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WORKING PAPER

25-15 How Much Capital Do Central Banks Really Have?

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ABSTRACT

Twenty or more of the world's most significant central banks have seen their equity position (or capital and reserves) go negative in the last few years. This novel situation does not fundamentally challenge the ability of these institutions to deliver on their mandate, but it does raise some interesting policy and communications issues. Central banks are incurring losses for two main reasons. The first is the impact of rising interest rates on their maturity mismatched portfolios. The second is losses on foreign exchange reserves accumulated in the attempt to avoid currency overvaluation. Comparing the experience of different central banks is not, however, straightforward. The lack of uniformity in their accounting practice makes it difficult to make comparisons. Indeed, if put on a common marked-to-market basis, this paper finds that some central banks that report positive net equity are really under water, while (in sharp contrast) others report a negative equity figure that neglects sizable unrealized capital gains.

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1. INTRODUCTION

Twenty or more of the world's most significant central banks have seen their equity position (or capital and reserves) go negative in the last few years. This novel situation does not fundamentally challenge the ability of these institutions to deliver on their mandate, but it does raise some interesting policy and communications issues.

Central banks are incurring losses for two main reasons. The first is the impact of rising interest rates on their maturity mismatched portfolios. The second is losses on foreign exchange reserves accumulated in the attempt to avoid currency overvaluation. There is much debate about the degree to which these losses matter (Bell et al. 2023). Governments grumble about the largely unforeseen suspension of central bank dividends and the calls for indemnity and

recapitalization payments (Cecchetti and Hilscher 2024). Years ago, the flow of dividends was boosted by profits generated from the early years of quantitative easing (QE), but (like eaten bread) these—and the wider benefits to economic activity and price stability from QE policies—have already been forgotten.

The circumstances have also attracted other lines of criticism from commentators. Some express concern about the impact of these developments on the future effectiveness of central bank policy. Conventional wisdom among financial economists is that, despite some tentative evidence that undercapitalized central banks do not contain inflation as effectively as well-capitalized ones do, the net equity of a central bank is considered at best of secondary importance, although it is generally understood that if it becomes too negative, the central bank's theoretical ability to control inflation could be lost (Del Negro and Sims 2015). Central bankers themselves tend to fear a loss of de facto policy independence if their equity is too low or goes negative (Archer and Moser-Boehm 2013; Bailey 2024; Goncharov, Ioannidou, and Schmalz 2023).

Although the losses are a legacy of the years of easy money and QE, it would be a big mistake to regard them as a metric of the overall effectiveness of policies that were not designed to turn a profit but to avoid price deflation and achieve and cement economic recovery from the global financial crisis and the pandemic. Still, the losses have resulted in a multiyear interruption in the payment of surplus income to shareholder governments. In some cases, they have also resulted in indemnity or recapitalization payments from governments to the central bank—an unexpected move that governments have not welcomed. The losses have, in effect, been quasi-fiscal in nature and, as such, inevitably attracted political attention. That attention has not been good for the reputation of central banks, making achievement of their policy goals more difficult. Indeed, each of the major loss-making central banks has been subject to recent criticism on this score.

Comparing the experiences of different central banks is not straightforward, because of the lack of uniformity in their accounting practice. This paper compares the experiences of loss-making banks by measuring total central bank capital on a marked-to-market basis across countries for the years 2022–24. It shows that some central banks that report positive net equity are really under water and some that report negative equity have sizable unrealized capital gains.

2. MEASURING THE LOSSES

The Swiss National Bank (SNB) reported the largest lost, equivalent to 17 percent of Swiss GDP in 2022. Having built sizable balance sheet reserves in previous years, it was nevertheless able to report a positive total equity position every year.

Despite heavy losses caused by sizable net interest payments, the US Federal Reserve System also continued to report positive total equity. But there is a catch. The Fed does not use the same accounting conventions as the SNB. If it did, it would have reported a very substantial net negative equity of about $1.2 trillion (more than 4 percent of GDP) at end-2024. Thus, although (unlike the SNB) the Fed is not allowed to build up reserves (beyond a very small amount specified in legislation), it can run up what are, in effect, very substantial negative reserves.

The European Central Bank (ECB) reported negative capital and reserves for 2024. They would have been positive had it used the same accounting conventions as the SNB. The same is true of several other Eurosystem national central banks, including the three largest: the Bundesbank, the Banque de France, and the Banca d'Italia.

The fourth of the main affected central banks, the Bank of England, reported positive total equity. But its main accounts do not cover the losses incurred on its asset purchase program.

Despite recent increases in Japanese bond yields, capital gains on the gold holdings of the Bank of Japan, another big user of QE, have been sufficient to keep its marked-to-market capital above zero.

Four main reasons account for the differences in these banks' experiences:

