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## **Central Banks Losses, Do They Matter?**

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## INTRODUCTION

Central banks play a crucial role in shaping a country's economy through their influence on monetary and fiscal policies. As a consequence, the credibility of central banks is fundamental in order to ensure the smooth functioning of the economy and maintain financial stability. However, in recent years, central banks have increasingly reported losses, raising important questions regarding the relevance of such losses and their implications on central banks' profitability.

This paper aims to analyze the causes and consequences of central bank losses in order to establish if they pose a potential threat to the role of central banks. Then, our objective is to understand the significance of central banks' losses and whether they should be a cause of concern for these institutions. In the first section, I will start by providing an explanation of how central banks' balance sheets have changed over time to arrive to the current typical structure with an insight into the components that can be found on the asset and liability sides of a central bank' balance sheet. We will see that the main sources of income for central banks include seigniorage income, interest generated by purchased financial assets, reserves of foreign currencies as well as payment services and monetary operations. At the same time, while central banks can generate profits through these sources, they are also exposed to potential losses in these areas.

Unlike commercial banks, which are profit-maximizing institutions, central banks the primary role of central banks is to maintain financial stability in the economy. Then, in section II, I will lay out the main differences between central banks and other financial institutions like commercial banks in order to understand how these differences can have substantial implications on how central banks deal with losses. Indeed, in section III, we will see that there are several examples of central banks conducting their operations effectively with negative capital. Then an important question that we want to answer is: Do central banks care about losses?

I will try to answer this question by analyzing results from historical and empirical studies<sup>1</sup>. Moreover, this section will explore the different implications that losses may have on central banks' solvency as well as on their monetary policy objectives. In section IV, I will explore the different available options for central banks to respond to financial losses and also what are the main limitations of the available responses. Central banks' responses to losses include the use of specific and general buffers, recording losses as an item on the balance sheet to be offset through future profits, recapitalization by the government and communication with the general public.

Finally, the last section of the paper will provide an in depth analysis of the historical context of losses of the European Central Bank and the Eurosystem's national central banks, the possible implications

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<sup>1</sup> See Goncharov et al. (2023).

of these losses on monetary and fiscal policy and possible ways available to the Eurosystem's central banks to deal with losses.

## I. HOW DO CENTRAL BANKS MAKE PROFITS AND LOSSES?

Central banks' structure and role differ significantly from traditional institutions, making the concept of solvency less applicable to them. However, just like any traditional financial institution, in order to fulfill their responsibilities, central banks need to finance themselves and manage both profits and losses which play a crucial role in the functioning of economies worldwide.

Nevertheless, different central banks might make use of different accounting methods and standard to keep track of their financial activities. Indeed, some central banks use fair value accounting, which can result in front-loaded losses due to declining asset valuations but anticipate future gains as assets mature. Instead, other central banks, employ historic cost accounting, where unrealized valuation changes are disclosed but not recognized in reported income.

Moreover, when central banks experience losses or negative capital, it can have political implications and potentially impact their independence. This is because central banks are often intertwined with government finances and operations. If a central bank faces significant losses, it may require financial support from the government to maintain its operations and fulfill its responsibilities. This situation can impact the government's budget and public finances, potentially leading to increased fiscal pressure or the need for the government to inject capital into the central bank. In fact, certain central banks have indemnity arrangements that usually involve government indemnification or authorized indemnities for particular operations.

The purpose of such arrangements should be to preserve central bank independence by protecting them from potential financial impacts. However, some argue that might threaten the perception of central bank independence, thereby reducing policy effectiveness<sup>2</sup>.

In particular, the fear of losses and insolvency in central banks may restrain policy-makers from providing additional stimulus during times of economic stress. The concern is that relying on government support to address central bank losses could compromise the central bank's policy autonomy and make it dependent on government approval. Therefore, gaining insights into the dynamics of central bank profits and losses is crucial in assessing the relationship between central banks and governments<sup>3</sup>.

Then, understanding the financial characteristics of central banks, including their income sources, accounting methods, and distribution rules, is crucial to comprehend the implications of losses and their influence on central bank credibility and policymaking.

In this first section, I'm going to describe in detail where profits and losses of central banks come from. To do so, a brief introduction on the balance sheet of central banks is needed.

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<sup>2</sup> Bell, Chui, Gomes, Moser-Boehm and Tejada. (2023). Why are central banks reporting losses? Does it matter?

<sup>3</sup> Diessner, S. (2022). Political Capital: Monetary-Fiscal Coordination Schemes in Europe and Japan.

## 1.1. CB BALANCE SHEET OVER TIME

In the past few decades, the size of central banks' balance sheets has been a subject of increasing interest, particularly in the context of historical fluctuations and recent developments.

A study by Ferguson, Schaab and Moritz, conducted in 2015 for the Centre for Economic Policy Research (CEPR), attempted to give an overview of the historical evolution of the size of central banks' balance sheets and its implications for the future. It was found that, over time, central banks' balance sheet size relative to output has generally fluctuated within well-defined boundaries, except during periods of significant geopolitical or financial crises. The two most notable crises that had a substantial impact on the balance sheets of central banks were World War II and the more recent global financial crisis of 2007.

Indeed, the global financial crisis of 2007 put the balance sheets of central banks into the spotlight because of the significant increase in size deriving from the adoption of unconventional monetary policies and other measures implemented as a response to the crisis. It was observed that the expansion in the size of central banks' balance sheets following the financial crisis has been significantly higher with respect to previous observations of expansions<sup>4</sup>.

This can be explained by the fact that, during the crisis, commercial banks started hoarding reserves and avoiding interbank market lending. This situation required central banks to take action in order to ensure the availability of reserves for the smooth flow of transactions. These actions include asset purchase programs as well as the implementation of policies. As a result, central bank balance sheets continued to expand in size where the expansion was mostly driven by the asset side rather than the liabilities.

Then, it becomes clear that the recent evolution of central bank balance sheets has been influenced by the measures implemented by the central banks of advanced economies to support macroeconomic and financial stability objectives in the aftermath of the financial crisis as well as the most recent Covid-19 pandemic.

Indeed, as a response to such crises, central banks often adopted measures such as asset purchase programs (APPs) and lending programs, which have been financed mainly through interest-bearing commercial bank reserves. As a result, the proportion of interest-free liabilities held by central banks saw a substantial decline<sup>5</sup>.

As we will see later in this paper, these measures taken by central banks have implications for their profitability. When central banks raise interest rates to combat inflation, their net interest income

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<sup>4</sup> Ferguson, N. and Schaab, A. and Schularick, M. (May, 2015). Central Bank Balance Sheets: Expansion and Reduction Since 1900. CEPR Discussion Paper No. DP10635, Retrieved from <https://ssrn.com/abstract=2613032>

<sup>5</sup> Bell et al., *supra* note 2.

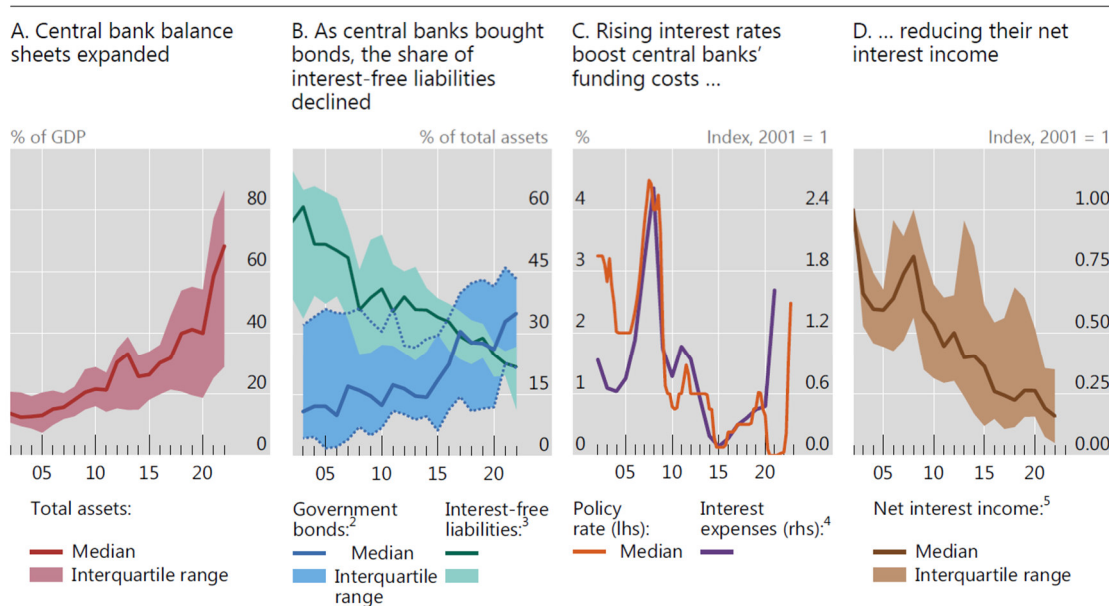
decreases due to the connection between their liabilities and policy rates<sup>6</sup>. This trend can be seen in the figure below (Fig.1).

Additionally, as bond yields rise, the valuation of assets held by central banks declines, further impacting their profitability. As a consequence, in recent periods, several central banks have reported losses, and it is expected that more central banks may face similar challenges.

The losses incurred by central banks have raised concerns regarding their credibility and authority as policymakers, as these losses could potentially result in negative equity, depending on the accounting methods that are used.

In light of these developments, it becomes essential to enter into a comprehensive discussion on the profits and losses of central banks, exploring their implications, challenges, and the broader impact on the economy.

**FIGURE 1: From CBs balance sheet expansion to the decline in net interest income<sup>1</sup>**



<sup>1</sup> Based on 27 AEs including euro area national central banks. <sup>2</sup> Subject to data availability, otherwise proxied by claims on government. <sup>3</sup> Includes cash in circulation and equity. <sup>4</sup> Funding for lending operations (in some cases at negative interest rates) caused a spike in interest expenses in 2020. <sup>5</sup> Net interest income as a share of assets.

**Source:** Bell S., Chui M., Gomes T., Moser-Boehm P. and Pierres-Tejada A. (2023).

## 1.2. CB's BALANCE SHEET STRUCTURE

The structure of a central bank's balance sheet is crucial for us to determine the income of the central bank since income is given by the difference between the value of liabilities and the value of assets.

<sup>6</sup> Bell et al., *supra* note 2.

Moreover, the central bank balance sheet enables us to have a closer look at the mechanics behind the decisions taken by central banks to achieve their goals and objectives. Indeed, according to Bindseil (2004)<sup>7</sup>, the balance sheet of a central bank is impacted by all transactions it conducts with the rest of the world.

Even if components of a central bank balance sheet change according to the institution and to accounting rules, we can generally identify a common structure that you can see in the next figure (Fig. 2).

**FIGURE 2:** CBs balance sheet structure

Liabilities	Assets
Banknotes	Foreign assets (net)
Commercial bank reserves	Government balances (net)
Capital and reserves	Central bank operations (net)
	Other Items (net)

Source: Rule G., (2015)

On the liabilities side of the balance sheet we can find banknotes, commercial banks' reserves and capital while on the assets side there are foreign assets, government balances, central bank operations and other investments.

Let's give an overview of the liability side. When talking about banknotes, we refer to those that are issued by the central banks and that are circulating into the economy.

Then, commercial banks' reserves are account balances that commercial banks keep at the central bank mostly for regulatory purposes. These reserves are widely used by central banks in order to fund asset purchase programs (APPs) and other investments and they dominate the liability side of a central bank balance sheet.

<sup>7</sup> Bindseil, U (2004a), Monetary Policy Implementation — Theory, Past and Present, Oxford Press.



Lastly, it is quite interesting to analyze central banks' capital as opposed to commercial banks' capital. Indeed, while both institutions keep capital on their balance sheet and losses are absorbed through capital buffer, central banks are not required to keep a certain amount of capital for regulatory purposes unlike commercial banks. Moreover, commercial banks can easily increase capital by raising funds in financial markets or by retaining earnings, however, central banks have more constraints in doing so since these actions can have significant fiscal implications due to the fact that, most of the time, they are owned by governments.

Another interesting point to make, regarding capital, is that central banks do not really have an optimal amount of capital to keep and it seems that there is no unique formula to calculate it<sup>8</sup>. This is due to the fact that central banks' objective is not profit maximization, as for commercial banks, but it is to achieve policy goals.

Let's see this through an example, suppose a central bank implements a quantitative easing program by purchasing government debt at low yields during a period of economic distress. As the economy starts to recover, investors may shift to riskier assets causing the yields on government bonds to rise and thus, leading the central bank to face losses when selling the bonds. However, despite the financial loss, the central bank's goal of promoting economic recovery is considered more important than profitability<sup>9</sup>.

Now, we take a closer look at the asset side of a central bank balance sheet. Foreign assets are mainly represented by foreign exchange reserves and generally they are assets that are denominated in non-domestic currency.

Government balances are balances kept at the central bank by the government and they increase when taxes are collected or when the government issues debt. So, these balances decrease when government pays salaries or when through expenditures.

When a central bank lends money to commercial banks, usually a collateral is required and it is shown on the asset side of the CB balance sheet. Moreover, central banks control the availability of reserves to the system through some operations. When these operations reduce the amount of reserves available, they appear on the liability side, while when operations increase the amount of reserves, they will show on the asset side<sup>10</sup>. On the asset side, there are also other items such as investment portfolios or property.

It is worth noting that the composition of central bank balance sheets is subject to changes over time, influenced by the specific mandates of each institution. In fact, it can be seen that the recent increase

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<sup>8</sup> Milton, S., and Sinclair, P. (2011). *The Capital Needs of Central Banks*. London: Routledge.

<sup>9</sup> Rule, G. (2015). Understanding the central bank balance sheet.

<sup>10</sup> Rule, G., *supra* note 9.

in the use of asset purchase programs (APPs) by advanced economy central banks lead to a significant portion of their assets being comprised of government bonds.

Now that we have seen what are the components of central banks' balance sheet, it will be easier to understand how central banks make profits or suffer losses as the balance sheet changes through time. Finally, it should be clear that central banks use the balance sheet to keep track of all kind of income and expenses which they encounter so that if the income exceeds the expenses, a profit is realized. On the other hand, if the expenses are greater than the income, central banks suffer a loss.

### **1.3. SOURCES OF INCOME**

Once we understood how the balance sheet helps us in determining a central bank's income, we will take a closer look at the main sources of income for a central bank.

One of the main sources of income for central banks derives from currency issuance. Since the production cost of currency is relatively low compared to its nominal value, central banks can earn profits if the revenues generated from issuing currency exceed the associated costs of printing and distribution.

This phenomenon is known as seigniorage and refers to the profit earned by a central bank from the difference between the face value of the currency it issues and the cost of producing it. In particular, the banknotes and coins that we carry around every day, are usually worth a lot more than what it costs to create them.

To see how seigniorage income is actually realized, consider the process by which money is introduced into the economy. This is done through commercial banks which "acquire" money from CBs in exchange for financial assets and then distribute it in the economy through ATM or their branches. Additionally, commercial banks contribute to the expansion of the money supply through credit creation since, when providing loans to borrowers, they effectively create new money in the economy. This, in turn, leads to the money multiplier effect and further increases the availability of money in the economy. The financial assets that the central banks receive from commercial banks generate income referred to as seigniorage<sup>11</sup>. Then, an alternative definition is given by the following: seigniorage is the revenue that the central bank gets from creating money and then introducing it into the economy<sup>12</sup>.

Going back to the importance of a central bank's balance sheet, the amount of income coming from seigniorage can be determined by looking at the asset side and the liabilities side.

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<sup>11</sup> ECB. (May 19, 2023). Profits and losses of the ECB and the euro area national central banks: Where do they come from?. Retrieved from [https://www.ecb.europa.eu/ecb/educational/explainers/tell-me-more/html/ecb\\_profits.en.html](https://www.ecb.europa.eu/ecb/educational/explainers/tell-me-more/html/ecb_profits.en.html)

<sup>12</sup> Bjerg, McCann, Macfarlane, Nielsen, and Ryan-Collins. (February 21, 2017). Seigniorage in the 21st Century: A Study of the Profits from Money Creation in the United Kingdom and Denmark.

Indeed, when there is a shortage of liquidity, it means there is an increased demand for central bank liabilities, such as banknotes and reserves. In this situation, the central bank responds by supplying the required reserves through various kinds of operations. As a result, the central bank's balance sheet is characterized by a majority of operations on the asset side to match the increased demand for liabilities. In this scenario, a central bank can earn positive seigniorage income as its liabilities are made up mostly by banknotes and the lending to commercial banks is backed by high-quality assets with a positive rate of return<sup>13</sup>.

