THE COVID-19 FINANCIAL CRISIS, GLOBAL FINANCIAL INSTABILITIES AND TRANSFORMATIONS IN THE FINANCIAL SYSTEM

By Joscha Wullweber

In collaboration with Rainer Voss and Gerhard Schick
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**About the author**


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Summary

This report discusses the overall instabilities inherent in the current global financial system in general, and the system’s performance in reaction to the COVID-19 pandemic in particular. It explains why the financial crisis induced by the COVID-19 outbreak was not an unpredictable black swan event in an otherwise stable system, and demonstrates that where the financial system is concerned, instability is the rule rather than the exception. The report holds that the financial system was already in crisis mode when the pandemic hit. For the past 20 years, the shadow banking system has been growing at a steady pace. Short-term repo market funding has been greatly accelerating. The crisis susceptibility of today’s financial system can mainly be explained by the fact that the stability of this financial system is strongly grafted on the stabilization of the shadow banking system, and that although the shadow banking system is inherently prone to crisis, it nevertheless remains largely unregulated. Moreover, since the last global financial crisis, new unsecure credit and debt structures have been building up. Private debt burdens have been soaring. High-frequency trading and algorithmic trading have become increasingly important. Exchange traded funds (ETFs) and portfolio trading have experienced rapid growth. The eurocrisis remains unsolved and the structural and politico-economic problems within the eurozone persist. Hence, downside risks to financial stability were already prevalent and conducive to further instability before the crisis began. In a crisis situation, existing risks tend to become even more pronounced. The COVID-19 crisis has once again demonstrated that financial markets in their current form do not act as a firewall to avert economic downturns. Central banks have had to step in to prevent large-scale insolvency by providing credit directly to large employers as well as to small and medium-sized businesses to enable them to maintain their business operations and retain their employees. More than ever before, the demand and supply of credit, and thus the functioning of financial markets as a whole, are determined by central bank monetary policy. However, even if central bank intervention does manage to stabilize financial markets, that stability will remain highly precarious unless strong and appropriate rules for financial markets are in place and governments complement monetary policy with forceful and comprehensive fiscal policies.
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Abbreviations

BIS Bank for International Settlements
COVID-19 Respiratory disease caused by the coronavirus SARS-CoV-2
ECB European Central Bank
ETF Exchange traded funds
HFT High-frequency trading
Fed U.S. Federal Reserve
FSB Financial Stability Board
FSOC U.S. Financial Stability Oversight Council
IMF International Monetary Fund
LME London Metal Exchange
MBS Mortgage Backed Securities
OECD Organisation for Economic Co-operation and Development
ON RP Overnight Repurchase Facility
ON RRP Overnight Reverse Repurchase Facility
OIS Overnight Indexed Swap
Repo Repurchase Agreement
USD U.S. Dollar
1. Introduction

"A stable financial system, when hit by adverse events, or 'shocks', continues to meet the demands of households and businesses for financial services, such as credit provision and payment services. In contrast, in an unstable system, these same shocks are likely to have much larger effects, disrupting the flow of credit and leading to declines in employment and economic activity" (Fed 2019a: 3).

This quote taken from the “Financial Stability Report” issued in November of 2019 by the Board of Governors of the Federal Reserve System (Fed), the central banking system of the United States, indicates that even before the world’s financial and economic systems were hit by the COVID-19 crisis, the global financial system was already far from stable. During March and April of 2020, entire nations all over the world essentially went into lockdown. Domestic production systems and almost all global supply chains were disrupted. Simultaneously, there was a stark decrease in demand. Unemployment figures soared, especially in countries with weak social security systems. Thousands of firms and corporations were forced into de facto insolvency. While shocks such as the COVID-19 pandemic are not predictable, the vulnerabilities to which the financial system is subject have long been obvious. Some forms of instability have been building up steadily for years. Others lie at the very core of the logic behind the market-liberal financial system. From the developments taking place in the system, critical observers and analysts have long recognized the looming prospect of another crisis (Boyer 2000a; Krugman 2012; Roubini 2018; Wullweber 2018; Pozsar 2019; IMF 2020).

This report discusses the overall instabilities inherent in the current global financial system in general, and the system’s performance in reaction to the COVID-19 pandemic in particular. It explains why the financial crisis induced by the COVID-19 outbreak was not an unpredictable black swan event in an otherwise stable system, and demonstrates that where the financial system is concerned, instability is the rule rather than the exception. Above all, it argues that the current financial system is not able to restore stability on its own. The financial system is not resilient in and of itself. The notion of general equilibrium in the long run driven by free market forces is based on faulty reasoning. Quite the opposite is true: The market-liberal financial system, with the shadow banking system at its core, is unstable owing to the very logic intrinsic to its current structure. After World War II, the Bretton Woods system was set up in order to stabilize the global
financial system and to forestall devastating global financial crises like Black Thursday in 1929. Since the Bretton Woods agreement ended in 1973, recurrent crises have become the norm. And it is always the state, and especially the central banks, which then have to come to the rescue by implementing exceptional stabilizing and revitalizing measures, as they have been doing since the start of the COVID-19 financial crisis.

In mid-February 2020, when China put the entire region around Wuhan on official lockdown and Italy quarantined the first towns in its northern regions, financial market players began to grow nervous. The eleven-year-long “bull market” – an expression of steadily rising prices in financial markets – faltered and quickly reversed into a bear market. By March 12th, the Dow Jones Index had already dropped by 20 per cent. Financial markets all over the world imploded in reaction to the economic consequences of COVID-19, which developed rapidly in China from a local outbreak into a country-wide epidemic, and then, within the space of two months, into a global pandemic. Overall, the Dow Jones fell by 37 per cent during March of 2020, exceeding the rate of losses sustained during the global financial crisis. The speed of the decline was unparalleled.

The nature of the COVID-19 crisis is exceptional: It has triggered a demand-side as well as a supply-side shock. Millions of people have not been able to go to work. Production has come to a halt in factories and plants around the world. Lockdowns have been imposed as a necessary measure to contain the spread of the virus. Consumption has drastically declined. The financial and economic situation remains even more uncertain than it was during the global financial crisis of 2007-2009 (see Figure 1). Many governments have launched huge fiscal programs to cushion the effects of the extensive lockdowns. Current figures in data on government spending suggest that the sum of financial aid provided to households and corporations during the present crisis will far exceed the total amount of subsidies disbursed during and after the global financial crisis of 2007-2009. At the same time, however, these necessary measures harbour the risk that financial markets will demand higher interest rates for the purchase of government debts, at least in some countries. This could lead to higher interest spreads between countries, as happened during the global financial crisis, and could even gravely aggravate the eurocrisis. During the coming months, or even years, central banks and fiscal policy makers will be tasked with the challenge of developing strong responses to counter financial and economic instabilities.
The study underlying the present report examines whether, when the COVID-19 pandemic struck, the financial system was functioning well and in a stable fashion, or whether it was not rather the case that it was already operating in crisis mode even before the pandemic took hold, and if so, why. Based on the findings, the report holds, in brief, that although it was impossible to foresee this particular COVID-19 financial crisis, the financial system was, indeed, already in crisis mode when the pandemic hit: For the past 20 years, the shadow banking system has been growing at a steady pace. Short-term repo market funding has been greatly accelerating. Since the last global financial crisis, new unsecure credit and debt structures have been building up. Private debt burdens have been soaring. High-frequency trading and algorithmic trading have become increasingly important. Exchange traded funds (ETFs) and portfolio trading have experienced rapid growth. The eurocrisis remains unsolved and the structural and politico-economic problems within the eurozone persist. Against this background, the report demonstrates that even though the specific trigger of the current financial crisis was not foreseeable, evidence had been mounting already beforehand that a crisis was imminent. Downside risks to financial stability were already prevalent and conducive to further instability. In such a situation, existing risks tend to become even more pronounced (IMF 2019a).

The report also examines whether financial crises are a natural phenomenon of modern-day capitalism and whether they are impossible to prevent insofar as they are an inevitable side effect of accelerating global economic developments. Since the global financial crisis of 2007-2009, several regulatory reforms have been implemented. In addition to many different voluntary
and non-binding standards, the reform structure also includes various regulatory frameworks and agreements with guidelines that are binding on national, regional, and transnational levels. Numerous regulatory systems and standards exist side by side in the financial governance structure. While the regulations have become more and more complex, with rules filling tens of thousands of pages, the report concludes that their effectiveness remains highly limited (BIS 2019a). The crisis susceptibility of today's financial system can mainly be explained by the fact that the stability of this financial system is strongly grafted on the stabilization of the shadow banking system, and that although the shadow banking system is inherently prone to crisis, it nevertheless remains largely unregulated.

While the paucity of financial reforms seems to confirm the assumption of a crisis-driven status quo (Moschella et al. 2013; Helleiner 2014; Scherrer 2014; Stellinga et al. 2017), something radical has changed: the leading central banks have meanwhile become the only institutions that take forceful action to guarantee the stability of the financial system. In order to stabilize the system, however, central banks have to stabilize the shadow banking system. This implies that central banks must regularly act as market makers of last resort to secure market liquidity in collateralized securities so as to stabilize the market for repurchase agreements (repos, see Chapters 3.1.4 and 4.6). Although the legal frameworks regulating the financial system remain weak, the highly unconventional measures taken by the leading central banks to safeguard the system have substantially strengthened the security framework in which the financial system is embedded (Mehrling 2011; Pozsar et al. 2015; Tett 2019; Wullweber forthcoming). Nevertheless, as the report demonstrates, these measures also have problematic side effects, which, in turn, increase the likelihood of further crises.

While focusing on the current financial crisis which was induced by the COVID-19 pandemic, the present analysis also highlights the general instabilities implicit in the financial system. Chapter 2 of the report delineates general developments within the global financial system. It begins by drawing on a simple but highly plausible credit cycle model developed by Minsky and applying it to the trends which have characterized global finance since the last major crisis of 2007-2009. It describes how the phases of the financial cycle shifted from recovery to the rising profit expectations that fostered the boom and euphoria which were then followed by debt deflation and the uncertainty that led to panic and finally culminated in the current financial crisis. The next section offers a more nuanced and complex understanding by embedding this cycle within general historical developments of financialization and the emergence in most industrialized states of a finance-led growth model, and therefore making it possible to explain the structural conditions that made this credit cycle possible in the first place. The third part of Chapter 2
refines the overall approach by clarifying basic concepts and categories fundamental to the realm of finance: liquidity, credit, money, money creation, and the credit hierarchy. A sound grasp of these issues is necessary to understand current developments in global finance considering that many misunderstandings, allegations, and interpretations rely on faulty or misleading assumptions about the basic structure and logics of finance. False narratives, especially those built around the notion of money and money creation, often result in proposals or policy approaches that only serve to further aggravate the situation. In recent years, many central banks have called upon students of economics to consider their textbooks with a critical eye. The Bank of England, for example, in a paper clarifying how monetary policy affects the creation of money, expressly states that their “description of the relationship between monetary policy and money differs from the description in many introductory textbooks” (McLeay et al. 2014a: 21). Chapter 3 examines what actually lies at the root of the instabilities in today’s financial system. This includes first and foremost the shadow banking system, which constitutes the core of the current financial system, but also asset market developments and the rise of private debt. High-frequency and algorithmic trading also count among the important issues that contribute to elevating the vulnerability of the financial system. At the centre of the report is Chapter 4, with a description and interpretation of the COVID-19 financial crisis as well as an explanation of some of its dynamics and constellations. The last part of Chapter 4 discusses how the leading central banks reacted to the COVID-19 financial crisis, and what largely unconventional monetary policy measures they have implemented to restabilize the system. The final chapter reflects on the current stage of financial stability and provides a brief outlook on possible future developments.
2. Approaching financial vulnerabilities and instabilities

Financial crises are highly complex phenomena. The COVID-19 financial crisis is no exception in this respect. Some studies attribute the cause of financial market instabilities to an excess of liquidity generated when central banks pursue expansive monetary policies. Others put the blame on an asymmetrical distribution of information, a lack of transparency, individual misconduct (moral hazard), or greed for profit. Although such explanations are not entirely wrong, they are far too simplistic to do justice to the complexity of the inherent logic and dynamics of the financial system (UNCTAD 2009). This chapter intends to provide important background information and an analytical framework to gain a deeper and more nuanced understanding of why even before the COVID-19 crisis the global financial system was already marked by instability, and why it continues to remain highly unstable.

2.1 From the global financial crisis of 2007-2009 to the COVID-19 financial crisis of 2020: Restabilization, asset bubbles, booms and bust

Hyman Minsky (1982a, 2008) provides a systematic perspective on financial instability which runs counter to the assumption that equilibrium emerges through the interaction of supply and demand over a medium-term. Arguing that the memory of previous crises fades as soon as the economy recovers, Minsky claims: “Stability is destabilizing” (Minsky 1982b: 26). In a so-called bull market, as he explains, optimism spreads among financial actors and eventually transforms into exuberance, so that risks and dependence on the effects of financial leverage are systematically underestimated: “Not only is stability an unattainable goal; whenever something approaching stability is achieved, destabilizing processes are set off” (Minsky 2008: 59). In this sense, a tendency for destabilization is implicit to the financial system. State measures of intervention are not able to completely neutralize this tendency: “A capitalist economy generates financial relations that are conducive to instability [...]. [...] as long as an economy is capitalist, it will be financially unstable” (Minsky 1982b: 36). However, although “all capitalisms are unstable, [...] some capitalisms are more unstable than others” (ibid.).

Minsky (1982b) identifies three distinct methods of financing: hedge finance, speculative finance, and Ponzi finance. In hedge finance, the expected profits of business operations are sufficient to pay interest as well as to reduce cumulative debt. Speculative finance refers to business dealings in which profit expectations are sufficient to pay accrued interest, but where new credits must be taken out on a regular basis to finance expiring loans. Ponzi finance results when income from the financed activities does not suffice to pay interest as it accrues on the principal, and new credits must be taken out (or real estate or other assets must be sold) to pay the interest
on old credits and to finance expiring loans. When the economy slows down due to a decrease in liquidity, hedge finance shifts towards speculative finance, speculative finance turns into Ponzi finance, and enterprises and actors who pursued hedge finance become insolvent. Minsky criticizes the neoclassical economics perspective that crises can only be triggered by external factors (state intervention in particular) and cannot be caused by operations intrinsic to the economic functioning of financial markets.

Based on this scheme, Kindleberger and Aliber (2015) discriminate between different stages of financial instability in a model that is also applicable to the current COVID-19 crisis: The first phase begins when profit expectations are raised by innovative financial products or investment strategies, technological revolutions or certain policies such as the liberalization and deregulation of financial markets, or an environment of low interest rates. In order to stabilize the financial system during and after the global financial crisis of 2007-2009, central banks had to resort to highly unconventional monetary policies such as quantitative easing, near-zero key interest rates (see Figure 2), negative interest rates on reserves, central bank liquidity swaps, and lender-of-last-resort as well as market-maker-of-last-resort facilities.

**Figure 2: Central bank interest rates from 2000 to 2016**

![Central Bank Interest Rates](image)

Source: Own illustration.

