in 2008 avoided a banking crisis. Credit continued to stimulate and capital adequacy was not significantly disrupted. Steps such as maintaining the standard of labor constant and preventing capacity atrophy have bypassed worse failure. GDP fell, but climbed substantially back to pre-crisis path.
2. This type is described as V shape of shock where output is displaced but growth take-offs to the initial level. In case of U.S., growth dropped steeply and never resumed to its pre-crisis level. This type of shock is also known as U-shape, where growth rate did recover but the gap between the initial level and updated level remains large, causing a huge damage to the economy's supply side and losing output. It did more damage on the labor supply and productivity.
3. The third shape is known as L-shape shock, which hit Greece. In case of Greece, its economy never recovered its prior output path, and the growth rate kept declining. This means the crisis did lasting structural damage to the economy's supply side.

So, when credit intermediation is disrupted and the capital stock does not change, recovery is slow, there comes an increase in the unemployment rate and therefore productivity is down. The shock becomes structural. When we talk about coronavirus shock, the intensity will be determined by the policy responses, consumer and corporate behavior in reacts to adversity. But so far, the virus is affecting the economies' supply side, particularly capital formation. So both V-shape and U-shape seems as an possible scenario. However, coronavirus does extend the liquidity and capital problems to the real economy in the incomparable way. Therefore the risk of financial and real liquidity shock are interrelated.

There are two paths for Covid-19 to do certain level of structural damage in a U-shaped scenario. One of them is Financial system risk. The fact that the capital markets have already been shaken, triggered a responses from central banks. If liquidity issues persist and real economy issues take to write-downs, capital problem may arise. In the case of financial crisis, capital formation would take a huge impact, parallely driving a slump with damage to labor

and productivity as well. Another scenario is extended real economy “freeze” where months of social distancing could disrupt capital formation participation and productivity growth. Depending on the shock the economy faces the recovery will follow accordingly to its challenges.

5. Government and Central Bank Measures to Covid-19

Governments around the world are taking precautionary measures everyday in order to prevent the adverse effects of the outbreak of Covid-19. Most of them are planning to spend and lend trillions of dollars to protect their economies against disruptions. These efforts include a range of measures from monetary easing to keep financial markets operating and to lower interest rates, to fiscal spending to counter the sharp downturn in the economic activity. In the following sections we will describe how certain government responded so far and what are the results of their regulations.

Table 2 - Economic Projections

	2019	2020		2021	
		Interim EO projections	Difference from November EO	Interim EO projections	Difference from November EO
World	2.9	2.4	-0.5	3.3	0.3
G20	3.1	2.7	-0.5	3.5	0.2
Euro Area	1.2	0.8	-0.3	1.2	0.0
Germany	0.6	0.3	-0.1	0.9	0.0
France	1.3	0.9	-0.3	1.4	0.2
Italy	0.2	0.0	-0.4	0.5	0.0
Japan	0.7	0.2	-0.4	0.7	0.0
UK	1.4	0.8	-0.2	0.8	-0.4
U.S.	2.3.	1.9	-0.1	2.1	0.1
China	6.1	4.9	-0.8	6.4	0.9

Source: OECD

Projections are based on information available to February 28. Difference from November 2019 Economic Outlook in %, based on rounded figures.