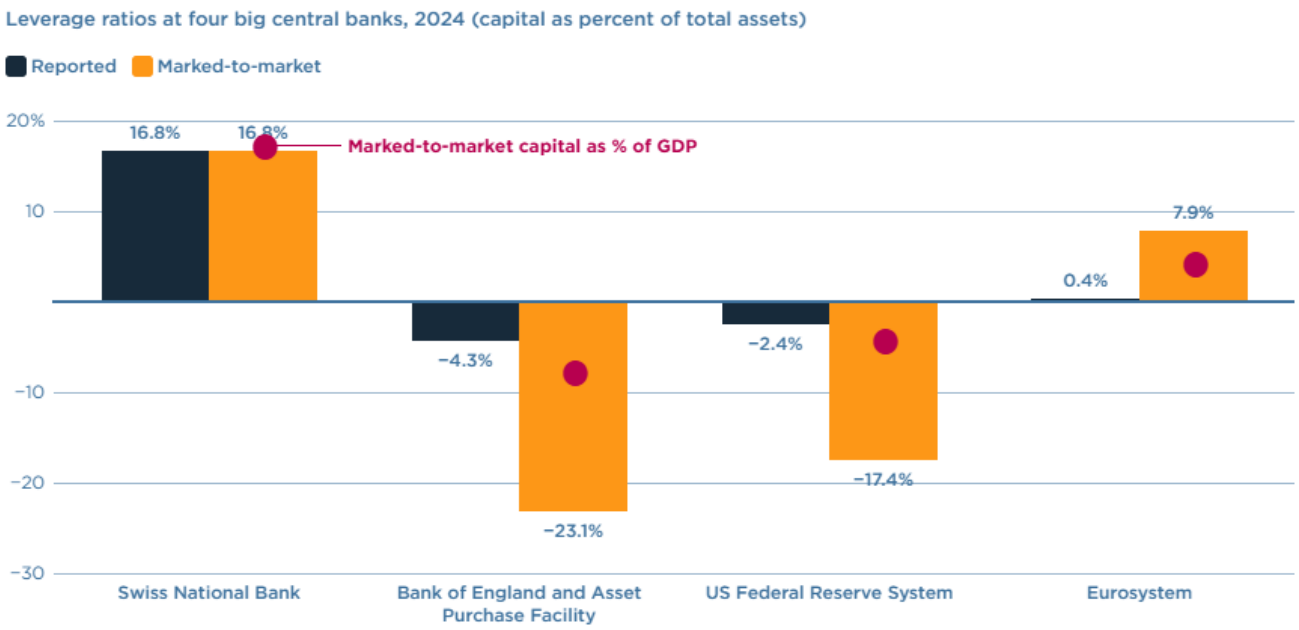
- *Use of fair value*. The SNB values essentially all of its financial assets at fair value (market price). The Fed and the euro area use historic book value.
- *Use of revaluation accounts*. The euro area central banks do not include the full fair value of their gold and foreign exchange holdings in their reported capital and reserves. Instead they segregate the unrealized capital gains in a revaluation account. This practice is analogous to Fair Value through Other Comprehensive Income (FVTOCI) in the International Financial Reporting Standards (IFRS) accounting rules. In contrast, the SNB accounts use what is basically a Fair Value through Profit and Loss (FVTPL) approach.[1]
- *Notional accounts for accumulated losses and indemnities from government*. Even though its cumulative losses exceed relevant reserves, resulting in a deficiency that will have to be covered before it can resume paying remittances to the US Treasury, the Federal Reserve System does not explicitly report a deficiency, or negative reserves. Instead, it balances the account by adding (counterintuitively) a notional (almost fictitious) asset known as "deferred asset: remittances to the Treasury." The Bank of England records as an asset the market value of the indemnity it receives from the UK Treasury.
- *Differing—and seemingly arbitrary—practices with regard to building and using provisions against losses on financial assets*. For example, in 2022, several central banks reduced their reported losses by using provisions they had previously made. Further losses in later years were virtually certain, but the provisions were not maintained or rebuilt.

Each of these central banks provides enough information to allow the calculation of a pro forma balance that adjusts each of the first three of these items to approximate the SNB's (FVTPL) accounting approach and adds provisions to obtain an estimate of marked-to-market capital. Figure 1 shows the calculated 2024 leverage ratios (marked-to-market capital as a percentage of total assets) for major central banks that were affected by the developments of 2022–24. It reveals a stronger outcome than the reported equity for the SNB and the Eurosystem, e.g., the Bundesbank and a weaker outcome for the Fed and the Bank of England.

1 A synonymous term—Fair Value through Surplus or Deficit (FVTSD)—is sometimes used (e.g., by the Reserve Bank of New Zealand).

Figure 1

Some central banks' 2024 reported asset losses and gains look bigger if marked to market



Notes: The leverage ratio is marked-to-market capital as a percentage of total assets. The figure for the Bank of England and the Asset Purchase Facility (APF) is as of February 2024; it treats the capitalized value of APF indemnity as unrealized loss. Eurosystem data are based on the European Central Bank and the 11 largest national central banks in the Eurosystem.

Source: Author's calculations based on the annual financial statements of each entity.

3. SOURCES OF LOSS AND CRITICISM OF CENTRAL BANKS

Normally, the fact that currency liabilities are not interest bearing whereas interest can be earned on its financial assets enables most central banks to operate profitably and to retain an equity buffer. In the past, large central bank losses have been attributed to exceptional events, such as operations to bail out the creditors of failing banks or the failed defense of an exchange rate peg.

In 2022–24, the pressures on the finances of central banks were, to a large extent, a legacy of the years of easy money. Having accumulated enormous quantities of securities through programs of QE or currency intervention, most of the leading central banks on both sides of the North Atlantic (along with others) entered the inflation surge that began in 2021 with a sizable maturity or exchange rate mismatch that made their finances vulnerable to the rising interest rates needed to choke off inflation. More generally, big balance sheets and more volatile interest and exchange rates imply large fluctuations in the underlying capital positions of central banks (especially when unrealized capital losses on their asset portfolio are taken into account).

With most of their long-term assets carrying low and fixed interest rates but their interest rate–bearing liabilities (especially bank reserves, whose volume was swollen by the asset purchases made during the global financial crisis and the pandemic) carrying floating interest rates that were now much higher, a stream of annual losses started in 2022 for several of the leading central banks. It is likely to continue for some years.

Already in the second half of 2022 many central banks began to warn of future losses, though they communicated about their finances with varying degrees of candor. Some brushed aside concerns about profit and loss or negative equity; others overemphasized or even exaggerated the deterioration in their financial position. Most central banks reacted to losses by reducing or suspending dividends to the government. Some were indemnified or recapitalized by the government.

The accounting conventions each bank follows and the arrangements that govern the financial relationship between the central bank and the government (including dividend policies, recapitalization, and indemnities) have affected the consequences, including the impact on government budgetary policy.