Moreover, it is not unusual for central banks to purchase financial assets, such as government bonds, in order to support the economy. This can be done for several reasons, for example it might be a way to prevent too low inflation for too long. Then, these financial assets purchased usually generate interest which are a source of income for the central bank.

However, there are many other factors that can affect central banks' income such as interest rates, market yield fluctuations, and exchange rate changes that impact net interest income and asset valuations.

Among the most common ones, another source of income derives from the reserves of foreign currencies. Central banks maintain foreign currency reserves to ensure monetary stability and support national monetary policy. These reserves can generate income since a CB earns interest on them paid by those banks that hold accounts with the CB<sup>14</sup>.

Finally, other sources of income include payment services and monetary operations. Indeed, central banks usually charge fees on payment services provided to commercial banks and government such as processing, clearing and settlement of financial transactions. If the revenue earned from the fees is greater than the costs associated to these services, the central bank can generate profits. Monetary operations, instead, are buy and sell operations of government securities in the market by the central bank. When a central bank sells securities at a higher price than the purchase price, then a profit can be generated.

#### **1.4. SOURCES OF LOSSES**

Central banks, like any other financial institution, are susceptible to both profits and losses. Now, we will explore the different channels through which a central bank might suffer a loss.

As already mentioned above, one of the main sources of income for central banks is seigniorage. However, it is important to note that while seigniorage is generally associated with profits, it is possible for central banks to realize losses from this income source under certain circumstances.

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<sup>13</sup> Rule, G., *supra* note 9.

<sup>14</sup> ECB, *supra* note 11.

Indeed, seigniorage income can be affected by factors such as counterfeiting, changes in demand for cash, and costs associated with currency production. For example, according to an analysis made by the European Commission, the cost of producing and distributing the 1 and 2 euro cent coins exceeds their face value leading to a negative seigniorage of 1.4 billion euros<sup>15</sup>. In other words, it costs more to make and circulate these coins than they are worth. This results in a financial loss since the expenses associated with producing and distributing the coins outweigh the revenue generated from their use.

Moreover, as opposed to the shortage of liquidity, when the growth of the balance sheet is driven by assets, we often observe an excess of reserves or operations designed to absorb them on the liability side. In this case, we have a surplus of liquidity that can cause the central bank to have negative seigniorage income due to a lower income coming from the asset side and an increase in costs deriving from additional liabilities. The negative income can also be explained by the fact that central banks' ability to set terms of transaction, during a surplus of liquidity, is more limited since there is not a real necessity coming from commercial banks.

Also reserves of foreign currency can cause the central bank to suffer losses due to the exposure of such reserves to exchange rates fluctuations. In fact, a loss will be realized when the value of foreign currency reserves will decrease compared to domestic currency and this occurs because the central bank's holdings of foreign currency become less valuable when exchanged back into the domestic currency<sup>16</sup>.

Additionally, central banks face the risk of potential losses through investments in financial assets and in the bond market. Indeed, as mentioned above, the purchase of financial assets and particularly of government bonds is a way to support the economy. By purchasing these assets, central banks inject liquidity into the financial system, lower borrowing costs, and stimulate economic activity.

However, in some cases, this can result in losses for central banks. An example is given by the German Bundesbank which has participated in the European Central Bank's bond-buying program, involving the purchase of sovereign bonds from eurozone countries. While this program aimed to address economic challenges and promote stability within the euro area, the Bundesbank suffered significant losses. In fact, in March 2023, the Bundesbank announced that it had experienced a loss of €1 billion from its bond holdings, which can be attributed to the impact of higher interest rates.

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<sup>15</sup> European Commission. (2013, May 14). Communication from the Commission to the European Parliament and the Council: Issues related to the continued issuance of the 1 and 2 euro cent coins

<sup>16</sup> Vallence, C. (2012). Foreign Exchange Reserves and the Reserve Bank's Balance Sheet| Bulletin–December 2012. Bulletin, (December).

This indicates that the value of the bonds held by the Bundesbank declined, resulting in financial losses<sup>17</sup>.

Before, it was mentioned that payment services and monetary operations usually generate income for central banks. However, it is also true that, central banks can suffer losses in these areas. In terms of payment services, central banks operate and maintain payment systems that facilitate financial transactions. They usually charge fees for these services but if expenses associated with the operating the payment system are higher than the profit coming from the fees, central banks can incur a loss.

Meanwhile, monetary operations involve the buying and selling of government securities, such as bonds so that if the central bank sells these securities at a lower price than the purchase price, it can result in losses.

In conclusion, while central banks generate profits through various sources such as currency issuance, foreign currency reserve management, investments and other market activities, they are also exposed to potential losses in these areas. When central banks suffer losses there are several political implications that also impact their independence, potentially limiting their ability to support governments and implement effective monetary policies. So, given that profits and losses of central banks can affect public confidence and investor perception, it is important for us to understand how they manage both profits and losses to maintain financial stability and fulfill their mandate of promoting monetary stability and economic growth.

In the next section of the paper, a clear distinction between central banks and commercial banks will be made in order to have a better understanding of how losses affect central banks.

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<sup>17</sup> Chazan, G. and Arnold, M. (June 26, 2023). Bundesbank may need recapitalisation to cover bond-buying losses. Financial Times. Retrieved from <https://www.ft.com/content/46d3952a-5ee2-431a-8430-4a71e530cbce>

## **II. WHAT MAKES CENTRAL BANKS DIFFERENT FROM OTHER BANKS?**

Central banks and commercial banks are two distinct entities that play crucial roles in the financial system. While both are involved in banking activities, they have distinct objectives, functions, and responsibilities. Central banks are primarily responsible for maintaining monetary stability, regulating the money supply, and safeguarding the overall financial system. On the other hand, commercial banks focus on providing financial services to individuals, businesses, and other organizations.

Understanding the differences between central banks and commercial banks is essential to assess the potential impact of losses on the role of a central. Indeed, these losses can potentially weaken the financial position of the central bank, limit their capacity to support governments and implement effective monetary policies, as well as erode public confidence in the banking system.

In this section, we will explore the contrasts in purpose and objective, regulatory authority, money creation, lending and deposits, and the critical aspect of independence between central banks and commercial banks. By delving into these distinctions, we can better comprehend the implications that losses may have on central bank autonomy and effectiveness in fulfilling their essential functions.

### **2.1. OBJECTIVES OF CENTRAL BANKS AND COMMERCIAL BANKS**

It is crucial to understand the differences in objectives and implications between central banks and commercial banks to grasp the distinct impacts of losses on these institutions and their broader effects on monetary policy, financial stability, and the availability of credit in the economy.

First, consider the purpose of a commercial bank and its objective. Commercial banks are profit-oriented institutions that provide a wide range of financial services to individuals, businesses, and other organizations.

Their main objective is to maximize profits by accepting deposits, granting loans, facilitating payments, and offering various financial products.

Commercial banks play a fundamental role in the economy by acting as intermediaries between savers and borrowers. In their classical intermediary role, commercial banks accept deposits from individuals who are motivated to save and extend credit to creditworthy borrowers with attractive investment opportunities. This function is crucial as it allows individuals with surplus funds to entrust their savings to banks, rather than undertaking the burden of identifying investment opportunities

themselves. So, by assuming the intermediary role, banks mitigate the direct risks associated with investments and facilitate the flow of capital throughout the economy<sup>18</sup>.

Indeed, the intermediation performed by commercial banks brings several benefits to the financial markets. Firstly, it reduces transaction costs by streamlining the process of connecting savers and borrowers. Additionally, it helps to spread the risk associated with investments among a broader pool of participants, thereby increasing overall stability. Moreover, intermediation allows for economies of scale and specialization to be realized, further enhancing the efficiency and effectiveness of resource allocation<sup>19</sup>.

Overall, commercial banks' intermediation function is instrumental in driving economic growth by efficiently allocating savings and connecting them with suitable investment opportunities.

At the same time, it is also true that financial intermediation carries a notable level of risk, as depositors rely heavily on banks to effectively handle credit exposures and safeguard their funds<sup>20</sup>.

Among the various activities carried out by commercial banks, they also play an important role in the management of payment systems which are essential for the efficient movement of funds between accounts. Commercial banks provide attractive transfer facilities that enable reliable, fast, and cost-effective transactions, while also maintaining comprehensive records of these transactions. Additionally, commercial banks offer conversion services that allow customers to make and receive payments using different forms of payment instruments, such as cheques, cash or credit cards. Indeed, regardless of which type of instrument is used to pay, an account holder should be able to receive the payment on his bank account since these payment instruments can be easily converted among one another and with different currencies<sup>21</sup>.

This function is of utmost importance given that, in a modern economy, noncash payments have become the dominant kind of transactions. So, commercial banks fulfill the public's demand for noncash payment services by offering a wide range of payment instruments.

In addition to their role in managing payment systems, commercial banks also facilitate currency exchange and provide services related to foreign exchange transactions, which are vital for international trade and investment.

Furthermore, they offer insurance services that help manage and mitigate risks associated with projects, providing vital protection against potential losses. Additionally, through leasing services,

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<sup>18</sup> Guenther, J. D. (1984). "The Role of Commercial Banks in the Adjustment Process". In *Adjustment, Conditionality, and International Financing*. USA: International Monetary Fund. Retrieved Jul 7, 2023, from <https://doi.org/10.5089/9780939934287.071.ch008>

<sup>19</sup> Clews. (2016). Chapter 4 - Commercial Banks and Syndicated Lending, *Project Finance for the International Petroleum Industry*, Academic Press, Pages 63-80, ISBN 9780128001585. Retrieved from <https://doi.org/10.1016/B978-0-12-800158-5.00004-9>.

<sup>20</sup> *Id.*

<sup>21</sup> Summers, B. J. (1994). "2 Banking and the Payment System". In *The Payment System*. USA: International Monetary Fund. Retrieved Jul 16, 2023, from <https://doi.org/10.5089/9781557753861.071.ch002>

businesses gain access to essential assets without the burden of large upfront capital investments. Additionally, their participation in capital markets activities, such as underwriting securities and facilitating investments, supports the financing and growth of projects.

However, if commercial banks fail to fulfill their responsibilities adequately, it can lead to detrimental consequences. Trust in banks is indeed a critical factor that determines the effectiveness of the financial system. When individuals and businesses have a high degree of confidence in banks, it encourages greater participation in the financial system as this trust contributes to the pooling of savings and the expansion of credit by banks. Indeed, a strong level of trust helps reduce the risk and intensity of bank runs which occur when depositors rush to withdraw their funds from a bank due to concerns about its solvency. By having trust in banks, depositors are less likely to engage in panic-driven behavior, thus contributing to the stability of the financial system. To mitigate these implications, regulatory authorities including central banks closely monitor the financial health of commercial banks and enforce capital adequacy requirements to ensure their stability.

However, when commercial banks experience losses, the implications can be different from those faced by central banks. Indeed, central banks are primarily responsible for maintaining monetary stability and promoting economic growth. They are the custodians of a country's monetary policy and often act as the lender of last resort during financial crises. Their main objectives include controlling inflation, regulating the money supply, and safeguarding the stability of the financial system. Then, the different objectives of central banks and commercial banks have significant implications for the consequences of losses incurred by each institution. It is crucial to understand that central banks typically have broader mandates that extend beyond profit-making.

Central banks have a distinct purpose and operate differently from commercial banks. They focus on policy mandates, not profits, and have the ability, at least in theory, to issue more currency to meet obligations. As the custodians of monetary policy, central banks have the authority to create and issue currency, control interest rates, and manage the money supply<sup>22</sup>. For this reason, central banks can operate without capital and can withstand periods of losses and negative equity due to their unique role. Indeed, there are several examples of central banks that have experienced negative capital but still maintained financial and price stability.

However, it is also true that if a central bank incurs losses, it may have several implications. There are situations where losses can undermine central banks' position, especially in cases of mismanagement or lack of government credibility. In the vast majority of cases, central banks are owned by the government or have their profits remitted to the Treasury. Then, losses incurred by the

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<sup>22</sup> Bell et al., *supra* note 2.



central bank can result in reduced dividend payments or even require fiscal support from the government to restore the central bank's capital.

Then, in order to maintain independence, central banks require financial autonomy, including control over their budget, clear protocols for handling profits and losses, and safeguards against government interference during episodes of negative equity or recapitalization<sup>23</sup>.

Moreover, losses can reduce the central bank's capital and potentially limit its ability to conduct monetary policy effectively. A weaker balance sheet may hinder its capacity to implement necessary measures to control inflation or stimulate the economy. So, losses suffered by a central bank can undermine market confidence and the credibility of its policies as investors and market participants may question the central bank's ability to maintain stability, which can lead to increased volatility in financial markets.

## **2.2. REGULATORY FRAMEWORK FOR CENTRAL BANKS VS. COMMERCIAL BANKS**

Now, we explore the differences in regulatory authority between central banks and commercial banks. While both types of banks operate within the financial system, they have distinct roles and responsibilities. Central banks, as the monetary authorities of a country, are essential in maintaining monetary stability and implementing effective monetary policies. Commercial banks, on the other hand, primarily focus on providing financial services to individuals, businesses, and other organizations.

It is important to note that, even though the specific regulatory authority and framework can vary across countries and jurisdictions, central banks generally play a key role in overseeing and regulating commercial banks to promote financial stability, protect depositors, and maintain the integrity of the financial system. In fact, central banks' responsibility differs from the traditional supervisory functions carried out by regulatory bodies. Supervision mainly revolves around regulating and overseeing individual financial institutions to guarantee their safety and soundness. In contrast, financial stability focuses on monitoring and safeguarding the overall health and stability of the entire financial system as a whole. Despite their distinct functions, a smooth interplay between central banks and supervisory bodies is crucial for effective financial stability<sup>24</sup>.

Commercial banks, in turn, must adhere to the regulatory requirements set by central banks and other regulatory bodies to ensure their operational licenses and compliance with industry standards.

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<sup>23</sup> Bell et al., *supra* note 2.

<sup>24</sup> Padoa-Schioppa, T. (2003). Central banks and financial stability: Exploring a land in between. *The transformation of the European financial system : second ECB Central Banking Conference, October 2002, Frankfurt, Germany.*

Central banks are typically granted broad regulatory authority over the banking sector. They oversee the activities of commercial banks, ensuring compliance with monetary policy, capital adequacy, and other regulatory requirements. This is because, as already mentioned, their primary objective is to ensure the stability and soundness of the financial system. Let's analyze some key aspects of their regulatory authority.

Central banks are responsible for formulating and implementing monetary policy which consists mainly in influencing interest rates in order to control inflation, aggregate demand as well as employment in the economy<sup>25</sup>.

They set interest rates, manage the money supply, and use various policy tools to influence economic conditions. As part of their regulatory authority, central banks oversee commercial banks to ensure they comply with monetary policy objectives, such as maintaining price stability and controlling inflation.

Moreover, central banks establish and enforce capital adequacy requirements for commercial banks. An example is given by Basel regulation which specify the minimum amount of capital that banks must maintain to mitigate the risks that they face and to absorb potential losses. By ensuring that commercial banks maintain adequate capital, central banks aim to safeguard the stability of the financial system and protect depositors' funds<sup>26</sup>.

Additionally, commercial banks must comply with liquidity requirements, which ensure that they have sufficient liquid assets to meet short-term obligations and manage liquidity risks.

Then, central banks have a certain degree of authority to regulate commercial banks. Indeed, before a commercial bank can commence operations, it must obtain a license from the central bank, which involves meeting certain criteria, such as demonstrating financial soundness, competent management, and adherence to regulatory standards<sup>27</sup>.

As a consequence, central banks also conduct ongoing supervision of commercial banks to monitor their activities, assess their risk management practices, and ensure compliance with regulatory requirements<sup>28</sup>. Indeed, commercial banks must adhere to risk management guidelines established by regulatory authorities which outline best practices for identifying, measuring, and managing various types of risks, such as credit risk, market risk, and operational risk. After the 2007 crisis, there were

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<sup>25</sup> Mathai, K. (2009). Back to Basics: What Is Monetary Policy?, Finance & Development, 0046(003), A014. Retrieved Jul 20, 2023, from <https://doi.org/10.5089/9781451953756.022.A014>

<sup>26</sup> King, P., & Tarbert, H. (2011). Basel III: an overview. Banking & financial services policy report, 30(5), 1-18.

<sup>27</sup> ECB. (2019). Guide to assessments of license applications - License applications in general (2nd revised edition).

<sup>28</sup> Mancera, M., Volcker, P. A., & Godeaux, J. (1991). "Session III Role of Regulation and Supervision of the Central Bank". In Perspectives on the Role of a Central Bank. USA: International Monetary Fund. Retrieved Jul 20, 2023, from <https://doi.org/10.5089/9781557752062.071.ch003>

major changes in the regulatory framework worldwide, emphasizing the importance of robust risk management procedures<sup>29</sup>.

