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Systemic risk and macro-prudential policy
Who is the Lender of Last Resort?

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SUMMARY

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Abstract

During times of financial crises, when banks and other financial institutions face severe liquidity challenges, the concept of the lender of last resort becomes paramount. The lender of last resort is a critical role performed by central banks to provide liquidity support to troubled financial entities in times of distress. The lender of last resort acts as a safety net, ensuring that financial institutions have access to funds when they face a shortage of liquidity, thereby preventing potential systemic risks and stabilizing the financial system. In this essay, we will delve into the concept of the lender of last resort and its theoretical foundations. We will first discuss the concept of liquidity risk and its implications for financial stability. Next, we will delve into the solutions provided by the lender of last resort to address liquidity problems. In the third part, we will examine the practical implementation of lender of last resort functions through the liquidity programs of central banks, such as the Federal Reserve (FED) and the European Central Bank (ECB). The changing definition of the lender of last resort, marked by the increasing significance of government intervention, will be presented. Subsequently, an analysis of the lender of last resort's role during the 2008 financial crisis will be conducted, followed by an examination of the challenges and risks associated with this function in today's financial landscape. Finally, we will analyze the impact of technological advancements on the function of the lender of last resort.

Through this analysis, we will gain insights into the crucial role played by the lender of last resort in safeguarding financial stability and addressing liquidity challenges in modern economies.

1. Lender of last resort and liquidity risk

Lender of last is resort is an institution (traditionally central bank) that provides liquid funds to banks at risk of illiquidity. As one can see this definition is specifically based on the notion of liquidity risk. One has to ask: What is a “liquidity risk”?

According to the literature, banks are generally exposed to two kinds of risks: credit risk (“the risk of not being repaid by borrowers at maturity”, Ugolini 2017, s. 104) and *liquidity risk* (“the risk of being unable to repay lenders on their demand”, ibidem). The second type of risk is crucial in this case. According to the US Office of the Comptroller of the Currency liquidity risk “is the risk to earnings or capital arising from a bank's inability to meet its obligations when they come due, without incurring unacceptable losses” (Categories of Risk, 1998, s. 2).

Dealing with the liquidity management is a primary problem for the bank, because bank is a financial intermediary that provides maternity transformation of assets. It transforms deposits that can be withdraw anytime into loans with different maturities. While creating assets (loans) from liabilities (deposits) it must ensure that liquid assets are always available at the right level.

This process can be explained by reference to the simplified balance sheet of a commercial bank during a bank run. Let's imagine that in a normal situation the relationship between bank's assets and liabilities is stable. In a very simplified manner, we can say that on the side of liabilities we have only deposits, while on the asset side – liquid (reserves, cash) and illiquid (loans, securities) assets. We assume that the bank is solvent, namely that assets are greater than deposits. Shareholder equity is positive; therefore, bank is solvent. Now, we can also imagine that the bank became a victim of a bank run: clients start to withdraw its deposits quickly. Bank runs are symptomatic examples of the so-called "coordination failure". If every depositor kept their money in the bank, everybody would be better off. This means that crisis is a self-fulfilling prophecy: "even in cases in which the run is irrational ex-ante (there was no reason to expect a failure, as the bank was healthy), it can become rational ex-post (the mere fact that depositors doubt its ability to repay is sufficient to make it unable to do so)" (Ugolini 2017, s. 107). In order to fulfill its obligations (pay off the depositors) bank must spend its liquid assets. The liquidity problem appears in the bank when the liquid reserves dry up. In this case to keep paying customers, the bank would have to sell its illiquid assets, such as securities or loans. Because these are illiquid assets bank would have to sell it below its price when purchased (or its "fair" value). This could let to the failure and collapse of the bank. Therefore, liquidity risk is mostly related to the to the inability to meet short-term debt obligations without incurring losses (caused by the selloff of securities). As we can see bank can collapse even if it is solvent – even if its assets are originally larger than liabilities.

There is also one important conclusion we can draw from this description: illiquidity and insolvency are two different kinds of problems. In real life they are often intertwined, however, theory clearly indicates that if the bank is insolvent and shareholder equity is negative it should be closed. On the other hand, bank that is solvent but has temporary liquidity problems should be able to operate. That's because the collapse of a solvent bank can generate serious negative externalities (e.g. for the banking sector or in general for the economy). Therefore, this is an opportunity for the central bank to intervene and grant a collateralized loan to the commercial bank. One can say that this operation represents some king of re-transformation of assets: central bank transforms illiquid asset back to its liquid form.

There are three most important sources of liquidity risk for commercial banks. Firstly, on the liabilities side there is a risk of deposits outflows. This type of problems was covered above with reference to its extreme form – bank run. Secondly, during the times of distress, on the asset side bank can have a problem with encouraging customers to take new loans or it can struggle to collect old unpaid loans. This can be a sign of the managerial problems in bank when it comes to the risk management, e.g. with the process of "getting to know your customer" (KYC). This is the case when liquidity risk is caused by credit risk. Thirdly, banks can have a problem with ensuring their liquidity by using inter-bank market (Rochet 2008, s. 47). Normally, banks provide liquidity through the interbank short-term loan market (overnight). However, during times of financial market uncertainty, banks may hesitate to lend their reserves on the overnight market if they are not confident about their ability to borrow cash themselves in times of distress. They may prefer to hold cash and forego profits from overnight loans to ensure that they have sufficient liquidity in unforeseen situations (Carlson et al., 2015).