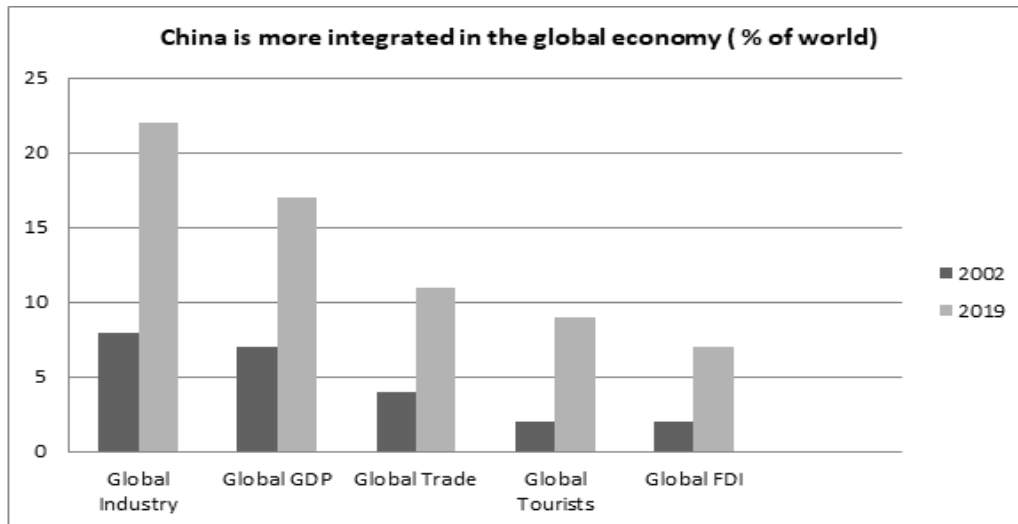
- Aggregate using moving nominal GDP weights at purchasing power parities
- The European Union is a full member of the G20, but the G20 aggregate only includes countries that are also member in their own right
- Fiscal years, starting in April

5.1. China's responses to Covid-19

World Health Organization has been a forefront on the China's containment measures since the outbreak happened in the Wuhan City. WHO has provided the government of China with technical advice on detection, testing, isolation and quarantine measures to support a rapid measures to contain the outbreak. Moreover, China shifts from a containment phase to a mitigating stage in just 2 months. To stop the spread of the virus, China took various measures which enacted aggressively, by locking down heavily affected regions, social distancing, mass isolation of infected patients, prohibitions on travel, and home quarantines. These policies appeared to be successful, with new cases and fatality rates declining.

However, these measures might lead to an economic downturn, that could implicate downs in international trade, global production networks and value chains and potentially trigger a collapse in the financial markets.

Figure 3 - China share of the global industry



Source: OECD, share of industry, GDP and trade in constant US dollars. Share of global FDI in current US dollars. Data for the tourist share refer to 2002 and 2018, and data for FDI refer to 2005 and 2018. Statistics are on a value-added basis and include construction sector.

To prevent an economic downturn, Chinese government had introduced a package of policies to support the resumption of work and production, including fiscal, monetary, financial and trade policies. The Central government has imposed regulations to protect the international trade and foreign investments and continues to open the market. Ministry of Finance arranged a total of 110.48 billion yuan of special fund for epidemic prevention and control, from which 71.43 billion yuan has been used. The fiscal authority also increased 1.85 trillion yuan of the quota of newly issued local government bonds to mitigate the negative impact of the epidemic on the economy. By the end of February, over 1.2 trillion yuan of local government bonds had been issued.¹

However, governments' misperception led to some issues at the early stage. Their awareness of the incoming crisis was slow and the lack of communication with the public and the failure to undertake precautionary measures gave the boost in spreading the virus among the region and lately worldwide as well. Although the Chinese government adopted its unprecedented containment measures shortly after. They launched a package of policies which helped

¹ Source: official [website](#) of Ministry of Finance

expand production of medical equipment while maintaining stable prices. Moreover they started immediately building temporary hospitals. When they had the epidemic under control, the government imposed its strict policies to control the virus but also began to allow the resumption of work and stimulated production.

Some of the measures included the expansion of production capacity for antivirus-related goods and services. Tax deductions and fee-waiving policies were issued for enterprises and taxpayers in certain industries, including medical services, public transportation and the delivery of daily necessities. Subsidies in the form of loan payments were provided for producers of necessary products and startups. Municipal governments reduced rental payments, deducted taxes for affected businesses and individuals and offered funds and credits. Nevertheless, local governments imposed policies for stabilizing employment and helping small and medium enterprises to overcome threats, as refunding of social insurance payments. Those enterprises that did not lay-off workers could use the subsidies and the deduction of social insurance payments.