In addition, commercial banks are subject to consumer protection laws and regulations to safeguard the interests of customers. These laws may cover areas such as fair lending practices, disclosure requirements, consumer privacy, and handling complaints. Regulatory authorities oversee and enforce these laws to ensure that commercial banks treat customers fairly and transparently.

Indeed, commercial banks are required to provide regular reports and disclosures to regulatory authorities. This includes financial statements, risk assessments, and other relevant information. By mandating reporting and disclosure, regulators can monitor banks' financial condition, risk profile, and compliance with regulatory requirements.

Finally, during periods of financial distress or crises, central banks assume a vital role as lender of last resort. They have the authority to provide emergency liquidity assistance to commercial banks to maintain financial stability. Central banks may also be involved in the resolution of failing banks, using their regulatory authority to facilitate resolution processes.

Then, it is clear that commercial banks operate under the regulatory framework established by the central bank and other regulatory bodies. As mentioned above, they are subject to various regulations and requirements aimed at ensuring their safety, soundness, and compliance with industry standards. To conclude, the regulatory response to losses also differs between central banks and commercial banks. Commercial banks have more constraints and limitations when suffering a financial loss since they are subject to closer scrutiny, regulatory capital requirements, and risk management guidelines to ensure their financial stability and protect depositors. Central banks, on the other hand, have a broader regulatory authority over commercial banks, overseeing their compliance with monetary policy objectives, capital adequacy, liquidity requirements, and risk management practices.

### **2.3. MONEY CREATION PROCESS**

Central banks and commercial banks play distinct roles in the creation of money in the economy. When it comes to the money creation process, central banks hold a unique role as they have the exclusive authority to create and issue currency. They control the money supply through various monetary policy tools, such as adjusting interest rates, reserve requirements, and open market operations. As a consequence, central banks play a critical role in managing inflation, maintaining price stability, and overseeing the overall health of the economy. Central bank money comprises banknotes in circulation as well as deposits held by commercial banks at the central bank. Money

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<sup>29</sup> Tian, W. (2017). Commercial banking risk management: Regulation in the wake of the financial crisis. New York, NY, U.S.A. : Palgrave Macmillan.

creation by central banks involves engaging in transactions with commercial banks. They can increase the monetary base by purchasing assets and providing credit to commercial banks. Conversely, the central banks can reduce the monetary base by selling assets and charging commercial banks' deposit accounts. This enables central banks to effectively manage and adjust the monetary base according to their specific monetary policy objectives<sup>30</sup>.

On the other hand, commercial banks do not have the power to create money directly. Instead, they play a vital role in the money creation process through fractional reserve banking. Indeed, when they receive deposits, they are required to keep a portion of those funds as reserves and can lend out the remaining amount as loans and credit. This lending process effectively increases the money supply and stimulates economic activity through the money multiplier which represents the maximum amount of commercial bank money that can be created based on a given amount of central bank money<sup>31</sup>. Indeed, the concept of fractional reserve banking is the foundation of the money creation process by commercial banks, as it operates under the assumption that not all depositors will immediately withdraw their funds, enabling banks to lend out a fraction of the deposits they receive. This practice leads to the multiplication of the initial deposit, effectively expanding the money supply and contributing to economic growth and activity.

Overall, commercial banks' involvement in fractional reserve banking and their utilization of the money multiplier mechanism have a significant impact on the overall money supply and economic activity in the financial system.

Central banks closely monitor and regulate commercial banks to ensure they adhere to reserve requirements and maintain financial stability. They oversee the money creation process and aim to strike a balance between promoting economic growth and safeguarding the integrity of the financial system.

Keeping in mind the different functions of central banks and commercial banks in the money creation process, it is clear that the implications of losses for central banks and commercial banks can vary due to their distinct roles and functions.

Indeed, losses incurred by central banks do not directly impact their ability to create money or influence the money supply. Central banks can still continue their monetary policy operations, such as adjusting interest rates or conducting open market operations, to manage inflation and stabilize the economy. However, as already mentioned above, losses in central banks can indirectly affect their credibility and independence. If losses persist or are perceived as a sign of mismanagement, it can

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<sup>30</sup> Jordan, T. J. (2018, January 16). How money is created by the central bank and the banking system. Speech presented at the Zürcher Volkswirtschaftliche Gesellschaft, Zurich, Switzerland. Available at: <https://www.bis.org/review/r180118c.pdf>

<sup>31</sup> Bransah, W. (May 2020). Multiplier Effect: How Fractional Reserve Banking Creates Money. Finance & Management Engineering Journal of Africa, Volume 2, Issue 6. Published by Dama Academic Scholarly & Scientific Research Society.

undermine public confidence in the central bank's ability to maintain price stability and fulfill its policy objectives.

On the other hand, losses directly impact the solvency and financial health of commercial banks. Significant losses can erode a bank's capital, potentially leading to a breach of regulatory capital requirements. This can pose risks to the bank's stability, ability to meet obligations, and even result in regulatory intervention or bankruptcy. Moreover, commercial banks' ability to create credit and contribute to money supply expansion may be constrained by losses. If losses deplete a bank's capital, it may limit the bank's capacity to lend and create new deposits through fractional reserve banking. Additionally, commercial banks experiencing losses may face increased scrutiny, additional capital requirements, and potential restrictions on their activities to mitigate risks and maintain financial stability.

In conclusion, central banks have the exclusive authority to create money and control the money supply through various tools. While losses may not directly impact their ability to create money, they can affect their credibility. On the other hand, losses directly impact the financial health of commercial banks, potentially limiting their capacity to lend and create new deposits. Understanding these implications is vital for maintaining a stable financial system.

#### **2.4. LENDING AND DEPOSITS**

While they do not engage in traditional lending activities to individuals or businesses, central banks have the authority to provide short-term loans or liquidity assistance to commercial banks. This is particularly important during times of financial stress, such as liquidity shortages or systemic banking crises.

By acting as lenders of last resort, central banks ensure the stability and functioning of the banking system. They provide emergency funds to commercial banks to meet their short-term liquidity needs and prevent disruptions that could have far-reaching consequences for the broader economy.

This liquidity support helps maintain confidence in the banking system and prevents widespread bank failures or panic-driven runs.

According to Domanski, Moessner and Nelson (2014), during the global financial crisis in 2007, several central banks including the European Central Bank (ECB), the Federal Reserve (Fed) as well as the Bank of Japan (BoJ) played a significant role as lenders of last resort by providing approximately \$4 trillion to support to commercial banks and other financial institutions.

This led to a drastic expansion of the aggregate size of central bank balance sheets in major currency areas and even if, after the crisis, central banks gradually reduced their liquidity support, their balance

sheets continued to expand due to asset purchase programs and new support measures introduced in response to the sovereign debt crisis, particularly in the euro area<sup>32</sup>.

However, losses incurred by central banks may reduce their capacity to provide support and assistance to commercial banks in time of financial distress and weaken their ability to fulfill their role as lenders of last resort for the banking system. Then, central banks try to preserve the integrity of their balance sheets and financial stability through collateral agreements. An efficient collateral policy that mitigates the risk of balance sheet impairments and promotes responsible liquidity management by commercial banks becomes fundamental.

For this reason, loans or liquidity assistance provided by central banks to commercial banks typically come with conditions and collateral requirements to safeguard the central bank's assets and mitigate risks. Central banks closely monitor the financial health and risk profile of commercial banks to assess their eligibility for such support<sup>33</sup>.

Commercial banks are the primary institutions engaged in traditional lending activities. They accept deposits from individuals, businesses, and governments and use these funds to provide various types of loans and credit facilities. Commercial banks play a critical role in the economy by allocating capital and facilitating economic growth through the extension of credit.

When commercial banks lend money, they charge interest on the loans they make, generating profits for the bank and returns for its shareholders. These interest earnings, along with other banking activities such as fees and commissions, contribute to the financial performance and sustainability of commercial banks. The profitability of commercial banks is directly linked to their ability to generate interest income from loans while effectively managing risks. Indeed, according to a study by Dietrich and Wanzenried (2009), when a bank's loan volume is increasing at a faster rate than the average growth of the overall loan market, it has a positive effect on the bank's profitability. In other words, if a bank is able to expand its loan portfolio more rapidly than its competitors or the industry average, it is likely to experience higher profitability. This growth in loan volume can lead to increased interest income and other revenue sources, which contribute to the bank's overall profitability<sup>34</sup>. However, it is also true that without proper risk assessments and controls, excessive loan portfolio expansion could lead to the risk of granting loans to insolvent or high-risk borrowers causing the bank's profitability to shrink due to losses on non-performing loans. For this reason, commercial banks evaluate the creditworthiness of borrowers and assess the risk associated with

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<sup>32</sup> Domanski, D. and Moessner, R. and Nelson, W.R. (September 2014). Central Banks as Lenders of Last Resort: Experiences During the 2007-10 Crisis and Lessons for the Future. BIS Paper No. 79c, Retrieved from <https://ssrn.com/abstract=2504657>

<sup>33</sup> Gray, S., Chailloux, A., & McCaughrin, R. (2008). Central bank collateral frameworks: Principles and policies. IMF Working Paper No. 08/222. Retrieved from <https://ssrn.com/abstract=1278433>

<sup>34</sup> Dietrich, A., & Wanzenried, G. (2009). What Determines the Profitability of Commercial Banks? ew Evidence from Switzerland.

lending. They manage their loan portfolios to balance risk and profitability, implementing risk management practices and adhering to regulatory requirements to mitigate potential losses.

Losses incurred by commercial banks can erode their capital, impact their profitability, and weaken their financial stability. In fact, significant losses can restrict a bank's lending capacity as it may need to reduce its loan portfolios or tighten credit standards to mitigate losses and maintain regulatory capital requirements. This can lead to a decrease in credit availability, making it more difficult for individuals and businesses to access financing.

As a consequence, regulatory authorities closely monitor the financial health of commercial banks, imposing capital adequacy requirements and conducting regular assessments to ensure they can absorb potential losses and maintain the safety and soundness of the banking system.

In summary, central banks provide liquidity support to commercial banks during times of financial distress to maintain stability in the banking system. Commercial banks, on the other hand, are engaged in lending activities, accepting deposits and providing loans to individuals and businesses. Losses incurred by central banks and commercial banks have significant implications for their lending activities and the broader financial system. Then, the oversight and regulation of both central banks and commercial banks are crucial for maintaining financial stability and the smooth functioning of the overall financial system.

## **2.5. INDEPENDENCE OF CENTRAL BANKS AND COMMERCIAL BANKS**

Central banks are typically designed to be independent from political influence. This independence should allow them to make objective decisions in monetary policy, free from short-term political pressures<sup>35</sup>.

As already mentioned, primary objectives of central banks include controlling inflation, managing interest rates, and ensuring a stable and sustainable economic environment. Central banks play a crucial role in shaping a country's monetary policy and maintaining financial stability. They achieve this by regulating the money supply, using various tools such as open market operations, reserve requirements, and discount rates. So, their independence from political influence allows them to make unbiased decisions focused on long-term economic goals rather than short-term political gains.

Furthermore, central bank officials, such as governors or board members, are often appointed for fixed terms to ensure continuity and prevent frequent changes in monetary policy, which could destabilize the economy<sup>36</sup>. This fixed-term appointment enhances the central bank's credibility, as it

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<sup>35</sup> Wachtel, P., & Bléjer, M. I. (2019). A Fresh Look at Central Bank Independence: Origins and Prospects. NYU Stern, Department of Economics.

<sup>36</sup> Federal Reserve Education. (2023). About the Fed - Archive: Structure and Functions. Federal Reserve Education. Retrieved from: <https://www.federalreserveeducation.org/about-the-fed/archive-structure-and-functions/>

demonstrates a commitment to its objectives and provides transparency to the public and financial markets.

On the other hand, commercial banks are private institutions that operate within the legal and regulatory framework set by the government. They serve as intermediaries between savers and borrowers, accepting deposits from individuals and businesses and lending those funds to borrowers in need of capital. Unlike central banks, commercial banks are profit-driven entities, aiming to maximize returns for their shareholders while managing risks associated with their lending activities so, their decisions and operations are subject to market forces, shareholder interests and regulatory oversight. While they may have their own governance structures, commercial banks are subject to special supervision and regulation due to their systemic importance and potential risk to the broader financial system. This is particularly true for the so-called "too big to fail" banks that are those financial institutions which are so large and interconnected that their failure could have severe repercussions on the entire economy causing other financial institutions to fail and triggering a widespread financial crisis. So, to prevent this scenario, regulatory bodies and governments oversee commercial banks to ensure compliance with various financial and banking regulations, safeguarding the interests of depositors and maintaining the stability of the financial system.

Indeed, in response to the financial crisis of 2007-2008, different regulatory authority around the world introduced various special regulations and measures to address the "too big to fail" issue. An example of special regulation is given by the Dodd-Frank Wall Street Reform and Consumer Protection Act which mandated higher prudential standards, orderly liquidation authority, and living wills for systemically important financial institutions<sup>37</sup>.

In summary, while central banks are typically granted a degree of independence from political interference to carry out monetary policy, commercial banks operate as private businesses and are subject to various regulations and oversight by government agencies.

Then, substantial losses incurred by central banks can have significant implications on their independence. Indeed, when central banks suffer significant financial losses, they may require capital injections or financial support to restore their financial stability and ensure their continued operations. In such situations, governments may step in to provide the necessary funds, which can lead to increased influence and control over the central bank's actions.

As a result, the central bank's financial independence becomes weaker, making it more susceptible to political pressures and reducing its ability to act as a separate and impartial entity. This, in turn, can

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<sup>37</sup> Gao, Y., Liao, S., & Wang, X. (2018). Capital markets' assessment of the economic impact of the Dodd–Frank Act on systemically important financial firms. *Journal of Banking & Finance*, 86, 204-223. Retrieved from <https://doi.org/10.1016/j.jbankfin.2016.03.016>.



lead to a loss of trust from the public, as it may seem that the central bank is influenced by the government's financial support rather than acting in the best interest of the economy.

In conclusion, the differences between central banks and commercial banks are fundamental in understanding the potential impact of losses on the role and independence of central banks. Losses incurred by central banks can have several consequences, affecting their financial strength, ability to support governments, and implementation of effective monetary policies. Furthermore, such losses may erode public confidence in the overall stability of the banking system.

In the next section, we will delve deeper into the specific implications of losses for central banks. We will explore the significance of these losses and evaluate whether they truly matter in the functioning of central banks.

### **III. WHAT IS THE IMPACT OF LOSSES FOR CENTRAL BANKS? DOES IT MATTER?**

This section explores the implications and significance of financial losses for central banks. As already mentioned, the primary objective of central banks lies in fulfilling their policy mandates which include maintaining price stability as well as financial stability. So, at least in theory, their focus should extend beyond generating profits or avoid losses. Nevertheless, central bank profitability is a topic of great interest for the general economy since it may affect their ability to fulfill their mandates effectively.

In this section we aim to investigate the potential consequences of losses for central banks and whether they truly matter in the broader context of the economy.

First, I will start the discussion by analyzing some of the most notable cases of central banks operating with negative capital. Then, I will try to answer the question of whether central banks worry about their losses or not and I will also investigate what are the possible consequences of losses on monetary policy decisions. Finally, an explanation of when a central bank is insolvent is provided along with an analysis of the limited resources of central banks.

#### **3.1. CENTRAL BANKS WITH NEGATIVE CAPITAL**

In the recent past, several central banks such as Swiss National Bank, Central Bank of Chile and Czech National Bank, have operated with negative equity.

Let's start by analyzing one of the most relevant cases that is the Central Bank of Chile. To understand the current capital position of this central bank, it is useful to first recall the economic history of the country over the past fifty years. We can consider four different phases, the first concerns the period from 1960 to 1973 which was characterized by a stable economic growth but with high and persistent inflation<sup>38</sup>. The next period, going from 1974 to 1981 saw great instability following a sharp decline in the country's GDP in 1975. During this phase, inflation rates reached very low levels and the fiscal deficit of the country was increasing. The most relevant phase for our discussion is the one related to the period going from 1982 to 1990. Indeed, during this period, Chile faced a huge banking crisis as a result several factors such as high interest rates, decline in foreign loans and an overvaluation of the Chilean peso pegged to the US dollar. As a response, the government conducted several interventions such as bail-outs of various commercial banks to address the financial instability. Also the Central Bank of Chile received support from the government during the mid-1980s banking crisis which adopted a "popular capitalism" process in order to recapitalize banks facing financial distress. Indeed,

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<sup>38</sup> Caputo, R. and Saravia, D. (August 24, 2018). The Monetary and Fiscal History of Chile: 1960-2016. University of Chicago, Becker Friedman Institute for Economics Working Paper No. 2018-62. Retrieved from <https://ssrn.com/abstract=3238188>

during this period, the Bank of Chile suffered losses after it purchased asset portfolios from banks judged as solvent but in financial distressed positions due to a loss of market confidence. These interventions resulted in the Bank of Chile having a negative equity position for many years afterward<sup>39</sup>. Finally from 1991 onward, Chile was able to bring down inflation levels and GDP started to rise over the years.