In situations involving deposit outflows and interbank liquidity crunch, lending of last resort would be an optimal strategy. This is because such situations are often associated with exogenous factors, such as macroeconomic shocks, and are often beyond the control of managerial qualifications.

2. Solution to the liquidity problems, conditions and bailouts

As reported in the literature we can distinguish two types of solutions to the liquidity problem in banks: ex ante and ex post solutions. Ex post solutions can be implemented after the crisis (i.e., liquidity crunch) has already occurred. Lending of last resort, deposit insurance and – the most controversial one – bailouts are primary tools in this case. It is said that the deposit insurance as well as a lending of last resort are not related to the moral hazard problem. Ex ante solutions are mostly related to the sphere of regulations (Basel Accords etc.). State legislations can cover areas such as liquidity, capital, reserves and activity requirements. It can also enforce supervision and disclosure. This essay will concern only the first point, we will analyze lending of last resort as an ex post solution to the liquidity problem.

When the liquidity crisis comes, bank may turn to central bank for assistance. To obtain an ex post help commercial bank must meet several conditions. They are mostly related to the fact that the central bank provide liquidity in a form of loan. We can enlist the most important and most general ones:

1. Bank must be solvent. As we have mentioned above, its total assets must be greater than its total liabilities.

2. Bank must bear the costs of the loan - lending of last resort is often based on much higher interest rate than the loans available on the market. This is a kind of penalty build into this system. It serves to reduce moral hazard.
3. Loan must be repaid (it is temporary). As pointed by a European Central Bank (What is a lender of last resort?, 2019), central bank can intervene and provide liquidity only temporarily in the case of unforeseen circumstances. After the crisis is overcome and everything return to normal, loans must be repaid. Maturity of loans can vary from overnight loans, from 30 days up to several months.
4. Bank must provide eligible collateral. But what does "eligible" mean in this context? Collateral can take the form of e.g. securities or loans. When it comes to loans, eligible collateral would entail that loans granted by commercial bank will be repaid. Eligible securities can take the form of treasuries. All in all, "good" collateral means that it has some inner value for the central bank. In fact, the idea of being solvent is inherently embedded in the notion of "good" collateral, since it entails that the bank has been well managed (it has had an efficient risk management, KYC etc.).
5. Other options are unavailable or would harm the bank's financial stability. During an uncertain situation on a market some options may not be available for the banks (e.g. inter-bank market). However, as it was mentioned above, liquidity risk is related to the fact that in a time of distress bank would have to incur unprecedented loses. In fact, change in a value of assets (mainly securities in this case) is not a problem in itself. It can become a problem when bank must sell them before their maturity. It should be highlighted that there are many other risks that are connected to the liquidity risk, for example interest rate risk. When interest rate rises the price of the government bons go down. If bank has liquidity issues, it must sell its bonds below the price when purchased. This was exactly the case with the Silicon Valley Bank, since it has purchased a lot of long-term government bonds when interest rates were near 0. When interest rate rose, it had to sell its bonds and incur losses on the asset side.

Based on the points above, the difference between lending of last resort and bailouts can be represented. Traditionally lending of last resort is perceived as a rule-based intervention, while bailouts as a discretionary one. Lending of last resort is a prerogative of the central bank, so it is an area of interest of monetary policy (Ugolini 2017). Bailouts are in general used in extraordinary situations threatening macroeconomic or financial stability of the whole system. They often serve to counter the domino effect of collapsing banks. Decisions of bailouts remain in jurisdiction of fiscal policy as they require spending public money. Literature has in general acknowledged that bailouts are very costly. They can't be a part of rule-based intervention as it would spur banks to take more risk on their investments on the asset side and – in effect - it would undermine the stability of banking system in general.

However, the most important difference between lending of last resort and bailouts concerns the solvency condition. As it was mentioned above, central bank can provide liquidity to banks that have liquidity problem as long as they are solvent. On the contrary, bailouts are intended for banks that are insolvent and illiquid. During 2008 crisis the letter type of intervention was even used to help banks who had "toxic" assets on their balance sheets (CDS and so on).

There is also a more subtle difference between lending of last resort and bailout. Traditionally literature acknowledges that bailouts are directly connected to the moral hazard problem, while lending of last resort is free from these types of problems. It should be noted that this division is based on the more fundamental distinction between insolvency and illiquidity. However, possibility for central bank to distinguishing between these two types of situations is called a "myth" by Charles Goodhart (1999, s. 342). When it comes to the inner situation of the bank's balance sheet there is a strong asymmetry of information between central bank and commercial bank. Therefore, there can be a situation where central bank will lend money to the insolvent bank, because it cannot distinguish between illiquidity and insolvency.