Many other countries copied the measures for prevention of global economic downturn from Chinese government. The central government reopened the stock market on 2nd February. The decision for reopening could send positive signals to the market regarding economic situation and stimulate market liquidity. VAT for small businesses were exempted for a period, thereby they protected corporates from default and assuring them liquidity. Moreover, their goal was to provide more credit to relevant companies in certain industries to stabilize the international and domestic supply chains. To avoid an economic downturn after the outbreak of the virus, the Chinese government took all precautionary measures correctly, creating a monetary and fiscal policies to prevent a macroeconomic recession due to unexpected demand and supply shocks saving the SMEs and the domestic economy in general.

5.2. Economic responses in Europe

Following the practices of Chinese government in the previous subchapter in this section we will examine Italy's responses which appeared to be the first epidemic centre in Europe which escalated quickly. Unfortunately, in Italy policymakers were struggling to keep up with the spreading of the pandemic. From the beginning of the first case of Covid-19 in Italy it followed to prohibiting all movements of people within the territory, and the closure of all non-

essential business activities. The Italian government dealt with the pandemic by issuing a series of regulations which gradually increased restrictions in lockdown areas, which then expanded until it applied to the entire country. The Covid-19 pandemic is a potential image leading to a major shock to the global and EU economy. The economic impacts of such measures are significant, and are felt through both supply and demand channels.

Infection curves in Italy, Germany, France and Spain so far look very similar to what we have seen in the case of China. Moreover markets have reacted violently and number of industries have taken a huge hit from Covid-19 shock. Italy has been the epicentre of the Covid-19 outbreak in the EU, confirming of 60% of cases and 90% of EU deaths. To help the health system, the government has adopted measures to recruit more than 20.000 doctors, nurses and operators. What is more, municipal authorities are investing a lot in intensive care capacity to avoid the collapse of the system. However the government has adopted a line of measures too. They managed to provide fund to the national redundancy fund which helped companies maintain the labour force in times of economic issues by subsidizing part of workers' wages. Furthermore, they provided financial aid of 500€ a month for three months to self-employed workers.

Funds were also provided to SMEs. Some of the policies included suspension of mortgage payments, tax payments and social security contributions. Since many businesses reported a 25 percent drop in revenues, they managed to provide tax credits for corporates. Italy initially allocated 900€ to implement such measures across municipalities quarantined and has moreover allocated an additional 25€ billion to implement the measures country-wide. Government measures comprising tax breaks, loan moratorium on mortgages and support for SMEs, should help avoid widespread bankruptcies, which could cause a more permanent hit to GDP, but won't be enough to avoid a recession. Nonetheless, the shock is leading to disruptive financial system and in sovereign bond markets, which need to be alleviated by central banks, which we will analyze in the next chapter.

Another country that has been affected in Europe early after Italy was Croatia. Even though, Croatia took precautionary measures on time, the country counted for around 2500 infected and 20 deaths on 9th, April. The average increase in the number of infected is 50 daily, which is far better than results around the countries in Europe. Croatia could thank that to on time responses of the government and health care services. Border closed soon after Croatia accounted the first 100 cases, and lockdowns were imposed, giving people allowance to travel

only with a special permit license. The Ministry of Finance set 63 regulations as measures to prevent economic shocks in the country. The first set of measures referred to those who felt or will soon feel the economic consequences of the epidemic. That pertained postponement of paying taxes for public goods and services, more precisely postponement of income tax and profit tax in the first three months, with the possibility of extension to three more months, and afterwards making it available to repay it in installments in 24 months period.

Withal, for set of measures to keep the liquidity, the government included moratorium on obligations towards HBOR-u (Croatian Bank for Renewal and Development) and commercial banks in a period of three months, approval of loans for payments of salaries and suppliers. Over and above, new loans were also enabled to all corporates for all costs of keeping businesses from defaulting, as well as government was paying the minimum wages of employees around the firms to keep the unemployment rate stable. Since the outbreak of the virus appeared in Croatia not far from high season of tourism travels. The Minister of Tourism announced postponement of fee payments for economic entities and private renters as well as payments of tourist tax for renters. These set of measures are so far keeping the financial system stable. Although, the economy of Croatia is fragile at the moment.