Each of the four large central banks has been subject to specific criticism:

- The SNB has been criticized for its conservative dividend policy, which needlessly restricts the funding of cantonal governments (Gerlach, Lengwiler, and Wyplosz 2025).
- The Federal Reserve banks have been criticized for insouciantly operating with what is effectively a negative net equity level, neglecting the risk that they could lose market credibility (Kupiec and Pollock 2024).
- The Eurosystem's policy on the interest rates paid on the deposits placed with it by banks has been criticized as entailing an unnecessary and distorting subsidy from the public sector to the banking system.[2]
- The Bank of England's asset sales policy has been criticized for constraining the new Government's ability to spend as much as it would like on its policy goals (House of Commons 2024; Mahon 2025).

Some of these criticisms are surely overstated—although that does not preclude their having an adverse reputational impact on the central banks concerned. The losses involve transfers, much of them within each national jurisdiction, rather than net economic losses. The sums involved are large, but not so large as to destabilize the macroeconomy. And they follow years of profits. Still, some of their fiscal and distributional consequences could have been finessed with more refined policy choices, underscoring the importance of paying closer attention to dividend, recapitalization, and indemnity policies as well as to the remuneration regime for bank reserves.

Good policy design might be more likely if the underlying data were fully understood and ideally reported on a common basis; having a common basis for assessing the scale of the losses and the underlying financial condition of the central banks would be useful. Using the information published by each central bank on their gold, foreign exchange, and securities portfolios (and including provisions and reserves) to calculate the capital positions they would have had if these assets had been accounted for at fair value through profit and loss yields a better picture of their underlying financial strength. The resulting figure—mark-to-market (mtm) capital—provides a more accurate measure of central bank capital than reported net equity or reported capital and reserves.

2 Paul De Grauwe and Yuemei Ji, "The High Price of the Fight against Inflation: The Case of the Euro Area," VoxEU, April 30, 2025.

4. COUNTRY CASES

This section estimates the financial condition of the world's half dozen leading central banks as well as the central banks of most of the largest countries in the Organization for Economic Cooperation and Development (OECD). It begins with the four major central banks that have been affected by the sequence of low-for-long and asset purchase followed by the fight against the 2021–23 inflation surge. The financial condition of these banks has evolved in strikingly different ways, which is not always easy to see from their published accounts. Putting their accounts on a common mtm basis yields a clearer picture.

The SNB had the largest proportional loss of any major central bank in 2022; by the end of 2024, it was in a much stronger financial position than the others. If unrealized capital gains are taken into account, the finances of the Bundesbank—the largest national central bank in the Eurosystem—are much stronger than they appear without doing so. When the deficiency of the Bank of England's asset purchase facility is added to its own balance sheet, it appears to have the weakest finances. However, because the UK Treasury indemnifies the losses of the Asset Purchase Facility (APF), the Bank itself is not under water. The Fed, with its large and growing net amounts owed to the US Treasury, appears the weakest of the four.

In moving from the published accounts to the mtm capital measure, the most important accounting policy issues relate to asset valuation and treatment of past losses. Provisioning against future losses is also relevant. Several central banks receive some sort of indemnity from the government for losses incurred from large-scale asset purchase (LSAP) or QE programs.

On valuation, the first question is whether a central bank's accounts value the assets it has accumulated at fair (market) value. The second question is if it does, does it segregate unrealized capital gains and losses from reported "capital and reserves" (or "net equity") (i.e., does it use a version of Fair Value through Other Comprehensive Income [FVOCI], the alternative being a version of Fair Value through Profit and Loss [FVTPL] or Fair Value through Surplus or Deficit [FVTSD], to use terminology more attuned to a public sector entity). Of the four central banks highlighted above, only the SNB and the Bank of England use FVTPL. Neither the Fed nor the Eurosystem fully use fair value.

United States

The Federal Reserve—which had purchased Treasury and US government agency bonds totaling more than a third of GDP by March 2022—started experiencing losses in 2022, as it raised interest rates to combat inflation. As a result, net interest income turned negative. Realized losses totaled $216 billion in 2022–24, far in excess of the Fed's total reported capital (bearing in mind that each regional reserve bank has its own balance sheet).[3]

Had these losses been acknowledged in the Fed's accounts, its capital would have been negative. But that is not how the Fed accounts for these realized losses. In an unconventional and rather complacent approach, the Fed does

3 The "Combined Statements of Condition" of the 12 US regional Reserve Banks include "Total Reserve Bank capital" which is the sum of "Capital paid in" and "Surplus," the latter being capped by law, with excess earnings promptly remitted to the Treasury.

not subtract realized losses from its capital. Instead, it balances its accounts by introducing a notional "deferred asset—remittances to the Treasury" equal to the accumulated losses (Anderson, Na, et al. 2022; Anderson, Marks, et al. 2022).[4] This "asset" will be reduced once future profits are realized. In essence, remittances from the Fed to the Treasury, which had been sizable in the previous decade, will not resume until the "deferred asset" is eliminated by the accumulation of future profits.[5]

Further losses are almost inevitable unless interest rates fall to the levels at which the Fed's QE securities were bought. The Fed values its QE securities holdings essentially at purchase value. The gap between the market and book value of these securities in effect indicates a market expectation of future net interest losses. Unrealized capital losses are not included in the balance sheet, although they can be read from a note to the accounts that indicates that at end-2024 unrealized capital losses on the Fed's asset portfolio amounted to $1.06 trillion.[6] Taking account of this unrealized capital loss as well as the "deferred asset" generates a figure of –4 percent of GDP as the Fed's mtm capital, yielding a leverage ratio of –17 percent.

The potential for reputational damage is not inconsiderable, as the profit flows associated with the earlier years of QE are easily neglected by commentators. Furthermore, critical commentators will readily ignore the fact that the QE programs helped stabilize the economy in earlier years, thereby boosting tax revenues, as well as lowering the cost of borrowing to the US government and the agencies.

