Who Sets the Deduction? Central Bank Losses and the Fiscal Cost of Monetary Tightening

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Abstract

When monetary tightening turns central bank results negative, the cost falls on the government, but the deduction central banks place before their transfers decides when it reaches the budget. I code who sets this deduction at 55 central banks and how each loss of 2008–15 and 2022–24 was absorbed. The bank sets it alone at 33 and with the government at ten more; where a bank's buffer could cover a loss, banks other than the Swiss National Bank released it in 42 of 47 cases. Of the Eurosystem's losses of 2022–24, equal to 1% of euro-area GDP, 60% was absorbed by buffers withheld in earlier years, 36% was carried forward and 4% was met from public funds. The rule re-times the fiscal cost of tightening rather than changing it. In a New Keynesian model calibrated to the Bundesbank, a Treasury that covers losses at once contracts the budget by 1% of GDP during the tightening and lowers the peak policy rate by 14 basis points; buffers spread the cost over a decade. Coverage is never far from the best rule, so the case for buffers rests on independence, which independence indices do not record.

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1. Introduction

Monetary tightening has a fiscal cost that runs through the central bank's balance sheet. When policy rates rise, the interest paid on the reserves created by asset purchases and foreign exchange interventions rises with them, while the income on the assets bought earlier does not, and in the financial years ending in 2022 to 2024, 41 of the 51 central banks whose accounts I could read made a loss before using any buffer (Bell et al. 2023; Cecchetti and Hilscher 2024). The government, as the residual claimant on the central bank, bears these losses in the end (Sims 2004; Del Negro and Sims 2015; Hall and Reis 2015). The question has returned. With the energy shock that came with the conflict in the Middle East, the ECB raised its key rates in

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June and September 2026 (ECB 2026b, 2026c), at a time when several central banks of the euro area still carried losses from the previous episode: the Bundesbank's accumulated loss stood at €27.8 billion at the end of 2025 (Deutsche Bundesbank 2026).

This paper asks who decides when that cost reaches the budget. Every central bank deducts something from its result before it pays its government: a provision for financial risks, an allocation to a reserve fund, a contribution towards a target for equity. Whoever sets the deduction decides whether a loss reaches the net result on which the transfer is computed, and so whether the budget meets the loss now, met it already through profits withheld in earlier years, or will meet it later through transfers that resume only once the loss is recouped. Control of the deduction is also part of financial independence, as the ECB's legal standard for the euro area recognises when it requires that national central banks "be free to independently create financial provisions" (ECB 2026a, 31–32), and a deduction sized without a stated standard is hard to hold to account (de Haan, Amtenbrink, and Eijffinger 1999).

The first contribution is a dataset. From the statutes, and from the agreements and regulations to which they delegate, I code who sizes the discretionary deduction before the transfer at 55 central banks, how the transfer is set, whether the rules permit, require or restrict the use of the buffer against a loss, and whether a quantitative standard for the deduction is published. From the annual accounts I code how each loss of the financial years ending in 2022 to 2024 and in 2008 to 2015 was absorbed, 139 loss years in all. At 33 of the 55 banks the bank sizes the deduction alone, and at ten more it does so with the government's approval; a quantitative standard for it is published at only 19.

The second contribution is evidence on how the control is used. In the loss years in which a bank's own buffer could cover the loss, banks other than the Swiss National Bank (SNB) released the buffer and showed no net loss in 42 of 47 cases across both episodes, usually by exactly the amount of the loss, and most often where their rules permit the release without requiring it. Whoever controls the deduction thus decides whether a loss reaches the net result. Because only banks that control a buffer can release one, and most of the cases fall in the Eurosystem, these counts describe how the control is used rather than identify its effect.