In the context of bailouts, this distinction may not be as significant; however, in the case of the lender of last resort function, it is crucial due to the underlying theoretical assumption that it is a policy aimed at maximizing welfare. Therefore, it is traditionally treated as a micro-perspective intervention, focused mainly on negative externalities related to the collapse of bank because of its liquidity problem. However, lending of last resort has also significant macroeconomic consequences. The lender of last resort is a crucial part of the institutional framework for financial stability. What is a purpose behind a lending of last resort besides maintaining the bank's operation? First, from the consumer's point of view, bank providing liquidity can prevent loss of confidence in bank and – in consequence – prevent bank runs. As it was noted by Paul Tucker, the simple presence of the lending of last resort mechanism, without taking any action (any lending), "can eliminate run-risk altogether, increasing social welfare at zero cost." (Tucker, 2014, s. 7). It can be a very powerful instrument especially in situations of liquidity crunch caused by slowdown on financial markets, therefore in liquidity problems not caused by the managerial failures. More important in this context is that the existence of central lender enables optimal usage of funds. In fact, central bank is a liquidity insurer. Without such an institution bank would have to keep much more liquid flows as reserves in case of an unforeseen eventuality. In hypothetical situation where there is no lender of last resort or some additional liquidity requirements, we would have less than optimal level of liquidity in the economy. Banks would need to keep larger liquidity buffers if they had concerns about the ability to access funds in the times of crisis. Knowing that there is such an institution as a liquidity provider of last resort bank can efficiently invest these additional funds.

From this perspective lender of last resort provides liquidity to banks, "which in turn provides liquidity insurance to the rest of the economy (households and businesses). Thus, central banks are liquidity re-insurers" (Tucker, 2014, s. 12). Through liquidity insurance system central bank indirectly assures that the real economy has access to the liquidity, this in effect prevents liquidity crunch (Carlson et al., 2015). Liquidity crunch is a very unfavorable situation for the economy, in which customers who meet all the conditions cannot get a loan from the bank. In effect, the liquidity problem is spilled over an economy: banks with liquidity problem can't provide loans to solvent firms, some of which will not be able to operate without additional liquidity. This is the transmission mechanism from financial to real part of the economy: companies that are solvent but have liquidity problems will go bankrupt. Central bank can intervene in this situation because it is "the only agent in the economy that is not exposed to liquidity risk" (Carlson et al., 2015, s. 8).

3. Lending of last resort in practice – FED's and ECB's liquidity programs

To illustrate how lending of last resort works in practice we can use FED's and ECB's liquidity programs as an example. Basic FED's lending facility for commercial banks is called "Discount Window Lending". There are three principal types of loans provided in the framework of Discount Window Lending: primary credit, secondary credit and seasonal credit. They tend to be a short-term loans with collateral provided.

Primary credit is the most important FED's lending program. It serves as a principal safety net for the banking system. "It is available to banks that are in generally sound financial condition, and there are no restrictions on the use of funds borrowed under primary credit" (Discount Window Lending, 2023). A loan can be granted for up to 90 days although it's most popular version - which works on a day-to-day basis - is an overnight loan.

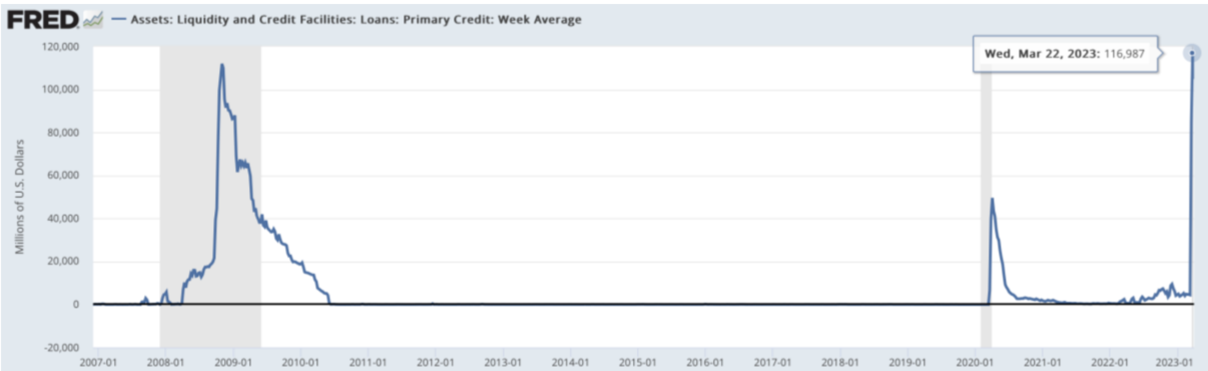
Secondary credit widens hypothetical recipients of central bank's loans, because there are no additional requirements concerning the bank's financial standing. Secondary credit is a lending facility available to banks that are not eligible for primary credit. "It is extended on a very short-term basis, typically overnight, at a higher rate than the primary credit rate" (ibidem).

The higher interest rate is a form of penalty for the higher risk that the central bank has to bear. Contrary to the secondary credit, central bank imposes some restrictions on the use of secondary credit.

The third type of FED's loans is a seasonal credit. It aims at assisting small depository institutions which have seasonal problems with liquidity. This type of loan can be granted for up to nine months when seasonal liquidity needs are higher. It enables banks "to carry fewer liquid assets during the rest of the year and, thus, allowing them to make more funds available for local lending" (ibidem).