Such measures became even more necessary after most governments refused or were not able to pursue investment programs to revive their economies, and instead adhered to austerity
policies (Krugman 2012; Blyth 2013; Konings 2016). While the policies did succeed in temporarily stabilizing the global financial system, they also encouraged financial players to take on greater risks. At the same time, especially through quantitative easing and low interest rates, the system became flooded with cash (see Figure 3). It was monetary policies such as those which created the breeding ground for the present COVID-19 financial crisis. Central banks, however, had little choice in the matter because they were faced with a highly unstable financial system and governments shying away from bolstering their economies through programs of support. Their monetary policies might have been more effective had they gone hand in hand with strong government investment to stimulate recovery, comprehensive social welfare and economic programs to reduce the divide between rich and poor, and a set of authoritative rules to regulate global finance and specifically the shadow banking system.

Figure 3: Central bank balance sheets

Source: BIS 2019b. Relative change from 2008 (= 100) to 2018 (~500). The aggregate size of the balance sheets in 2018 amounted to around 22 trillion USD.

When profit expectations are over-inflated as the result of a specific event or conditions that serve as a breeding ground for optimism, corporations and financial players are inclined to raise their credit level to benefit from potential gains. This is what took place during the years following the global financial crisis. To be sure, the stimulation of investment was precisely the goal of the various monetary policies, especially those involving low interest rates and quantitative easing. The problem, however, was that investment activities concentrated largely on the financial sector and to a much lesser extent on the productive economy. According to Kindleberger (2015), a second phase sets in at some point – a boom stage marked by the expansion of credit granting.
This is exactly what happened during the years prior to the COVID-19 crisis (see Chapter 2.2, 3.2, and in detail Chapter 4). Expansion of credit led to an increased demand for stocks and other assets, which, in turn, increased market prices and attracted further financial investments because of rising profit margins. Positive feedback occurred as increasing financial investments led to higher asset prices, which, once again, attracted additional financial investments and, in turn, gave new impetus to the trend. Interest rates, rates of payment, commodity prices, and the aggregate level of private debt increased, inducing a veritable state of euphoria: Investors bought assets, not to finance or support the productive economy, but rather to profit from their anticipated price increases. A follow-the-leader process set in: “Investors rush to get on the train before it leaves the station and accelerates” (Kindleberger et al. 2005: 27). In this way, an asset bubble emerged.

Eventually, as Kindleberger suggests, the cycle moves to a third phase characterized either by the cooling down of a productive economy or the stagnation of an already weak economy, and a decline in profit expectations (see also Fisher 1932, who calls this phase debt-inflation). Investors become wary as uncertainty grows over whether the increase in value will continue, whether values have already levelled off, or even whether the trend has begun to take a downward turn. At this point, financial players start selling more assets than they purchase. Asset prices begin to fall. The need to liquidate existing debts leads to the first round of so-called ‘fire sales’ (the sale of assets well below their value). As investors struggle to procure cheap credit, the need for cash increases to repay existing debts. In such a situation, without help from state institutions such as the central bank, some strongly leveraged borrowers (who have invested their money in Ponzi finance schemes) go bankrupt since they are not able to service their debts. The unemployment rate increases and pessimism spreads over the profitable prospects of business ventures.

Before the COVID-19 crisis began, economies and financial markets were experiencing conditions of the type that belong to this third phase. The world had been facing an uncertain economic outlook already since 2018 (OECD 2019; IMF 2020). Markets had been growing increasingly shaky as the America First policy agenda pursued by the Trump administration led to trade conflicts between the USA and other countries. The conflicts between the USA, China, and the European Union in particular had significantly impacted the global economy. Brexit had also been causing distress to financial markets (Bank of England 2019; Fed 2019a). What is more, numerous economies never fully recovered from the global financial crisis and the eurozone crisis. In many countries, unemployment figures remained high, and real income stagnated. The unequal distribution of wealth within and among countries became even more pronounced than previously (Piketty 2014). All these developments combined added to elevated uncertainty and
led to a weaker economic outlook. And yet, because of profitability challenges, the shadow banking sector increased its risk taking activities (ECB 2019). The uncertain and unstable environment became very visible at the end of 2019 with a short but pronounced repo crisis when the U.S. repo market experienced a critical liquidity shortage. The crisis was precipitated by the Fed’s efforts during the preceding years to at least moderately shrink its balance sheet (see Chapter 3.1).

In situations marked by such a downturn, a specific event with signal effect can occur at any time, triggering a fourth phase - one marked by panic. In the present crisis, the event which drove the financial market into panic mode was the outbreak of the COVID-19 pandemic coupled with the oil price war. When panic sets in, everyone expects a decline in asset prices, and financial actors everywhere try to sell their assets (see in detail Chapter 4.4). The expectation becomes a self-fulfilling prophecy. When the great majority of financial players rush to sell their assets, prices decline and assets become more illiquid: “Liquidity can literally vanish overnight” (Nesvetailova 2010: 6). The liquidation of debts can no longer keep pace with the price collapse: “When a whole community is in a state of over-indebtedness […] the very act of liquidation may sometimes enlarge the real debts instead of reducing them” (Fisher 1932: 25). A vicious circle develops, forcing everyone to participate in asset sales since nearly all assets depreciate in value: “Mass liquidation defeats itself” (Fisher 1932: 26). A last-minute panic occurs. Kindleberger uses the German word “Torschlusspanik” to refer to the sense of urgency with which “investors crowd to get through the door before it slams shut”(Kindleberger et al. 2015: 33). The crisis only ends when investors can once again believe that asset prices will stop falling or when a lender of last resort can convince investors that sufficient amounts of liquidity will be provided to meet demands. This is precisely what happened when central banks all over the world resorted to unconventional monetary policies above and beyond those already in place and enacted never-before-seen liquidity programs, virtually taking the entire capital market and the wholesale money market on their balance sheets (see Chapter 4.6).

Minsky’s theory of financial instability deviates from the rationality thesis of neoclassical economics which holds that in the long term, investors will act rationally. Empirically, it has been demonstrated that irrational and emotional factors repeatedly guide the actions of financial market participants (Kindleberger et al. 2015: 39ff.). Such behaviour – the sudden transformation from confidence and euphoria to pessimism and panic – is a recurrent source of financial market instability: “Behavioural economists have shown how even the most sophisticated and professional financial traders make illusory correlations, believe that unusual and unsustainable trends are likely to last indefinitely, and place too much emphasis on recent events” (Tickell 2003: 10).
Price developments become self-fulfilling prophecies “based on similar hunches held by a vast cross section of large and small investors and reinforced by news media” (Shiller 2000: xv). Actors’ expectations have a strong influence on economic processes: “A monetary economy ... is essentially one in which changing views about the future are capable of influencing the quantity of employment and not merely its direction” (Keynes 1936: 2).

2.2 Historical developments: financialization and finance-led growth models

Since the collapse of the Bretton Woods system in the 1970s, and increasingly since the 1980s, major changes have been taking place in global finance. The concept of financialization provides a framework to gain deeper understanding of these transformations in the financial system and to examine how they relate to the rest of the economy and society. It highlights the growing importance of the financial economy and its expanding intertwinement with other economic and social spheres (Martin 2002; Epstein 2005; Froud et al. 2006; Ertürk et al. 2008a; Van der Zwan 2014). The concept approaches the mounting number of financial crises since the 1980s as a consequence of structural changes in the financial and economic system, and views those changes not as a natural or necessary development, but rather as the outcome of political struggles to shape the economy and global competition among industrialized countries (Wullweber 2019a). It encompasses processes such as the rise of shareholder value as a characterizing feature of business management; the growing dominance of the Anglo-American capital market and of investment banking in relation to traditional loan-based banking; steadily increasing equity prices; capital reduction through share buybacks; rising dividend pay-outs; offshoring, the emergence of new financial actors and the rising power of financial elites; the liberalization of international capital flows; and the rapidly growing trade with ever more complex financial products. These different developments increase the volatility and vulnerability of the financial system and, as a consequence, the vulnerability of the productive economy as well (Boyer 2000b; Epstein 2005; Treeck 2009; Krippner 2011).

During the Bretton Woods era, the global financial system was highly regulated and closely supervised. As currency exchange rates were fixed, there was virtually no trading in foreign currency. Capital controls became the rule. It was the time of embedded liberalism (Ruggie 1982). With the collapse of the Bretton Woods system in 1973, the financial economy took on an importance that increased incrementally during ensuing decades, owing not least to the huge demand to hedge against exchange rate fluctuations. (Epstein 2005; Ertürk et al. 2008a). Since the 1980s, financialization, economic globalization, and other political and economic processes have led to stagnating or falling real wages and a growing disparity between upper and middle as
well as lower incomes in most Western countries (Piketty et al. 2003; Piketty 2014). At the same time, public expenditures and welfare programs have been reduced. In the USA, the political and economic solution to the problem of maintaining a certain level of prosperity for the working population in the face of these developments was the integration of workers into the financial markets. The bottom 80 per cent of U.S. average real income in 2020 was roughly the same as in 1974, while prices for financial assets rose by about 500 per cent between 2009 and 2020 (Foroohar 2020). The integration of workers into the financial system was achieved through private health insurance and incentives to encourage private investments, e.g. by facilitating access to credits and mortgages. Also the transition from a pay-as-you-go system organized through the welfare state to private pension schemes induced a torrent of capital in search of profitable investment opportunities. This is because contributions made by employees into state pension funds are transferred directly to pensioners, while contributions made to private pension funds must be invested on a long-term basis in order to generate the profits that are eventually paid out as retirement benefits. The fact that huge sums of money are channelled into private pension funds means that fund managers must constantly search for investment opportunities with (high) yields. This can lead, or at least contribute, to the creation of asset bubbles (Boyer 2013a).

Access to financial markets was facilitated by various reforms such as banking deregulation and mortgage and credit securitization. Consumption today has come to depend more and more on the availability of credit: “If wage austerity promotes higher profits, the surge of the stock market might be such that individuals perceive an improvement in their economic status, go to the bank and get credit to buy durable goods, cars and houses that they could not afford with direct wages” (Boyer 2013b: 7; Boyer 2013a). Debt-financed consumption has become the engine of the economy – a privatized form of Keynesianism (Crouch 2009). The fact that debts eventually have to be serviced can potentially lead to vulnerabilities in the system, especially, as the global financial crisis has shown, when it happens on a large scale (Stockhammer 2007; Konings 2018).

Whereas under Fordism from the mid-1940s until the 1970s, it was increasing wages that drove mass consumption, under the finance-led growth model, access to credit has become the driving force (Oren et al. 2019). Because of their integration into the financial markets, wageworkers tend to practice a kind of Ponzi finance, especially in the USA: They buy houses they cannot afford on their wages, hoping that rising real estate prices will one day make it possible for them to sell at a profit. Ertürk et al. (2008b) speak about “the financialized masses”. This growth model, fuelled by mounting household debt, works well as long as housing and equity prices are on the rise, i.e. as long as expanding loans and mortgages are backed by an upward trend in asset values (Aglietta
And yet, despite these developments, labour wages and salaries still represent the main source of income for most households. Growth regime of this nature is highly prone to crisis: “The more extended the impact of finance over corporate governance, household behaviour, labour-market management and economic policy, the more likely is an equity-based regime to cross the zone of structural stability” (Boyer 2000a: 142). While the years prior to 2008 were marked by a strong increase in mortgage debt, after the global financial crisis it was mainly consumer credit in the form of student and auto loans that saw a stark rise, especially in the USA (see Figure 4).

Figure 4: U.S. consumer credit balances

Although global crisis is not necessarily the inevitable outcome of the processes involved in this phenomenon, scholars specialized in International Political Economy convincingly explain how structural and financial developments over the past four decades have bred conditions that increase the likelihood of financial crises on a global scale. Already prior to the collapse of market liquidity in 2007 and the COVID-19 pandemic, crisis periods had become more frequent: the 1982 international bank and debt crisis, the 1986 crisis in the U.S. savings banks sector (savings and loan crisis), the stock market crash of 1987, the so-called Tequila Crisis of 1995/1996, the Asian and Russian crisis and the bankruptcy of the weighty hedge fund Long-Term Capital Management in 1997/1998, the Dotcom-crisis of 1999/2000, the 2001 sovereign default in Argentina, and several others. A study commissioned by the IMF counted a total of 147 banking crises, 218 currency crises, and 66 sovereign debt crises in the period from 1970 to 2011 (Laeven et al. 2012: 3). This makes it all too clear that the liberalization of the global financial system after the collapse of Bretton Woods has led to a continuous rise in the system’s vulnerability and
instability. The leading central banks have become today’s super heroes that keep the system running despite its chronic instability (see Chapter 3.1.4 and 4.6; Wullweber forthcoming): “The stability of an equity-based regime depends on monetary policy which controls financial bubbles” (Boyer 2000a: 111).

2.3 Liquidity, money, and credit

The availability of liquidity is crucial to the functioning of the financial system. In today’s world, the use and creation of money and credit have become so commonplace that the complexity and elasticity of the money market and its underlying mechanisms tend to be overlooked or disregarded. An understanding of these functions, however, is important in order to comprehend how the financial system works, why financial crises occur, and what the system’s governance problem involves. Unfortunately, many misconceptions surround these issues. To quote ECB Executive Board member Isabell Schnabel on the flawed conceptions that are prevalent in Germany: “Many of the narratives that are very popular in Germany cannot be maintained because they simply do not match the facts” (Isabell Schnabel, quoted in Financial Times 2020a).

In general, when banks grant credit, they book the amount borrowed in the form of a deposit. In this way, money is created out of thin air. As demonstrated below, the function of banks as intermediaries between lenders and borrowers is almost negligible (McLeay et al. 2014a: 15). Any institution that borrows short and lends long is vulnerable whether it is a private bank or a non-bank creditor. The central bank is an exception, for it can create as much liquidity as needed, at least in its own currency. This is because the central bank is located at the top of the credit hierarchy (see Chapter 2.3.3 below). The very moment a run occurs on private banks or shadow banking entities, such institutions tend to collapse, because the cash available almost never meets all liabilities, in the form, for instance, of deposits. A bank run can become contagious, and contagion, in turn, can lead to the breakdown of the entire financial system. In such a situation, the central bank is the ultimate source of liquidity – the lender and market maker of last resort. Why is that the case? Why can private banks create money anew? And finally, why can financial liquidity suddenly vanish and when could a sudden liquidity shortage pose a risk to the system?

2.3.1 Liquidity

Stable financial markets are a fundamental condition for a functioning domestic and global economy. The indicator for measuring the functionality of financial markets is liquidity. A liquid market is one that functions smoothly and optimally: “Liquidity, like efficiency, is considered one of the great virtues of perfectly competitive markets” (Carruthers et al. 1999: 353). Until the global
financial crisis of 2007–2009, regulatory intervention on the part of the state was regarded with scepticism based on a market liberal understanding of government responsibilities that guided most of the policy programs. According to the prevailing assumption at the time, the less those markets are regulated, the more liquid they become: “[Liquidity] is associated with free and laissez-faire markets, and hence with the absence of an intrusive institutional or regulatory apparatus. If exchange constitutes the elementary form of market life, liquidity means that exchange occurs easily and frequently – markets are operating smoothly and properly” (Carruthers et al. 1999: 353). This predominant notion of self-regulating market forces further assumes that it is impossible to centralise the complexity of the information required to understand market conditions, and that consequently the market should be left to operate as freely as possible: “Markets aggregate diffuse information more effectively and set prices more efficiently than any central planner possibly could” (Bernanke 2007: 1). Before the global financial crisis erupted, it was believed that such intervention would most likely distort market rationality (Taylor 2009; Dowd et al. 2010; Wullweber 2019b). This changed in the course of the crisis when it became clear that central banks were the only institutions capable of stabilizing the financial system. During the COVID-19 financial crisis, intervention on the part of central banks has been highly welcome.