Currently, the Fed is holding its QE assets to maturity, even though its short-term policy interest rate (the Federal Funds rate) has increased sharply since early 2022. It has thus not yet embarked on active quantitative tightening (QT) by selling bonds into the market. If and when it does so, it will bring forward the realization of the embedded losses. Most experts assume that QT decisions should be driven by considerations about the effectiveness of the monetary policy stance, rather than by profit and losses to the Fed.[7]

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4 This valuation practice is justified in what seems to be a rather defensive note to the Combined Financial Statements of the Federal Reserve Banks: "Due to the unique nature of the Reserve Banks' powers and responsibilities… the Board of Governors has adopted accounting principles and practices in the [Financial Accounting Manual for Federal Reserve Banks (FAM)] that differ from accounting principles generally accepted in the United States of America (GAAP)…. Although the application of fair value measurements to the securities holdings may result in values substantially greater or less than their carrying values, these unrealized changes in value have no direct effect on … the ability of the Reserve Banks, as the central bank, to meet their financial obligations and responsibilities. Decisions … are primarily motivated by monetary policy and financial stability objectives rather than profit. Accordingly, fair values, earnings, and gains or losses resulting from the sale of such securities and currencies are incidental."

5 Unlike the SNB, for example, the Fed is tightly restricted in how much of its annual profits can be set aside to cover potential future losses.

6 Euro area central banks have large unrealized capital gains on gold; the Fed does not. The gold certificates provided by the US Treasury and held by the Fed are valued at the pre-1971 price of $44 per fine ounce. The market value of gold was about 50 times that figure in 2022, so that the gold holdings at end-2022 would be valued in the market at about $500 billion rather than the $11 billion reported. However, the US Treasury may reacquire the gold certificates at any time at the original cost. The difference between book and market price would therefore likely benefit the Treasury.

7 Kupiec and Pollock (2024) suggest that reluctance to realize losses may have influenced the Fed's decision not to restart active QT and that this failure may in turn have implied the need for a higher policy interest rate to tackle inflation. They do not provide evidence that such reluctance was an influential consideration.

Some critiques seem overdrawn. Kupiec and Pollock (2024) question whether a negative capital position is entirely innocuous, noting that bank deposits at Federal Reserve banks are not explicitly guaranteed by the US government and that the emergence of a perceived credit risk could hamper the effectiveness of monetary policy. Such concerns may be exaggerated, but the fact that they are being aired underlines the reputational damage associated with this balance sheet development.

Eurosystem

In addition to the ECB, the Eurosystem comprises 20 national central banks, each of which has its own balance sheet. All of them use essentially the same accounting policy. They have been buying multinational and private sector securities as well as government bonds; total holdings reached a peak of about 38 percent of GDP in 2021.

Eurosystem QE saw national central banks generally concentrating on purchases of national bonds. As a result, although each national central bank pays the same interest rate for bank deposits, the incidence of the sharp rise in interest rates since mid-2022 has been different across countries, reflecting the distinct histories of national long-term bond yields of the euro area countries. The average interest rate on each national central bank's asset portfolio now reflects the national bond yield at the time the assets were bought.

In 2022, in Germany and the Netherlands, both of which enjoyed low bond yields between 2009 and 2021, the Deutsche Bundesbank and De Nederlandsche Bank became the first to report negative annual profits (before transfers from reserves).[8] In 2023, several others followed, including the Banque de France and the Banco de Espana (but not the Banca d'Italia).[9] Two additional years of losses exhausted the Bundesbank's reserves and pushed its reported capital and reserves (net of accumulated losses) below zero in 2024.[10] The Banque de France still managed to report a tiny positive figure that year.

The valuation of assets in Eurosystem accounting depends on the purpose for which the assets are held. Gold and foreign exchange are valued at market price, with unrealized capital gains reported in a revaluation account (and not included in capital and reserves). In contrast, fair value is not used for these banks' large portfolios of securities held for monetary policy purposes, which represent the largest share of these securities. Instead, these QE holdings are accounted for at an amortized cost (subject to impairment), with the unrealized capital losses disclosed only in a note. If FVPTL had been used for these QE securities, capital and reserves would have been reduced in every member country.

Unlike the Fed and the Bank of England, all three of the largest euro area national central banks hold sizable foreign exchange and especially gold reserves,

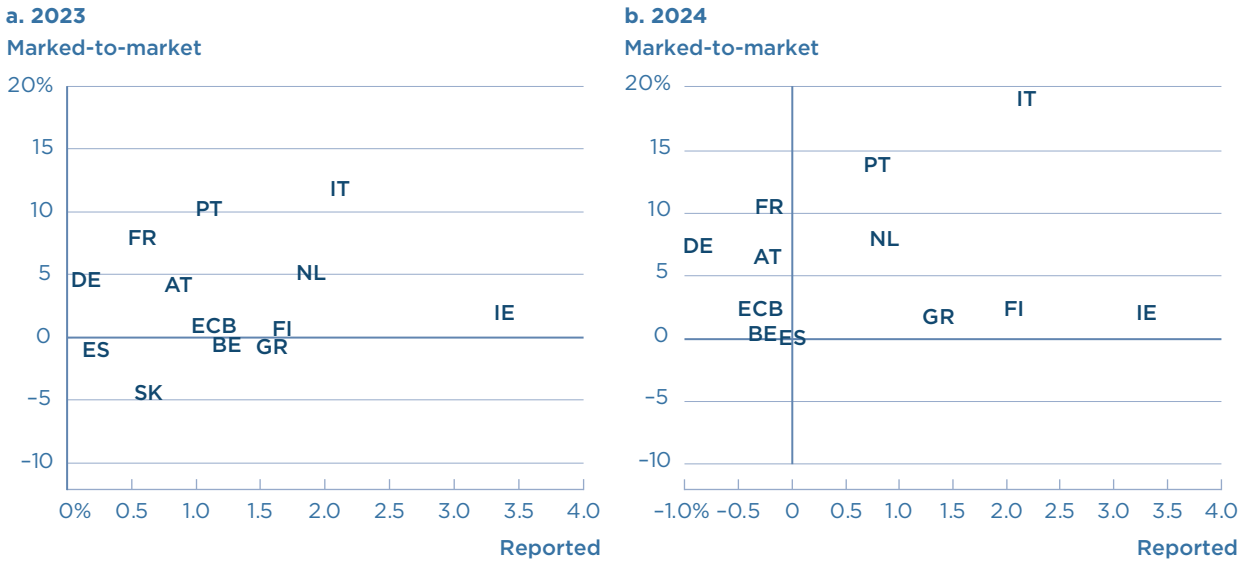
8 Some banks would have reported losses in 2022 were it not for the fact that they used the provisions they had previously built up against risks. Despite the near certainty of future losses, these provisions have not been rebuilt.