Each one of these loans is characterized by a different level of interest rate. Primary credit is the most important program in FED's liquidity provision system, that's why the term "discount rate" is used as a synonym for the "primary credit rate". In general, credit rates enlisted above are significantly higher than the cost of interbank loans. That's why banks turn to the central bank as a last resort, in exceptional situations. It is worth noting that there are also different liquidity provision tools implemented by the FED during the COVID crisis and after the Silicon Valley and Signature Bank downfalls (for example Bank Term Funding Program - BTFP).

As we can see on the graph, discount window borrowing tends to rise when there is a crisis, therefore when banks start to experience liquidity pressure. We can clearly distinguish the following liquidity crises: 2008 crisis, 2020 COVID pandemics and recent financial problems of several banks in US and in Europe. However, we can see that recently the liquidity pressure has started to rise since the beginning of the recent slowdown (since the start of the war on Ukraine).



When it comes to the ECB lending facilities the situation is more complex. It was only in 2017 that the rules of the ELA program were clearly defined. They were formalized in a document called "Agreement on emergency liquidity assistance". In general, Emergency Liquidity Assistance (ELA) is provided by the national central banks of euro area countries

(NBCs), not by the ECB itself. Agreement states that banks in member states can apply for loans to national central bank in two manners: as a rule (on a day-to-day basis) or in exemptional circumstances. We are dealing with ELA when "(a) a Eurosystem NCB provides central bank money and/or (b) any other assistance that may lead to an increase in central bank money to a financial institution or a group of financial institutions facing liquidity problems, where, in either case, such operation is not part of the single monetary policy" (Agreement on emergency.., 2017, s. 1). In most cases ELA provision to single bank shouldn't exceed twelve months. If it does, the Governor of the relevant NCB is required to provide monthly justifications for the continuation of ELA in a letter to the President of the ECB, who has the discretion to impose additional requirements and conditions.

It is worth noting that the ECB's credit program is much more discretionary than that offered by the Fed. When it comes to the ELA program, conditions are often assessed on a case-by-case basis by the NCB. The collateral requirements for the ECB's ELA are generally not as stringent as those for regular ECB operations, and the collateral is also evaluated on an individual basis by the ECB (through NCB).

During times of crisis, the ECB frequently employed various forms of liquidity provision. For example, throughout the COVID-19 pandemic these measures included implementing asset purchase programs, offering long-term refinancing operations (LTROs), and introducing pandemic emergency measures, such as the Pandemic Emergency Purchase Programme (PEPP). These initiatives were aimed at supporting liquidity in financial markets and providing monetary stimulus to the eurozone economy.

When discussing the lender of last resort role of institutions such as the ECB or FED during financial crises, it is noteworthy that the definition of the lender of last resort has evolved in recent times. Many economists have noticed that during recent events, such as pandemics and crisis triggered by war (gas price crisis), governments in advanced economies have taken over the role of the liquidity provider of the last resort. In the IMF report this new role war called "Financier of Last Resort" (2022). Governments implemented the so-called "financial support measures" (FSMs), which were primarily aimed to support firms by providing "credit guarantees, loan programs, and equity injections" (Battersby et al. 2022, s. 2). Credit guarantees consist of governments providing guarantees on loans to support businesses, ensuring that lenders would be reimbursed in case of default. Governments established also loan programs to provide businesses with access to affordable credit, often with favorable terms and conditions. Equity injections involved governments injecting capital or making equity investments in businesses to support their ongoing operations and stabilize their financial position. There were provided mainly to systemically important and state-owned firms. We can enlist also many other liquidity programs: wage subsidies, tax reliefs, grants and subsidies and moratoriums on loan payments. All these measures enable the regulators to transfer risk from private sector to the public sector.

During the COVID crisis guarantees were the most often used liquidity program. Sharp decline of firms' cash flows because of the lockdowns have spurred their demand for liquidity. To meet this demand governments implemented public loan guarantees programs. They aim at guaranteeing the substantial part of the loan by government and they generally applied to small and medium size companies. When it comes to the guarantees and loans it is assumed that the program should target private firms that are illiquid but solvent. As one can see, the assumption that funds should be provided to firms that are solvent is still valid, whether we are talking about central bank or government money. This forms the basis for the relationship between the private sector and the public lender of last resort.

The extension of the government's role as a lender of last resort was marked with the changing role of the central banks. Infusion of record amount of money into real economy was made possible because government spendings were financed by central banks. The process of debt monetization has reduced the independence of central banks and their monopoly on providing liquidity. It has also resulted in a significant shift, with central banks taking on the role of market maker of last resort, while governments have assumed the role of financier of last resort. In the times of COVID crisis central bank create a demand (market) for government securities. This kind of transactions signalized moving away from the rule-based policy when it comes to lending of last resort. In the event of a liquidity crisis, standard monetary interventions were found to be insufficient. That's why lending of last resort took the form of the discretionary policy (De Grauwe 2011). This change is associated with the increasingly apparent issue of moral hazard. It is worth noting that this kind of shift (or extension) of the definition of lender of last resort has begun since the global financial crisis in 2008.