At first glance, hardly any market conforms as closely to the postulates of general equilibrium theory as some sectors of global financial markets, especially the stock markets. General equilibrium theory assumes that as long as the state does not intervene, equilibrium will establish itself on a market with rational actors through the price mechanism which quantitatively balances out the supply and demand of goods. In this way, the market becomes cleared. According to this assumption, prices are an exact reflection of the relation between supply and demand, and consequently represent equilibrium. As the Turner Report of the UK’s Financial Authority Services observes, regulatory authorities had been long convinced of the soundness of the concept of market equilibrium: “The predominant assumption behind financial market regulation – in the US, the UK and increasingly across the world – has been that financial markets are capable of being both efficient and rational […] and that the overall level of prices as a result has a strong tendency towards a rational equilibrium” (Financial Services Authority 2009: 39). The global financial crisis, however, revealed the shortcomings of these market concepts and showed that “efficient markets can be irrational” (Financial Services Authority 2009: 39).

In times of economic upswing, all possible forms of assets seem to be highly liquid. This perception can have dramatic consequences. When confidence turns into uncertainty over the future value of assets, their liquidity decreases (Minsky 1982a). The outbreak of the COVID-19
pandemic was marked by a sharp reduction in the high level of liquidity which prevailed shortly before the crisis began (see Chapter 4.3). In a crisis, liquidity can quickly vanish. Within days after the outbreak of the COVID-19 financial crisis, a bull market developed into a credit crunch. Without massive government intervention led by the central banks, financial markets would have collapsed (see Chapter 4.6). In uncertain times, the demand increases for assets which are still perceived as having a high level of liquidity. This refers primarily to money, but normally also to assets such as gold and other precious metals as well as government bonds. Even such assets, however, can lose liquidity, as was demonstrated in mid-March by the COVID-19 crisis.

Liquidity in financial markets exists as long as confidence prevails. Confidence – market confidence – thus constitutes a core element of the financial system (Bernanke 2008: 1; Wullweber 2016). Such confidence strongly depends on the ability of promisors to convince others that their promises will be kept and that payment will be made when it falls due: “Promises form the core of finance. One party promises to pay a sum of money to another. Much financial activity involves, one way or another, the design, production, distribution, evaluation, acceptance (or rejection), enforcement, and modification of promises” (Carruthers et al. 2011: 240). Besides performance criteria, confidence in financial markets is largely dependent on global socio-economic and political factors such as the monetary policy of central banks, particularly that of the U.S. Federal Reserve, the political regulation of financial markets, economic decisions made by governments and especially by ministries of finance and economy (Amato et al. 2012). Table 1 below summarises the governance of liquidity and the various forms of liquidity generation.
Table 1: Governance and generation of liquidity

<table>
<thead>
<tr>
<th>LIQUIDITY GENERATION VIA MONEY CREATION</th>
<th>STATE INSTITUTIONS</th>
<th>PRIVATE INSTITUTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-term Lending</td>
<td>Auctions by central banks</td>
<td>Repos, interbank market, Eurodollar market</td>
</tr>
<tr>
<td>Providing Collateral</td>
<td>Government bonds</td>
<td>Financial derivatives, tranching practice</td>
</tr>
<tr>
<td>Financial Commodification</td>
<td>Securisation (through government-sponsored enterprises)</td>
<td>Securisation through private actors (mostly SPVs)</td>
</tr>
<tr>
<td>Smooth Working of the Financial System</td>
<td>Money supply created by central banks, quantitative easing</td>
<td>Standardisation and calculation practices, ratings, risk evaluation models</td>
</tr>
<tr>
<td>Lender of Last Resort</td>
<td>Emergency credits, bailouts, government programmes</td>
<td>-</td>
</tr>
<tr>
<td>Dealer of Last Resort</td>
<td>Purchase of toxic assets (by bad banks), purchase of government bonds by central banks, purchase of corporate bonds by central banks</td>
<td>-</td>
</tr>
<tr>
<td>Over-the-counter Trading</td>
<td>-</td>
<td>Private institutions within the shadow banking system</td>
</tr>
</tbody>
</table>

Source: Author’s own elaboration.

2.3.2 Money

Banks are often regarded as intermediaries that bring together creditors and debtors and act so as to optimally match the supply of and demand for money (Mankiw 2017). According to this interpretation, banks are neutral, cost-reducing middlemen. As Schumpeter (1986 *1954: 303) points out, however, banks not only lend the money they have received, but they also, much more importantly, create new money via the loans they grant. Nowadays all central banks confirm this statement (McLeay et al. 2014b, 2014a; Deutsche Bundesbank 2017). In modern-day economies, money is mainly created by way of debt contracts between banks and borrowers. Within this context, the state-backed private system of money creation can react quite flexibly to the demand for money. Privately issued debit notes and state issued money are linked through state guaranteed convertibility. The banking system thus turns private debt into public money: “[W]hat the banker does with money cannot be done with any other commodity […] for no other commodity’s quantity or velocity can be increased in this way” (Schumpeter 1986 *1954: 304–305).
This is a complex link between the banking system and the state, and between the state and its creditors (the owners of state bonds). It is mediated by the central bank which accepts private bank credit for central bank money at par on demand. As the Bank of England clearly states: “Rather than banks lending out deposits that are placed with them, the act of lending creates deposits” (McLeay et al. 2014a: 15).

When a bank issues a loan, both sides of the balance sheet change. The newly issued bank credit increases the assets of the borrower on one side of the balance sheet in the form of a new deposit entry. The borrower’s obligation toward the bank to pay back the debt is recorded on the other side as an increase in liabilities (see Figure 5).

**Figure 5: Stylized borrower’s balance sheet**

![Stylized borrower’s balance sheet diagram](image)

Source: Author’s own diagram.

On the bank balance sheet, the book entries are simply mirrored. The new credit appears on the asset side, and the new deposit shows up on the liability side (see Figure 6).

**Figure 6: Stylized commercial bank balance sheet**

![Stylized commercial bank balance sheet diagram](image)

Source: Author’s own diagram.

The bank’s money is a promissory note – an IOU (I owe you) from the bank to the borrower. Keynes observed that bank money is “simply an acknowledgement of a private debt, expressed in the money of account, which is used […] to settle a transaction” (Keynes 1971 *1930: 5). A special feature of a bank loan that sets it apart from a simple credit between two persons is the fact that
the promissory note issued by the bank is recognized as legal tender. In this way the bank loan becomes money that can be used as a universal equivalent for all assets within the given currency area. It comes to represent “a debt owing by the State” (Keynes 1971 *1930: 5). There are no natural limits to the creation of money. In practice, however, a bank with too little equity capital and too many high-risk investments has no sound basis for investor confidence in the bank’s capacity to make disbursements or meet its payment obligations. Apart from this, “it is evident that there is no limit to the amount of bank money which the banks can safely create provided they move forward in step” (Keynes 1971 *1930: 23). The limits of money creation are, again, subject to investor confidence and trust, and, above all, to policy restrictions which lie mostly within the framework of statutory regulations and therefore within the domain of the state.

2.3.3 Credit hierarchy

Although money is a form of credit, it is obvious that not all forms of credit constitute money (Wullweber 2019c). Where does the dividing line lie between money and credit? In other words, when does a credit become money? A credit is considered money if it can be used to settle debts. It follows that no clear distinction can be drawn between money and credit, considering that this depends on the level at which the credit is located in the hierarchy of money (Mehrling 2013; Pozsar 2014). During the era of the gold standard, the hierarchy was designed so that gold was regarded as the only real money, and cash represented the promise to be converted into gold at any time. At this level, gold is money, while cash is credit. At the present-day bank level, money is represented by the reserves that banks hold at the central banks, since banks can only settle their debts with each other by drawing on central bank reserves. For consumers or the productive economy, in turn, deposits at the bank and cash represent money. Market actors make payments through deposits. Deposits imply a promise on the part of the bank that the deposited assets can be exchanged at any time for central bank money. In the absence of the gold standard, central bank reserve money today is no longer backed by gold. Reserve money has now come to serve as base money which is underpinned by confidence in the ability of the central bank or the state to keep the value of money stable (again: confidence and trust!). Internationally, however, the U.S. dollar represents the primus inter pares. The dollar is the global currency. It is situated above the other currencies (see Figure 7 below). This becomes evident during global financial or economic crises when corporations and financial players all over the world have a great need for U.S. dollars. In such situations, central banks which have a standing currency swap line with the Fed are in a privileged position (see Chapter 4.6). This refers specifically to the “C 5” group which includes the European Central Bank, the Bank of England, the Bank of Japan, the Swiss National Bank, and the Bank of Canada.
The general conclusion that money represents a form of credit can now be expressed in more precise terms depending on the form it takes: Money in the form of cash is an IOU from a central bank to a cash holder. Reserves at the central bank are an IOU from a central bank to a private bank. A bank deposit is an IOU from a commercial bank to an account holder. These IOUs, however, are not equivalent. They can rather be represented as standing in hierarchical relation to one another and, in a more general sense, in their relation to various assets insofar as concerns their potential for being converted into money at the next higher level in the hierarchy at a desired point in time without loss in value (Bell 2001; Mehrling 2013; see Figure 7).

**Figure 7: Global credit hierarchy**

Central bank money stands at the top of the hierarchy. Bank deposits follow central bank money at the level just below the top. Despite the fact that there is a direct relation through bank reserves between bank deposits and central bank money, bank deposits are not central bank money (Mehrling 2013). The next level down in the hierarchy is occupied by the different types of assets which represent a promise to pay at a specified time in the future. According to Bell (2001: 159), the degree to which a given asset approximates the money-form of value depends on the extent to which that asset can be converted, upon need, without substantial loss of the value paid, i.e. at its original nominal value (= book value), into the money issued by the next lower level in the hierarchy - in other words, the degree to which said asset can be traded at par on demand (Wray 1990). As a rule, deposits with banks in the form of demand deposits can at any time be converted into (central bank) money at least as long as the bank has access to central bank reserve money. This means that through the central bank, the state accepts the convertibility of bank deposits into money: “Because the central bank guarantees that demand deposits will trade
at par with government currency and because they are accepted in payment of taxes, bank promises (demand deposits) are nearly as liquid as state money” (Bell 2001: 160). The factor that determines the special features of today's monetary system is the elastic and dynamic manner in which the system responds to the demand for liquidity.

Liquidity is vital for maintaining financial stability. While cash is the most liquid asset, it does not generate any interest (Keynes 1971 *1930). In their quest for yields, financial players try to hold on to as little money as possible and prefer to invest in less liquid assets. In a bull market, all assets tend to become highly liquid. Some of them become almost money-like. Especially in times when asset prices keep rising, financial players grow confident that they will be able to sell such assets on demand with profit. When a bull market turns into a bear market, however, investors with highly illiquid investments have a problem. As they cannot settle their debt contracts with securities, they suddenly find themselves in great need of money (see again Figure 7). When this happens, financial players have to sell their assets at any price they can get in order to avoid insolvency. This, in turn, exerts downward pressure on asset prices, and the acquisition of money becomes even more complicated. The inevitable consequence is a run on liquidity that can then lead to a financial crisis (see Chapters 3.1 and 4).
3. The breeding ground for the COVID-19 financial crisis

Corrective regulatory measures taken since the global financial crisis of 2007-2009, did not succeed in sustainably stabilizing the overall financial system (Moschella et al. 2013; Helleiner 2014; Young 2014). Indeed, when the COVID-19 financial crisis struck, the global financial system was already highly prone to instabilities. This is because the permanent unconventional measures taken by leading central banks since the global financial crisis only managed to temporarily restore stability (Tooze 2018; IMF 2019b; Wullweber 2020b). This chapter discusses some of the most important sources for and structure of financial instability: the shadow banking system, the asset boom and rising private debt load, and high-frequency trading.

3.1 The shadow banking system

Already by the end of 2019, it had become obvious that attempts to build a stable shadow banking system after the global financial crisis had largely failed. For no obvious reason, the financial sector suffered a shock wave when the repo rate suddenly peaked to a level that had only previously been seen during the global financial crisis in 2008 (Tett 2019; Kaminska 2019). The sharp increase was an indication of a high short-term demand for liquidity which the market itself was unable or unwilling to satisfy. In response to this development, the Fed stepped in and, for the first time in more than a decade, reactivated its repo facility, injecting 75 billion USD per day into the money market, while at the same time giving shadow actors access to its balance-sheet (Fed 2019b). Although the shadow banking system played a major role in triggering the global financial crisis (Wullweber 2020a), its importance in the financial system keeps on growing. Data from various sources point to the fact that financial players in the shadow banking system – and in like manner also many commercial banks – have emerged from the crisis even stronger than before (FSB 2017a, 2018; Sgambati 2019).

3.1.1 What is the shadow banking system?

Efforts to visualize the shadow banking system often result in diagrams that tend to be obscure, some resembling an electric circuit more than a network of financial actors (see Figure 8).
The shadow banking system is described as the unregulated part of the financial system in which various players organise the provision of liquidity outside of the loan-based banking system (FSB 2020a). The Financial Stability Board (FSB) defines the shadow banking system as “credit intermediation involving entities and activities (fully or partially) outside the regular banking system” (FSB 2013: ii). In the regular banking system, banks provide their customers with financial means, in other words with money, through loans. They create the money they lend by expanding their balance sheets (see Chapter 2.3.2). In the shadow banking system, funds are largely provided through broker-dealers who mediate between cash-rich players, such as money market funds, and those actors in need of money, such as hedge funds via legal contracts called repurchase agreements (repos). These intermediaries, or shadow dealers, connect the money market that provides the money with the capital market which provides the securities that serve as collateral for the transaction. It follows that in the shadow banking system, money markets and capital markets are interwoven in a very specific way. Pursuant to Mehrling et al. (2013: 2), shadow banking can accordingly be defined as “money market funding of capital market lending” highlighting the interface character of this system (see Figure 9).
Today, the shadow banking system accounts for an annual securities trading volume of over 180 trillion dollars, and the share of total global financial assets now stands at about 50% (FSB 2019; 2020a). From 2018 to 2019, the total amount of short-term outstanding debt which is highly prone to instabilities increased nine per cent to almost 15 trillion (see Table 2).

**Table 2: Total amount of liabilities most vulnerable to runs**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total runnable money-like liabilities*</td>
<td>14,733</td>
<td>9.3</td>
<td>4.0</td>
</tr>
<tr>
<td>Uninsured deposits</td>
<td>4,820</td>
<td>3.6</td>
<td>8.1</td>
</tr>
<tr>
<td>Repurchase agreements</td>
<td>3,902</td>
<td>21.6</td>
<td>8.1</td>
</tr>
<tr>
<td>Domestic money market funds**</td>
<td>3,192</td>
<td>12.9</td>
<td>2.4</td>
</tr>
<tr>
<td>Commercial paper</td>
<td>1,090</td>
<td>3.7</td>
<td>4.9</td>
</tr>
<tr>
<td>Securities lending***</td>
<td>649</td>
<td>–5.1</td>
<td>10.6</td>
</tr>
<tr>
<td>Bond mutual funds</td>
<td>4,174</td>
<td>9.0</td>
<td>9.0</td>
</tr>
</tbody>
</table>

Note: The data extend through 2019:Q2. Growth rates are measured from Q2 of the year immediately preceding the period through Q2 of the final year of the period.

* Average annual growth is from 2003:Q4 to 2019:Q2.
** Average annual growth is from 2001:Q4 to 2019:Q2.
*** Average annual growth is from 2000:Q4 to 2019:Q2.