UK's government has also imposed some Economic Relief Measures including: Coronavirus Business Interruption Loan Scheme, delivered by the British Business Bank, will allow businesses with a turnover of no more than 41 million pounds to apply for a loan of up to 1.2 million British pounds, with the government covering up to 80% of any losses with no fees. The entire expense of delivering 14 days of compulsory sick leave per employee would be refunded by the government for companies with less than 250 workers. Nonetheless, businesses and self-employed individuals in financial distress and with tax liabilities receive support with their tax affairs. In France, the government will pay the salaries of people forced to stop work, firms do not have to pay taxes that fall due in March. What is more, Bpifrance guaranteed loans and gave flexibility with struggling enterprises to help them overcome short-term cash flow problems. Companies can also declare force majeure due to the outbreak if they cannot honour a contract with the public sector and postpone payment of certain social charges and taxes.

5.3. Central Bank interventions

Financial situation have toughened increasingly, along with that, expectations of low inflation, means that monetary policy has a major role in intervention. Central banks can act in mitigating tight financial conditions by increasing liquidity and cutting interest rates, thereby preventing a possible credit crisis. Markets were in anticipation of act by central banks. since the sharp fall in sovereign bond yields worldwide. In this uncertain environment, if liquidity pressures threaten markets, central banks will have to step in and provide emergency liquidity. The large decline in interest rates, together with the anxiety and low confidence towards the economic outlook, have raised the investors doubts about the health of banks. Banks' share prices have plummeted and they are likely to fear of potential loses.

However, banks are stronger than they were in the 2008 financial crises and they have already been detailing the steps they will take to help small businesses and household customers affected by the virus outbreak. The measures are in some way similar of the forbearance measures introduced by the UK banking industry during the financial crisis of 2008-09. In the next subchapters we will examine some measures of certain countries that central banks have prepared for. The uncertainty from Covid-19 will however remain for the foreseeable future. Banks and governments are taking all necessary aggressive fiscal and monetary policy responses but the clarity on how these steps will stabilize markets and accelerate the path to normality is slowly emerging, and in some cases yet to emerge.

Banks need to continuously prompt the needs of their clients and simultaneously the multiple near, short and medium term operational, financial, risk, and regulatory compliance implications. They have the ability to support the market and facilitate a quick return to stability. Some potential long-term impact on banks and capital markets could arise, like impact of continued reduction of interest rates, reduced business activity, and large scale non-performing loans if this becomes a prolonged recession. There is also a possibility of implication within the regulatory changes.

However there is an opportunity for banks to support restructuring of a wide range industries and increase trust and reputation of the banking industry in the long run.

5.4. Croatian National Bank regulatory framework

The CNB believes that banks should contribute to the efforts to alleviate the social and economic consequences of the coronavirus pandemic. As a result to disruption in the economy, CNB has adjusted its approach to the supervision of credit institutions in accordance with the positions of the European Banking Authority (EBA) and the European Central Bank (ECB) Some of the expected economic consequences and responses of the pandemic, according to CNB are:

- Sharp and short-term economic contractions potentially resulted from a supply shock accompanied by a demand shock. Monetary policies impact in that field of shocks are limited.
- Maintenance of favourable financing conditions in efforts to preserve jobs and boost faster recovery
- Stress in Croatia is also focused on the foreign exchange and bond markets, therefore monetary policy measures are aimed at mitigating turmoil in these markets.
- Corporate liquidity is also expected to diminish due to the fall in income, supervisory measure are also aiming at facilitating the rescheduling of loans.

More of monetary policy measures observe objectives as stabilisation of the foreign exchange rate and provision of foreign currency liquidity. According to CNB, 9-17 March – four foreign exchange interventions were made at which a total of EUR 1.625bn was wold to banks. Thereby, exchange rate stabilised at around EUR/HRK 7.57.