4. The context of the financial crisis and its relationship with Lender of Last Resort

The 2008 financial crisis has had enormous consequences for the global economy, people lost their job and homes due to the collapse of the property market and a significant downward in business activity. The crisis has caused unpredictable threats to the world economy and with those facing it. The root causes of the 2008 financial crisis can be traced back to a combination of factors that make up a complex and interconnected web in the financial system. These factors include regulatory adjustment, financial innovation, ineligible mortgage lending, debt standardization, and speculative behavior by financial institutions, among others.

One of the extremely important factors that contributed to the 2008 financial storm was the adjustment process. In the decades before the catastrophe, there was a tendency to compromise everywhere, especially in the America. Regulatory regulations involve loosening or dismantling government control and supervision over financial powers, allowing them to operate with incredible freedom and flexibility. This regulatory environment has created wolves for financial forces to engage in risky and speculative activities, including the creation of sophisticated financial products such as mortgage-backed securities (MBS) and debt-based bonds (CDOs), create unpredictable "complexity" in the sector, causing struggling to many people on how to face these economic challenges.

Financial innovation, another contextual factor, also contributed to the 2008 financial crisis. Financial institutions have come up with new ways to generate higher returns through complex products. Complexity and high risks, such as excessive use of financial leverage, contribute to increased risks and push back the limits of the financial system. Unqualified mortgage lending is also a contributing factor to the financial crisis. Many credit unions have provided mortgages without a qualifying loan requirement, with the aim of increasing interest rates and creating complex credit products. As ineligible loans became non-repayable, financial institutions faced huge risks and mounting debt burdens, leading to the collapse of many banks and the entire financial system. Debt standardization is also an important factor contributing to the financial crisis. Standardize debt repayment packaging for complex financial instruments traded in global markets.

In summarize, the financial crisis of 2008 included the rampant use of intricate and high-stakes financial products by institutions, reckless mortgage lending to unqualified borrowers, the normalization of debt practices and standards. All of these factors collectively precipitated a collapse in the trust in the global financial system, resulting in the most serious financial crisis since the historic Great Depression of 1929. Its enduring consequence effects throughout the global economy, with impacts on millions of people worldwide.

During the 2008 financial crisis, the lender's role as leader was finally asserted with vivid and confusing salient features, including:

1. Emergency Liquidity: Made by the Federal Reserve Bank of the United States, quickly provided emergency liquidity to financial institutions facing the funds fever. This is done by introducing discount window borrowing mechanisms in which banks

can borrow money from the Federal Reserve Bank of the United States by offering collateral.

2. Unexpected Collateral Expansion: The Federal Reserve Bank of the United States has expanded the range of collaterals that financial institutions can use to borrow money, including accept higher risk Assets, such as substitutes related to the real estate market. This has caused confusion about the declining asset quality of financial institutions.
3. Acting as a market maker: The Federal Reserve Bank of the United States has acted as a market maker, providing liquidity to various markets, say commercial paper market, the market for substitute warrants relating to property rights, and the market for market deposits. This has created the confusion about the measures to stabilize this market and prevent the crisis from spreading further.
4. Employment Situation: The US Federal Reserve Bank (Fed) offers a complicated futures guide. During the 2008 financial crisis, the Fed provided an unexpected future guide for financial institutions and markets. Generally, for the purpose of providing liquidity support and taking necessary measures to stabilize the financial system. This has helped to reduce uncertainty and restore confidence in the unpredictable financial system.
5. Coordination with other Central Banks: As the last lender during the 2008 crisis, the Fed collaborated with other Central Banks around the world to provide Payment Assistance to Banks. Central banks other than global financial institutions are facing difficulties in funding. Coordinating this entire requirement helped to prevent the expansion of the crisis and the cause of the global financial crisis.
6. Implemented Unconventional Monetary Policy Tools: The Fed also implemented unconventional monetary policy tools during the 2008 crisis, such as quantitative easing (QE), to provide more payment accounts to the financial system and stimulate economic growth. QE involves the purchase of large quantities of Term Substitute Warrants, such as government bonds and acceptance warrants related to the real estate market, assumption of the introduction of payments into the financial system, and timeout rate reduction.
7. Protecting Financial Stability: During the 2008 crisis, representatives of the last standby banks, including the US Federal Reserve, implemented a series of measures to protect the financial stability of the country. Thus, providing conditional

assistance to struggling financial institutions, in order to prevent their potential failure and unpredictable spillover effects on the financial system.

Taken as a whole, the lender of last resort during the 2008 crisis, primarily the US Federal Reserve, exhibited a diverse, unexpected set of characteristics, such as providing emergency liquidity, opening expand collateral capabilities, act as a market maker, provide a forward direction, coordinate with other central banks, develop unconventional monetary policy tools, and protect infrastructure stability mitigates systemic risks and stabilizes the financial system during the worst financial crisis in modern history.

5. Challenges and Risks

During the 2008 crisis, the landscape was rife with challenges, innovations, and risks for lenders of last resort. The ever-evolving global economic landscape poses daunting challenges, requiring disruptive changes in fiscal and monetary policy to navigate its complexity.