The increasing significance of this system is reflected, among other things, in the fact that within the financial system, more and more loans are now being granted by non-bank financial players (Hardie et al. 2013; FSB 2017a; FSB 2019). In this realm, the most important financial actors are investment banks, broker dealers, money market funds, private equity firms, hedge funds and other investment funds, as well as special purpose entities (SPEs) created by commercial banks (Pozsar 2014; FSB 2017a: 19-21).
The term *shadow banking system* suggests a part of the financial system that lies outside the purview of the state (Gorton 2010; Adrian et al. 2012; FSB 2013; FSB 2015a). This, however, is a misleading notion. Some countries, such as the USA and France, and also institutions at the European level, have quite actively supported the expansion of the shadow banking system. This is mainly due to the fact that the system generates a high demand for government bonds which are the kind of safe assets that it crucially requires. Consequently, it guarantees the purchase of government bonds (Mügge 2013; ECB 2017; Gabor et al. 2018). Moreover, it is rather difficult for private financial actors to generate liquidity by securitizing assets, loans, and mortgages without state involvement: “Mortgage markets involve government operating on a massive scale on millions of homes, and performing better than capitalists could for themselves by inducing capitalists interested in liquidity to invest in private debts backed by partial government guarantees” (Carruthers et al. 1999: 368). The rising importance of the shadow banking system reflects the logic of laissez-faire market liberalism. Because liquidity should be generated by the market itself, there is a need for an unregulated system complementary to the regulated banking sector. It also corresponds to the increasing gap between rich and poor: on the one hand, a growing number of people in urgent need of credit and, on the other, a small portion of society in possession of an expanding amount of the world’s wealth that needs to be invested (Boyer 2000a). The shadow banking system has seemed to be the logical market liberal answer to these demands (Mehrling et al. 2013; FSB 2015b, 2017b). Much less regulated, shadow banking entities around the globe function as intermediaries in money and credit supply and generate liquidity that is more easily accessible than in the traditional banking system (Wullweber 2020a).

### 3.1.2 Repos (repurchase agreements)

For many financial institutions, the shadow banking system has come to play a pivotal role as a source of liquidity at relatively low interest rates. Repos are the most frequently used path to short-term liquidity. As such, they constitute the core of the shadow banking system. They allow market players to exchange money for securities while collateralizing the transaction (Wullweber 2020a). Repos are very specific legal constructions involving the sale of securities at an agreed price with a commitment by the seller to repurchase the same securities at the end of a set term at a predetermined price plus interest. For the most part, repo contracts are concluded on an overnight basis, but the transactions can also specify a longer maturity period such as three months. As the legal owner, the buyer of the security (the creditor) is entitled to resell the underlying securities (Singh 2017). If the asset seller (the borrower of money) becomes insolvent and cannot repurchase the securities, the creditor is entitled to sell them on the market. Accordingly, the underlying assets serve as collateral. Although the securities formally belong to
the buyer (who is effectively the lender), the seller (or borrower) continues to receive all interest payments on them until expiry of the repurchase term. In other words, legal ownership is distinct from economic ownership (see Figure 10).

**Figure 10: Stylized repo transaction**

In a repo transaction, one party, usually the borrower, has to pay a so-called haircut, that is, an extra charge on the securities. The haircut is intended to ensure that in the event of default by the lender, it will still be possible to sell the relevant securities without a loss on the market even if the market value of the underlying securities has decreased. Usually, government bonds have the lowest haircuts and interest rates, especially bonds of major industrialised countries, which are considered to be very safe and stable (Golec et al. 2017). The availability of such government bonds is therefore of great importance for repo transactions (Bank of England 2015: 6). Since the price of a repo transaction is measured by the quality of the collateral, interest rates vary widely. In order to protect the creditor even in the event of high value loss on the securities, the value of the collateral is determined on a mark-to-market basis. This implies that price movements are taken into account almost in real time. Accordingly, if the value of the securities that are used as collateral falls below a certain margin, a margin call applies. This means the borrower has to pledge additional collateral for the repo transaction. As a result, the trade is constantly adjusted to the changing price situation and thus promises to pay out at face value (BIS 2017). Another advantage of repo transactions, in addition to the fact that they make it possible for financial
players to obtain money at a relatively low price, is that the underlying securities can be sold, which makes them very flexible. For this reason, the extensive use of repos tends to be viewed as a positive development (FSB 2017b: 3). The right to re-use the collateral of a repo transaction (known as re-hypothecation) allows financial players to hold a smaller stock of their own securities, and thus helps to lower their balance sheet costs. Repo transactions have become more important not only for economic reasons, but also because of regulatory developments, considering that the Basel III agreement provides for safeguards among other things in the form of minimum capital requirements, which can be obtained, e.g. through repo transactions (FSB 2017b; Thiemann 2018).

### 3.1.3 Shadow dealers

As described above, repos can be transacted directly between two parties (see again Figure 10). However, the demand for money and the supply of securities are not always well aligned. For this reason, transactions are generally arranged through an agent, a market maker, also called a shadow dealer, who buys securities from one party, such as an investment manager, a pension fund, a hedge fund or an insurance company, in order to sell them to another party, such as a money market fund. In this way, cash-rich actors can invest their money short term and – in theory – risk free, while actors in need of cash can easily access money with interest rates far below the rates charged in the banking system. Furthermore, market makers often trade for their own accounts (BIS 2017: 5-6; Gabor et al. 2016: 617-618). In this way, market makers such as Bear Stearns, Morgan Stanley, or Merrill Lynch create liquidity. Until the financial crisis, liquidity was also provided by enterprises such as Lehman Brothers and AIG. Financial intermediaries, so-called market makers, facilitate transactions between financial players who have a liquidity surplus available to lend, and asset managers who cover their liquidity needs by providing securities as collateral (see Figure 11).
Although market makers do not play a significant role in the traditional loan-based lending sector, they are central to the shadow banking system: They bid on securities at a specific price, protect their investments through mark-to-market mechanisms and haircuts, and resell the securities. In this sense, money market funding of capital market lending via repos transacted by market makers is the defining characteristic of the shadow banking system. As the nodal point of the shadow banking system, these shadow dealers regulate supply and demand by determining the present asset prices based on estimations of changing ideas about their future value (Keynes 1936). When asset holders sell securities to raise money, market makers buy them and resell them with a profit margin. Banks provide market makers with necessary credit lines, as a rule also in the form of repo transactions in which the traded securities serve as collateral. This can increase the banks’ needs for reserves. Central banks assume a background function by facilitating financing through the expansion of open market operations: “market liquidity is sustained every day because funding liquidity is elastically forthcoming in this way” (Mehrling 2011: 104).

### 3.1.4 Financial instabilities

In non-crisis times, financial players are just as interested in the possibilities that the shadow banking system offers to create repo contracts that serve as money equivalents and allow them to elastically expand their credit claims, as they are in having access to central bank reserves. Repos can be described as money equivalents because, similar to the money form, they
constitute a promise to trade at par on demand without loss of value. The key question is: What mechanisms exist to secure the promisor's promise? While in good times, money equivalents such as derivatives, government bonds, or repos are often regarded as safe and as liquid as money, in a financial crisis like the one triggered by the coronavirus pandemic, it becomes evident that in contrast to money, such assets can rapidly lose their liquidity. While for bank credit the convertibility on demand with central bank money is guaranteed by the state via specific security structures, other credit forms, such as repos or derivatives promise to guarantee the convertibility by providing various private mechanisms and different means of collateral. This private simulation of state security, however, only effectively functions in non-crisis times (Gorton 2017; Wullweber 2020a).

Financial governance has accepted the shadow banking system as crucial to the global liquidity system. Whereas directly after the financial crisis of 2007-2009, governance agencies such as the Financial Stability Board and the Bank for International Settlement argued in favour of reducing the size of the shadow banking system, these institutions now propose transforming shadow banking into resilient market-based finance (FSB 2015b, 2017b; BIS 2019c). They have also chosen to systematically replace the term shadow banking with non-bank financial intermediation activity to lift the system's status ‘out of the shadows’ into a more reputable sounding domain (FSB 2019; to retrace this development, see Engelen 2018). It is argued here, however, that the systemic threat posed to the entire financial system by the shadow banking system still remains and is even growing (FSB 2017a: 48). Why is that the case?

In the traditional loan-based banking system, banks bear the risk of liquidity shortages, in particular if borrowers declare bankruptcy and default on their loans. They also face a liquidity risk in the event of exceptionally large bank account withdrawals (Bank of England 2015). The danger of insolvency is buffered by deposit insurance and equity, whereas liquidity risk is mitigated by the central bank marginal lending facility (discount window). Accordingly, it is through state measures and state institutions that the traditional banking system is broadly secured against overall systemic risk.

In the shadow banking system, the risk factors are of a somewhat different nature. In line with laissez-faire rationality, it is a privately organized collateral and safeguarding system. It is important to note that in contrast to traditional banks, shadow banks cannot create money. They only can extend credit (see Chapter 2.3). Furthermore, they do not have access to central bank reserves. Accordingly, cash, deposits, or equity, are hardly ever used to mitigate the risk of insolvency. Insurance against insolvency risk takes the form of various types of securities and swaps, including credit default swaps (CDS), interest rate swaps, and foreign exchange swaps.
Loans in the shadow banking sector are financed through the money market instead of through the creation of deposits by banks. Liquidity risks in the shadow banking system are contained through repo transactions which, in turn, are based on securitised loans.

Prior to the financial crisis of 2007-2009, in terms of overall risk, the traditional banking system differed from the shadow banking system in that the former was insured through state statutory protection schemes, while the latter did not enjoy any (direct) government protection. In the shadow banking system it was rather the case that securities used as collateral simulated the government-backed deposit insurance, protecting depositors in the traditional banking (see Table 3; Wullweber 2020b).

### Table 3: Traditional and shadow banks prior to the global financial crisis: protection against risk

<table>
<thead>
<tr>
<th></th>
<th>Risk of insolvency</th>
<th>Risk of liquidity</th>
<th>Total risk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Banking system</strong></td>
<td>Buffered by deposit insurance provided by the state and equity capital</td>
<td>Marginal lending facility of the central bank</td>
<td>Protected by the state through statutory protection schemes</td>
</tr>
<tr>
<td><strong>Shadow banking system</strong></td>
<td>Various types of securities and swaps</td>
<td>Repo transactions based on securitized loans</td>
<td>Securities simulate government protection</td>
</tr>
</tbody>
</table>


In non-crisis times, repos enhance the liquidity of the financial system. However, since repo agreements are concluded to run for a relatively short period of time, borrowers face higher liquidity risks. Also, the value of the underlying collateral is calculated on a mark-to-market basis, which explains why repo prices are subject to pro-cyclical developments. Furthermore, the possibility to reuse the same securities for several transactions strongly promotes highly leveraged financial practices and the build-up of a chain of debt based on the same collateral. Hence, diversification in the underlying security is relatively low (FSB 2017a: 27). This means that the repo market is inherently destabilizing.

During non-crisis times, particularly during a bull market, it becomes easy to sell and resell a large part of the securities that are used as collateral in the shadow banking system. The market liquidity of those securities generally depends on whether there is a two-way market where traders are both willing and able to buy and resell them. For this to be the case, the traders need to have access to the money market. Without access to the money market, market makers would have to use their own assets or take out a bank loan to finance their trade. Market liquidity, therefore, depends on financial liquidity. Current-day security traders finance their activities
primarily through repos. They avoid borrowing money from banks whenever possible and resort to bank loans only in the case of emergency. When the financial market expands during a bull market, the need for collateral increases. Because the supply of government bonds is limited, the demand increases for securities with a higher liquidity risk. These cost less, but must be secured, in turn, through swap transactions. This is because it is generally assumed that the price rate of a risk-free security (such as U.S. government bonds) is the same as the sum of what a higher-risk security costs together with risk insurance, the interest rate swap, and the foreign exchange swap (Mehrling et al. 2013: 6-7). Through this type of safeguard, quasi-sovereign bonds are created that, in times of prosperity, are as liquid as the government bonds, which are considered to be safe assets. Because they are less expensive than government bonds, their share of the overall volume of traded securities increases sharply. Before the COVID-19 crisis, mutual funds, for example, tripled their holdings of U.S. corporate bonds (see Figure 12). To put this into perspective, according to the Fed (2019a), in 2019, mutual funds held around one sixth of outstanding corporate bonds and acquired around one fifth of newly issued leveraged loans.

**Figure 12: U.S. corporate bonds held by mutual funds**


In times of crisis, the situation becomes highly problematic (Mehrling et al. 2013; Adrian et al. 2010). Just as in the weeks leading up to the global financial crisis of 2007-2009, there was a considerable rise in repo transactions shortly before the COVID-19 financial crisis hit. Certain market players were able to significantly raise their debt level, using short-term refinancing to increase their leverage. This leverage, however, collapsed during both crises. When financial markets stumble into crisis, risk premiums increase for higher-risk securities. This presents a problem for heavily leveraged investors. In such a situation, quasi-government bonds no longer enjoy the status of safe bonds. The effect of such a development is registered very quickly since
the value of the collateral is marked to market. When less robust securities are up for sale in large quantities, market makers continue to try and sell them, but most likely at falling prices. If the securities have served as collateral for repo transactions, brokers will respond to uncertainty over the solvency of their clients by issuing higher margin calls and increasing haircuts on the securities. Heavily leveraged market participants can find themselves in a difficult position if they are required to provide additional liquidity and collateral that they may not themselves own. Borrowers who are forced to sell part of their securities will have less potential to transact repos considering the smaller stock of securities they will be able to rely on as collateral. Other market players will become more hesitant to extend credit in their effort to hold on to as many liquid reserves as possible. As the sale of securities increases, their value decreases, and that, in turn, leads to higher margin calls and haircuts. This strains liquidity and sets off a downward liquidity spiral (BIS 2017: 29-30, and FSB 2013). Bid prices and the cost of loans rise. It becomes difficult for market makers to conduct transactions as it gets harder for them to resell securities and to finance their own security purchases. When the market liquidity of the securities decreases, they become more expensive as collateral for repo transactions (due to higher haircuts). This causes financial liquidity to decline. That, in turn, leads to a decline in the total amount of repo transactions. Financial players may then be forced to sell their securities, accelerating the downward price spiral (see Figure 13).

Figure 13: Downward liquidity spiral

Source: Author’s own diagram.
What is more, the value of the underlying collateral is calculated on a mark-to-market basis. This explains why the price of repos can be subject to a sudden decline, leading to pro-cyclical developments such as those witnessed in March 2020 during the COVID-19 crisis. In times of severe crisis, even U.S. government bonds and gold become difficult to liquidate. Everywhere there is a dire need for liquidity in the form of money, and financial players are ultimately forced to sell their assets at any price (Mehrling 2011: 96-99). When this happens, the repo market has a destabilizing effect (FSB 2017a). That is why, in times of crisis, once it becomes impossible to find buyers for securities, or when securities have to be sold far below the regular market price, the difference in risk protection between the traditional and the shadow banking system becomes decisive (BIS 2018).