9 Despite relatively high Italian government bond yields when the bonds were bought, the Banca d'Italia recorded a sizable operational loss. It was more than offset by the combined effect of an accumulation of tax assets created by the operating loss and a transfer from risk provisions.

10 *New York Times*, "Huge Loss at German Central Bank Adds to Gloomy Outlook," February 25, 2025.

Figure 2

Reported and marked-to-market leverage ratios of the largest national central banks in the Eurosystem, 2023 and 2024 (capital as percent of total assets)



Note: Figure shows the European Central Bank (ECB) and the following countries: Austria (AT), Belgium (BE), France (FR), Germany (DE), Greece (GR), Finland (FI), Ireland (IE), Italy (IT), Netherlands (NL), Portugal (PT), Slovakia (SK), and Spain (ES). For Slovakia, 2024 data have not been published yet.

Source: Author's calculations based on data from each central bank.

which have appreciated in value. The unrealized capital gains from these holdings are not included in annual profit and loss or in accounting capital; they are reported in a revaluation account (where they are treated as FVOCI). Adding the unrealized capital gains on gold, foreign exchange, and QE (as if they were accounted for at FVPTL), results in positive mtm capital for the Bundesbank, the Banque de France, and the Banca d'Italia. Indeed, by 2024, the Banca d'Italia had an mtm leverage ratio of over 19 percent.

Carrying out the same exercise for the other euro area national central banks reveals that the unrealized profits on gold holdings have not always been sufficient to prevent their mtm capital from going negative. The Banco de Espana recorded mtm capital of –1 percent in 2022 (it had recovered to a tiny positive figure by 2024). The central banks of Belgium, Finland, Greece, Luxembourg, and Slovakia also reported negative mtm capital.

For some central banks in Europe, mtm capital is much higher than the reported capital and reserves; for others it is much lower (figure 2).[11] Annual losses have meant that central bank dividends to the government have been suspended in most euro area countries, as they have in the United States.

QE-related losses at Eurosystem central banks have not escaped criticism from scholars. De Grauwe and Ji argue that the ECB should have set tiered

11 For the ECB, losses for the year (after any transfer from reserves) as well as cumulative losses from previous years, are noted as liability items. Most national central banks in Europe also follow this practice (an exception is the Belgian National Bank, which assigns current year losses as a fictitious asset instead of subtracting them from liabilities; these losses are subtracted from reserves the following year and thus do not accumulate). The reported capital and reserves clustered more closely around zero in 2024 than in 2023.

interest rates on bank deposits, including a large unremunerated base tier to prevent the commercial banks from gaining so much on their deposits in the Eurosystem, bloated as these deposits were by the QE programs.[12] Of course, paying below-market interest rates on bank deposits can be seen as a quasi-tax (and perhaps a retrospective one) and needs to be considered in that context.

United Kingdom

By the end of 2021, as it began to increase its policy interest rate, the Bank of England had accumulated bonds equivalent to 39 percent of UK GDP as part of its Asset Purchase Facility (APF, a separate legal entity funded by a loan from the Bank). Only a small share of these bonds were corporate bonds; the bank's holdings of government bonds represented a larger share of GDP than that of any other central bank (Du, Forbes, and Luzzetti 2024). As interest rates rose, net interest from the program shrank, turning negative in 2022.

The Bank of England's situation is significantly different from that of the Fed or the ECB in that receives an indemnity from the UK government against losses associated with the APF (Busetto et al. 2022). Losses do not simply constrain the payment of a Bank of England dividend to the UK Treasury;[13] the Treasury promptly pays the Bank of England for the loss. Consequently, there is no question of these losses eroding the Bank's reported capital.

If the APF were on the Bank of England's balance sheet and there were no indemnity, the losses, realized and unrealized, would be subtracted from the bank's capital and reserves.[14] The resulting figure, shown in figure 1, is the mtm capital (expressed as a percentage of total assets) of the consolidated bank plus the APF. This figure puts the British case on the same basis as the others.

Since September 2022, the Bank of England has been actively reducing its asset holdings through sales into the market, thereby raising interest rates and increasing the slope of the yield curve. But this active QT also brings forward the crystallization of losses that would otherwise have been recorded through negative net interest in future years. Accordingly, the indemnity payments from the government are being frontloaded.

The Bank of England's published estimates indicate that this indemnity could result in cumulative payments from the Treasury to the Bank from 2022 on of as much as £280 billion, or about 12 percent of GDP (of which about £80 billion was paid over in 2022–24). This figure is much greater than the total sum paid by the bank to the Treasury from net interest received in the early years of QE (Bank of England 2025).[15, 16] These huge losses came as a surprise: As late as mid-2021, net

12 Paul De Grauwe and Yuemei Ji, "The High Price of the Fight against Inflation: The Case of the Euro Area," VoxEU, April 30, 2025. See also Belhocine, Bhatia, and Frie (2023).

13 All surpluses by the APF are paid over to the Treasury quarterly.

14 In its accounts, the APF's assets are mtm and the capital value of the indemnity is reported as a residual; however, the indemnity payments relate to realized (cash) losses.

15 The Bank of England transferred £124 billion in net revenue from QE to the Treasury between 2013 and 2022. The direction of transfers reversed thereafter: By the end of 2024, the cumulative net flow was less than £50 billion and heading to –£150 billion by the mid-2030s (about the same as projected in mid-2023). These projections depend on future interest rate movements.

16 Not only does the Bank of England hold no gold, the UK Treasury's Exchange Equalization Account's gold holdings are not nearly as large as those of other large European national central banks.

losses were not considered likely (Office of Budget Responsibility 2021; House of Commons 2024).