The complex web of the financial landscape is ever-expanding, as lenders of last resort, including the famous Fed, struggle with the task of assessing the risk profiles of financial institutions and make important decisions. Providing liquidity support and taking measures to stabilize the financial system is emerging as a challenge, always unstable with complexity and uncertainty. This requires pioneering advances in unique monetary policy tools and an accurate assessment of the ever-evolving financial landscape to effectively address potential risks. The unpredictable nature of the crisis further increases the need for creative and agile responses to the complex challenges ahead.

The challenges and risks associated with transparency in providing lender support ultimately remain a dilemma. During the turbulent and erratic phase of the 2008 crisis, efforts to provide liquidity support and implement measures to stabilize the financial system were mired in public confusion. Transparency and reliability in lender decisions have been challenged, as the complex and volatile nature of these decisions poses unprecedented challenges. The confusion and uncertainty surrounding the provision of liquidity and stability support measures has reverberated, casting a shadow over doubt about the eventual outcome.

The use of unique monetary policy tools, while demonstrating innovation, is fraught with risks and challenges. The absence of established precedents and the inherent risks associated with untried pioneering measures further add to the confusing and bewildering nature of charting a path forward. The complex and intricate web of uncertainties, complications and unknowns that pervades these untested measures creates a lot of confusion for the lenders.

Furthermore, the aftermath of the 2008 crisis sent a sudden and complex wave, plunging the lender of last resort into a spiral of urgent and erratic challenges. The urgency of the situation, coupled with the turmoil and erratic volatility in financial markets, has made the task of accurate economic and financial forecasting a formidable task, shrouded in uncertainty. This has added more risks to the final lender's decision-making and implementation of policy measures.

The role of the lender of last resort, also known as the LOLR, has been an important part of modern central banking and the financial system. LOLR's mission is to provide settlement calculations to financial institutions in times of crisis or systemic risk, as a safety net to prevent financial sprees from expanding. However, despite its importance, the lender's function is ultimately confronted with various techniques that can affect its effectiveness and introduce risks to the stability of the financial system.

One of the main principles of the last lender is the matter of moral hazard. Moral hazard refers to the tendency of financial institutions to engage in excessive risk, knowing they can rely on LOLR for liquidity support in times of crisis. This can create a moral hazard problem because it can encourage reckless actions and increase the likelihood of future financial crises. Financial institutions may be members to engage in risky activities, such as under-inflating, over-reducing, speculative investing, or implementing risk management, with the expectation that the LOLR will help them out of a state of failure. This moral hazard issue can threaten market discipline, distort incentives, and create a sense of injustice for other market participants who do not have access to the same level of liquidity support. This can also lead to an under-allocation of resources because financial institutions may be willing to take on excessive risk that is attributed to the network and entirely attributed to the LOLR.

The issue of timing and scale of interventions can also cause problems for lenders of last resort. Determining when and how much calculations to provide to financial institutions can be a sensitive undertaking and must be decided. Providing too many account calculations can encourage moral hazard and encourage excessive speculative activities, while providing too little account calculations can increase financial pressures and spread the transmission. Lenders ultimately need to make sound and informed decisions, consult each other in times of emergency, consider the severity and nature of the crisis, the availability of certain assets, and the potential for measures to support market activity and stability. However, making accurate judgments and decisions in an emergency can be difficult because available information may be incomplete, uncertain, or rapidly changing.

The lender may end up dealing with technicalities related to its operational framework and operational tools. Traditional instruments used by lenders of last resort, such as open market operations, discount window loans, or collateralized loans, are not always effective in tournaments deal with certain types of crises or disruptions. For example, during the 2008 global financial crisis, the communication tools of the last resort lenders were ultimately inadequate to meet the payment needs of financial institutions facing price pressures, because they do not meet the crisis level and the regulation of the problem. This has raised questions about the intervention of governments and international financial institutions, along with the introduction of algorithms in governance and enforcement of evolving new measures to stabilize the economy market and maintain liquidity calculations.

In addition, lenders must eventually face up to the job security techniques of ensuring fairness in the intervention process. The distribution of computation and interventions can cause ethical and policy controversies and disagreements. Lenders ultimately need to be sure that their decisions and interventions are fair, transparent, and meet ethical and social standards, while maintaining the effectiveness of their intervention solutions.

Furthermore, political awareness and public opinion can cause other problems for the lender of last resort. LOLR actions, such as providing liquidity support to financial institutions, can be seen as a form of rescue or research institute for private institutions using public funds. This provision may lead to opposition and criticism from the public, especially if there is a perception of unfairness or preference for certain processing organizations or their costs - those who may object to the end of the LOLR are started by the close tax. Political pressures and public perception can influence central bank decision-making and affect their ability to function as an effective LOLR, because they may face requires reverse requests from various stakeholders and needs to navigate the delicate balance between financial stability and public accountability.

The international aspect of the lender's function can ultimately provide implications. A financial surge or disruption in one country or region can have spillover effects to other countries or regions, as financial markets and financial institutions are globally connected. The actions and policies of one country's LOLR may affect the stability and functioning of the main financial system in other countries, and distribution among central banks may be required to requested effectively manage spillovers across borders. However, the distribution and coordination of policies by different central banks can be complicated and sometimes difficult due to the diversity of each country's goals, economic conditions, and policies. Differences in political, economic, and regulatory perspectives can also create techniques for the coordination and action of central banks with one another.