This problematic constellation, which is directly associated with the underlying dynamics of the shadow banking system, is not a new discovery. Quite a similar situation developed during the global financial crisis of 2007-2009. Back then, the Lehman Brothers bankruptcy created a panic on repo markets, triggering the above-described chain reaction: Prices for most securities fell, and market players raised haircuts and asked for margin calls on collateral across virtually all asset classes. This, in turn, made security values drop even lower. When the tipping point was reached, the money market collapsed and demand suddenly disappeared for the vast majority of repo transactions, even those backed by government bonds (Mehrling 2011; FSB 2017b). Financial liquidity no longer translated into market liquidity (Brunnermeier et al. 2009). Mistrust overtook the financial sector and gave market players cause to hold on to cash and sell securities so as to reduce their risk exposure. As a result, the market maker system ceased to function. Securities became difficult if not impossible to price, and trading broke down.

When that happened in September 2008, the Fed stepped in and vastly expanded its inventory of monetary intervention instruments. To restore market liquidity, it assumed the role of market maker and initiated its own market making operations. Central bank intervention, especially on the part of the Fed as global lender and dealer of last resort, had a stabilizing effect on the financial system as a whole. Interventions by central banks on a massive scale led to a major expansion of their balance sheets. The size of the Fed’s balance sheet rose from around 900 billion dollars (six per cent of the U.S. nominal GDP) in 2007, to 4.5 trillion dollars in 2017, or 23 per cent of the GDP (Potter 2017). However, it is not so much the concrete figures that matter when it comes to the money issued by the central bank. What counts more is the theoretically unlimited amount of transactions that can potentially be concluded to stabilize the financial system. Since the global financial crisis, it is no longer the exception for the central bank to act as lender and dealer of last resort. It has meanwhile become the norm (Bank of England 2015; Wullweber
In a crisis situation, financial players need an authority to set an upper and lower limit for securities trading and money lending. Accordingly, once it became evident that measures within the financial system would not be able to buffer the effects of the crisis triggered by the COVID-19 pandemic, the central banks took prompt and forceful action (see Chapter 4.6).

### 3.1.5 International policies supporting the shadow banking system

Internal financial market developments are not the only explanation for the strong growth of the global repo market over the past 15 years. Another perhaps even more important explanation lies in the role of policy makers. By strictly separating monetary and fiscal policy, and by taking political action to declare central banks as independent from the reach of governments, a process that started in the 1980s in particular, governments found themselves in a situation where their central banks no longer guaranteed the purchase of state bonds. Instead, the bonds had to be placed on the financial market where they wound up in competition with the bonds of other states. This occurred particularly in the euro area, where there is a common currency but separate government bonds. This is why European institutions, led by the European Commission and the ECB, became the driving force behind the expansion of a European repo market that is modelled after the U.S. repo market (Gabor 2016). They hoped that the repo market would foster a network of interconnections within the various security and government bond markets in the euro area. On the one hand, they expected that this would facilitate ECB operations and make it easier for the ECB to communicate its decisions on monetary policy. On the other hand, they believed that if all government bonds in the euro area had equal standing in their acceptability as collateral for repo transactions, it would fortify the Europeanisation of national government bonds while keeping German bonds from becoming the prime source of collateral in the euro area. An integrated European financial market, according to the ECB, would be more receptive to ECB interest rate decisions, which would make it more effective than a market fragmented into national jurisdictions. In line with this reasoning, the ECB has come to regard repo transactions as the most important tool for the implementation of monetary policy decisions (EZB 2015: 4). What is more, the volume of repurchase agreements concluded on a daily basis by the central bank has direct bearing on the availability of central bank money. In 2002, the European Parliament and the Council of the European Union issued Directive 2002/47/EC on financial collateral, creating a legal framework to simplify cross-border trade in repos with the expectation that the measure would increase “the efficiency of the cross-border operations […] necessary for the implementation of the common monetary policy”, and, at the same time, allow participants in the money market to “balance the overall amount of liquidity in the market among themselves, by cross-border transactions backed by collateral” (European Parliament/Council
2002: 44). In other words, the consolidation and expansion of the European repo market involved the effort to establish an internal financial market alongside the European internal market for goods, persons, and services where it was possible for financial actors to engage not only in the unimpeded cross-border transfer of foreign currencies, but also of securities (Mügge 2013; ECB 2017).

Insofar as concerns the idea of strengthening the Europeanisation of national government bonds while reining in the dominance of German bonds in the EU, some background information is necessary for a better understanding. After the euro was adopted as the common currency, German government bonds were regarded as safe securities while the government bonds of almost all other countries in the euro area received lower ratings: “Having left behind the threat of a de facto deutsche mark zone, governments worried that the euro government bond market would become a German bund zone” (Gabor et al. 2016: 624). To counteract this development, the ECB and major European banks undertook a joint effort to encourage repo basket transactions comprising government bonds from a variety of euro area countries. Banks have been interested in this approach as a way to deal with the dilemma they face from countries such as Germany which exercise fiscal restraint and therefore tend to reduce the volume of their outstanding loans. As a result, they do not issue enough new government bonds that are needed as collateral on the repo market. An integrated European securities market makes it possible, in effect, for banks in the euro area to use government bonds with lower ratings while simultaneously financing conditions as government bonds with higher ratings. At the same time, however, countries like Germany and the Netherlands have accused the ECB of undermining the fiscal policy discipline of countries such as Greece, Italy, or Portugal which have lower credit ratings (Weidmann 2013). To play down this criticism, the ECB has argued that its repo monetary policy is based on established market assessment practice. Up until the financial crisis, it was indeed the practice within the euro area, in line with the course taken by the ECB, to accept government bonds of every euro area country on equal terms as collateral for repo transactions. During the financial crisis of 2007-2009, however, the fragility of the European single financial market became evident. After the onset of the crisis, and the resulting euro crisis that started in 2011, the policy changed. The government bonds of countries in the euro area once again became subject to differentiated ratings, with the consequence that particularly those with higher ratings were used as collateral in repo transactions. While U.S. government bonds maintained their good ratings, this was not the case for many euro area government bonds (Pozsar 2014).

1 German bunds are sovereign bonds similar to U.S. Treasuries.
Briefly stated, there are three main reasons for the growing importance of the repo market in the shadow banking system. First of all, it offers private players a high degree of flexibility and a large variety of investment and financing options. Second, because there is a high demand among these players for assets that are suitable as collateral for repo transactions, governments can place their state bonds on the financial market on favourable terms, albeit at the same time in competition with one another. Third, central banks use the repo market as a monetary policy transmission channel. For private players, the repo market is simply a profitable and flexible opportunity for financing and investing. For state institutions, it offers a venue to place government bonds in competition with other sovereign bonds and a vehicle to pursue monetary policy. Among other things, this leads to the development of a market-oriented monetary policy that relies on measures such as regular auctions and market-based rating methods. More important still, the financial system has become more crisis-prone as a result of these developments.

3.2 Asset markets, and rising private and corporate debt

After the financial crash of 2008, asset prices experienced a steady upward climb. Expanding asset value, however, cannot be explained by evidence of strong economic productivity, higher average living standards, growing business opportunities, or optimism over a positive economic outlook for the years ahead. On the contrary, prospects rather became bleaker. As most analysts agree, even before the present crisis hit, conditions had been growing more and more alarming in the face of escalating trade wars, the ongoing eurozone crisis, the fragmentation of the international community, growing inequality, the divisive forces of right-wing populism, the financial implications and uncertainty of Brexit together with numerous other adverse political and economic developments (Fed 2019a, IMF 2019c; Cihák et al. 2020). And yet, asset prices continued to rise, entirely detached from economic fundamentals, financial conditions, or historical norms.

There are various reasons for this development. Against the backdrop of growing global inequality, a small minority of private wealthy individuals, institutions, and investors were seeking ever more profitable forms of investment (Piketty 2014; Cihák et al. 2020). Shrinking opportunities increased the willingness of investors to take on risk. At the same time, in order to stabilize the global financial system, leading central banks were injecting huge amounts of liquidity into the system, pushing asset prices even higher. Why was this happening?

In response to the financial crisis of 2007-2009, the governance structure of the global financial system underwent a radical and historically unprecedented transformation process. Leading
Central banks became the backbone of the emerging regulative configuration (Mehrling 2017; Wullweber forthcoming). Over the past decade, the most important change in their role occurred when they came to act as market maker of last resort, a development that has significantly stretched the limits of their legal mandate (Mehrling 2011; Wullweber 2020b). This and other far-reaching monetary policy measures were necessary because in preceding years, most governments had refrained from adopting more active fiscal policies (Arnold et al. 2019). Instead of pursuing a more active course, they had constructed legal frameworks based on the politics of austerity that impeded expansionary fiscal action (Blyth 2013; Green et al. 2015; Konings 2016). In the absence of strong government intervention, central banks reacted to an environment of weak economic and business activities by adopting so-called dovish monetary policies such as quantitative easing and low interest rates with the goal of encouraging business activity.

As a result, the money market became flooded with liquidity. Central bank reserves reached a historically high level. Central bank policies also drove up the demand for government bonds. By the end of 2019, about 15 to 17 trillion dollars in government bonds had produced negative yields, a share of more than 25 per cent (IMF 2019a, see Figure 14).

**Figure 14: Market capitalization and share of negative yielding bonds**


Yields on corporate debt were also very low (see Figure 15).
In order to earn higher yields, many financial players such as hedge funds, but also more cautious entities such as insurance companies and pension funds, invested in more highly leveraged and less liquid assets with higher risk profiles (see Figure 16). As a result, these companies became more vulnerable. Some institutional investors such as fixed-income funds had invested in low-quality credit assets and had also decreased their liquidity buffer in the form of equity capital, for example. In a financial crisis like that caused by the COVID-19 pandemic, investment strategies of this nature make it much more difficult to sell such assets when there is a general demand for liquidity. What complicates matters even further is that in order to be able to pay interest on pension contributions and at the same time earn higher returns, retirement schemes, such as defined benefit pension funds, invest in long-term assets. This leads to even higher liquidity risks and greater volatility (IMF 2019a. see Figure 16).

Source: IMF 2019a: 40, in per cent of fixed-income portfolio.
In the years leading up to the present crisis, corporations were able to finance themselves with cheap loans, with a resulting surge in corporate debt. The loose monetary policies pursued by the central banks eased financial conditions with the side effect that parts of the nonfinancial corporate sector adopted higher risk business models. By the end of 2019, the business-debt-to-GDP ratio was close to its historical high (see Figure 17). Moreover, half of all outstanding investment-grade debts were rated in the lowest class of the investment-grade range (triple-B). This is also close to an all-time high (Fed 2019a).

Figure 17: Nonfinancial business- and household-sector credit-to-GDP ratios

There was a constant rise in consumer credit such as student loans and auto loans (see Figure 4 in Chapter 2.2). Relative to historical standards, delinquency rates on these loans were quite high (Fed 2019a: 25). Measured in the ratio of debt to assets, business was also highly leveraged, reaching the highest level in two decades (see Figure 18).
As demonstrated in the foregoing, already before economies were hit by the COVID-19 pandemic, the volume of private debt had grown so large as to make repayment very difficult for some firms (especially those financed through Ponzi schemes, see Chapter 2.1; IMF 2019a). Rising asset prices regularly go hand in hand with increasing household and business debt. Indeed, as has been shown, the level of household and business debt was at a historical high. The problem of excessive corporate debt becomes obvious in crisis situations such as the one we are currently experiencing. When asset prices are elevated, their drop in value tends to be steeper. If asset prices fall, income declines, and the costs of debt service rise. Highly indebted households and businesses come under pressure. Faltering businesses need to reduce spending, and that, in turn, reduces the overall level of economic activities. Already by the end of 2019, corporations were facing a severely weakened profit outlook. Especially in the United States, loans had been widely used to finance special dividends for investors alongside expensive mergers or acquisitions (IMF 2019a).

Financial institutions and investors are also affected when cash squeezes lead to nonperforming loans. They are urged to scale back their credit lines at a time when everybody urgently needs credit. Especially highly leveraged actors do not have the necessary capital buffer to absorb losses. As a consequence, they are forced to cut lending and sell their assets at fire-sale prices. As the domino effect progresses, liquidity problems become a more serious concern for the majority of corporations and financial firms, forcing the cost of borrowing even higher. This is precisely what happened during the COVID-19 financial crisis. Adverse conditions such as these tend to result in heavy losses and, ultimately, the insolvency of many firms (Fed 2019a).
3.3 High-frequency and algorithmic trading

Recent years have witnessed an increasing drive toward the algorithmization of trading and high frequency trading (HFT) to enhance the liquidity and profitability of securities. Market making entities - which are central to liquidity production - rely heavily on computer algorithms to execute trading operations. Computer programs in today's world, similar to human traders, strive to buy securities at the lowest possible price so that they can resell them at the highest price possible, and thus achieve a high spread. Some simple algorithms, for instance, are designed to search the market for stocks whose value is quoted successively higher several times in a row, and to buy them in anticipation of a continuing increase in value. Others sell such stocks in the expectation that the price will swing back to the original value. Various programs scan the financial market for historically correlated price patterns, e.g. between crude oil price increases and increases in the share price of oil firms or vice versa. Since there is a frequent but asynchronous correlation between the two, fast computer programs can exploit the lag time (Adler 2012). Arbitrage opportunities can arise both within a financial market as well as between different financial markets, or between the different prices of securities and their derivatives (e.g. stock index futures) (MacKenzie et al. 2012).

Many algorithmic computer programs are designed for use in high frequency trading. HFT involves placing and cancelling large quantities of transactions on the market in a rapid and continuous manner. Depending on the market conditions, HFT can liquidate market positions so that none remain open at the end of the trading day. HFT has led to a narrowing of spreads in financial markets outside crisis periods (MacKenzie et al. 2012). Computing power nowadays enables frequency trading in the time frame of a mere millisecond (a thousandth of a second). In a certain respect, the direction of globalization shifts into reverse at such a speed. Normally, especially where financial markets are concerned, globalization is viewed as the diminishing importance of distance. In our current day and age, however, computers have become so fast that distances have acquired even greater importance. Today it definitely does make a difference whether a computer program that executes buy and sell orders is situated at the New York Stock Exchange or the Chicago Board of Trade - in other words directly at the hub of financial trading - or in some outlying city. Information about orders placed moves almost as fast as the speed of light. Since the year 2011, it takes information transmitted from Chicago to New York, via microwave relay towers about 4.2 to 5.2 milliseconds, which is much slower than the frequency of financial trading (see Cookson 2013). Even nanoseconds (a billionth of a second) can be crucial: “In a very close race between two computerized traders, that nanosecond just might make the difference between catching a profitable trade and missing it” (Angel 2011: 8). Reducing
the time in which a trade is conducted has now become an objective in the technology race: “This variable, called latency, is rapidly approaching the physical limits of the universe set by quantum mechanics and relativity” (Adler 2012).

While at first glance it would seem that this could lead to an immense liquidity increase, Carruthers and Stinchcombe (1999: 353) argue that one requirement of liquidity is that “everyone can know at all times what the price is.” With HFT, however, this requirement is only partly guaranteed, since those traders that possess fast computers in close proximity to the financial markets clearly have an information advantage. The prices seen by other dealers might not be up-to-date: “[T]raders at a large distance from matching engines are permanently doomed to learn ‘what the price is’ much more slowly than those who co-locate” (MacKenzie et al. 2012: 288). Financial players are aware of these problems: “[W]e have to abandon this idea that there is a universal truth for the best currently available price” (Natan Tiefenbrun, quoted in MacKenzie et al. 2012).