Unfortunately for the British government, the APF indemnity has interacted with the government's commitment to balance current spending and taxation (in what it calls the budgetary "golden rule"), thereby constraining its ability to deliver on spending intentions. Indeed, its budgetary plans require a projection of the volume of QT sales over the next few years. These forecasts are prepared not by the Bank of England (which might imply a commitment to pursue a particular sales policy) but by the Office of Budget Responsibility. Thus, in a complex and rather opaque manner, the whole history and future prospects of the Bank of England's QE and QT are constraining government budgetary policy. That this might become a problem was vigorously noted soon after interest rate increases were under way (Tucker 2022). Not surprisingly, the Bank of England has come in for criticism over the way in which the consequences for its own finances of its monetary policy tools have complicated the budgetary challenges for the UK Government (Tucker 2022).[17]

If the Bank of England had adopted the Fed's accounting system and its reluctance to indulge in active QT, by 2024 the new UK government would have had substantially more headroom to increase spending, as it had hoped to do to achieve its political goals. Most other central banks suspended dividends only when losses were incurred; the indemnity triggers payments from the Treasury to the central bank. Of course, the full impact of the losses would eventually pass through to the Treasury. But "eventually" is a long time in politics.

Switzerland

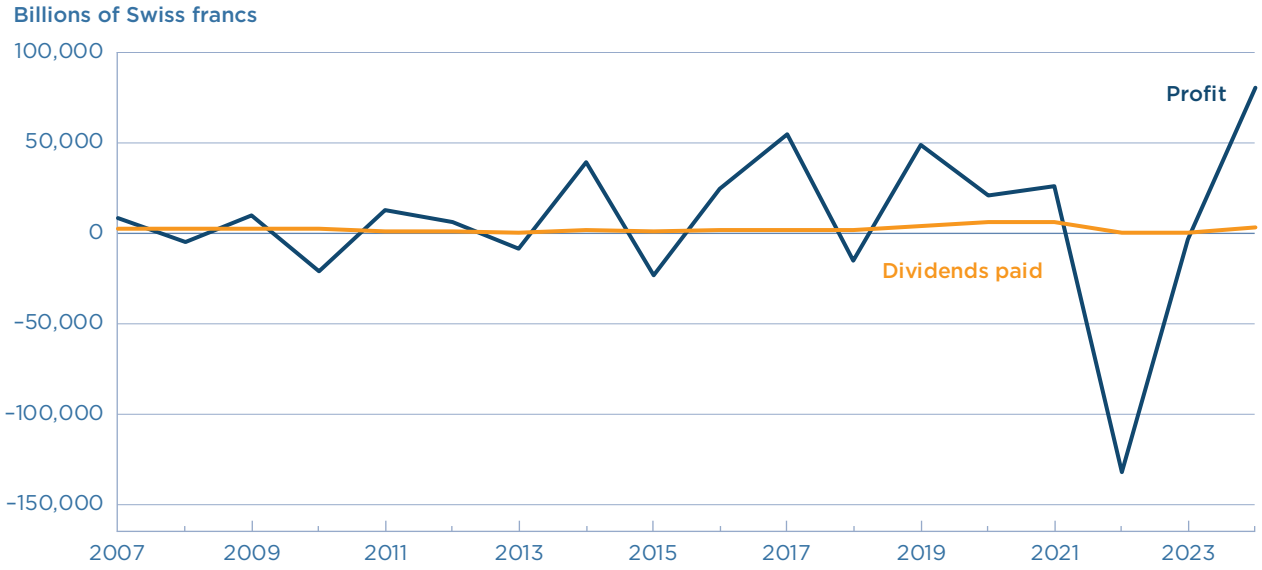
In 2022, the SNB recorded the largest one-year loss of any central bank ever: CHF132 billion, equivalent to $143 billion in 2022 or 17 percent of Swiss GDP. It also experienced losses in 2023. In 2024, the SNB swung back, reporting profits of CHF81 billion.

These large swings were driven mainly by unrealized gains and losses on the large foreign exchange portfolio accumulated by the SNB in earlier years. In contrast to many of the other central banks, however, the SNB books unrealized capital gains and losses in the same year as profit and loss (FVTPL). As a result, the huge swings reported in the SNB's profit and loss account are much larger than those in other central banks. Such swings have been occurring for several years (figure 3). The SNB's average annual profit in 2007–24 was CHF7 billion, or about 1 percent of GDP, with a standard deviation of CHF44 billion.

If the early months of 2023 were torrid ones for the SNB—with the failure of Credit Suisse coming on top of the huge financial losses—the SNB, uniquely in Europe, managed to avoid a big inflation surge. Indeed, its actions in containing inflation contributed to the financial loss by increasing both interest rates and the exchange rate value of the Swiss franc.

17 See also Louis Ashworth, "How to (Maybe) Solve the UK's Quantitative Tightening Puzzle," *Financial Times*, July 2, 2024.. Christopher Mahon, "Where the Bank of England's QE Programme Went Wrong," *Financial Times FT Alphaville*, April 7, 2025.

Figure 3
Annual profit and dividends of the Swiss National Bank, 2007–24



Source: Author's calculations based on data from the Swiss National Bank.

Whereas what was happening at the Fed, the Bank of England, and the Eurosystem was related to securities denominated in local currency, the SNB losses were associated mainly with foreign currency assets. Over US$1 trillion of foreign assets had been purchased in the years of low inflation, in a successful attempt to avoid the loss of competitiveness and deflation that could have resulted from currency appreciation coming from safe haven flows into the Swiss franc not directly related to interest rate movements. Of these assets, about a quarter were equities and half were bonds. Thus, in addition to a maturity mismatch on fixed-interest securities, there was a currency mismatch, as the SNB fought against inflation with both interest rates and exchange market intervention. In particular, there was a significant appreciation of the Swiss franc against the euro during 2022, which led to the heavy losses recorded that year.