Indeed, the Central Bank of Chile has presented negative equity values since 1997 due to the fact that the profitability of their assets, which are mainly composed by international reserves, has been lower than the interest payment made by the bank<sup>40</sup>. Additionally, their equity position was also affected by fluctuations in exchange rates, since international reserves in the form of assets are denominated in foreign currency while liabilities are kept in domestic currency.

So, the Central Bank of Chile received the support of the government first in 1987 and then in various tranches from 2006 until 2011<sup>41</sup>. However, this support came at a cost for the central bank since it weakened substantially its financial independence. So, this could be a signal that the even though small losses might be sustainable for central banks, the role of capital is indeed crucial for central banks so that they should manage their earnings in order to maintain an equilibrium.

Another example of central bank in a similar situation is given by the Czech National Bank (CNB) which, in the same way of the Central Bank of Chile, keeps mainly foreign exchange reserve on the asset side of the balance sheet. In 2010, the European Central Bank (ECB) published a Convergence Report in which it pointed out that negative capital for a central banks might raise concerns about their financial independence suggesting that negative capital may reduce the central bank's ability to fulfill their mandates. Moreover, according to the report, the principle of financial independence for a National Central Bank (NCB) not only requires adequate resources to perform its tasks within the European System of Central Banks (ESCB) but also its national tasks<sup>42</sup>. This means that the NCB should have adequate financial resources and capital to carry out its responsibilities at both the domestic and European levels. In response to this report, the Czech National Bank stated that its previous losses were due to accounting revaluation of foreign exchange reserves and that such losses have never been a threat to the central bank's independence or credibility<sup>43</sup>. Moreover, the Czech National Bank emphasized the fact that their monetary policy is effective and that it is not affected

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<sup>39</sup> IMF. (2022, September 12). Chile: Financial Sector Assessment Program—Technical Note on Crisis Management and Bank Resolution (Country Report No. 2022/295). Retrieved from <https://www.imf.org/en/Publications/CR/Issues/2022/09/09/Chile-Financial-Sector-Assessment-Program-Technical-Note-on-Crisis-Management-and-Bank-523258>

<sup>40</sup> Central Bank of Chile. Preguntas Balance del Banco Central de Chile - Preguntas Frecuentes Estadísticas. Retrieved from <https://www.bcentral.cl/web/banco-central/areas/estadisticas/preguntas-frecuentes-estadisticas>

<sup>41</sup> Abate, G. (2018). La partecipazione di investitori privati al capitale delle banche. Italia: Egea.

<sup>42</sup> ECB. (May, 2010). Convergence Report. Retrieved from <https://www.bancaditalia.it/pubblicazioni/rapporto-convergenza-bce/2010-report/>

<sup>43</sup> Czech National Bank. (December 5, 2010). International relations: The Czech National Bank disagrees with the ECB Convergence Report. Retrieved from <https://www.cnb.cz/en/cnb-news/press-releases/The-Czech-National-Bank-disagrees-with-the-ECB-Convergence-Report-00001>

by the losses they have accumulated. At the same time, the Czech National Bank remarked the fact that their ability to perform tasks in the ESCB is not threatened by such losses.

As it can be seen in figure 3, prior to 2013, the year in which the CNB introduced an exchange rate commitment with the aim of weakening the Czech koruna against the euro, the CNB experienced negative equity for 16 years. This situation occurred mainly because of banks bail-outs in the late 1990s which required the support of the CNB and because of valuation losses as a result of the Czech koruna's appreciation against major reserve currencies<sup>44</sup>.

Indeed, we should keep in mind that the Czech economy is a small, open economy, so the strengthening of koruna implies that each koruna can buy more of other currencies like euros and dollars. We already mentioned that the CNB keeps a large amount of foreign exchange reserves on the asset side of the balance sheet to conduct monetary policy operations. When the koruna appreciates, it means that the value of these reserves decreases when you convert them back in the domestic currency.

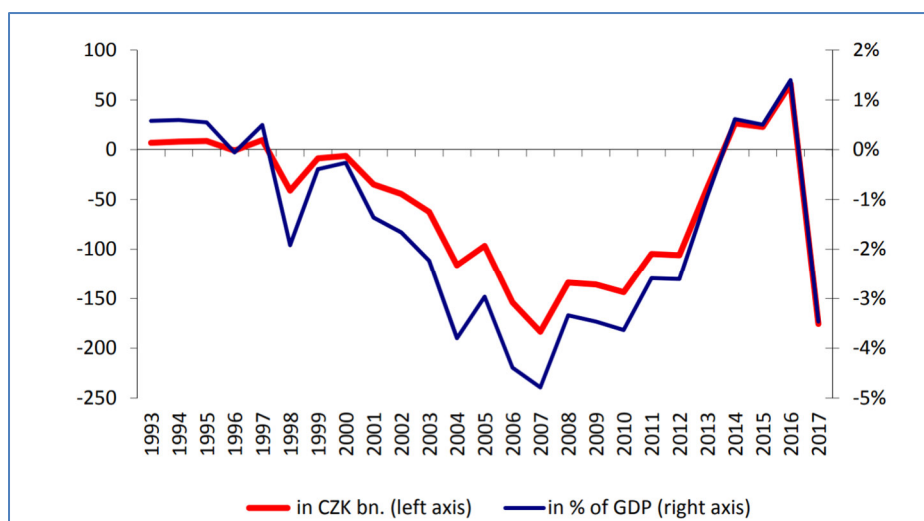
Throughout 2012, the CNB tried to fight recession and high deflation by using its main monetary policy instrument, interest rates. However, even after lowering interest rates to almost zero (0.05%), the economy was recovering too slowly so that on 7 November 2013, the CNB introduced an exchange rate commitment as an unconventional monetary policy tool. The objective of the CNB was to weaken the domestic currency against the euro to bring back inflation to its target level of 2% by maintaining the Czech koruna exchange rate at or above 27 korunas per euro.

So, even if the primary goal of the CNB was to achieve price stability, the commitment had a significant impact also on the central bank's balance sheet. For instance, the depreciation of the Czech koruna in 2013–2014 allowed the CNB to generate substantial profits due to the fact that when the koruna is weaker, the foreign reserves held by the central bank become more valuable when converted back to the domestic currency.

### **FIGURE 3: CNB's equity**

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<sup>44</sup> Franta, M., Holub, T., & Saxa, B. (2018). Balance Sheet Implications of the Czech National Bank's Exchange Rate Commitment. CNB Working Paper Series, 10.



Source: Franta, M., Holub, T., & Saxa, B. (2018).

Indeed, Martin Cincibuch, Tomáš Holub and Jaromír Hurník (2009) stated that the CNB could cover the accumulated losses from future profits, mainly coming from seigniorage given the expected slowdown in the appreciation of the local currency<sup>45</sup>.

Actually, the full repayment of CNB's accumulated losses was completed much earlier than expected in 2014 due to the depreciation of the Czech koruna against major currencies like the euro and the US dollar<sup>46</sup>.

However, the CNB went back into negative equity after their exit from the exchange rate commitment, on 6<sup>th</sup> April 2017, due to a new appreciation of the domestic currency against major currencies. Moreover, according to a study conducted by Franta, Holub and Saxa in 2018, the CNB is expected to report negative equity for two decades more.

Also the Swiss National Bank (SNB) reported severe losses that led them to operate with negative capital. From figure 4 below, it can be seen that the Swiss National Bank's balance sheet saw significant changes in 2022 where the balance sheet contracted by 17% mainly due to a decline in foreign exchange investments, resulting in a loss of 131 billion of Swiss Franc (CHF)<sup>47</sup>. This led to a significant decline in the SNB's equity during 2022, more precisely going from CHF 204 billion to CHF 66 billion at the end of the year. It is unlikely that the financial loss experienced by the Swiss National Bank in 2022 will have a significant impact on its monetary policy tools such as the policy interest rate, repos, communication, and foreign exchange interventions. It is also unlikely that the bank will need a recapitalization indeed, given that at the end of 2022 the SNB still exhibited an

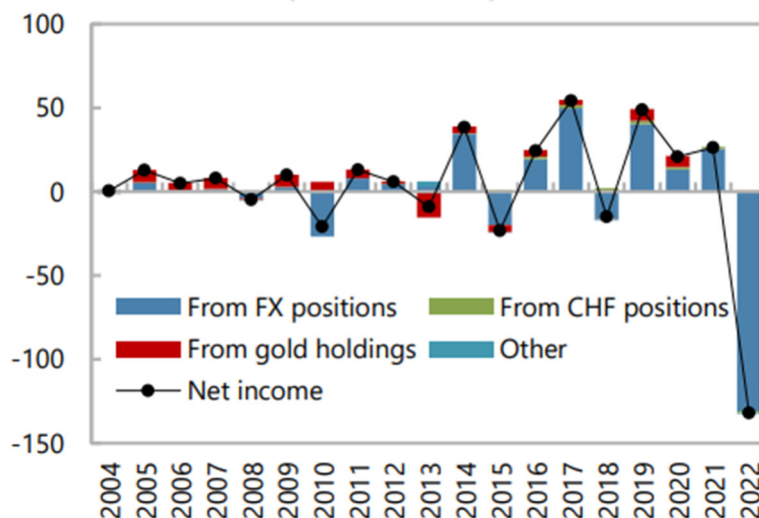
<sup>45</sup> Cincibuch & Holub & Hurník. (2009). "Central Bank Losses and Economic Convergence," Czech Journal of Economics and Finance (Finance a uver), Charles University Prague, Faculty of Social Sciences, vol. 59(3), pages 190-215, August.

<sup>46</sup> Franta et al., *supra* note 44.

<sup>47</sup> IMF. (2023). Switzerland: Selected Issues, IMF Staff Country Reports, 2023(197), A001. Retrieved from <https://doi.org/10.5089/9798400243608.002.A001>

equity of CHF 66 billion, since there are no legal requirements for recapitalization of the SNB in case of negative equity, it seems that government funds will not be needed.

**FIGURE 4: SNB's net income**



Source: IMF Staff Country Reports (2023).

In summary, the SNB's financial loss in 2022 is not expected to have significant implications for its monetary policy operations or recapitalization needs. However, the lack of profit transfers to the government may create some fiscal challenges requiring adjustments in the budget plan of the government.

These are just few of the example of central banks which have been able to successfully operate with accumulated losses, other banks worth to mention are the Bank of Israel as well as Bundesbank which recently experienced losses of €1 billion from its bond holdings.

Before moving to the next part of the discussion it is worth mentioning that most of the central banks operating with negative capital are those of small open economies. This is due to the fact that after facing financial crises in the 1990s and early 2000s, many central banks of these small economies built up foreign exchange reserves in order to protect themselves against large fluctuations in exchange rates<sup>48</sup>. However, international reserves are still a major component of their asset side of the balance sheet making their profits more susceptible to changes in exchange rates.

### 3.2. DO CENTRAL BANKS CARE ABOUT LOSSES?

So, some central banks such as the SNB and the CNB argue that negative capital does not matter as long as they can fulfill their mandates. Indeed, according to Bunea et al. (2016), while profits are an

<sup>48</sup> Bell et al., *supra* note 2.

important indicator of the operational performance of commercial banks, this is not an essential factor for central banks. This is because, since central banks are not profit maximizing institution, their performance should be measured based on whether or not they are able to conduct their tasks efficiently. Giampaolo Galli and Federico Neri (2023) argue that the income statement of almost all central banks in the Eurozone is recently deteriorating. However, the authors explain that if the losses are limited through time, even if substantial, they are sustainable and should not require central banks to ask governments for fund since at least for some time, central banks can effectively operate even with negative capital.

Indeed, under certain circumstances, it could be optimal for central banks to report a loss. Recently, several central banks have reported losses primarily due to the impact of unconventional monetary policy measures, such as asset purchases through quantitative easing (QE), used in response to period of crises such as the 2007 financial crisis or the more recent covid-19 crisis<sup>49</sup>. During QE, central banks purchase large quantities of government bonds and other assets to inject money into the economy and stimulate economic activity with the aim of lowering long-term interest rates, encourage borrowing and spending, and support financial markets.

As a consequence, when they purchase these bonds and assets, the central bank's balance sheet expands having the purchased assets on one side and an increase in money supply of the same amount on the liability side. However, central banks' liabilities include interest-bearing reserves held by commercial banks so that when money supply increases, also the amount of interest they need to pay on those reserves does so. So, if their assets such as government bonds have fixed interest rates, they may not keep up with the rising interest payments on reserves leading to losses for central banks. Nevertheless, incurring these losses is optimal for central banks since their objective during these QE operation was to stimulate economic activity, so these measures are used to pursue broader financial stability objectives even if they may result in losses.

Morgan Stanley's chief economist, Seth Carpenter, stated that even if central banks face losses, these do not lead to bankruptcy or to a loss of their ability to conduct monetary policy because, in such situation, central banks stop remitting money to the Treasury and accumulate these losses as a "deferred asset"<sup>50</sup>. So, instead of reducing its capital and reserves to cover the loss, the central bank will treat it as a deferred asset on its balance sheet where this asset represents the amount of loss that needs to be recovered from future earnings and profits. This concept of deferred assets allows central banks to maintain their financial stability and operational capacity even during periods of losses, without immediate adverse effects on their ability to conduct monetary policy.

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<sup>49</sup> Jones, M. (2023, February 7). Post-QE bond losses rising reality for central banks - BIS. Reuters.

<sup>50</sup> Wigglesworth, R. (October 10, 2022). Are central banks going bankrupt? Financial Times.

However it is also true that the public's trust in central banks strengthen when the financial position of central banks is solid. This is because, if central banks generate profits rather than losses, they are perceived as being more independent from governments and political pressure.

Indeed, in the vast majority of cases, governments are the sole shareholders of central banks so that when central banks generate profits, they usually remit them to the Treasury<sup>51</sup>. On the other hand, if central banks report losses, in extreme circumstances, it may happen that governments transfer funds to them in order to restore their financial health. This situation can indeed create concerns about the independence of central banks' actions with respect to political pressures from governments.

Moreover, even though several central banks state that losses are not relevant to assess their operational and policy performance, recent research suggests that central banks are more inclined to generate profits and actively avoid reporting losses.

In 2023, Goncharov, Ioannidou, and Schmalz conducted an empirical study in order to understand whether central banks avoid reporting losses and why. The analysis is conducted by focusing on a dataset of observations where profits are just above or below zero. The main idea behind this study is to see if there is or not a discontinuity in central banks' profit distribution when they are near to zero since such a discontinuity should be a signal of a preference for profits over losses. Essentially, this means that the researchers are examining whether, when their financial results are close to zero, central banks tend to round up their profits or engage in accounting practices that help them avoid reporting losses.

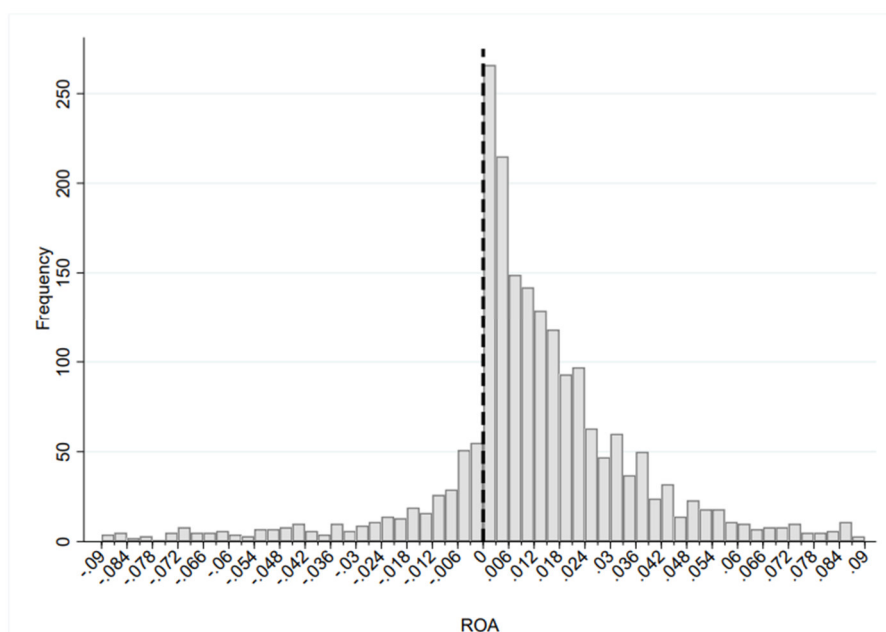
Indeed, according to the authors, in a frictionless world, central banks should not systematically generate very small profits with respect to very small losses. Therefore, if they were to find a large number of observation for central banks that are above zero relative to below zero, this would suggest that central banks prefer profits over losses. As shown in figure 5, the authors found indeed that it is more likely for central banks to report small profits rather than small losses suggesting that they manage earnings in order to avoid facing losses.