In addition, for some time now anomalies have been appearing on financial markets which did not exist in the same form prior to the extensive computerization and algorithmization of trading. These anomalies involve sudden crashes of financial markets and therefore extreme price fluctuations in the span of mere minutes. Usually in such cases prices tend to stabilize themselves by the end of the trading day when prices swing back to about the same level at which they stood at the beginning of trading. On 6th May 2010, for instance, the Dow Jones Index fell by 600 points within a span of just six minutes, the sharpest fall within a single day in the index up to that point. Twenty-three minutes later, the Dow Jones had almost completely recovered. Since then, similar events have been described as flash crashes. A study of the U.S. Securities & Exchange Commission (2010) concludes that this extreme event – “one of wildest days in Wall Street history” (Bowley 2010) – was triggered by an automated self-execution algorithm of a mutual fund. The only peculiarity was the size of the trading order: 75,000 so-called E-Mini S&P contracts valued at around 4.1 billion dollars. Various feedback repercussions of cross-market arbitrageurs, HFT programs, and other financial actors resulted in a ‘hot potato effect’, as a consequence of these contracts having been moved back and forth very quickly in the form of high-frequency trades, which created a downward spiral (the trades changed hands more than 27,000 times between 2:45:13 and 2:45:27 p.m., in other words in just 14 seconds). When the Chicago Mercantile Exchange halted trading at 2:45:28 p.m. for a mere five seconds, the market began to calm down. Many automated programs shut down automatically, and, trading had to continue manually in part. Nevertheless, the downward spiral continued for 20 minutes and only came to a halt at 3:00 p.m. Altogether, 20,000 trading operations had been executed far below
their average starting price, and thus were retroactively reversed (Commodity Futures Trading Commission; Securities & Exchange Commission 2010).

Neil et al. (2012) identified a total of around 18,500 events between 2006 and 2011 where strong price fluctuations, both up and down, occurred within very short periods of time (less than 1.5 seconds). This averages out to one flash crash a day, although it is also worth noting that the frequency of flash crashes has increased over time. Today flash crashes even seem to be the rule rather than the exception: “[W]e are now in the age of the flash crash” (Oakley 2015). One of the most notorious examples of technology malfunction occurred in August 2012 when the staggering amount of 450 million dollars was lost in only 40 minutes due to a faulty algorithm (Popper 2012). The potential for such critical fluctuations in stock prices and flash crashes expands when algorithmic programs interact with each other (MacKenzie 2014; U.S. Department of the Treasury; Board of Governors of the Federal Reserve System; Federal Reserve Bank of New York; U.S. Securities and Exchange Commission; U.S. Commodity Futures Trading Commission 2015; IMF 2015).

Attempts to regulate the field have proven to be difficult. The increase in the quantity of market data poses challenges to effective regulation (Commodity Futures Trading Commission/Securities & Exchange Commission 2019), and while regulatory laws have emerged in Germany and the EU – the 2013 HFT Act in Germany, for example, or the 2018 European Markets in Financial Instruments Directive (MiFID II) – already the lack of a common, general definition of trading algorithms is problematic (Coombs 2017: 279). Malmgren and Stys (2011: 31) find that “the emergence of fast-moving, agile traders who are able to elude the watchful eyes of European market overseers is causing much anxiety in the European Union.” They continue to emphasize that “London regulators observed that none of the appropriate authorities were competent to review and approve the nearly limitless, continuously evolving algorithms that are utilized” (Malmgren et al. 2011: 31; Coombs 2017: 284).

Nevertheless, efforts are being undertaken to increase the regulation and transparency of HFT. As in the case of EU and German regulations, they include provisions that make HFT subject to authorization, measures to require the flagging of orders created by algorithmic trading, and the introduction of financial transactions fees for computerized trading. Mechanisms designed to significantly slow down trading, so-called speed bumps, are another form of market regulation. While speed bumps reduce the rate of trades coming into the market, they do not apply to orders sitting in the market and waiting for a buyer or seller. This gives slower trading firms a chance “to cancel an order before a faster trader can execute it, neutralising the speed advantage that has led, critics claim, to predatory behaviour” (Henderson 2019). Some venues that are known for
using such mechanisms include the Aequitas NEO Exchange, the TSX Alpha Exchange, the Eurex Exchange, and the Moscow Exchange (Baldauf et al. 2019).

The EU Markets in Financial Instruments Directive MiFID II established that investors who employ HFT and do not fall within a specific exemption regime must obtain appropriate authorization from the financial market authorities. Furthermore, such investors are also required to store time-sequenced records of their algorithmic trading systems for at least five years in order to prevent market manipulation by placing larger buy or sell orders that they do not intend to execute - a tactic called ‘spoofing’. The regulatory package introduced parameters to ensure consistency in the identification of HFT practices, where firms are identified based on quantitative thresholds. It additionally aims at ensuring greater transparency within financial markets, and introduces identification tools for regulatory bodies. Nevertheless, it does not contribute to making financial markets more resilient to flash crashes. In this connection, Weller and Bruno (2018) point out that there is an urgent need to provide supervisory authorities with more efficient and effective tools to prevent such inequitable and unfair practices.

While HFT has been used quite extensively since 2007, and almost all market participants rely on some form of computer-based trading system, Meyer et al. (2018) observe that trading companies are finding it harder today to leverage further profits using the practice due to several factors that make HFT less profitable, in general, than it was during its heyday in the 2000s. These developments have led to consolidation on the U.S. equity markets, with smaller companies selling out to bigger ones which can afford the higher costs of HFT. Bigger hedge funds and brokers have also started to employ computerized trading in their operations, increasing competition on the markets (Meyer et al. 2018). Some of these firms have entered into mutual co-operation, funding projects like the ‘Go West’ network which links the Pacific Coast, Tokyo, and Chicago, and enables the participants to share bandwidth and speed (Meyer et al. 2018).

Algorithmic trading is employed to increase market participants’ competitiveness and is slowly transforming commodity markets: Almost two thirds of crude oil contracts traded on Chicago Mercantile Exchange’s futures market between 2012 and 2016 were automated orders (up from 54 per cent). In soybeans, wheat, and precious metals, the share of algorithmic trading rose by almost half. It is estimated that traditional human investors only account for around ten per cent of U.S. equity trading. The rest is conducted on the basis of algorithms (Wigglesworth 2019). The expansion of algorithmic trading in these markets has contributed to sharp price fluctuations (Terazono 2018a). Quantitative investors participate in the markets on a short-term basis, generating high volumes and exacerbating intraday volatility in the process. These tendencies,
however, decouple the fundamentals of supply and demand in the commodity markets, furthering speculation and risks: “The rise in intraday price volatility is making it difficult for some producers and food companies to maintain their hedging positions, while others are reluctant to take positions in the face of the frequent unusual market moves” (Terazono 2018b). Similarly, the London Metal Exchange (LME) has seen a surge in computer-based trading forms. Seddon (2020: 525) even argues that the LME has been “reinvented for the benefit of algorithmic traders and speculators.”

Despite the speed bumps and risks associated with the practice, the use of algorithmic trading is nevertheless still growing due to advances in artificial intelligence and the emergence of cryptocurrency markets. The progress made in research on artificial intelligence contributes to machine learning, making algorithms more adaptable and receptive to market changes and dynamics. At the same time, cryptocurrency markets are characterized by algorithm-friendly features such as high fragmentation, high volatility and loose regulations which make them attractive to quantitative investors (Zhou et al. 2018: 187). In addition to these areas, algorithmic trading has gained a foothold in many other markets. Futures markets, example given, are among those that are highly computerized: As an example, automated orders in the currency futures market in the United States constituted a share of 91% as of 2018 (Meyer 2019; Commodity Futures Trading Commission/ Securities & Exchange Commission 2019). Algorithms have altered the rhythm of markets, making their fluctuations more difficult to assess and anticipate. What is more, they are responsible for making markets more vulnerable to abrupt dislocations (Wigglesworth 2020a). As such, it has become more important than ever to identify, understand, and evaluate the risks of algorithmic trading and to promote the development of more effective regulation, particularly in the light of the shocks and disturbances that exacerbate financial instability. As will be described in the next chapter, algorithmic and high-frequency trading tends to intensify and aggravate financial crises. When the COVID-19 financial crisis struck in March 2020, it became necessary on multiple occasions to enforce a halt to trading in order to prevent algorithmic trading programs from disrupting markets to a far greater extent than would have happened without their intervention.
4. The COVID-19 financial crisis

We are currently experiencing a deep economic and financial crisis, the sharpest downturn in the global economy since the Great Depression of the 1930s. In almost every country in the world, there has been a dramatic rise in unemployment. Already by early March 2020 in the USA, for example, unemployment figures had risen to a level higher than during any other crisis since the Great Depression (see Figure 19 for initial job claims). In just four weeks, from mid-March to mid-April, there were 22 million new unemployment claims compared to 2.6 million in the worst four weeks of 2009, and 2.5 million in 1980. By the end of May 2020, the figure had topped 40 million (Rocco et al. 2020; Badkar et al. 2020). In contrast to the global financial crisis of 2007-2009, the present crisis was not directly triggered by financial practices internal to the financial system, but rather by an unparalleled global shutdown that began in Wuhan, China in January 2020 to contain the outbreak of the highly contagious and potentially lethal respiratory disease caused by COVID-19, a coronavirus also known as SARS-CoV-2. As the viral epidemic continued and rapidly reached pandemic proportions, governments around the world followed China’s example and enacted lockdown measures in order to curb the spread of the disease, which has meanwhile affected every country in the world.

Figure 19: U.S. initial jobless claims from 1965 to April 2020 (seasonally adjusted)

Source: St. Louis Fed 2020b.

It is still too early to fully assess the long-term ramifications of the COVID-19 crisis for the global financial system and the global economy, or to quantify its economic impact. Already now, however, it is obvious that economic growth and financial stability are threatened everywhere as the entire financial and economic landscape grows increasingly uncertain. The coronavirus
pandemic has triggered global turmoil in financial markets. Although the crisis is unique, it has very clearly highlighted the fragilities and instabilities already inherent in the financial system.

The current crisis is closely linked to the measures taken by governments to contain or at least slow down the spread of the coronavirus. Lockdown and social distancing policies have restricted everyday life and economic activity on a level never before seen. The economic consequences have been dramatic. With millions of people in quarantine, daily life has been severely disrupted and consumption has dramatically decreased. The isolation of entire regions and economic areas has also led to the shutdown of production and logistics and a breakdown of regional as well as global supply chains. Business activities and global trade have been suspended on a large scale. The shock has affected both demand and supply at the same time. As Pozsar (2020: 2) notes, the “supply chain is a payment chain in reverse.” When both production and demand come to a simultaneous halt, this leads to missing payments across the whole network of production and distribution. When this occurs not merely in one branch or sector, but in the entire economy, the situation becomes critical. The impacts can be devastating when crisis hits an already unstable financial system, as has happened in the present case.

4.1 An unstable financial system

As demonstrated in the foregoing chapters, the global financial system was already in an unstable condition when the COVID-19 outbreak erupted. A huge asset bubble had been building up during previous years. The volume of private and business debt had surged to record levels. An enormous amount of money had been invested in risky assets such as Exchange-Traded Funds (ETFs). High-frequency and algorithmic trading had become more popular than ever. And the shadow banking system was experiencing steady expansion as it grew increasingly more important in credit creation and intermediation processes. These are just some of the chief factors of instability.

For more than ten years following the global financial crisis, the financial system had experienced a bull market – the longest rally in history. By mid-February 2020, asset prices had surpassed all previous records. The situation was completely detached from economic fundamentals, financial or economic conditions, and historical norms. As discussed in Chapter 3.2, money had been flooding the markets, pushing asset prices to extreme levels. In order to achieve higher yields, many financial players had adopted aggressive market strategies, investing in less-liquid and higher-risk assets with a low level of credit quality. Under these circumstances, they became much more prone to market volatility. At the same time, non-banks and shadow banking agents had decreased their liquidity buffer. Even banks, which had been forced by the Basel III
agreement after the global financial crisis to build up a stronger capital buffer, were again growing more susceptible to vulnerabilities as a result of their practice of paying discretionary bonuses to managers and dividends to shareholders while at the same time buying back shares on a large scale level. In 2019, big banks paid out an amount of about 325 billion dollars globally in share buybacks and dividends (Bair 2020). Moreover, regulators were once again beginning to relax capital requirements and lower stress testing standards (Systemic Risk Council 2019).

In the productive economy, cheap credit opportunities had led to a sharp rise in corporate debt. Although it was precisely the goal of loose monetary policies to encourage higher corporate investments, the larger volume of loans was not accompanied by rising demand. For several years, conditions in most industrial countries had been bordering on recession. For the vast majority of people, income was stagnating. As purchasing power failed to grow and even declined, effective demand decreased (see Chapter 2.2). This, in turn, led to overindebtedness on the part of many corporations.

4.2 Shaky financial markets

In February 2020, the price for government bonds rose steadily while stocks started to slide. The Intercontinental Exchange, which owns the New York Stock Exchange and other trading platforms, recorded a monthly average record volume of 7.6 million futures and options contracts. CME Group, the world’s largest futures exchange, experienced its second busiest day in its 104-year history. On Friday, 28th February, almost one trillion shares were traded (Stafford et al. 2020). As uncertainty over the economic implications of COVID-19 rose, financial markets became shaky. While empty supermarket shelves indicated that people were stockpiling over fears of possible curfews and quarantine measures, very intense trading activities in the financial markets were setting exchange volume records. The coronavirus had started to spook investors. Trading flows jumped sharply. The United States’ S&P 500 stock index, for example, dropped more than ten per cent, its fastest loss ever, more rapid even than during the crash of 1929 (Stafford et al. 2020). European Stocks experienced the same downward trend. As a response to the shaky financial markets, the Fed cut its policy rate by a half of a percentage point (see in detail Chapter 4.6 on central bank policies since COVID-19). The decision, however, had no effect on the market. As supermarkets failed to keep up with the surging demand for staples like toilet paper, alcohol-based disinfectants, hand soap, and canned food, the fear of a new crisis had financial markets firmly in its grip.
4.3 Run for safety

At the beginning of the crisis, investors began to buy up safe assets. In early March, the 10-year U.S. Treasury bond yield – a key reference for financial players around the world – fell to a historical low of 0.7 per cent and U.S. Treasury Bill yields dropped to below zero. Germany’s 10-year bonds were trading at a record low of minus 0.74 per cent. Government bonds, and especially U.S. Treasuries, count as very safe assets. When Treasury sales climb, their yield declines and their price increases. As financial players grow more fearful that their risky assets will incur high losses, or even go into default, they try to replace these assets with safer investments. This triggers a flight to safety on a massive scale, which, in turn, leads to intense trading activity (Cipriani et al. 2020; Smith et al. 2020a).

While investors were selling their higher-risk assets, the search for safe havens and short-term investments exploded. Other more risky markets began to bear the brunt. The Financial Times Stock Exchange Index 100, the most important British stock index, suffered its worst days since the 2008 financial crisis. Germany’s Dax initially fell around 6 per cent and later even more than 12 per cent, the second largest drop in its history. U.S. stocks had their worst day since 1987. The S&P 500 experienced the most rapid fall into a bear market on record (Financial Times 2020b). At the same time, government money market funds (MMFs), which invest in safe, short-term government debt, recorded the highest ever weekly inflow, an amount of 286 billion USD, while prime and municipal MMFs faced a strong outflow (Smith et al. 2020b).