There has been also a guaranteed level of international reserves for a further stabilisation. Another objective of the measures are provision of kuna liquidity for the ongoing financing of the economy and supporting the stability of the government bond market (purchase of government bonds). Some of the supervisory expectations are reduction of the requirements regarding the liquidity coverage ratio and the classification of exposure to clients in risk category A whose operations have been or will be affected by the pandemic. Over and above, The CNB has taken all the relevant steps to maintain the stability among key central bank functions, as payment operations, cash supply, monetary policy implementation and international reserves and foreign currency liquidity management.

The value of croatian kuna (HRK) has been sliding since March, 2020 when the kuna was estimated around 7,450, by the end of April, the estimated value was around 7,569 for Euro.

Croatian National Bank had 8 interventions in which they spent over 1,4 billion EUR on foreign exchange reserves. That reflects the expectations of investors of how great shortfall will the tourist sector have and foreign exchange inflow as well. In addition to structural and regular open market operations, the central bank has taken other measures to increase the liquidity of the banking system in recent weeks of April, so it has begun buying government bonds of the Republic of Croatia in order to maintain stability in the government securities market. In March, the CNB purchased securities of the Republic of Croatia with a total nominal value of HRK 4.29 billion through two operations, and is still announcing new auctions. In addition, given the state's need for additional funding due to the Covid-19 package of measures CNB also reduced the reserve requirement rate last week, freeing up an additional HRK 10.5 billion for banks.

Regular operations are one of the measures taken by the central bank to increase the liquidity of the banking system with the aim of maintaining exchange rate stability and financial stability during the crisis caused by the coronavirus epidemic in the Republic of Croatia. Thus, in mid-March March 16, the CNB conducted a structural operation on the open market, in which it placed HRK 3.8 billion with banks for a period of five years, with an interest rate of 0.25 percent. On March 16, the central banks resumed regular weekly operations, ranging from HRK 350 million (early April) to a maximum of HRK 1.52 billion at auction in early April. The interest rate on a regular operation in mid-March was 0.30 percent per year, but already at an auction held a week later, on March 23, the interest rate on these short-term placements fell to 0.05 percent and has remained at that level ever since. The largest foreign exchange intervention of the central bank, way by the end of March when CNB sold EUR 618.15 million to banks, at an average exchange rate of HRK 7.608529, by which it seeks to preserve exchange rate stability and alleviate depreciation pressures on the kuna. CNB Governor Boris Vujčić said at the government session in mid-March that the CNB was introducing three main monetary steps classes-stabilizing the exchange rate and maintaining foreign exchange liquidity to continue financing the economy through systemic and routine repo operations.

Supporting the stability of the government bond market by introducing government bond repurchase operations. The stated amount cannot be added up because these are different measures. While foreign exchange interventions convert kuna liquidity into foreign currency, a bank financing operation and bond redemption create additional kuna liquidity, and lowering the reserve requirement rate releases banks' existing liquidity that has been blocked by the central bank monetary measures. But all of these moves were complementary and aimed to

preserve favorable financing conditions for all bank clients despite the economic downturn and the huge disruptions affecting global financial markets, while maintaining exchange rate stability. Also, state funding could facilitate the expected rise in private savings that will require secure investments. On the other hand, financial markets are under constant turmoil, uncertainty is extremely high, and all this will require very careful management of budget financing.