### **FIGURE 5: SNB's net income**

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<sup>51</sup> Bunea, D. and Karakitsos, P. and Merriman, N. and Studener, W. (April 26, 2016). Profit Distribution and Loss Coverage Rules for Central Banks. ECB Occasional Paper No. 169, Retrieved from <https://ssrn.com/abstract=2770326>





**Source:** Goncharov, I., Ioannidou, V., & Schmalz, M. (2023).

As already mentioned, central banks' independence is fundamental in order to conduct an effective monetary policy. Then, an interesting point in Goncharov et al. (2023) is trying to understand whether the behavior of avoiding losses affects the monetary policy decision of a central bank.

Indeed, it could be possible that the same factors that push central banks to manage earnings in order to generate profits, have also an impact on monetary policy decisions leading to different outcomes. For example, central banks might be reluctant to implement those policies which could potentially lead to a loss such as raising interest rates in order to lower inflation. Then, we would expect that if profits are higher in periods of low interest rates and high inflation, there is probably some kind of correlation between monetary policy decisions and the incentive to generate profits by central banks. However, the authors stated that such correlation may be due to the fact that under periods of high inflation and low interest rates, it might be better for central banks to avoid losses since it could be a threat to their credibility and independence<sup>52</sup>.

In conclusion, even though central banks often state that their capital position is not relevant for them to achieve their objectives and fulfill their mandates, they do exhibit a preference for reporting profits over losses. So, overall we can say that central banks do care about losses. Moreover, according to recent research, they also actively manage their earnings in order to avoid such losses and this behavior could lead to potential implications on their monetary policy decisions and objectives such as controlling inflation and achieving financial stability.

<sup>52</sup> Goncharov, I., Ioannidou, V., & Schmalz, M. (2023). (Why) do central banks care about their profits?. *The Journal of Finance*.

### 3.3. IMPACT OF LOSSES ON MONETARY POLICY OBJECTIVES

Now, let's take a closer look at how losses affect monetary policy decisions. It is useful, for our purpose to make a distinction between expansionary monetary policy and contractionary monetary policy. When a central bank is implementing an expansionary monetary policy, it applies a set of measures to stimulate economic growth and increase aggregate demand. This is usually achieved through the reduction of interest rates in order to encourage spending and investments, or it is done with open market operations in which central banks buy government assets or other financial securities to increase the money supply.

On the other hand, a contractionary monetary policy requires central banks to control inflation and slow down economic growth. As opposed to expansionary monetary policy, in this case central banks will raise interest rates to discourage borrowing and reduce spending, while in open market operations, the central bank will sell assets with the aim of reducing the money supply.

According to the 2016 document published by the ECB titled "Profit distribution and loss coverage rules for central banks", central banks are protected from insolvency due to their ability to issue money. For this reason, losses would not represent a significant constraint for central banks when pursuing expansive monetary policies. Indeed, central banks will still be able to issue money and lend to banks even when exhibiting a negative capital.

However, a research by Sheard (2013) conducted for Standard & Poor, states that some issues arise in the case of a central bank implementing a contractionary monetary policy<sup>53</sup>. The research focuses on the challenges that central banks may face when implementing a contractionary monetary policy. A contractionary policy is designed to slow down economic growth and control inflation by reducing the money supply and increasing interest rates. Indeed, while in expansionary monetary policy central banks create reserves and inject liquidity into the banking system to stimulate economic activity, when implementing contractionary measures the central bank needs to reduce both reserves and excess liquidity.

However, central banks face a problem when the assets purchased during the expansive phase decrease in value. Indeed, in such case, selling these assets in the contractionary phase could not generate enough funds to adequately reduce the money supply. Let's consider the monetary policy implemented by the ECB during the Covid-19 pandemic crisis. The ECB made use of unconventional monetary policy tools in the past few years to help the economy recover from the covid-19 pandemic. Indeed, they implemented an expansionary monetary policy through a pandemic emergency purchase programs (PEPP) and other quantitative easing measures to provide liquidity and support the

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<sup>53</sup> Sheard, P. (2013, August 13). Repeat After Me: Banks Cannot And Do Not "Lend Out" Reserves. Standard & Poor's.

economy which during all 2020 was experiencing inflation below target due to the drastic reduction in demand mostly caused by the lockdowns. As the economy was starting to recover from the pandemic, the ECB started a process of "normalization of monetary policy" which refers to the process by which a central bank goes back to conventional monetary policy from unconventional measures.

Indeed, the ECB announced the decision to discontinue net asset purchases under the PEPP at the end of March 2022. However, once the economy started to recover in mid-2021, inflation began to rise both due to the increase demand as well as for the higher prices for energy and food. These prices continued to rise sharply also due to the conflict between Russia and Ukraine which led inflation to increase even more. Then, in June 2022, the ECB decided to end net asset purchases under its asset purchase program (APP) and to implement a contractionary monetary policy by increasing its key policy rates by 25 basis points in July to control inflation, with additional gradual increases to be implemented in the future based on the economic outlook. However, this normalization process could imply significant losses for central banks that might impact their ability to conduct monetary policy effectively. Indeed, as interest rates increase, it can happen that the amount that the central bank must pay on its assets is less than what it receives from its liabilities.

This is what happened to several banks in the eurozone even though the most significant examples are the Bundesbank which announced losses of €1 billion from its bond holdings in March 2022.

To solve the problem, the government could intervene by recapitalizing the central bank by issuing bonds or by transferring funds to the central banks. However, we mentioned several times that this could lead to a loss of credibility and independence of central banks. So, large losses may restrict the central bank's ability to conduct monetary policy effectively. If losses are substantial, they could limit the central bank's capacity to conduct open market operations, which play a crucial role in controlling the money supply and interest rates. In response to such a situation, central banks might consider to adjust interest rates in order to generate profits to recover losses. However, this decision could have serious consequences on the independence of the central bank.

To fully understand the importance of central banks' independence, it is useful to go back to the 1970s. During that period, it was a common practice for policymakers to use monetary policy tools in order to achieve higher employment by boosting aggregate demand even if that meant having higher inflation<sup>54</sup>. Even if this practice seemed to work in the short-term, over time it became clear that the public started to predict the actions of monetary policy and integrated expectations of increased inflation into their prices. As a result, the effect of rising employment with higher inflation

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<sup>54</sup> Draghi, M. (2018, October 26). First Lamfalussy Lecture by Mario Draghi, President of the ECB, at the Banque Nationale de Belgique, Brussels. Retrieved from <https://www.ecb.europa.eu/press/key/date/2018/html/ecb.sp181026.en.html>

started to disappear. In order for central banks to gain back their credibility as institutions capable of maintaining stable inflation, they had to ensure independence from political pressure while focusing only on their mandates and objectives.

An example of a central bank that was able to achieve independence and credibility is given by the German Bundesbank which, in the 1950s, was able to do so through a successful anti-inflationary monetary policy and by resisting to political pressures coming from the state<sup>55</sup>. Then, over time, central banks became more independent from political objectives, and according to a study carried out in OECD countries, it was found that central banks' independence and inflation are negatively correlated meaning that it is indeed useful to grant independence to central banks<sup>56</sup>.

Then, in extreme cases, significant central bank losses might necessitate financial support from the government mostly in the form of capital injections to restore their financial stability and ensure their continued operations. Such situation can erode public trust in central banks, as it may seem that they act under the influence of governments rather than acting in the best interest of the economy. As a result, central banks become more susceptible to political pressures reducing its ability to act as a separate and impartial entity threatening their capability in employing monetary policy tools effectively.

Moreover, if a central bank were to excessively lower interest rates to encourage borrowing and spending, this could lead to undesired inflationary pressures in the economy. This, in turn, may erode the value of the currency and result in a loss of confidence in the central bank's ability to maintain price stability. Then, from a more technical point of view, there is the so-called zero lower bound. When interest rates approach zero, conventional monetary policy tools, such as further lowering interest rates become less effective in stimulating demand and economic growth. At this point, the economy may fall into a situation known as a liquidity trap where market participants may choose to hoard cash rather than invest or spend it<sup>57</sup>.

To mitigate such risks, central banks must maintain financial independence and sufficient operational and financial resources to fulfill their mandates without undue government interference.

In summary, central banks can indeed operate with negative capital however, they may encounter difficulties in restrictive policies. From what we have seen until now, losses do matter for central banks and can have significant implications for their ability to implement monetary policy effectively.

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<sup>55</sup> Berger, H. (1997). The Bundesbank's path to independence: Evidence from the 1950s. *Public Choice* 93, 427–453. Retrieved from <https://doi.org/10.1023/A:1004928828323>

<sup>56</sup> Berger, H. and de Haan, J. and S. Eijffinger. (2001). "Central Bank Independence: An Update of Theory and Evidence", *Journal of Economic Surveys*, 15(1): 3-40.

<sup>57</sup> Altavilla, Burlon, Giannetti, & Holton. (2021, April 12). Is There a Zero Lower Bound? The Effects of Negative Policy Rates on Banks and Firms. *Journal of Financial Economics (JFE)*. Forthcoming. Swedish House of Finance Research Paper No. 19-11. Retrieved Sep 3, 2023, from <https://ssrn.com/abstract=3460947>

### 3.4. SOLVENCY AND LIMITED RESOURCES OF CENTRAL BANKS

Given the examples of central banks operating effectively with negative capital, it seems that central banks' financial stability does not depend on conventional solvency measures alone<sup>58</sup>. However, this does not necessarily mean that a central bank cannot become insolvent or that losses do not matter. Indeed, we can make a distinction between policy insolvency, that refers to the inability of a central bank to implement monetary policy effectively, and technical insolvency which arises when a central bank make use of more resources than it has available. Then, according to a study by Reis (2015), the concept of solvency related to central banks is directly tied to the fiscal support that the government provides them<sup>59</sup>. The reason behind this is explained by the fact that central banks usually operates as the government's bank and holds various government accounts. This interconnection between the two institutions makes clear that in times of crisis or economic distress, governments may provide the necessary financial resources in order to stabilize the central bank's operations and maintain confidence in the monetary system.

So, in order to assess whether a central bank is solvent or not, Hall and Reis (2015) provide a rule-based approach which involves periodic calculations of net income, which is a key financial indicator for central banks<sup>60</sup>. According to this rule, if the central bank's net income is positive, meaning that the bank has generated more income than its expenses, the central bank transfer the positive net income to the Treasury. On the other hand, if the central bank's net income turns negative, the central bank requires financial support to cover the deficit. The support should be provided by the fiscal authority, typically the government, which transfers funds to the central bank to cover the shortfall. However, it should be noted that, while some major central banks such as the Federal Reserve and the European Central Bank (ECB) follow this approach for positive net income, the procedure for negative net income does not always follow the rule. Indeed, when these central banks generate profits, they rebate those profits to their respective Treasuries. Regardless, governments may not always provide full financial assistance to central banks during periods of losses.

Indeed, when central banks suffer losses, governments usually step in only after specific buffers and general reserves have been depleted, or when carrying the losses forward would be prolonged over an indefinite period<sup>61</sup>. This coverage for central banks' losses can be provided through the transfer of funds or by issuing government securities, in order to restore central banks' level of capital.

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<sup>58</sup> Bell et al., *supra* note 2.

<sup>59</sup> Reis, R. (2015). "Different types of central bank insolvency and the central role of seignorage," CEPR Discussion Papers 10693, C.E.P.R. Discussion Papers.

<sup>60</sup> Hall and Reis. (2015). "Maintaining Central-Bank Solvency under New-Style Central Banking." NBER Working Paper 21173 Retrieved from <https://www.nber.org/papers/w21173>

<sup>61</sup> Bunea et al., *supra* note 51.

Then, this means that losses can indeed lead to insolvency of central banks and according to this rule, the financial stability of central banks depends on how well they manage their resources and financial obligations. So, even if there is a prevailing belief in the economy that central banks can always resort to printing money in order to settle debts and purchase goods, this is true only to a certain extent and should not be misunderstood as an unlimited capacity to create resources.

Indeed, recent research tries to address this issue by showing that central banks indeed have limits and just like any other institution, they face resource constraints.

To see this, it is important to understand how central banks manage their liabilities. Central banks' liabilities can be divided in two different types that we will call  $h_t$  and  $v_t$ <sup>62</sup>. The first type of liabilities,  $h_t$ , refer to the total amount of a central bank's liabilities that pay out a return below the market return to its holder. For simplicity, Reis (2013) considers this return to be equal to zero, meaning that liabilities of the type  $h_t$  do not pay interests to its holders. These are generally represented by physical currency such as banknotes and coins in circulation. On the other hand,  $v_t$  is given by the total amount of liabilities of a central bank that gives the holder the safe market return,  $i_t$ , between time  $t$  and  $t+1$ . An example of such liabilities is excess reserves held by commercial banks at the central bank.

Now, let's say that a general central bank has  $J$  assets each earning a stochastic return  $i_{t+1}^j$ . Then, in his paper, Reis provides the following resource constraint for central banks:

$$h_{t+1} + v_{t+1} = h_t + (1 + i_t)v_t + a_{t+1} - \sum_{j=1}^J (1 + i_{t+1}^j) a_t^j + p_{t+1}d_{t+1}$$

where

- $a_t$  is the total value of the assets held by the central bank;
- $d_t$  represents dividends that the central bank pays to the Treasury in real terms;
- $p_t$  is the price level.

Then, the constraint indicates that in the next time period, the total liabilities of the central bank will be equal to the combination of its current liabilities of type  $h_t$ , the current value of  $v_t$  liabilities increased by the interest they earn, along with the change in the value of the central bank's assets and the dividends paid to the government. So, this highlights the fact that central banks manage their assets and liabilities in order to fulfill its commitments and goals. Here, they need to generate funds at time  $t+1$  following the current time period  $t$ , so that they can cover the existing current liabilities,

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<sup>62</sup> Reis, R. (2013). "The Mystique Surrounding the Central Bank's Balance Sheet, Applied to the European Crisis." *American Economic Review*, 103 (3): 135-40.

expand their balance sheet by purchasing new assets and allocate funds to pay dividends to the government.

To see why central banks resources are not unlimited, it is crucial to understand the relation between the two types of central bank's liabilities. People hold physical currency, of type  $h_t$ , for various reasons, such as for day-to-day transactions or as a safe asset during times of uncertainty. So, the demand for currency is influenced by various factors like economic conditions, interest rates, as well as public confidence in the stability of the currency. However, in order to maintain the stability and confidence in the currency, it is crucial that central banks commit to exchange the two types of liabilities,  $h_t$  and  $v_t$ , for the same value. In this way, the central bank assures the public that the currency can be readily exchanged for other assets or liabilities without loss of value and thus, it is trustworthy.

So, given this commitment by central banks, it is clear that they cannot just print money in order to increase  $h_t$  or more generally the money supply. Indeed, according to Reis (2013), central banks influences  $h_t$  indirectly through monetary policy tools in order to maintain the two types of liabilities on par. These monetary policy tools are usually employed to control inflation however, they indirectly influence the demand for currency  $h_t$ . Central bank can indeed influence the demand for money and, therefore, the quantity of currency held by the public and banks by adjusting interest rate. For example, by raising interest rates, the central bank can aim to reduce inflationary pressures by curbing consumer spending and borrowing. At the same time, higher interest rates might reduce the demand for money in the form of currency,  $h_t$ , because of the opportunity cost. This is because, when interest rates are high, individuals and businesses can earn higher returns by investing in interest-bearing assets like bonds or depositing funds in savings accounts. Vice versa, lower interest rates can boost economic activity and potentially lead to higher inflation, as an indirect effect, lower interest rates should also increase the demand for money.

Then, since we said that central banks do have limits in their ability to create resources, it must be that these limits are to be found in the usage of monetary policy tools. Indeed, while it is true that central banks can influence  $h_t$  through its monetary policy tools, including changes in interest rates, there are several constraints and considerations that prevent it from a limitless expansion.

As said before, excessively lowering interest rates can lead to undesired inflation and could be a threat to public confidence in the central bank's ability to maintain price stability. Additionally, the zero lower bound can limit the effectiveness of further lowering interest rates in stimulating economic growth.