Some scholars have criticized the SNB's dividend policy as being too conservative (Gerlach, Lengwiler, and Wyplosz 2024, 2025). The SNB paid its shareholders (mainly the Swiss cantons and the federation government) an annual average of less than CHF2 billion in 2007–18. Payouts increased significantly in 2019–21, reaching CHF6 billion (about 0.8 percent of GDP) in both 2020 and 2021. The losses in 2022–23 meant no dividends—a shock for the affected governments. Thanks to the recovery in 2024, the SNB paid dividends of CHF3 billion that year. Gerlach, Lengwiler, and Wyplosz (2024) make the sensible suggestion that dividend policy should be governed by an explicit target ratio of equity to total assets.

Despite the large fluctuations in the CHF value of its foreign reserves portfolio and the huge loss reported in 2022, the SNB's mtm capital has been more than 6 percent of GDP for many years.

Other countries

The Peoples Bank of China (PBOC) and the Bank of Japan—the other two central banks among the world's six largest—have not yet entered the list of central banks with negative capital (even when the assets are mtm).

China did not have a major post-pandemic inflation surge, and interest rates generally declined there over the past decade. The PBOC's finances have not been part of the dynamic discussed here for other central banks.

The Bank of Japan has been a big user of QE, acquiring half of the outstanding stock of Japanese government bonds in recent years. They are accounted for at amortized cost, and their fair value was well below book value in March 2024. However, the Bank of Japan's sizable gold holdings are also valued at cost; unrealized capital gains on gold, together with accumulated provisions against losses, are still higher than the unrealized capital losses on the bond portfolio. In March 2024, reported leverage was about 0.5 percent; estimated mtm leverage was more than three times higher, at 1.7 percent. Subsequent increases in long-term bond yields in Japan weakened the balance sheet since then, but capital gains on gold are likely to have been sufficient to keep mtm capital above zero at the end of the accounting year (March 2025).

Table 1 presents data for most of the other large OECD central banks. The central banks of Australia, Canada, and New Zealand had negative capital positions in recent years:

- Most relevant items in the Reserve Bank of Australia's accounts are reported at FVTPL. The bank's net capital moved sharply negative following huge unrealized capital losses on its bond portfolio in the year ending June 2022. The position deteriorated in each of the following two years, resulting in a June 2024 mtm leverage of –5 percent.
- The Bank of Canada moved into a negative capital position (reported as "deficiency" on its balance sheet) in 2022, when the interest rate paid on its large stock of bank deposit liabilities (accumulated as a consequence of the pandemic-driven QE) started to exceed the earnings on its holdings of Canadian government bonds. The deficiency grew in 2023, leading to reported leverage of almost –2 percent for 2023. Unrealized losses on the QE portfolio are indemnified for capital value but apparently not for the likely net interest losses on it. If the value of the indemnity is subtracted (as done above in the case of the Bank of England), net mtm leverage is about –9 percent.
- The Reserve Bank of New Zealand values its QE (LSAP) portfolio at fair value through profit and loss. In 2023 and 2024, it reported positive net equity. However, like the Bank of England, the bank receives an indemnity from the national government from the QE (LSAP) assets it purchased. This arrangement is accounted for in a slightly different way to the Bank of England, but the general approach is the same. In contrast to the Canadian case, the New Zealand indemnity covers net interest costs. Without this indemnity, the bank would have reported a small negative mtm capital in 2021, deteriorating to a more than –8 percent in 2023 and –4 percent in 2024.

Table 1
Marked-to-market capital at leading OECD central banks

Central bank	Capital as percent of assets	Capital as percent of GDP	Year
Bank of England (including the Asset Purchase Facility)	–23.1	–7.6	2024
Türkiye Cumhuriyet Merkez Bankası İdare Merkezi	–17.5	–7.1	2024
US Federal Reserve System	–17.4	–4.2	2024
Banco de México	–17.4	–2.3	2023
Česká národní banka (Czech Republic)	–14.9	–6.8	2022
Národná banka Slovenska (Slovak Republic)	–11.4	–5.0	2022
Bank of Canada	–9.2	–1.0	2023
Reserve Bank of New Zealand	–8.4	–1.8	2023
Magyar Nemzeti Bank (Hungary)	–6.9	–2.8	2022
Bank of Israel	–5.7	–2.7	2022
Reserve Bank of Australia	–4.9	–4.2	2024
Banco Central de Chile	–4.3	–1.2	2023
Bank of Greece	–4.1	–4.7	2022
National Bank of Belgium	–3.4	–2.1	2022
Banco de España	–1.4	–1.1	2022
National Bank of Poland	–1.3	–0.3	2023
European Central Bank	–1.0	–0.1	2022
Bank of Finland	–1.0	–0.4	2022
Central Bank of Luxembourg	–0.2	–0.8	2022
Central Bank of Ireland	0.8	0.3	2022
Bank of Japan	1.7	2.1	2024
Oesterreichische Nationalbank (Austria)	2.3	1.3	2022
De Nederlandsche Bank (the Netherlands)	2.4	1.2	2022

table continues

Central bank	Capital as percent of assets	Capital as percent of GDP	Year
Bundesbank (Germany)	2.7	2.0	2022
Banque de France	6.2	4.4	2022
Sveriges Riksbank (Sweden)	6.6	1.7	2022
Banca d'Italia	7.0	5.1	2022
Banco de Portugal	7.1	5.8	2022
Swiss National Bank	7.5	8.3	2022
Danmarks Nationalbank (Denmark)	11.7	2.6	2022
Norges Bank (excluding the Norwegian Sovereign Wealth Fund)	35.0	4.7	2022

OECD = Organization for Economic Cooperation and Development

Notes: Asset data refer to end of the financial year: end February for the Bank of England, end March for the Bank of Japan, end June for the reserve banks of Australia and New Zealand, and end December for all others.

Source: Author's calculations based on annual financial statements of each central bank and GDP data from Eurostat and the International Monetary Fund.