Another international form of the lender of last resort function is the relationship with international financial institutions. From expanding aid in turbulent times to promoting economic stability, these organizations use their influence in shaping the global economic fabric, employing a range of interventions, Initiatives and measures are often intrigued and intrigued by those who want to understand the nuances their diverse activities. LOLR events may be interactive or dual when in conflict with the policies and conditions of these organizations. Achieving alignment and coordination between the policy and actions of LOLR and international financial institutions can be a secret that needs to be addressed.

Finally, another significant secret of lender of last resort function is the ability to anticipate and respond to future financial risks and crises. Economic and financial situations can change rapidly and with complexity, and LOLR's ability to make accurate predictions and respond promptly can affect the computational efficiency of this function. LOLR policy direction and responses should be based on timely assessment and forecasting of the economic and financial situation, but this is a formula that requires specialized knowledge, analytical skills and quick decision analysis.

The lender of last resort, in a nutshell, is a pivotal player in ensuring financial stability and addressing crises within the intricate web of the financial system. Nevertheless, this role is not without its challenges, including multifarious and intricate objectives, economic conditions, policies, international financial institution relationships, and the need to navigate unpredictability and proactively tackle future financial risks. To ensure the efficiency and stability of the lender of last resort function, tight distribution, consensus and action between central banks, international financial institutions and governments is required economic books of each country. In addition, it is also important to ensure that the ultimate lender function is carried out in a transparent, accountable, and legal manner to avoid ethical, social, and potential problems causing negative impacts to the financial system and economic fundamentals.

A typical development in the last lender function is the consideration of new financial technologies and utility vehicles, such as cryptocurrencies and blockchain technology. The popularity of these technologies is growing and has the potential to change the way the financial system works and could affect the lender of last resort function in the future.

In a nutshell, the lender of last resort function emerges as a quintessential instrument in the financial stability and navigating through crises in the perpetually evolving and labyrinthine financial system. Nonetheless, it grapples with the intricacies and multifarious dimensions of the modern economic and financial landscapes, demanding a precarious equilibrium of distribution, consensus, and regulatory compliance to ensure peak effectiveness and seamless alignment with the ever-shifting demands of the dynamic economy and society at large.

In summary, during the 2008 crisis, lenders finally faced many complex challenges and risks related to the complexity of their financial situation, transparency, and suddenness. Decision making and implementation of policy measures require innovation and the ability to respond to difficult and uncertain situations in financial markets.

6. Lender of Last Resort together with the development of technology

New technology such as blockchain, cryptocurrencies, and fintech companies can strongly influence the role and operations of the lender of last resort. These changes require adaptation and innovation to ensure that lenders ultimately remain competent to fulfill their mandate in a constantly changing financial landscape.

Blockchain technology, with its signature transparency and decentralization, could affect to the traditional banking system with unforecastable surprise, leaving lenders ultimately exposed to central dynamic changes liquidity source. If financial institutions decide to apply blockchain technology to their transactions, this could reduce their reliance on central bank intermediaries, thereby impacting the demand for confusing final lender's account. Furthermore, the rise of cryptocurrencies, including central bank cryptocurrencies (CBDCs), could strongly affect the demand for liquidity of the end lenders, as CBDCs can close role as an alternative means of payment and source of liquidity. The incomprehensibility and complexity of these changes leaves lenders ultimately exposed to many variables and uncertainties in their work of adapting and operating in the increasingly volatile environment of financial technology.

Fintech companies, with their innovative and technology-based approaches to providing financial services, can also pose challenges and opportunities for the lender of the end. These firms can upset traditional banking, change the risk profiles of financial institutions, and create new sources of liquidity. This can affect the ability of the final lender to assess risk and provide liquidity support effectively. To adapt to these changes, lenders may ultimately need to enhance their technological capabilities, including their ability to understand and monitor blockchain, cryptocurrencies, and fintech companies. This may include building resilience to new risks and challenges associated with digital financial technology and services. Lenders may eventually need to adjust policies, procedures, and regulatory frameworks to ensure the appropriateness and correctness in monitoring, operating, and providing liquidity in the context of continuously evolving and changing technology.

In addition, lenders of the end need to be wary of the uncertainty and complexity of these new technologies. Blockchain technology, cryptocurrencies, and fintech can present both opportunities and risks to the financial and economic systems. This requires the lender of the end to be able to assess and manage potential risks, and to be ready to adapt and innovate in response to the ever-changing changes in technology and financial markets.

In summary, the influence of new technology such as blockchain, cryptocurrency, and fintech on the end-lender is complex and challenging. To ensure sustainability and efficiency in its role, lenders ultimately need to perfect their technological capabilities, adjust policies and procedures, and be wary of uncertainty and complexity of these new technologies.