In these circumstances, the central bank's ability to further expand  $h_t$  is limited. Moreover, if interest rates are too low, the profitability of banks and other financial institutions could be under risk and

this can lead to unintended consequences for financial stability. So, while central banks can allow inflation to rise above the target as a tool to generate resources and prevent sovereign defaults, they need to consider these limitations in order to achieve their policy objectives effectively.

Furthermore, losses can also impact the exchange rate. Indeed the inflationary pressure that may arise when central banks decide to lower interest rates to finance its losses, can lead to a depreciation of the currency, impacting the exchange rate.

In summary, excessive losses can threaten central banks' ability to control inflation effectively and it is indeed possible for central banks to become insolvent in times of financial losses. Therefore it is crucial for them to manage their resources and liabilities carefully in order to prevent potential insolvency.



#### IV. POSSIBLE RESPONSES OF CENTRAL BANKS TO LOSSES

In the first section of this paper, it was mentioned that in the past few years central banks worldwide exhibited an increase in the size of their balance sheet mostly due to the adoption of some unconventional monetary policy operation as a response to periods of financial crisis. However, the challenges central banks face in managing financial risks and losses are not new and can be better understood in light of historical experiences.

The Great Depression was a severe economic crisis which took place in the United States in the late 1920s until the 1930s. This period was characterized by high unemployment, deflation and bank failures. As Roosevelt became President of the United States in March 1933, he started to implement a series of measures known as the New Deal, aimed at stimulating the economy. One of the most interesting tools used to achieve this objective is the issuance of Irredeemable Gold Certificates (IGC). Indeed, on April 5 1933, Roosevelt issued an order that required U.S. citizens to exchange their gold coins for U.S. dollars at a fixed rate<sup>63</sup>. In order to leverage these gold reserves, the government decided to issue, with the help of the Federal Reserve who acted as the custodian of the gold held by the U.S. Treasury, the so-called Irredeemable Gold Certificate. These were used as a form of currency to increase liquidity in the economy, however, they were not backed by a promise to exchange them for physical gold. This created some issued for the Federal Reserve.

For instance, the Fed had limited control over its own balance sheet since it became heavily reliant on IGC which were non-redeemable government obligations that paid no interest. For this reason, the Fed's ability to effectively cover losses was reduced since while IGC appeared as assets on the central bank's balance sheet, they could not be easily converted into cash or other interest-bearing assets. Moreover, this also implied a limited capacity for the Fed to conduct open market operations to control the money supply<sup>64</sup>.

Then, it becomes of primary importance to understand how central banks can face these financial risks by analyzing the available responses to losses and try to find an optimal way for central banks to deal with them. Let's consider a study conducted by Bunea et al. (2016) for a research paper series of the European Central Bank. In this study, the authors analyzed the different policies adopted by several central banks regarding the distribution of profits and coverage of losses. The resulting data and information are derived from the answers of 57 central banks to a questionnaire sent by the ECB. The geographical distribution of these banks allow us to say that the sample is representative of the overall behavior of worldwide central banks. Indeed, of the 57 central banks, 19 (33%) central banks

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<sup>63</sup> Stella, P., & Klüh, U. (2022). Believing in Monetary Madness: How to Credibly Transfix Inflation Expectations. Stella Consulting LLC & Darmstadt Business School.

<sup>64</sup> *Id.*

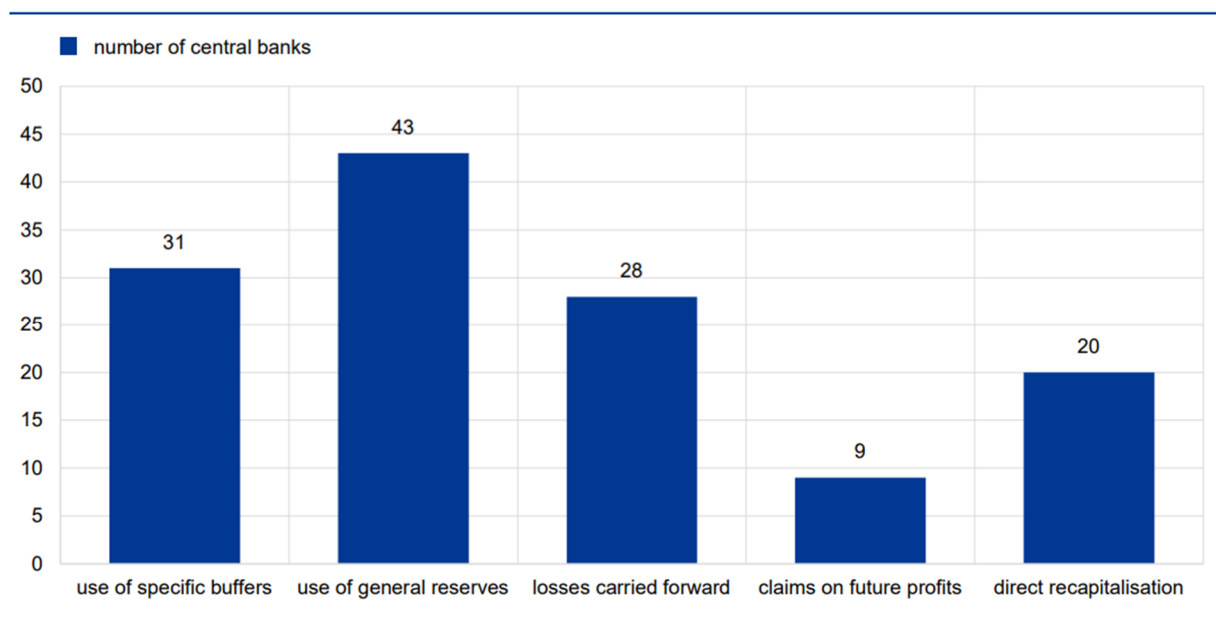
are from the euro area, 9 (16%) are from the EU but they are not in the euro area, 4 (7%) central banks are from Europe but not the EU, 11 (19%) from North and South America, 5 (9%) from Asia, 5 (9%) from Africa and 4 (7%) from Oceania<sup>65</sup>.

The authors identified five different ways in which central banks deal with losses bases on their answers on the questionnaire. These are as follows:

- *consumption of specific buffers;*
- *consumption of general reserves;*
- *losses carried forward;*
- *claims against future profits;*
- *direct recapitalization by the government or shareholders;*

In the figure below (fig.6), the distribution of central banks' response is shown. It should be noted that the different ways in which central banks cover losses are not mutually exclusive, meaning that they can be used in sequence or as a mixture.

**FIGURE 6:** Coverage/treatment of losses



**Source:** Bunea et al. (2016)

<sup>65</sup> Bunea et al., *supra* note 51.

From the distribution it seems that the most commonly used option by central banks in the sample is the utilization of general reserves to cover losses. In this section, we will go through several options available to central banks in order to absorb losses to understand if there is an optimal approach for managing them.

#### **4.1. SPECIFIC AND GENERAL BUFFERS**

When a central bank suffers a loss, one of the most common responses is to make use of its buffers in order to cover the loss. What does it mean to use its buffers? With the term “buffer” we are referring mainly to the central bank’s reserves or its capital. However, it is useful, in this context, to make a distinction between specific and general buffers. Usually, capital buffers represent a general buffer corresponding to the amount of capital that a central bank holds as a cushion against potential losses so, this buffer is similar to the capital requirements that commercial banks must meet to ensure their financial soundness. Capital buffers are quite useful since they enable central banks to ensure operational and financial independence by providing them with enough resources to absorb losses and conduct monetary policy in an effective way.

Also reserves can be viewed as general buffers however, some types of reserves such as revaluation reserves are regarded as specific buffers. Generally speaking, reserves are an essential buffer through which central banks absorb losses so, central banks hold different kinds of reserves such as commercial banks reserves, foreign exchange reserves, but also gold or other assets. These reserves can be seen as a form of financial insurance, so that in time of financial distress, central banks can use them in order to address losses.

A special type of reserves held by central banks are the so called revaluation reserves. These are funds that central banks keep in order to cover those losses that may arise due to changes in the value of their assets. This is because, central banks’ assets are subject to fluctuations in values over time so, revaluation reserves can be used to absorb the losses deriving from these fluctuations. Then, it is trivial to say that revaluation reserves are a form of specific buffer since they are established by central banks to address a specific kind of loss.

For instance, let's consider the case of the Banque de France in late 1990s. It is quite interesting to see how the central bank managed its gold holdings through revaluation reserves. Indeed, at that time, the Banque de France periodically revalued its gold reserves according to the prevailing market prices meaning that the value of gold holdings fluctuated based on the changes in market prices.

To address the potential losses deriving from these fluctuations, the Banque de France made use of the Official Gold Stock Revaluation Reserve (OGSRR) which allowed the bank to “freeze” the

revaluation amounts in order to prevent an impact on the profits and losses account of the central bank (Stella, 1997).

The concept of "freezing" can be understood by looking at how gains and losses deriving from market prices fluctuation are treated in accounting terms. Usually, when the value of a central bank's asset changes, this change is reflected in the central bank's financial statement. However, revaluation reserves allow central banks to neutralize the impact of these changes in value on the bank's account. Indeed, instead of reporting these gains or losses, central banks can create a separate reserve account such as the OGSRR so that, when profits or losses are realized from revaluation, these are recognized on the OGSRR and not on the central bank's profit and loss account.

So, it can be seen how revaluation reserves act as a specific buffer created to deal with a particular type of risk that, in this case, is the potential losses arising from fluctuations in the value of gold.

Other types of specific buffers can result from special provisions established by central banks as a response to certain types of losses or risks in order to protect themselves from, for example, credit risk.

For instance, the current president of the De Nederlandsche Bank (DNB), Klaas Knot, stated that starting from 2015, the DNB has set up a buffer consisting of a combination of capital and special provision in order to absorb potential losses as a response to the potential financial risks deriving from its participation in the ECB asset purchase programs.

The purpose of this buffer was to ensure DNB's ability to fulfill its responsibilities and achieve its goals also in time of financial distress. The size of the buffer was established on the base of several tests conducted under different scenarios that could result in substantial losses for the central bank.

This buffer is the result of a combination between the provision against financial risks, capital and reserves. In particular, according to Knot (2022), funds deriving from capital and reserves amounted, in 2022, to €8.5 billion while the provision was funded by allocating to it a portion of the central bank's annual profits for a total of €2.8 billion.

Then, specific buffers are a very useful tools that help central banks to absorb losses adequately and gives them a protection against specific types of financial risks acting as a cushion. Moreover, specific buffers enable central banks to reduce the impact of losses on their balance sheets because, setting aside funds for specific types of losses helps central banks to have more control on the way in which losses are covered. However, it should be noted that, under certain circumstances, losses might exceed the available buffer. In this case, it is necessary to take other measures.

## **4.2. LOSS CARRIED FORWARD AND FUTURE PROFITS**

Among the different ways in which central banks deal with losses, we find two practices that make use of central banks' profits to cover losses. The concept of loss carried forward indicates a practice through which central banks carry the losses of one year over to the following year. Usually this is done with the losses that remain after trying to absorb it in other ways such as by using specific and general buffers. The loss is then covered by using part or all profits of the year following the one in which the loss was realized. However, this response to central banks losses can bring several issues since it leads central banks to have negative capital. As seen in the previous section, even though central banks can still conduct operations with negative equity, this situation can bring concerns regarding the independence of central banks leading to a loss of trust from the general public that could lead, in turn, to operational insolvency of central banks meaning that they are no longer able to conduct monetary policy effectively.

Then, central banks can also cover losses through claims against future profits. This practice is actually very similar to losses carried forward but, in this case, the losses are reposted on the balance sheet as claims against the government so that the central banks should not experience negative equity.

However, even if profits can be of great help to central banks in the coverage of losses, we know that the vast majority of central banks remit profits to the government. So, it is crucial to understand what is the decision-making process behind profit distribution to see how central banks try to achieve the right balance between contributing to public finances and maintaining a sound financial position.

Central banks around the world follow different practices in order to decide the amount of profits to be distributed to the Treasury based on several factors such as the need to build financial buffers against potential future losses or the need to contribute to public finances in periods of economic and financial trouble.

In Bunea et al. (2016), several central banks worldwide provided information about the methods used to distribute profits to the government. From the responses of central banks to the questionnaire, six categories in which they allocate annual net profits have been found. In the first category, central banks establish a fixed percentage of profits that will be allocated to the government. In this way, it is easier to manage the profit distribution process, however, the ability of central banks to build substantial reserves over time is limited. The second category refers to central banks that adopt a fixed percentage of profits to be allocated to reserves. So, central banks allocate a fixed percentage of profits to create financial buffers to cover potential losses. This option is more focused on central banks' stability but limits the amount of profits that can be distributed to the government.

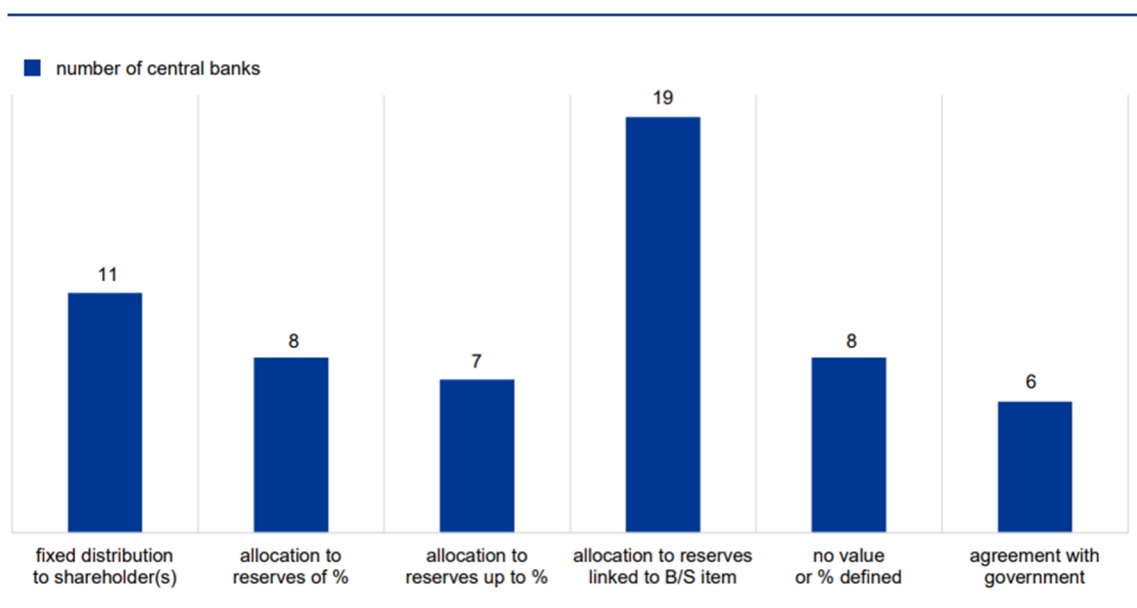
The third category allows central banks to allocate a flexible amount of profits to reserves that can be between zero and the maximum percentage of net profits. So, central banks can choose the amount

of profits to distribute to the government based on the financial and economic context. In the fourth option, central banks will allocate a fixed percentage of profits to reserves until a target level is reached. So, they may allocate 30% of profits every year until a target level for reserves is reached and allocate a lower percentage the following year. Looking at the figure below (fig.7) it seems that this option is the most used by central banks.

Then, the fifth category does not require any specific amount of profits to be allocated to the government or to reserves. This means that central banks have more freedom in deciding the percentage of distribution based on the specific needs of the bank and the economy as a whole.

Finally, in last category central banks establish the percentage of distribution on the basis of a bilateral agreement with the government so that the allocation of profits is in line with both the needs of the central banks and those of the general economy.

**FIGURE 7:** Profit allocation/distribution regime by category



**Source:** Bunea et al. (2016)

The allocation of profits from central banks plays a crucial role in sustaining the economy. Indeed, during periods of crisis, the injection of funds from central banks to governments can be of great help in the process of recovery since it increases the fund available to them in order to implement measures aiming at bolstering the economy. On the other hand, if governments relies too much on these transfers, their budgets could face excessive volatility and also central banks might face issues due to the fact that sustained injections of funds to governments can reduce central banks' ability to absorb losses and can compromise their independence and credibility.

Indeed, central banks' profits are a crucial element in the process of building and maintaining buffers that can be used to cover potential losses. If central banks allocate too much of their profits to the government, it may happen that they are left with not sufficient funds to manage these buffers properly. This, in turn, can lead to big concerns in periods of financial distress because central banks may have insufficient reserves to provide liquidity to the economy.

Then, governments and central banks should try to find the right balance in the distribution of profits in order not to compromise central banks' stability as well as public finances. So, clear communication between central banks and governments becomes fundamental.

According to the analysis conducted by Bunea et al. (2016), central banks that agree on profit distribution with governments on the basis of bilateral agreements, do not necessarily show higher profit distribution due to government pressure. This indicates that these kind of agreements involve discussions that take into account not only government needs but also the stability of central banks.