The experience of non–euro area European Economic Area central banks has been mixed. The Nordic banks avoided a net negative mtm capital; several central European banks did not:

- The National Bank of Denmark has not conducted large QE purchases. It operates a fixed exchange rate regime, which has led to substantial fluctuations in its foreign exchange reserves. As it holds much of its foreign exchange in euros, however, its assets have not been subject to large capital value fluctuations. Although it incurred a loss in 2022, the loss was much less than its net equity position at the time, so it did not move into a negative mtm capital position.
- The Bank of Norway enjoyed a comfortable net equity position well in excess of its unrealized capital losses. The largest item on both the assets and liabilities side of its reported balance sheet relate to the Norwegian Sovereign Wealth Fund, but by construction these items always balance. This fund is netted out from the denominator in calculating leverage.
- Sweden's central bank (Sveriges Riksbank) incurred losses in 2022, essentially because of the QE portfolio accumulated during the pandemic. Although Sweden is in the European Union, it does not use the euro and is not part of the Eurosystem. Unlike the Eurosystem national central banks, it books unrealized net capital losses on its QE portfolio to profit and loss. The 2022 loss (which, at about 15 percent of GDP, rivalled that of the SNB in relative terms) pushed its reported equity into a small negative position. As revaluation accounts, reflecting accumulated profits on gold and foreign exchange, were much larger, its mtm capital remained positive. Nevertheless,

in accordance with a new law that sets a target equity (set at SEK60 billion in nominal terms) and calls on the Riksbank to petition parliament for a recapitalization if its reported equity falls below one-third of that target, the Riksbank successfully petitioned parliament in 2024 for a capital injection of about 0.5 percent of GDP, allowing reported equity to be positive again.

- Negative net interest flows caused by maturity mismatches in the domestic currency portfolio of Hungary's central bank were the main source of the large reported losses in 2022 and 2023 that pushed its reported net equity negative in 2023, even though the asset portfolio was not mtm. Data for 2024 have not yet been analyzed.
- In Poland, a sequence of losses on both net interest and foreign exchange pushed the central bank's mtm capital into negative territory (–1 percent) in 2023.

The central banks of two large OECD emerging market economies—Mexico and Turkey—have also experienced large negative mtm capital positions. The positions of Colombia and South Korea likely remained positive.

- Mexico's central bank reported negative net equity in 2019, 2022, and 2023. At end-2023, its leverage ratio was down to –17.4 percent. A sharp currency depreciation in 2024 raised this ratio to 2.0 percent. The Bank of Mexico marks most of its book to market; its reported net equity (which requires no adjustment to be equivalent to mtm capital) is quite vulnerable to exchange rate changes, although it has also experienced significantly negative net interest in five of the eight years between 2017 and 2024, most notably in 2022. It did not pay a dividend to the government in that period, reflecting the accumulation of deficits. It appears that dividends will resume only when these deficits are offset by cumulative surpluses.
- After a decade of surpluses, Turkey's central bank reported large losses in 2023 and 2024, mainly on its local currency operations, as it struggled to stabilize inflation. Already by the end of 2023, these losses had wiped out the bank's net equity, despite its sizable gold holdings (which are valued at market price). Its mtm leverage ratio plummeted from 2.4 percent in 2022 to –17.5 percent in 2024.
- The central banks of Colombia and South Korea appear to have positive mtm capital, although calculation cannot be readily made from their published financial statements.

This wave of losses normalizes the idea of negative equity, which used to be thought of as an eccentricity confined to a small handful of banks, notably in the Czech Republic, Chile, and Israel:

- Long noted as a central bank with a history of negative equity, the Czech National Bank—whose monetary policy has frequently involved substantial accumulations of foreign exchange—moved into a positive net capital position between 2014 and 2016, reflecting sharp currency depreciation in 2013. Starting with a strengthening of the Czech koruna in 2017, however, it incurred a sequence of large losses that left it in a net negative position ever

since. Its leverage reached almost –15 percent by 2022, with some recovery in the following two years.

- The Central Bank of Chile spent most of the past two decades with negative equity, a position that seems to date back to losses incurred in banking crises of the 1980s. A brief interlude of positive equity ended when the bank raised interest rates sharply to combat the inflation surge, leading to a large loss in 2022 that pushed the bank back into negative mtm equity.
- The Bank of Israel moved from an mtm leverage of almost –6 percent in 2022 to a small positive net mtm equity position (including revaluation accounts) in 2023 and 2024. Its main asset holdings are in foreign exchange; it does not report any gold holdings.

5. CONCLUDING REMARKS

This paper estimates the net equity position of selected central banks on an mtm basis. It shows that seemingly innocuous differences in accounting conventions, rarely discussed considerations of dividend policy, and the distributional implications of the remuneration of bank deposits all matter more than might be expected in determining central banks' net equity positions, especially in the aftermath of the sudden whiplash of inflation and interest rates. The differences between reported equity and these estimates suggest the need for central banks to coordinate internationally so that they report on a common accounting basis, preferably FVTPL.

Arbitrary choices about central bank dividend policy or the precise design of indemnities should not drive important fiscal policy decisions. Dividend policy should be designed in such a way as to both smooth the flow to government and ensure that true mtm capital remains within a range around a target leverage ratio. Optimal control theory offers several ways of doing so. The target ratio would be higher the higher is the estimate of the forward-looking variance of leverage. The target ratio should be nonnegative, but occasional moves into moderate negative capital need not trigger immediate recapitalization.

Much more controversial are changes in the remuneration of bank deposits at the central bank. Over the years, many central banks have adopted interest tiering, but there is no general agreement on how it should be implemented. Despite the fear that change would amount to retroactive taxation, central banks should develop a coherent strategy for implementing a predictable tiered interest rate policy for the deposits banks keep at the central bank. The idea would be to reduce the indirect exposure of the fiscal authorities to losses from any further use of QE.

As long as they are kept within a reasonable range over time, central bank losses need not undermine the effectiveness of monetary policy. But they deserve to be analyzed and discussed more coherently.

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