Emerging markets were particularly hit by the COVID-19 financial crisis. In search for liquidity, safety, and, most importantly, U.S. dollars, investors on a large scale pulled out their investments from emerging countries. Even in comparison with the global financial crisis of 2007-2009 the figures are shocking (Wheatley 2020, see Figure 20).
4.4 Run for liquidity

In a situation where more and more small firms and big companies become financially stressed, and simultaneously suffer a demand as well as a supply side shock, almost all financial market players develop a high preference for liquidity. Financial as well as non-financial companies stockpile cash in order to meet their obligations. They also seek to monetise their not so liquid assets. When bank clients suddenly withdraw their deposits all at the same time, serious problems can result for banks, especially when this happens at a time when many companies are also drawing down huge amounts of money. Given the over-indebtedness of many corporations and the highly leveraged business practices discussed in the foregoing chapters, there is no question that such problems were foreseeable.

In such a situation, any additional bad news can trigger a run on liquidity funds and lead to a market break-down. This is what happened on 9th March of this year, when the members of OPEC failed to reach an agreement and, instead of reducing oil production, actually increased their output. The price for crude oil fell sharply, registering the steepest decline in almost three decades (Wigglesworth 2020b). In this panic situation, almost all asset prices sharply decreased and liquidity vanished. The stress was felt in virtually all financial markets. The Financial Times Stock Exchange Index (FTSE) 100 in London suffered its worst quarter since the 1980s (Financial Times 2020c).
As more and more financial players were faced with liquidity problems, their uncertainty over the solvency of their counterparts grew and trust diminished. Furthermore, since most global trading is transacted in U.S. dollars, there was a global run on the currency. The run on U.S. dollars, in turn, fostered increased activity in forex markets. Under such circumstances, financial markets tend to become dysfunctional. Circuit breakers were triggered in several cases on the stock market, and stock trading was suspended. The intention of a circuit breaker is to curb panic selling, especially by interrupting the algorithmic and automated trading programs that have come to dominate today's markets (Wigglesworth 2020a; see Chapter 3.3). Market makers, which normally sustain market liquidity, either drastically expanded their bid/offer-spreads, that is, the difference between the lowest ask price and the highest bid price for a security, or disappeared from the market altogether. This especially affected the corporate bond market and consequently the Bond ETF markets. Mutual funds also suffered huge losses during the middle of March 2020 (Henderson et al. 2020a). The run on security markets also had negative consequences for credit supply. This led to disruptions in credit flows, potentially resulting in unnecessary defaults triggered by liquidity constraints.

4.5 Financial market psychosis and contagion

The next phase of the COVID-19 financial crisis started with the meltdown of passive and algorithmic investing, the unwinding of exchange traded funds, and the sale of even the safest assets by market players desperate to raise cash. In times of crisis, traditional correlation patterns between asset classes tend to dissolve. When investors have to meet their obligations but cannot sell asset A, they sell asset B, even if they would prefer to hold on to that investment. In most other circumstances, it is the rule that when stocks decline, the price of Treasuries increases. This is because investors sell risky assets and buy safe assets, in other words government bonds. After 9th March, however, this “rule” no longer applied. Because Treasuries in every maturity bracket were being sold in massive amounts, the prices declined and the yields rose (Schrimpf et al. 2020). Eventually, financial market players tried to sell as many assets as possible in order to avoid liquidity problems. Selling all different categories of assets at the same time, however, leads to falling prices and rising interest rates. A downward liquidity spiral begins (see Chapter 3.1.4). The comparison with a pandemic is not far-fetched: Selling pressure in equities spreads like an infection to the bond markets, which, in turn, infects the gold market and completely unrelated assets like cryptocurrencies. Interest rates rise, and since they also serve as a yardstick for non-financial investments, the effects spill over into the productive economy. Only massive and coordinated fiscal and monetary interventions can interrupt this “cycle of doom” (Financial Times 2020d).
Assets can only be sold if there is a demand. The less demand there is, the higher the yields and the lower the prices. If the market for assets deteriorates, the bid-ask-spread widens. This was also true for the U.S. treasury market (see Figure 21). At one point during mid-March, the amount of sovereign, corporate, and financial bonds issued in Europe, the Middle East, Africa, and the Americas fell to zero, simply because no demand whatever existed for these bonds (Gross 2020).

Figure 21: Bid-ask spreads from 2005 to 2020

When U.S. treasury bonds – which, apart from the U.S. dollar, are the safest and most liquid assets in the world – no longer find a buyer, hysteria breaks out on financial markets. The situation was even more dramatic for mortgage-backed securities (MBS). In good times, the MBS market is usually the second most liquid market in the world. In mid-March, banks and broker dealers were struggling hard to maintain a market in these assets. The malfunction directly affected the shadow banking system. When the price of general collateral falls, and Treasuries and other government bonds become the preferred assets for collateral, the collapse directly feeds into market evaluations via mark-to-market practices, leading to margin calls and larger haircuts (see Chapter 3.1 and especially Chapter 3.1.2). This is precisely how the situation developed in the COVID-19 financial crisis: Asset prices fell and margin calls for all repo transactions increased, triggering a stronger demand for cash. And this, in turn, stimulated the sale of assets even further, leading to lower prices and so on. Mounting demands were made on traders to add collateral to their positions, forcing them to sell assets that had previously performed well. A vicious circle was set in motion. The S&P 500 index, the German Dax and France's CAC 40 all suffered heavy losses in their value (Financial Times 2020e).
When even the safest assets become illiquid, market making becomes risky. Market makers fall short of fulfilling their "obligation" and stop quoting prices, creating a vacuum. During March of 2020, this is what happened in the market for bonds with the lowest grade trading ratings (so-called junk exchange traded funds). The trend later spread to almost all segments of the capital markets and finally to the entire shadow banking system. Once again, central banks remained the only institutions capable of filling that void (see Chapter 4.6).

Financial market participants are driven by fear and emotions. In times of uncertainty, this creates volatility. In mid-March, in a frantic environment, the S&P 500 initially dropped 9.5 per cent. Shortly after, as a reaction to strong central bank interventions (Chapter 4.6) it regained 9.3 per cent, and then, over the course of three consecutive days, lost 12 per cent. Finally, it rebounded and experienced its strongest week in at least a decade (Fletscher 2020). During that period, circuit breakers were activated several times because of the extreme volatility (see Figure 22 and Figure 23).

**Figure 22: Stock market implied volatility**

![Graph showing stock market implied volatility](image)

Source: FSB 2020b: 3. The Chicago Board Options Exchange Volatility Index (VIX) is one of the most important indices for price volatilities.²

Figure 23 shows the price volatility in the important U.S. government bond market.

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² Indices, however, are not a passive and neutral reflection of financial market developments. They are created by index providers that have their own interests. Furthermore, they can exert performative effects and exacerbate downward liquidity spirals (Wullweber 2016; Petry et al. 2019).
As a response to dysfunctional markets, central banks all over the world opened their “flood gates” and provided trillions of dollars to the financial system via different policy decisions (see the next section).

At the end of March, following two weeks of severe turbulence, there was plenty of cash with only few safe assets available for purchase. Awash with money, the bond markets rallied, and at the beginning of April, U.S. Treasury bonds traded back up to a very low yield of 0.09 per cent. Hence, during the last week of March, completely detached from developments in the corporate universe, equities offered an excess return over bonds at their highest level since the eurozone debt crisis of 2012 (Fletscher 2020). In order to counter this overshoot, the U.S. Treasury announced that it would increase the size of its monthly auctions for 3-year, 10-year and 30-year notes.

In a situation where the outlook for the global economy was at its worst, and Kristalina Georgieva, the chief of the IMF, referred to the COVID-19 pandemic as the worst economic crisis in the history of the IMF, risk sentiment switched again. In search for higher yields, financial players once again started to invest in junk bonds and other riskier assets, as demonstrated by the record inflow into that market segment at the beginning of April (Henderson et al. 2020b). Less risky investment-grade corporate bonds profited from a coordinated central bank announcement to the effect that such bonds would be included in the central bank investment universe. Money market funds were also able to secure an inflow of cash. They invested mainly in short-term government debt. With respect to corporate bonds, the rise after the downturn is explainable because central banks, and especially the Fed, announced that they would start to buy investment-grade rated corporate bonds (Financial Times 2020c; see next section).
4.6 Central bank responses to the COVID-19 financial crisis

When financial markets panic, market players themselves are not capable of curbing the crisis. The stakeholders are deeply entangled, myopic, and driven by emotions of fear, panic and irrational behaviour. Given that many investments are linked to indices or bound to track certain assets or portfolios, the freedom of investors is diminished. Even if ratios suggest otherwise, they are forced to execute operations in the way their algorithms dictate because they are obliged to replicate the object of their fund guidelines. As discussed in Chapter 2.1, 3.1.4, and 4.4, in panic situations the downward spiral of asset prices affects most assets. Financial assets today are mostly rated mark to market. This means that falling prices are factored into asset value almost in real time. Accordingly, investors have little choice but to follow the path from hedge finance to speculative finance and lastly to Ponzi finance. They are not in full charge of the destiny of their investments. The steeper the journey becomes, the more it endangers the financial viability of the investment: Bid-offer spreads widen, bids and/or offers disappear entirely, and the exit door for common investors closes. Assets become unsaleable, and the whole system grinds to a halt. Since assets in the form of collateral are the lubricant of repo markets, and hence the cornerstone of shadow banking financing, this translates into a massive squeeze on shadow bank liquidity. Credit lines are pulled, collateral is pledged, there is no new financing available and financial markets become dysfunctional. Market makers in the repo market are especially prone to illiquidity spirals because they do not regularly have access to central bank reserves or other short-term central bank lending emergency facilities (see Chapter 3.1.3). If these institutions reduce or even cease trading, the entire shadow banking sector is affected. As the shadow banking system is now the heart of the financial system, it can bring the overall global financial system to collapse (see Chapter 3.1). The stress tests for banks in recent years appear rather weak in the light of what took place in March during the COVID-19 crisis. What is more, during the month preceding the crisis, in a move that in retrospect appears to be a case of bad timing, the Fed began to relax the capital, liquidity, and stress test obligations for banks (Systemic Risk Council 2019).

As demonstrated in Chapter 2.3.3, the only institutions which do not have a liquidity problem (in their own currency) are central banks, which makes them the stabilizer and lender of last resort in times of crisis. When the COVID-19 crisis hit, central banks acted forcefully in an attempt to halt the crisis and curb its economic impact. They advanced even further into uncharted and unconventional monetary terrain than they did in the wake of the 2007-2009 financial crisis, crossing the red line that since the 1980s has strictly separated fiscal and monetary policies. The fear that government access to the central bank balance sheet might lead to overspending was
replaced – and rightly so – by the much greater and more imminent fear of a total collapse of world trade and a subsequent severe deterioration of all economic activities. Prevailing ideology over the past three decades has not allowed central banks to directly finance government spending. This was based on the assumption that governments might abuse such a privilege as an opportunity to increase public debt in unsustainable ways. It was argued that central banks should instead act independently from governments as neutral guardians of their respective currencies and keepers of price stability. The neutrality of central banks, however, has always been a political myth, making it possible to delegate complicated and unpopular political decisions regarding monetary policies to seemingly apolitical central bank technocrats (McNamara 1998, 2002; Krippner 2007; van't Klooster et al. 2019). In the light of a historical effort to curb a global pandemic without destroying entire branches of industry, this approach is no longer tenable (Wullweber forthcoming).

**Interest rate policy**

The traditional crisis reaction of central banks consists of lowering the key interest rate. Reducing key interest rates is based on the hope that lower rates will stimulate lending. The explanation lies in the need on the part of commercial banks for central bank money to settle transactions between one another (see Chapter 2.3.3), and also, in some jurisdictions, to meet the minimum reserve requirements: “For banks, the survival constraint takes the concrete form of a ’reserve constraint’” (Mehring 2011: 13). As a rule, a central bank’s interest rate influences the rate at which commercial banks lend money to one another and to private individuals. Other factors being equal, it is assumed that the lower the interest rate is, the higher the demand for credit will be. Central banks seek to achieve a macroeconomic effect on lending practices by adjusting their interest rates, and thus the price for central bank money (McLeay et al. 2014a; Bank of England 2015). When key interest rates approach the zero lower bound, however, the control effect from interest rate cuts is lost.

When the COVID-19 crisis struck, the leading central banks were confronted with the problem that key interest rates were already very low. As discussed earlier (see Chapter 3), this is because after the 2007-2009 financial crisis, the global financial system never really emerged from crisis mode, and interest rates were already hovering around zero. The ECB and a few other central banks had set negative interest rates for reserve deposits. The Bank of England had fixed its key rate at 0.75 per cent. The Fed had only raised its rates modestly to 2.5 per cent. At the beginning of March 2020, the Fed decided to react in a very traditional manner and cut rates to a modest half-percentage point. This had no positive effect. Shortly thereafter, the Fed and also the Bank of England lowered their rates to 0.25 per cent, once again, however, to no avail (Wolf 2020).
**Lender of last resort**

Central banks quickly realised that they would have to make use of much stronger monetary ammunition than interest rate policies, and that above all they would have to expand their policies relating to lender of last resort, quantitative easing, market maker of last resort, and the provision of liquidity swaps. Central banks are able to pursue these powerful tools because they occupy a unique position among financial players. Unlike other financial institutions, central banks do not have a liquidity problem during a crisis, at least not in their own currency, because they are located at the top of the credit hierarchy (see Chapter 2.3.3).

For this reason, during times of crisis central banks have the capacity to act as lenders of last resort, and – at least theoretically – to provide unlimited amounts of credit (Giannini 2011). The idea behind the concept of lender of last resort is to provide liquidity to credit institutions which in principle are solvent, but which have longer-term liabilities that make it impossible for them to meet short-term obligations. Under certain circumstances, institutions in this position may then be forced to pay a high price for the funds they need. Especially in times of crisis, however, it is difficult to distinguish between insolvent and illiquid financial players, considering that periods of prolonged illiquidity can lead to bankruptcy (Bank for International Settlements 2014).

One of the most important monetary policy decisions at the very beginning of the COVID-19 financial crisis was the provision of emergency liquidity assistance as a short-term measure to help institutions cope with money shortages and to prevent a credit crunch on the financial markets. At the beginning of April, the Fed set up a new facility to provide term financing in order to buy loans made by banks to support small businesses (Fed 2020a). This program, which already includes 454 billion U.S. dollar loan guarantees provided by Fed lending facilities, is meant to support the fiscal stimulus package that the U.S. Congress had passed in the preceding week. The Fed has also started to buy commercial papers from business concerns under the Primary Market Corporate Credit Facility (PMCCF) and the Secondary Market Corporate Credit Facility (SMCCF), the Main Street New Loan Facility (MSNLF) and the Main Street Expanded Loan Facility (MSELF). All these policies are highly unconventional and provide credit of up to 2.3 trillion USD to support the economy (Boyarchenko et al. 2020a). While some monetary policies are similar to the financial crisis of 2007-2009, the purchase of corporate loans and commercial paper provides credit directly to non-financial firms. These policies once again moved Fed policies into a new domain where it began providing liquidity directly to the productive economy. This underscores how serious the current situation is. The same is true for the ECB, the Bank of England and the Bank of Japan, the Bank of China and many other central banks which have similar programs. In effect, central banks around the world now provide a huge amount of money
to financial players as well as to non-financial players in order to stabilize financial and economic systems (Tett 2020). In addition to these measures, the Fed has gone even one step further, and for the first time in its history has launched a Fed-backed vehicle to buy investment-grade ETFs in order to counter over-reactions in equity trading (Ablan et al. 2020).