5.5. U.S. Federal Reserve Department

Fed played a leading role in boosting the economy during the Financial Crisis 2008 and in similar way they are imposing measures to keep up the financial stability during the Covid-19 outbreak. U.S. accounted for almost 500.000 cases of infected people by Covid-19 and over 20.000 deaths by mid-April. Nonetheless, unemployment claims to be one of the clearest real-time indicators of economic conditions and U.S. has reached to a record 6 million people left out of jobs, and more is expected to be. Therefore, ECB, Bank of England, and other central banks together with Fed offered extra funds to the market. Some of the measures Fed took by now include

- Slashing interest rates to zero and buying bonds worth hundreds of billions of dollars.
- Fed is also expecting to increase its holding of U.S. government bonds by at least 500bn dollars and its holdings of mortgage-backed securities by at least 200bn dollars to ensuring the lower the cost of long-term debts and support the housing market.
- Fed is also towards a goal to ensure that affected businesses and individuals get cheap access to loans, urging banks to use their capital designed to ensure the lender in such uncertain events.
- Fed also allowed an easy access for foreign central banks to exchange their currencies for dollars, intending to reduce disrupts abroad that could spill over into the U.S. economy.
- The Fed estimates the impact of its measures to provide about 300bn in new financing available to businesses.

All the major central banks have now lowered their interest rates to zero and both the Fed and the ECB have coordinately got into asset purchases. Major central banks are in cooperation and in close contact in order not to cause spill-overs from mistakes done during the Financial Crisis.

The US Federal Reserve (Fed) has also announced new mechanisms to meet growing demand of central banks and monetary authorities around the world for dollars. As a part of a new package to mitigate the effects of the pandemic, the Fed announced the temporary establishment of new repo operations, allowing foreign central banks to exchange all U.S. short-term debt securities they hold for cash. Unlike the currency swaps that the Fed has already established with a group of central banks and used in the 2008 financial crisis, the new repo operations will be available to most central banks and monetary authorities in the world that have accounts in the Fed's New York branch.

The New York branch of the Fed announced that it has over 200 account holders, with the vast majority made up of foreign central banks and monetary authorities. The US Federal Reserve is trying to prevent liquidity shortage due to the dollar craze fueled by the new coronavirus, shaking up the global economy, heavily dependent on the US currency. Due to the shortage of dollars, the recession or decline in activity can turn into a financial crisis in a very short time, because of the lack of dollars can lead to insolvency and deleveraging. Particularly high risk threatens debtors in emerging markets, which have accumulated large amounts of dollar-denominated debt due to low interest rates in the United States in recent years. They are now in trouble as their exports fall sharply due to the shutdown of economic activities around the world. A significant strengthening of the dollar could also harm the United States through tighter financing conditions and a rise in US exports to foreign markets.

5.6. European Central Bank set of measures

According to European Central Bank, the economic activity across the EU will decline significantly. The situation of the pandemics creates adverse effects on the cash flows of companies and employees, increasing the possible unemployment rate and survival of firms. Monetary policy in this particular event is important to keep the financial sector liquid and offer supportive financing for all sectors in the economy which applies to all individuals, firms, banks and governments. The uncertainty level of economic downturn is noticed around all assets both in EU and globally. As a result ECB's Governing Council announced a new

Pandemic Emergency Purchase Programme an envelope of EUR 750bn and additional EUR120bn decided in March, which is total of 7.3% of EU GDP.²

This regulation has three major conveniences: Firstly, it describes to the exogenous shock the economy is facing. More, it allows the intervention in the entire yield curve, protecting from the financial fragmentation and disruptions in credit pricing. Third, it manages the shaken progression of the virus and its uncertainty.

Furthermore, they have purchased commercial papers of sufficient credit quality and expanded the eligible collateral in refinancing operations, in order to protect the flow of credit to companies and individuals. ECB has also up to EUR 3 trillion in liquidity which they ensured through their refining operation and imposed the lowest interest rate to -0.75% . EU banking supervisors have also extended to an estimated EUR 120bn of bank capital to support lending capacities by euro area banks.