In the digital age, the role of the lender ultimately faces challenges and opportunities simultaneously in the chaotic and complex landscape of financial technology. Some of the challenges include:

1. Turning Technology upside down: The rapid advancement of digital technologies, such as blockchain, cryptocurrencies, and fintech companies, can upset the traditional financial system, potentially challenging roles, and efficiency of the lender of last resort. Lenders may ultimately need to adapt to these disruptive technologies and understand their implications for monetary policy, financial stability, and liquidity provision.
2. Regulatory and Legal Uncertainty: The digital age presents regulatory and regulatory challenges, as gaps or inconsistencies in existing legal and regulatory frameworks can appear. Lenders may ultimately face challenges in determining the appropriate regulatory and regulatory responses to emerging technologies, cryptocurrencies and fintech companies, to ensure financial stability and protect the interests of consumers.
3. The ever-growing reliance on systems and digital technologies in the digital age presents a large amount of cybersecurity risks such as cyber-attacks, inscrutable data breaches and elusive fraud schemes. These risks can cast a pall of uncertainty over the stability and integrity of the entire financial system, leaving lenders grappling with the complexities of safeguarding against them. Navigating this convoluted landscape demands lenders to be proactive in implementing measures that are robust and comprehensive in mitigating and managing the risks hiding in the realm of cyberspace.
4. Lack of transparency: The nature of some digital technologies, such as blockchain, can pose challenges in terms of transparency and visibility of financial transactions and

activities. The complexity of these digital technologies can make it difficult for final lenders to assess risk, manage assets, and make appropriate policy decisions.

However, along with the challenges, the digital age also presents opportunities for the lender of the end, including:

1. Increased efficiency and speed: Digital technology can help increase efficiency and speed in managing and delivering liquidity. Fintech technology, such as blockchain technology, can provide fast and secure transaction solutions, reducing the time and resources required for the final lending process.
2. Diversification of Funding Sources: The digital age opens up opportunities for lenders of last resort to diversify funding sources. Digital financial technologies, including cryptocurrencies and emerging technologies, can provide diverse funding options, helping to reduce reliance on central banks and traditional financial intermediaries.
3. Improve transparency: Digital technology can help improve transparency in the management and tracking of the end lender's activities. Blockchain technology, for example, can provide high transparency in financial transactions and activities, helping to ensure honesty and transparency in the final lending process.
4. Capability to capitalize on the potential of cryptocurrencies: The rise of cryptocurrencies, including central bank cryptocurrencies (CBDCs), could provide new opportunities for lenders of last resort. CBDCs can be used as an alternative means of payment and source of liquidity, enhancing the availability and convenience of liquidity for the end lender.

In short, the digital age presents simultaneous opportunities and challenges for the lender of last resort. While the complexity and diversity of digital technology can make risk assessment and asset management difficult, it also means increased efficiency, diversification of capital, enhance transparency and capitalize on the potential of cryptocurrencies. To take advantage of these opportunities, lenders of the end need to adapt and exploit the full potential of digital technology to gain benefits and reduce risks in the final lending process.

7. Conclusion

The way lenders ultimately interact with stakeholders such as government officials, regulators, and financial industry stakeholders can be extremely complex and full of sudden changes. The relationships between these parties can be influenced by a variety of factors and dynamics, causing confusion.

Government officials often must work closely with lenders of last resort during times of financial crisis or economic uncertainty. This could involve coordinating fiscal policy measures, such as a stimulus or bailout, along with monetary policy measures taken by the lender of last resort. Government officials can also provide guidance or directives to the lender of last resort, influencing their policies and actions to be in sync with common economic and political goals.

Regulators, including Central Banks and financial regulators, regularly work closely with the lender of last resort. This may include supervisors and ongoing supervision of financial institutions, assessing their stability and risks, and collaborating with the lender of last resort in guiding regulatory policy. to ensure the stability and certainty of the financial system. The regulator also contacts the lender of last resort to provide information and inform the situation about emerging risks and ways in the financial sector that influence the decision of the final lender.

Stakeholders in the financial industry, such as banks, financial institutions, and market traders, also interact with the lender of last resort in a variety of ways. They may make requests, suggestions, or opinions about the policy or measure the lender will ultimately take. Financial industry stakeholders may also engage in complex and difficult negotiations or negotiations with the lender of last resort regarding loan conditions or financial assistance measures.

However, the relationship between the lender of last resort and the parties involved is not always unanimous in opinion and sometimes disagreement occurs. Controversy, disagreement, or conflict may arise about the policy decision or measure of the final lender. This can lead to sudden changes in relationships or create challenges and opportunities that are difficult to handle and adapt to. Confusing, intertwined, and complex situations can arise when stakeholders present conflicting opinions or requests that are not easy for the final lender to process and accommodate.

In summary, the relationship between the lender of last resort and stakeholders such as government officials, regulators, and financial industry parties is complex and varied. It can influence final lender policy and decisions and presents opportunities and challenges in maintaining the stability and certainty of the financial system. As it was mentioned above, lending of last resort is changing: lender of last resort stakeholders are getting more and more important as lending of last resort is becoming a prerogative of the government and its fiscal policy. We can conclude that, although traditionally lender of last resort is a central bank that provides cash (liquid assets) ex-post (after the liquidity crisis has occurred) in form of a loan to banks that are illiquid but solvent, nowadays an equally important task of the central bank is to provide liquidity to states by monetizing debt. By doing so, the central bank becomes somewhat dependent on the government, which begins to play a primary role in providing liquidity to the economy in an extraordinary situation.

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