### **4.3. RECAPITALIZATION BY THE GOVERNMENT**

Under extreme circumstances, it may happen that the losses incurred by a central bank are too heavy to be covered with financial buffers and offsetting them with future profits would require an excessive period of time. Then, only after all other measures have been implemented, central banks can ask governments to provide them with more capital. Usually, central banks prefer to avoid such situation due to the fact that it can create issues regarding the independence of central banks.

Governments can cover central banks losses through transfer of funds or by issuing securities that then are transferred to central banks. The amount of the transfer is equal to the amount that is needed in order to restore the level of capital of the central bank<sup>66</sup>. When the government issue securities to cover central banks losses, these are then redeemed at a later point in time through the profits of the following years. For example, in the United Arab Emirates, the government covers the central bank's losses by issuing non-interest bearing negotiable Treasury Bonds that are later repaid from the bank's subsequent net profits<sup>67</sup>.

Now, let's make a comparison between two different views by using the results of an analysis based on the laws of 135 central banks by Stella and Lönnberg (2008). The first view sustains that the Treasury stands behind central banks<sup>68</sup>. An example of central bank that follows this view is the Croatian National Bank which in its Act lays out the following "The liabilities of the Croatian National Bank shall be guaranteed by the Republic of Croatia."<sup>69</sup> Other examples include central

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<sup>66</sup> Bunea et al., *supra* note 51.

<sup>67</sup> Lönnberg, A., & Stella, P. (2008). Issues in central bank finance and independence.

<sup>68</sup> See Greenspan(1997), Goodhart(1999) and Buiter(2006).

<sup>69</sup> Act on the Croatian National Bank. Article 1, Section 2.

banks of El Salvador and of Iceland. In contrast, there are several countries in which the law states that governments are not responsible for central banks' losses and vice versa. It is interesting to note that this last view is shared by most countries that were previously part of the Soviet Union due to the fact that at the time in which these laws were written, this was considered crucial for central banks independence<sup>70</sup>.

Moreover, not all countries explicitly state that the government should cover central banks losses. However, in some of these countries, provisions indirectly imply that the government is responsible for central banks losses because, in their central banks law, they lay out the procedure that governments should follow to cover losses or capital deficits of central banks.

For instance, in the Act of the Bank of Korea is it outlined that the government should cover losses when central banks reserves are not enough to absorb them.

In the early 1980s, the Philippines faced a severe financial crisis as a result of widespread insolvency of domestic commercial banks and other institutions. At that time, monetary policy in the Philippines was not focused on independence of central bank or on price stability so that the Central Bank of the Philippines provided emergency assistance to the economy under political pressure from the government. However, the recession period persisted from the start of the 1980s through the beginning of 1990s causing the central bank to suffer excessive losses deriving from the numerous rescues of domestic banks which resulted in the insolvency of the central bank itself<sup>71</sup>.

Then, starting in 1993, the country established a new independent central bank, the Bangko Sentral ng Pilipinas (BSP), with the primary objective of maintaining price stability. The establishment of the BSP marked a significant moment for the country since, according to the New Central Bank Act of 1993, the BSP is an independent institution from the government with full administrative authority. Moreover, the act also allowed the BSP to start with a new balance sheet and the account would be recapitalized by the national government. The recapitalization program provided injection of new capital from the budget, treasury bills and deposits coming from the national government<sup>72</sup>.

Nevertheless, in many cases, governments do not cover central bank losses even when the law mandates recapitalization. Indeed, when central banks need help from the governments, it is usually in periods of time when the government itself may be in financial distress so it can happen that a state is not able to fulfill their obligation to support the central bank.

Finally, in the questionnaire by Bunea et al. (2016), 27 central banks stated that their respective governments have the possibility to provide more funds than what is stipulated in their organic laws.

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<sup>70</sup> Lönnberg et al., *supra* note 67.

<sup>71</sup> Arora, V. B. (2000). "IV Monetary and Exchange Rate Policy." In Philippines. USA: International Monetary Fund. Retrieved from <https://doi.org/10.5089/9781557758613.084.ch0004>

<sup>72</sup> *Id.*



This is done through different forms of guarantees. The first type of guarantee is related to risks arising from operations with the International Monetary Fund (IMF) and a total of 11 central banks have incorporated them into their agreements with governments. The second form of guarantee are issued for specific kind of risks and, also in this case, there are 11 central banks that adopted this type of guarantee. Finally, 10 central banks have established general guarantees to be used only after all their financial buffers have been utilized in order to prevent the capital of the central bank from becoming negative.

#### **4.4. THE ROLE OF COMMUNICATION**

Last but not least, one of the main tools that central banks use when suffering losses is communication. By now, it should be clear that central banks play a critical role in maintaining economic and financial stability so, effective communication with the public, governments and financial markets is a powerful tool for central banks to address challenges arising from losses.

Indeed, clear and transparent communication can help a central bank to significantly reduce the risk of misperception on the financial health of the institution<sup>73</sup>.

Then, disclosing information and reasons behind central banks' policy choices that might result in financial losses can help central banks to have more control on the impact of such losses on the economy. For instance, increased transparency can be useful in a situation in which a central bank will incur a loss due to the implementation of a measure that has the objective of ensuring economic and price stability which brings benefits to households and businesses. This is because, having more information, the public will be reassured knowing the reason behind the losses incurred by the central bank.

An example of central bank using communication in response to losses is the De Nederlandsche Bank (DNB). Indeed, on 9 September 2022, Klaas Knot the DNB's current President, published a letter regarding the DNB's capital position addressed to the Netherlands' Minister of Finance.

In the letter, the President of the DNB provides information regarding the deteriorating capital position of the bank due to anticipated losses. It explains that during the Covid-19 crisis, central banks in the euro area supported the economy by pursuing expansionary monetary policy. However, the recent period of high inflation required the bank to shift towards a contractionary monetary policy which is very likely to bring losses to the DNB due to the fact that interest rates paid on deposits rise faster than the income received on bonds purchased during the expansionary monetary policy. Although the DNB has built up a buffer to absorb potential losses, in the letter it is explained that this

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<sup>73</sup> IMF. (2005). Research How central bank losses can be handled, IMF Survey, 0034(022), A012. Retrieved from <https://doi.org/10.5089/9781451939019.023.A012>

might not be enough and that significant cumulative losses are expected to be realized between 2023 and 2026. Then, President Knot proceeds in listing the possible responses of the DNB to such losses by stating that other buffers could be used however, a recapitalization or other measure could be necessary if future profits resulted to be too low<sup>74</sup>. At first sight, this letter might seem alarming. Nevertheless, its purpose is to provide the public with clear and reliable information to ensure that the central bank is closely monitoring losses and has control over them. Indeed, as long as losses do not impact the credibility of central banks, such losses should not be a threat for central banks.

Moreover, communication allows central banks to manage economic agents' expectations. For instance, forward guidance and clear announcements on future policy decisions can have a significant impact on short-term rates which, in turn, influence long-term interest rates<sup>75</sup>. Forward guidance refers to a central banks providing information to the public about its future decisions on monetary policy on the basis of assessments that aim to achieve financial and price stability.

Indeed, in the aftermath of the Global Financial Crisis, central banks in advanced economies realized that communications to the general public were a crucial factor in order to achieve monetary policy objectives. Before the crisis, the former President of the ECB, Jean-Claude Trichet stated that the central bank never pre-committed meaning that they didn't provide anticipations of their future intentions about monetary policy decisions<sup>76</sup>. However, as a consequence of the Global Financial Crisis of 2007-2008, the eurozone was facing a severe economic and financial challenges with spreads of Italian and Spanish government bonds reaching peak levels. On July 2012, Mario Draghi, the ECB President at that time, delivered a speech stating that the central bank would have done "whatever it takes to preserve the euro". Just by using these words and without the immediate use of any policy tool, Draghi's communication had a substantial impact on financial markets reducing the spread on Italian and Spanish government bonds.

Seeing how communication could be of great help for both central banks and the general economy in times of financial distress, the ECB introduced the use of forward guidance in 2013 when the Governing Council announced that it expected the interest rates to remain low for a certain time period to anchor expectations for interest rates at low levels. Nevertheless, we should keep in mind that in order for this kind of communication to be effective, it is crucial that the announcements are based on assessment of the current economic situation since the effectiveness of this tool depends on credibility<sup>77</sup>.

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<sup>74</sup> Knot, K (2022): "Letter regarding DNB's capital position", 9 September, Netherlands Bank.

<sup>75</sup> Christophe B. & Paul H. (2018). "Central bank communication during normal and crisis time". Sciences Po.

<sup>76</sup> *Id.*

<sup>77</sup> ECB. (December 15, 2017). What is forward guidance?, Retrieved from [https://www.ecb.europa.eu/ecb/educational/explainers/tell-me/html/what-is-forward\\_guidance.en.html](https://www.ecb.europa.eu/ecb/educational/explainers/tell-me/html/what-is-forward_guidance.en.html)

## **V. CASE STUDY ON EUROSISTEM**

Since January 1, 1999, the European Central Bank (ECB) has held the responsibility for conducting monetary policy within the Eurozone which comprises European Union countries that have adopted the euro as their common currency.

The establishment of the Eurozone and the creation of the ECB was laid out in the Statute of the European System of Central Banks and the European Central Bank, which came into effect on June 1, 1998. The European System of Central Banks (ESCB) encompasses both the ECB and the national central banks (NCBs) of all EU Member States, regardless of whether they have adopted the euro or not.

Together, the ECB and the national central banks collaborate to fulfill their tasks and responsibilities which primarily include financial stability. While the ECB acts as the central institution of the ESCB and the Eurosystem, each NCB holds legal personality under its respective national legislation. As an integral part of the Eurosystem, the NCBs execute their duties in line with the directives set by the decision-making bodies of the ECB such as the Governing Council. NCBs may also undertake additional tasks, independently, as long as these activities do not conflict with the objectives and functions of the Eurosystem.

Given the unique nature of the Eurosystem, where both the ECB and NCBs play fundamental roles in the conduct of monetary policy and financial stability, several challenges may arise from potential losses incurred by central banks, both at the national and ECB levels. In this section, we are going to describe the historical context and evolution of central banks' losses in the Eurosystem. Then, after analyzing the profit-loss sharing mechanism of the ECB we will focus on the policy implications of central banks losses in the Eurosystem and possible responses.

### **5.1. HISTORICAL ANALYSIS OF EUROSISTEM LOSSES**

To better understand the historical context of central banks' losses in the Eurosystem, it is useful to look at the evolution of balance sheets as well as monetary policy decisions in the eurosystem. When the Eurosystem was still in its early stage after its establishment, the balance sheets of the ECB as well as those of its NCBs were managed by following a parsimonious approach meaning that the focus was on keeping the balance sheets with a simple structure in order enhance efficiency (Belhocine et al, 2023). At the same time, monetary policy was focused on short term interest rates

and the size of its balance sheet accounted total assets of €836 bln in 2000 and liabilities amounted to €371 bln of currency and €125 bln of bank reserves<sup>78</sup>.

However, after facing the global financial crisis of 2007-2008, both the ECB and the Eurosystem's NCBs significantly increased the size of their balance sheets. This expansion was driven by measures like asset purchase programs (APPs) and other lending programs such as long term refinancing operations (LTROs). These measures had the aim of stabilizing financial markets by injecting liquidity in the economy. Moreover, in order to stimulate the economy and fight deflation, between 2014 and 2015, the Eurosystem started a program of quantitative easing (QE) and also introduced negative interest rates. In this way, the ECB became the first major central bank in the world to introduce negative interest rates on its deposit facility implying that commercial banks had to pay interest on the excess reserves they held at the ECB. The purpose of this measure was to encourage commercial banks to lend to businesses and consumers rather than hoard excess liquidity.

As economic conditions improved, inflationary pressures began to rise so, in order to fight rising inflation, central banks started to raise interest rates posing new financial challenges. Indeed, as a result of the increase in interest rates, central banks' net interest income declined because interest expenses on liabilities increased, while interest income from assets didn't necessarily rise proportionally.

Recently, the Eurosystem had to face the COVID-19 pandemic crisis which further enhanced the central banks' balance sheet expansion. Indeed, a response to such crises was the establishment of new asset purchase programs with the aim of stimulating economic growth and recovery. More precisely, in 2020, the ECB started The Pandemic Emergency Purchase Program (PEPP) which led central banks to purchase a substantial amount of government bonds in order to facilitate the implementation of fiscal measures. So, at the end of 2022, the annual consolidated balance sheet of the Eurosystem, which combines the assets and liabilities of the European Central Bank (ECB) and the Eurosystem national central banks (NCBs), had reached a size of €8.6 trillion which is the equivalent to 56% of the euroarea GDP<sup>79</sup>.

**FIGURE 8:** Eurosystem Consolidated Balance Sheet, 2021-2022  
(€ billion)

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<sup>78</sup> Belhocine, N., Bhatia, A. V., & Frie, J. (2023). Raising Rates with a Large Balance Sheet: The Eurosystem's Net Income and its Fiscal Implications, IMF Working Papers, 2023(145), A001. Retrieved Sep 16, 2023, from <https://doi.org/10.5089/9798400244643.001.A001>

<sup>79</sup> *Id.*

Assets			Liabilities		
	2021	2022		2021	2022
Securities of euro area residents denominated in euro	4,886	5,102	Banknotes in circulation	1,544	1,572
<i>of which: held for monetary policy purposes</i>	4,713	4,937	Liabilities to euro area credit institutions	4,371	4,077
TLTRO and other claims on euro area credit institutions	2,229	1,355	Liabilities to other euro area residents	771	576
Gold and gold receivables	559	593	Liabilities to non-euro area residents	713	545
Claims on non-euro area residents	513	537	Revaluation accounts	555	586
Other assets	377	369	Capital and reserves	113	115
			Other liabilities	498	485
Total assets	8,564	7,956	Total liabilities	8,564	7,956

Source: Belhocine, N., Bhatia, A. V., & Frie, J. (2023).

However, this expansion in size caused several issues for the Eurosystem since it created a greater exposure to interest rate risk deriving mainly from QE programs.

In particular, during quantitative easing (QE), the ECB purchased a large amount of assets which earned fixed interest rates, such as government bonds, in order to provide the economy with more liquidity. On the other hand, we know that central banks keep commercial banks' reserves on the liabilities side of the balance sheet which yield a variable interest rate that is usually influenced by monetary policy decisions. Then, as the economy recovered and inflationary pressures increased, the ECB decided to combat inflation by raising interest rates which resulted in a situation where the ECB and its national central banks were paying higher interest rates on their liabilities while receiving fixed lower interest on their assets. This difference between higher interest expenses and lower interest income led Eurosystem's central banks to report financial losses.

Other major central banks such as the Bank of England and the Federal Reserve have experienced similar losses after engaging in QE programs. However, the Eurosystem could face unique challenges due to its nature of economic and monetary union. This diversity implies that the ECB and the national central banks must coordinate their policies in order to face financial and economic challenges effectively.

## 5.2. PROFIT-LOSSES SHARING MECHANISM

The mechanism through which national central banks (NCBs) are involved in profit and loss sharing within the Eurosystem is an essential aspect of the Eurosystem's financial framework. When the Eurosystem as a whole, including the ECB and the NCBs, incurs losses due to various reasons, such as interest rate differentials or other financial market dynamics, there are mechanisms in place to address these losses.

One way to cover losses is by using the profits earned in previous years. Over time, the Eurosystem has accumulated profits from various monetary policy operations and financial activities. These

profits can serve as a buffer to absorb losses in times of financial stress. Article 33 of the Statute of the European System of Central Banks and of the European Central Bank governs the allocation of net profits and the handling of losses within the European Central Bank (ECB) and the euro area National Central Banks (NCBs)<sup>80</sup>.

According to the Article, when the ECB records profits, these profits are typically allocated among the euro area national central banks in proportion to their capital contributions to the ECB which are typically based on the size of each country's economy within the euro area.

Specifically, a portion determined by the Governing Council but not exceeding 20% of the net profit, is allocated to the general reserve fund. This transfer is subject to a limit which should not exceed 100% of the ECB's capital. Then, the remaining net profit is distributed among the shareholders of the ECB, with each shareholder receiving their share in proportion to the number of shares they have paid. In some cases, the national central banks may allocate a portion of the profits they receive to their respective country's government budget to provide them with additional revenue benefiting the country's citizens.