**Quantitative easing (QE)**

Already during the global financial crisis of 2007-2009, the policy of quantitative easing (QE) was introduced in order to complement key interest rate policies. Quantitative easing is a form of open market operations by central banks, albeit a very special and unconventional form. Just as when money is lent against securities through a marginal lending facility, in open market transactions, money is made available to financial players through the sale and purchase of securities – for the most part, government bonds. Central banks finance such transactions by creating money. This implies that they can create money at will and bring it into circulation by purchasing assets, in most cases domestic government bonds, but ultimately by buying an asset of their choice (Stigum et al. 2007).

Unlike in the case of interest rate policy, when central banks purchase government bonds or other assets from private holders of those bonds, it has a direct impact on the amount of money in circulation. The idea behind quantitative easing, besides the purchase of otherwise illiquid securities, is that the money acquired through the sale of securities will be reinvested, and the seller will use the funds to purchase assets such as shares or corporate bonds. It is assumed that this will increase the value of the shares, and, in turn, will facilitate access to money on the markets for business concerns, which they can then invest in areas such as production (Bank of England 2015). Optimally, this should stabilize the financial markets and stimulate the economy. However, in the case of the USA, the goal was also to stabilize the Treasury market. As discussed in Chapter 4.4, financial players as well as business entities in the productive economy were in such great need of cash that they even sold their safest and most liquid assets – assets such as Treasury bonds and other government bonds which previously counted among the most sought after securities: “We may be witnessing the biggest dash for cash the world has seen” (Financial Times 2020f). In response to this dilemma, central banks around the world have again launched or intensified their quantitative easing programs. Besides creating the 750 billion Euro Pandemic Emergency Purchase Programme (PEPP), the ECB, for example, has initiated a new round of QE measures that will involve the purchase of bonds in an amount of more than one trillion euros by the end of the year (ECB 2020). Similarly, the Bank of England has set up a term funding scheme for small and medium-sized firms, and a COVID Corporate Financing Facility to support larger firms. In addition, it is also providing liquidity to the financial sector (FSB 2020b).
**Market maker of last resort**

In mid-March, when the security market became dysfunctional, and there was a breakdown in typical relationships, for example, between Treasury yields and stock prices, and the Treasury market, which is the largest and most important government securities market in the world, became progressively more illiquid, the Fed once again adopted a strategy employed for the very first time during the global financial crisis: Alongside its role as lender of last resort, it began to serve as dealer of last resort (Kaminska 2020). This implies that the Fed has stepped in to trade on both sides of the repo market by dramatically increasing the size and the terms of its repo transactions. Cash-rich vehicles such as money market funds, which had retreated from the market as money-suppliers, are on the one side. On the other are financial players such as security dealers and hedge funds which are in need of cash (see Figure 24). The expansion of open market operations along with liquidity support, through auctions for example, presents an alternative to the bilateral provision of liquidity, and in this way has also reduced the risk that financial operators will be stigmatized.

**Figure 24: Federal Reserve as market maker of last resort**

![Diagram showing the Federal Reserve as market maker of last resort](Source: Author’s own diagram.)

The Commercial Paper Funding Facility (CPFF) was set up in mid-March to enhance the liquidity of the commercial paper market and provide a liquidity backstop for this market by supporting financial players to roll over outstanding commercial paper (Boyarchenko et al. 2020b). Most of the primary dealers do not have a reserve account, and, accordingly, are not eligible for the Fed’s discount window. In order to obtain funding, these financial players are able to access another debt instrument which has been revived, the Primary Dealer Credit Facility (PDCF) (Martin et al. 2020; see also Chapter 3.1). Especially for the shadow banking sector, the Fed has strengthened...
its overnight reverse repo facility (ON RRP) as well as its overnight repo facility (ON RP) (Bernanke et al. 2020). It has also established two further debt instruments: the Money Market Mutual Fund Liquidity Facility (MMLF), which is very similar to an instrument initiated during the global financial crisis but with a broader range of eligible assets (Cipriani et al. 2020; Politi 2020), and the Term Asset-Backed Securities Loan Facility (TALF), which is designed to tackle the capital market by enabling the issuance of asset-backed securities collateralized, among other things, by student loans, auto loans, or credit card loans (Fleming et al. 2020b). Both facilities are specifically geared to shadow banking institutions, making it possible for the Fed to serve as a counterpart for both borrowers and lenders on the money market and on the capital market (Wullweber 2020b; see again Figure 24). As in 2008, the Fed has once again moved the wholesale money market onto its own balance sheet (Mehrling 2011).

The Fed has also announced that it would purchase Treasuries, agency mortgage-backed securities (MBS), and agency commercial MBS to the extent necessary (Fed 2020b). Between 15th and 31st of March alone, the Fed bought 775 billion dollars in Treasury bonds and 291 billion dollars in agency MBS (Fleming et al. 2020a). These policies helped to calm the market, which bounced back very quickly (see).

Figure 25: Rates on 30-day commercial paper ease

Source: Cipriani et al. 2020.
It was also possible to narrow the spreads, as is shown in Figure 26 for the one-week overnight indexed swap (OIS), a further sign that the financial markets have once regained a semblance of calm.

**Figure 26: Spread for the one-week overnight indexed swap**

![Graph showing spread for the one-week overnight indexed swap](image)

Source: Boyarchenko et al. 2020b.

The U.S. Treasury market also calmed down (see Figure 27).

**Figure 27: The U.S. Treasury market**

![Graph showing the U.S. Treasury market](image)

Source: Fleming et al. 2020c.
**Liquidity swaps**

Global crises are often associated with U.S. dollar funding problems (Pozsar et al. 2020). With worldwide falling demand and revenues in the context of U.S. dollar dominance, many firms (and also countries) have been struggling to meet their dollar-denominated liabilities. For this reason, the Fed has established new currency exchange agreements (swap lines) with other central banks in order to facilitate their access to U.S. dollars and to ensure U.S. dollar liquidity. Currency swap lines which the Fed had already set up with several central banks in 2008 were once again revived in March 2020. In the current crisis situation, however, the Fed has taken its policies even one step further. With so many businesses around the globe in dire need of U.S. dollars, and with banks outside the USA holding nearly 13 trillion dollars worth of dollar-denominated assets (Aldasoro et al. 2019), the Fed has opened a new temporary facility for Foreign and International Monetary Authorities (FIMA). FIMA will enable foreign central banks to access U.S. dollars by using their existing stocks of Treasury bonds to transact repurchase agreements with the Fed (Fed 2020c). Accordingly, the Fed has revived and significantly strengthened swap lines with other central banks while at the same time broadening the range of eligible central banks. Eligibility has now been extended to include central banks in large emerging markets such as Brazil and Mexico, for example, as well as to central banks in European countries such as Denmark, Norway and Sweden.
5. Outlook

The economic and financial turbulence caused by the COVID-19 pandemic is not endogenous to the financial system. As the report has demonstrated, however, even before the outbreak, the global financial system had already shifted into crisis mode. Accordingly, when the pandemic struck, the financial system was not in a position to buffer the impact of the economic downturn. On the contrary, the system’s existing weaknesses only made the overall economic crisis worse by triggering adverse feedback loops and downward liquidity spirals that led to a deepening of economic decline and made economic recovery much more difficult.

The warning signs were all there long before the onset of the crisis, and financial scholars and economists have repeatedly pointed them out. The Systemic Risk Council (2019), for example, has been criticizing the reduction of equity and liquidity requirements in banking for many years, arguing that it would impede the system’s resilience in times of crisis. On several occasions, they have called attention to the high possibility of spill-over effects from the financial system into the non-financial system. They have warned that this could aggravate an economic crisis, depress economic activities, endanger jobs, and erode asset values even further, while at the same time creating an environment prone to greater risk taking. Moreover, they have also criticized existing leverage and liquidity mismatches in the shadow banking system.

Lack of trust in the private financial sector long predates the current crisis. For years, the volume of unsecured interbank loans has been progressively declining, while the demand for repo transactions has continued to rise (BIS 2017, 2019c; ECB 2017, 2019). Although in response to the global financial crisis of 2007-2009 government entities and institutions responsible for shaping policy had promised to make the financial system more resilient, the situation has remained very much the same since then in terms of market dynamics and how financial players react in crisis situations: First there was a rush for safety which was followed by a run for liquidity. That led to a downward price and liquidity spiral, which then resulted in a widespread plunge in asset values.

The present financial crisis has once again very clearly demonstrated that financial markets in their current form do not act as a firewall to avert economic downturns. They are in no way capable of serving this purpose. Not only were they not capable of withstanding the economic impacts of the corona pandemic; more serious still, the escalation of viral contagion led directly to an escalation of financial contagion. Since the financial crisis of 2007-2009, it has become obvious that to work properly, the financial system depends on central banks. The present breakdown has made it all the more clear that in an emergency situation it is not even able to fulfil its basic function: the provision of liquidity to the productive economy. Central banks have had to step in to prevent large-scale insolvency by providing credit directly to large employers as well
as to small and medium-sized businesses to enable them to maintain their business operations and retain their employees. Moreover, the financial system itself is now operating on life support and is in need of liquidity injections to an even greater degree than during the last global financial crisis. As a result, instead of being able to concentrate their full attention on the critical situations developing in their countries’ economies and health care systems, governments and central banks have been forced to deal at the same time with the crisis in their financial systems. This has absorbed crucial capacities and valuable resources which are urgently needed in other parts of the economy.

More than ever before, the demand and supply of credit, and thus the functioning of financial markets as a whole, are determined by central bank monetary policy (Eickmeier et al. 2013; Avdjiev et al. 2017). Monetary policies, needless to say, cannot stop a virus pandemic like COVID-19. But they are able to keep the measures that are required to curb such an event from causing a financial crisis (Tooze 2020). And there is no doubt that they can mitigate economic crises and fight global recession. This, of course, changes central bank balance sheets. The Federal Reserve balance sheet, for example, already reached a record amount of over seven trillion dollars in early June 2020 (see Figure 28). Some estimates predict that before the crisis is over, the figure could rise as high as nine trillion (Smith et al. 2020c).

**Figure 28: Federal Reserve balance sheet expansion**


Central banks must now intervene in markets to an extent never previously imagined. They also have to employ measures that were unthinkable before the COVID-19 crisis. In the current situation, they reacted with unparalleled speed, power, and variety of policy measures. They cut
interest rates, introduced government bond and security buying programs, created liquidity facilities, and opened credit lines for various financial and non-financial actors. Will the immense expansion of central bank balance sheets become a problem for financial stability? Or will the stabilizing measures implemented by central banks and governments resolve the COVID-19 financial crisis?

As demonstrated in Chapter 2.3.2, central banks can create money at will in their own currency. In the wake of the COVID-19 crisis, this money can be used to revive the productive economy, support people who have lost their jobs, and strengthen health care systems, plus a whole lot more. Although central banks all over the world have exercised their power to implement a diverse range of monetary policy options to counteract the effects of the COVID-19 crisis, the measures they have introduced have been complemented only in part by forceful fiscal policies. Unlike fiscal policies, however, monetary policies do not directly translate into economic activities. When monetary measures introduced by central banks fail to reach the productive economy and, as has happened before, are diverted instead into the financial sector as excess reserves, the pattern of boom and bust cycles is bound to continue with serious negative implications for the entire productive economy. Current data already point to the likelihood of such a development. The implications of the COVID-19 crisis for economy and society will very probably lead to the most severe global recession since the global depression of the 1930s. No one knows how long COVID-19 containment measures will have to remain in place before a coronavirus vaccine becomes available. And yet, since April 2020, financial markets all over the world have begun to rally. The S&P 500 index of U.S. blue-chip stocks is already heading in the direction of the all-time high achieved before the outbreak of the COVID-19 pandemic (Henderson 2020). Hence, even if central bank intervention does manage to stabilize financial markets, that stability will remain highly precarious.

There is, however, another possible scenario that needs to be considered in light of the fact that some central banks have recently come under strong political pressure. This applies first and foremost to the ECB. As the only institution capable of stabilizing the eurozone in the uncertain times of COVID-19, the ECB is currently undergoing a deep legitimacy crisis itself, owing to the very measures it has taken to stabilize the eurozone. Several governments, including that of Germany, have accused the ECB of overstretching its mandate and illegitimately financing weak Member States by buying too many of their government bonds. This is particularly astonishing considering that when the scale of the COVID-19 pandemic became apparent, the EU was not in a position to take concerted action to buffer the impact of the ensuing economic downturn. Instead of being based on European-wide coordination and joint economic policies, responses
to the coronavirus crisis were organised almost exclusively on the national level. Possibilities for counteracting the economic downturn in the EU, however, vary widely from country to country. While some Member States have considerable capacity to offer financial support to the various branches of industry and commerce as well as to wage and salary earners, other countries have only limited financial flexibility. As a result, already existing weaknesses within the eurozone have led to an increase in inequality among the Member States, driving the eurozone further into severe crisis. It was only the swift and forceful action on the part of the ECB with a diverse set of unconventional policy measures that made it possible to at least provisionally restabilize the eurozone. National governments continue to wrangle over possible EU-wide instruments and programs. Back in March 2020, for example, the EU was asked by the president of the ECB to consider issuing so-called “corona bonds”, a version of Eurobonds designed to finance government recovery programs. Even this proposal, however, is no longer on the table. As a consequence, it has basically been left up to the ECB to take forceful action.

The ECB is the only institution left that is currently capable of and willing to enforce stabilizing measures in the face of the COVID-19 euro crisis. At the same time, as an institution that remains largely independent of democratic control, its increasing power and influence have given rise to such notions as unelected power, technocratic exceptionalism, and central-bank dominated order. The political dimension and the distributive consequences of monetary policies have become widely discussed issues not only in the media and political circles, but also among ordinary citizens. The fact that the ECB has lost its neutrality is reflected, among other things, in the legal actions brought against the ECB. Particularly significant in this connection is the ruling handed down by the German Federal Constitutional Court on 5th May 2020 that questions the legality of the ECB’s QE program for the purchase of government bonds. The Court ruling requires Germany’s central bank, the Bundesbank, to halt participation in this program unless the ECB is able to show that the policy is ‘proportionate’. Without the resources of the Bundesbank, however, QE will be on very shaky footing. This, in turn, could severely destabilize the entire eurozone and even set the stage for the next, possibly even worse, eurozone crisis.

Whichever way these two scenarios play out, the overall problem remains that financial markets are not adequately regulated. Mass hysteria tends to govern how financial markets react, both in good times and bad. And that explains the build-up of asset bubbles. If we expect the system to cushion the impact of unforeseen disasters and public emergencies such as the COVID-19 pandemic, it will be necessary to create a much more comprehensive framework of safety buffers in the form of equity, excess reserves, emergency funds and other collective crisis management instruments. The maintenance of such buffers will be costly. Moreover, they will
exert considerable pressure on bank profitability. But in the end, it is not a question of whether costs will arise, but of who will have to bear the expense – public or private institutions.

Another important part of the problem is the shadow banking system. It has become clear over the course of the past decade that the policy approach taken to build up a resilient system of non-bank financial intermediaries has failed. Instead of trying to strengthen a defective system, concerted measures must be undertaken to dismantle the shadow banking sector. Finally, monetary policies alone cannot revitalize the economy. They must go hand in hand with fiscal policies. The Bank of England has taken an important step in this direction: In order to fight the coronavirus pandemic, it has, for the first time in its history, directly financed government spending (Giles et al. 2020). It is the demand created by consumers, employees, state institutions, and private firms that vitalizes supply chains. To ensure the stability requisite to meet this demand and to avoid recurrent crises, urgent action will be needed to establish strong and appropriate rules for financial markets.
6. Literature


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