6. Alternative scenarios of Covid-19 on financial markets ?

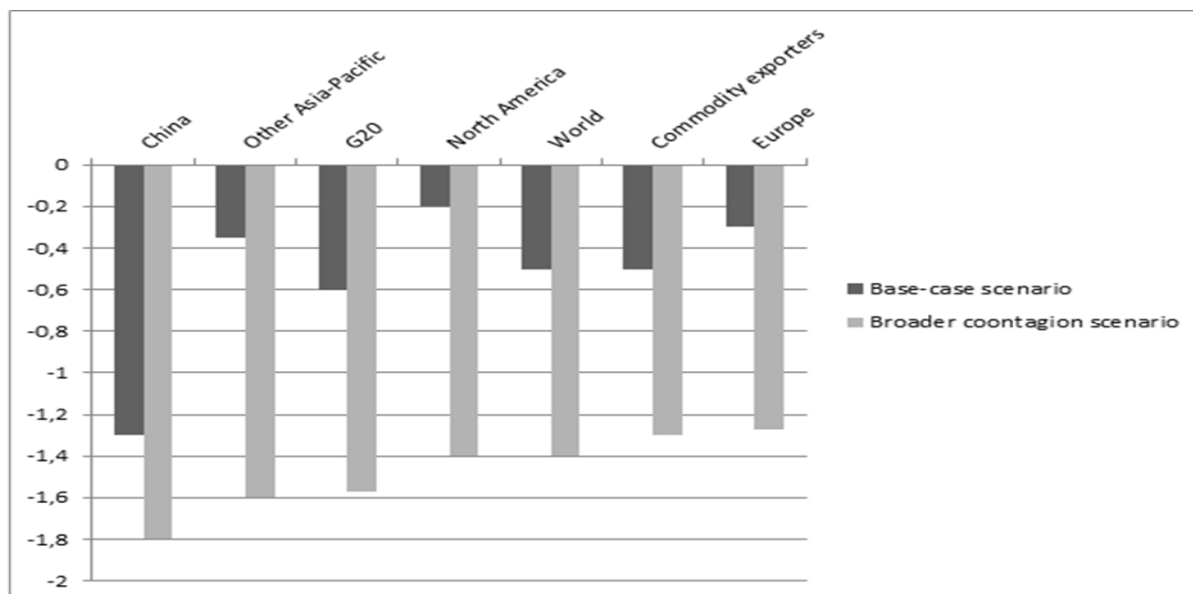
The spread of Covid-19, has obviously affected adversely to the economy, by unsettling supply chains, dropping sales of some products, travel banned, stock markets volatility and uncertainty as well as the fear of a global recession.

It might be hard to predict how long will the economic downturn last, but it is clear that the world is facing a global recession from widely reactions of markets, and responses of governments to lowering interest rates.

² Official [website](#) of ECB

A global pandemic is a novel danger with no precedents, interest rates are already too low which gives banks less financial power to mitigate the impact.

Figure 4-Change in GDP growth in 2020



Source: OECD, graph illustrates a change in GDP growth in 2020 relative to baseline, percentage points. It is a simulated impact of weaker domestic demand, lower commodity and equity prices and higher uncertainty. Base-case scenario represents a case of virus outbreak in China. With the outbreak expanding worldwide, the broader contagion scenario illustrates. Exporting resources include Argentina, Brazil, Chile, Russia, South Africa and other oil-producing economies outside the OECD.

6.1. Outcomes of low interest rates

The Fed announced on March 15 to cut its target interest rate to a range of 0 to 0.25% which is the record lows they reached since the Financial Crisis in 2008-09. The Fed's move is a sign that they consider a severe economic risk that could slow down the economy. The Fed's interest rate is primarily used to influence the U.S. economy. When they decide to lower the rate that means the borrowing is cheaper: Mortgage rates fall, APRs for credit fall, car loans get cheaper ect. In this way they plan to stimulate people to borrow more and therefore spend more. The Fed reaches the target interest rates through expectations and open market operation, where it buys up Treasury bonds with money it creates in a bid to make those bonds' interest rates fall to its target range.