On the other hand, in case the ECB incurs a financial loss that exceeds the available profits, financial buffers, and reserves, national central banks within the Eurosystem may collectively work to cover these losses. According to Article 33, firstly, any loss should be offset against the general reserve fund of the ECB. Then, if the loss exceeds what can be covered by the reserve fund, the Governing Council should decide whether the loss can be offset against the income generated during the relevant financial year. This offset is carried out in proportion to and up to the amounts allocated to the national central banks as specified in Article 32.5 of the Statute. This mechanism ensures that the losses are distributed among the member countries in proportion to their capital contributions to the ECB.

For this reason, it is fundamental for NCBs to be adequately capitalized. Indeed, while the primary goal of the Eurosystem is price stability and not profit maximization, national central banks bear financial risks and adequate capital is essential to maintain their credibility and effectiveness.

One of the main concerns for the Eurosystem is the risk associated with large holdings of sovereign debt by NCBs, particularly when such holdings are considered on an "own-risk" basis<sup>81</sup>. In other words, countries like Italy, Spain, and Greece, which are characterized by substantial exposures to their own sovereign debt, are particularly vulnerable due to the fact that . The paper if these States were to default, the chances of the NCBs being recapitalized by the defaulting sovereigns are minimal so the risk exposure is high. Then it seems logical that according to Wessels and Broeders (2022), it is crucial for national central banks to maintain sufficient capital since after severe losses, even if the

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<sup>80</sup> ECB. (2023). Capital subscription. Retrieved from <https://www.ecb.europa.eu/ecb/orga/capital/html/index.en.html>

<sup>81</sup> Buiter, W. (2020, October 1). The Eurosystem: An accident waiting to happen. Retrieved from <https://cepr.org/voxeu/columns/eurosystem-accident-waiting-happen>

Eurosystem as a whole remains solvent, an individual national bank could become insolvent if there was no unlimited loss-sharing.

Nevertheless, given the profits and losses sharing practices of the Eurosystem, the capitalisation of individual NCBs is not a real issue as long as the financial strength is sufficient at the aggregate Eurosystem level. For instance, let's consider the National Central Bank of Greece during the Euro Sovereign Debt crisis. At that time, the Bank of Greece was very close to a state of default after the Greek government defaulted on its financial obligations. Nevertheless, the bank managed to keep conducting its operations thanks to the support of the Eurosystem.

This is a clear example of how the Eurosystem is able to deal with unprecedented financial challenges. However, even though risk-sharing in the Eurosystem provides an additional benefit to NCBs, on an aggregate level, the capitalisation of the Eurosystem should still be adequate so each NCB should do its part.

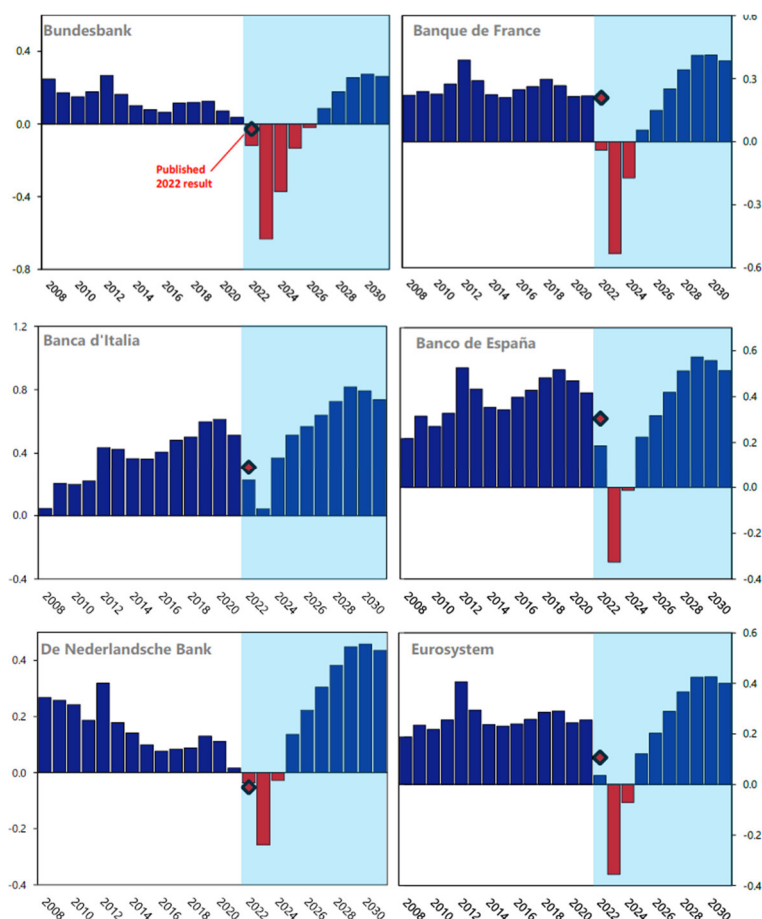
### **5.3. POLICY IMPLICATIONS OF LOSSES IN THE EUROSYSYTEM**

The role of the ECB and of the Eurosystem NCBs in managing both monetary and fiscal policy is crucial and the consequences of central banks' losses can have serious implications for the effective implementation of these policies. For this reason, the European Central Bank has historically required NCBs within the Eurosystem to maintain adequate capital in order to prevent them from having negative capital positions. Indeed, according to the ECB, prolonged periods of negative capital could impair the central bank's ability to conduct its monetary policy in an effective way. For instance, in its 2010 Convergence Report, the ECB strongly suggested the Czech National Bank to increase its capital position in order to maintain its credibility and independence.

However, given that the Eurosystem consists of different states, each with its own National Central Bank, it faces a unique set of challenges and risks that makes it different from centralized central banking systems like the Federal Reserve.

As previously mentioned, the Eurosystem's central banks have recently experienced significant losses as a consequence of policy measures implemented in order to address periods of financial distress for the economy as a whole. Belhocine et al. (2023), in a recent study, performed an analysis on the Eurosystem, the ECB and its "top-five" national central banks over a ten-year period. The analyzed NCBs are the Bundesbank, Banque de France, Banca d'Italia, Banco de España and De Nederlandsche Bank. From the figure below, it can be seen that, according to the authors' projections, the Eurosystem NCBs will continue to experience significant losses in the years ahead.

**FIGURE 9:** NCBs and Eurosystem: Annual Pre-Provision, Pre-Tax P&Ls, 2008–31 (%of GDP)



Source: Belhocine, N., Bhatia, A. V., & Frie, J. (2023).

Then, it is fundamental to understand if the losses reported by central banks in the Eurosystem do affect monetary and fiscal policy or not.

Firstly, we will focus on monetary policy. Under normal circumstances, central banks use tools like interest rate adjustments and open market operations to influence economic conditions. However, when facing losses, central banks might be less inclined to take actions that could increase their exposure to risk. This situation could lead to serious implications regarding the ability of central banks to conduct monetary policy in an effective way.

From a report published by Oxford Economics (2023), it emerges that the Eurosystem is likely to face accumulated operational losses of around €150-200 billion over the next two years mostly due to interest rate mismatch deriving from QE programs. Moreover, the increase in interest rates will have an asymmetric effect across NCBs in the Eurosystem. Indeed, central banks with larger holdings of commercial bank reserves such as the Bundesbank, National Bank of Belgium, and De Nederlandsche Bank, are more affected by an increase in interest rates because central banks will pay higher interest on these reserves. On the other hand, some central banks such as those of Portugal, Greece, and Italy may be more resilient to the impact of higher interest rates because they hold fewer



reserves<sup>82</sup>. However, even if losses are expected to persist in the near future, it is unlikely that these losses will affect the ECB's ability to perform its monetary policy tasks effectively<sup>83</sup>.

Indeed, as we have already discussed throughout the paper, there are several examples of central banks both within the Eurosystem and outside, that have operated with negative capital for extended periods of time without compromising their credibility or their ability to conduct monetary policy. Examples of such banks are the Czech National Bank, the Swiss National Bank or the Central Bank of Chile. Indeed, according to the concept of "policy solvency", as long as negative capital does not affect monetary policy, it is not a significant problem.

Now, let's turn to the fiscal implications of central banks' losses. Central bank losses can have a significant impact on public finances since they often result in reduced payments from the central bank to the Treasury. In the context of the Eurosystem, the European Central Bank is at the center of the monetary system meaning that losses can affect the finances of individual member states. Indeed, as we explained before, when the central banks gain profits or suffer losses, these are shared with the national central banks. Then, when reporting losses, NCBs will have reduced funds to remit to their respective governments implying a reduction in the governments' budgets to implement fiscal policies. So, in time of financial distress such as during the Covid-19 crisis, fiscal challenges could be amplified since both central banks and governments are likely to dispose of more constrained budgets.

Nevertheless, according to Ono and Pina (2023), central banks' losses should not have a significant impact on governments' fiscal balances. However, even if the impact on government finance is small it will last for a long time given that these losses are expected to persist for several years.

More precisely, Belhocine et al. (2023) found that the projection period of their analysis on the Eurosystem's central banks can be divided in three phases. The first is a loss-making phase which is expected to last for several years for different NCBs. This phase will be followed by a period of buffer replenishment and finally by a new steady state.

Moreover, we should keep in mind that it may also happen that, following severe losses, the cash flows are reversed meaning that the ECB or its NCBs could be entitled to receive additional funds from the government. Nevertheless, However, the nature of the losses faced by central banks in the Eurosystem is temporary and recoupable so it is unlikely that central banks will need the support of the state in the near future<sup>84</sup>.

In the following section, we will go through the possible responses available to central banks in the Eurosystem in order to deal with losses.

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<sup>82</sup> Oxford Economics. (2023, May 10). Eurozone: Central bank losses will have a fiscal, not monetary, impact. Research Briefing.

<sup>83</sup> *Id.*

<sup>84</sup> Belhocine et al., *supra* note 78.

#### **5.4. POSSIBLE RESPONSES TO EUROSISTEM CENTRAL BANKS LOSSES**

Generally speaking, there are several ways in which central banks can respond to losses. Among the possible responses there is recapitalization by the government, the use of capital buffers and also offsetting losses against future profits.

A paper by Buiters (2020) explores three possible approaches available to national central banks in the Eurosystem in order to face losses and reduce the risk of insolvency. The first approach suggests allowing NCBs to borrow from the ECB by using their capital key share of future revenues as collateral. In this way, the NCBs would have a safety cushion when facing severe capital losses. However, this approach doesn't provide a real solution to the fact that profits and losses are different for each NCB in the Eurosystem and so each NCB faces its own financial risks.

Another strategy focuses on risk reduction. This strategy suggests that NCBs should try to reduce insolvency risk by decreasing the weight of risky assets on their balance sheets. This could be done by increasing the supply of low-risk assets. Moreover, Buiters (2020) suggests using financial engineering mechanisms to create additional safe assets. This could be done by issuing asset-backed securities (ABS) or collateralized debt obligations (CDOs) which are tied to sovereign debt instruments.

However, a limitation of this approach is that eliminating all sovereign risk from the Eurosystem's balance sheet could be counterproductive given that the primary role of the ECB and thus of the NCBs is that of maintaining financial and economic stability. To see why this solution might not be optimal we should keep in mind that one of the main tools that central banks use to implement monetary policy includes asset purchases such as government bonds in order to influence interest rates and stimulate economic activity. Then, by removing sovereign bonds from their balance sheets, the ECB and its national central banks might limit their ability to conduct effective monetary policy.

Furthermore, given the primary objective of central banks to maintain economic and financial stability, it is trivial to say that monetary and fiscal policy are highly interconnected. Indeed, in times of financial crises, central banks usually have a significant role in supporting fiscal policy so that removing all sovereign risk could limit the central bank's ability to assist governments in times of economic distress. Moreover, as previously mentioned in the paper, central banks often act as lenders of last resort for commercial banks and financial institutions during periods of financial distress. In exchange for liquidity, these financial institutions are usually required to provide some sort of collateral that typically include sovereign bonds. If the ECB were to eliminate all sovereign risk, then

the pool of eligible assets for collateral could be greatly reduced by posing a constraint on the ability of both central banks and financial institutions to respond timely and effectively to financial crises. Finally, the last approach suggested by the author is to increase risk-sharing. In the context of the Eurosystem, the notion of increased risk-sharing implies a significant shift in the roles and responsibilities of NCBs towards a more unified and consolidated structure. Then, the objective would be that of transforming the Eurosystem NCBs into branches of the ECB with the aim of minimizing the financial risk exposure of the individual NCBs. This transformation could be achieved by gradually removing the activities which NCBs undertake independently and that could potentially lead to financial losses and risks. Moreover, there should be a higher degree of integration and centralization between NCBs and the ECB. In this way, the likelihood of individual NCBs facing financial distress should be highly reduced enhancing the overall stability of the Eurosystem. Moreover, in times of financial crisis, a more centralized approach to risk management and asset purchases allows for more effective and rapid responses.

However, it is important to note that this transition to increased risk-sharing is a complex process that requires careful coordination among member states as well as legal and structural adjustments.

Overall, within the Eurosystem, NCBs as well as the ECB have substantial capital buffers and the profit-loss sharing mechanism ensures a safe management of the Eurosystem's financial losses. Moreover, the ECB Governing Council ensures that the implementation of monetary policy decisions is made in a way that it is independent from the specific needs of individual NCBs<sup>85</sup>.

To conclude, while losses are expected to persist in the near future, it is unlikely that the central banks in the Eurosystem will face constraints in conducting their mandates adequately. Indeed, the establishment of financial buffers, the profit-loss sharing mechanism as well as clear communication with the general public, provide important safeguards to the Eurosystem against the negative effects of losses.

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<sup>85</sup> Bhatia, A. (2023, July 7). Euro area central bank quantitative easing losses are temporary and recoupable.

## VI. CONCLUSIONS

To conclude, this paper explored different causes of losses for central banks as well as the implications that losses can have on these institutions. First, I showed how central banks generate income from various sources, including seigniorage, interest from financial assets, foreign currency reserves, and payment services, while also acknowledging the potential sources of losses. Then, I switched the focus on the main differences between central banks as opposed to commercial banks since the differences in structure and objectives of these two types of institutions can have significant implications on how they deal with losses. In particular, it is found that central banks primarily focus on policy mandates rather than profit-seeking objectives so, while losses might be more relevant for commercial banks, losses for central banks are usually not a great cause of concern. Indeed, we have several examples of central banks operating with negative capital such as the Czech National Bank or the Central Bank of Chile. This is explained by the fact that central banks have the exclusive authority to issue new currency so, at least in theory, they have unlimited resources that should allow central banks to cover any amount of losses. Nevertheless, in section IV we found that in practice this is actually not true. For instance, according to Reis (2013), despite their unique role, central banks do have resource constraints due to the fact that they have to maintain the exchange rate between liabilities that pay interest below market returns such as banknotes and those that pay market returns such as commercial bank reserves in order to ensure currency stability and public trust. Then, it is not possible for central banks to print money in an unlimited amount. Moreover, it was found that losses can indeed have a negative impact on public trust and central banks' credibility due to a perception by the general public that central banks might become less independent from political pressures after a recapitalization by the government. The paper also analyzed the possible impact of losses on monetary policy decisions concluding that while losses might not have a significant impact on expansionary monetary policy, when operating with negative capital, losses can have substantial implications for contractionary policy.

In order to answer the question of whether central banks care about losses or not, in the paper it is found that while several academics<sup>86</sup> state that central banks shouldn't be concerned about losses, a recent empirical study conducted in 2023 by Goncharov, Ioannidou, and Schmalz showed a tendency for central banks to prioritize reporting profits over losses. This preference for profits suggests that central banks actively manage their earnings to avoid reporting losses.

Furthermore, we explored the various responses available to central banks when confronted with losses, including the consumption of buffers, reserves, claims against future profits. Effective

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<sup>86</sup> See Bunea et al., (2016), Galli et al., (2023) and Wigglesworth, (2022).

communication has emerged as a powerful tool for central banks to address challenges arising from losses by enhancing transparency and reducing the risk of misperception from the general public.

Finally, in the context of the Eurosystem, I conducted a case study to understand the historical context of central banks' losses and the profit-loss sharing mechanisms in place. I explored the policy implications of these losses on both monetary and fiscal policy decisions and examined possible responses available to the ECB and national central banks within the Eurosystem's framework. It was found that while central banks anticipate persistent losses in the near future, it is unlikely that these institutions will face significant constraints in fulfilling their mandates adequately. Indeed, the ECB and the Eurosystem's NCBs can rely on substantial financial buffers, profit-loss sharing mechanisms, and clear communication with the public to ensure financial stability.

To conclude, even if it is possible for central banks to achieve their policy objectives while having negative capital, in my view it is crucial for central banks to maintain adequate capital reserves to ensure financial stability. Indeed, while moderate losses may not be a significant problem in the short term, prolonged periods of substantial losses may damage the reputation of central banks causing instability in the economy. Then, prudent capital management is essential to maintain public trust, safeguard independence, and fulfill monetary policy objectives effectively.

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