Moreover, the ECB has been experimenting with modestly negative interest rates. Under a negative rate system, investors have to actually pay borrowers to lend them money. ECB rate is varying at around -0.5% , a low cost to most depositors. If rates slide to even more negative rates, there is a danger of businesses and individuals withdrawing their money and likely to hold cash. The changes in interest rates can also affect both inflation and recession. To keep the inflation stable and unchanged, FED uses indicators as CPI (Consumer Price Index) and PPI (Producer Price Index) When these indicators start to increase by 2-3% annually, the Fed will raise the federal fund rate to keep the rising prices under control and vice versa in order to borrowing money to become cheaper and potentially bring recessions to end. In the stock market changes in interest rates determine how investors will invest their money. When interest rates have fallen sharply, consumers and businesses will increase spending, causing stock prices to rise.

What is more, as interest rates are decreasing, it becomes easier to borrow money, thereby many companies will issue new bonds to finance expansions. This will cause the demand for higher-yielding bonds to increase, taking bond prices higher. However, changes in interest rates need time to bring effects to the economy, generally up to 12 months. By adjusting the federal funds rate, the Fed helps keep the economy stable during the long-term period.

6.2. How long will the slump in markets last?

How long will the uncertainty last no one knows, but we do know that it largely depends on government and central bank responses. However, markets worldwide are facing major difficulties during the coronavirus outbreak. China makes up a larger share of the world economy than it did when SARS occurred in 2003. Companies like Apple, Nike and other manufacturers are already feeling adverse effects of the virus. Even more consequences are facing industries and businesses related to travel and tourism. The stock market might not be the economy but it sure is the signal about the stress and uncertainty about the economic outlook among the investors.

Basically, they're predicting that the coronavirus will continue to spread and cause more disruptions, depress demand and maybe cause a global slowdown. Nonetheless, the oil market war between Russia and Saudi Arabia could just trigger the recession even more. Investors are preparing for the worst scenario and companies and analysts have changed their business forecasts for earnings already. Lockdowns worldwide closed many shops, restaurants, theaters and ect. Starbucks shut down 2.000 stores only in China. Smaller manufacturers are even less resilient to the shock. Airlines are expecting to lose up to \$100bn as well as other economies and businesses that rely on tourism e.g. Croatia. Millions of people lost their jobs. However at some point the economy will bounce back but not everybody will experience the same recovery phase. There will be some individuals who will have V-shaped recovery, those with higher-income, and who did not lose their jobs might affect stock market to start improving. But the low-wage service sector jobs were the most vulnerable to being cut because of the Covid-19 pandemic.

7. Conclusion

The Covid'19 outbreak was unexpected and it hit the economy with a huge impact on wide sectors. It caught politicians, policy makers and financial markets unprepared. The concept of recession is blunt. The shape of the shock is still unknown. It will still be determined by the virus properties, policy responses, as well as individual and corporate behavior to fight against adverse impacts. In our opinion, both a deep V-shape and U are possible. World economy has a long history with such crisis and policy makers, governments and all financial institutions are well organized in these certain situations.

However, coronavirus extends liquidity and capital problems to the real economy, so the risk of interrelated financial and real liquidity shocks are raising the stakes. The Covid-19 crisis could lead to a number of real economy bankruptcies, which could be tough for the financial system to manage. The virus contagion has already spread around the world causing the financial contagion to follow and causing many disruptions and uncertainties in the markets worldwide. The economic devastation has become clearer every day. Unemployment rate has hit the high records in the U.S. and worldwide. Thousands of restaurant and hotels, airlines, might never return to solvency. Most of these people will be in serious debts. Social consequences will be long lasting and the financial markets are likely underestimating the coronavirus depression. The good side is that banks are currently more resilient, by having larger capital and liquidity cushions. This lowers the risk to financial stability from the banking sector, despite declining share prices.

Although, the global economy is already weak and faces many downside risks, the coronavirus outbreak reinforces the need for policy actions to contain the spread of the virus, boost confidence and demand and limit adverse supply effects. We think there is a chance for innovation to prevent a full-blown U-shape, keeping the shock's closer to a V-shape. But the underlying solution depends upon fiscal and monetary policies implied from governments around the world. Overall, policymakers must act decisively and cooperate globally to preserve the monetary and financial stability during the outbreak of Covid-19.

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In Zagreb, 30.06.2020

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