The third contribution is a measure of when the losses reached budgets. A consolidated accounting shows that the deduction rule re-times the government's receipts rather than changing their present value, up to the spread between the policy rate and the government's borrowing rate on the equity left in the bank (Proposition 1). I then split each bank's losses of 2022 to 2024 by when they reach the budget. Across the 41 banks with a loss, buffers built from earlier profits absorbed on average 54% of it, 38% was charged to capital or carried forward against later transfers, and 8% was met from public funds, which reached six banks. At the 19 banks of the Eurosystem with a loss, the losses equalled 1.0% of euro-area GDP; 60% had been withheld from governments before the losses, 36%, or 0.35% of GDP, was carried into later years, and 4% came from public funds. How the cost was timed depended on the rules more than on its size. Losses of 1.6% of GDP reached the British budget at once through the Treasury's indemnity of the Bank of England's asset purchases; losses of 1.0% of GDP did not reach the German budget in the loss years at all, because the Bundesbank had already stopped its transfers to build its provisions and carried the rest forward; and the Confederation and the cantons lost

payouts of 1.8% of Swiss GDP while the SNB went on raising its provisions. Where fiscal rules tie spending to current receipts, the deduction rule thus decides whether monetary tightening comes with a fiscal contraction, and when. A New Keynesian model with a central bank balance sheet, calibrated to the Bundesbank, whose estimated exposure to the policy rate is close to the median of the euro-area central banks, puts magnitudes on this. When the Treasury pays the losses at once, the budget contracts by 1.0% of GDP in the three years of tightening, the policy rate peaks 14 basis points lower and the stabilisation loss falls by 2%, about three times as much for a balance sheet three times as exposed; when the bank releases a buffer or carries the loss forward, the budget forgoes only its usual transfer, for twelve years or more, with no measurable effect on stabilisation. With hand-to-mouth households the effects of coverage grow by about half; with debt finance they all but vanish. Which rule stabilises best depends on why rates rise: covering losses at once is best when the tightening answers a demand shock and can be worse when it answers an energy shock, but it is never far from the best, so the case for buffers rests on independence rather than on stabilisation. The model's date for the resumption of transfers, the mid-2030s, matches the one De Nederlandsche Bank has published. For balance sheets of the euro-area kind the rule is a question of when the budget pays rather than of stabilisation, and where a fiscal contraction does come during the tightening it complements monetary policy against cost-push inflation.

The fourth contribution concerns measurement. The CBIE index of Romelli (2022) records the allocation of profits to the general reserve fund as fixed by statute for 38 of the 53 banks of the comparison that it covers. That is correct for the general reserve fund, but for 35 of these banks the statute also leaves another deduction, usually a provision for general risks, to the bank, alone or with the government's approval, and it was this deduction that absorbed the losses. I propose an item with two parts, who sizes the deductions that the statute does not fix and whether a quantitative standard for them is published, and code it for all 55 banks.

The SNB shows what the margin means inside a negotiation. It is the only bank in the comparison whose transfer is agreed with the government for a term while the deduction in front of it is left to the bank. Read as a capped payout applied to the equity above provisions that the bank alone raises, the agreement of October 2026 leaves a year without payout before 2031 with a probability of between a third and a half, depending on the expected return, and continuity is far cheaper to buy in the recipients' budgets than in the bank's reserves.

Section 2 places the paper in the literature. Section 3 classifies the 55 central banks by who sets the deduction, Section 4 shows how the control was used in the two loss episodes, Section 5 proposes the index item and Section 6 discusses the Swiss case. Section 7 measures when the losses reached budgets, at the Bundesbank, Danmarks Nationalbank, Norges Bank and the SNB among others, and considers the renewed tightening of 2026. Section 8 sets out the model and its results, and Section 9 concludes. An online appendix gives the model of the Swiss arrangement, the proofs, the data and the computations of Sections 7 and 8 (Appendices F and G).

2. Related literature

The paper belongs to the work on the interaction of monetary and fiscal policy. Since Sargent and Wallace (1981), Leeper (1991) and Sims (1994), the price level and the path of public debt are understood to depend on which authority adjusts to the other's choices, and recent work estimates how fiscal shocks that are not funded by future surpluses feed inflation (Bianchi, Faccini, and Melosi 2023) and how the regime of interaction has shifted over time (Kliem, Kriwoluzky, and Sarferaz 2016). Central bank losses are a channel of this interaction that models usually consolidate away: with the central bank's remittances an internal transfer, what matters is whether the treasury stands behind the bank (Del Negro and Sims 2015; Reis 2015; Bassetto and Messer 2013; Benigno and Nisticò 2020; Bassetto and Sargent 2020), and the consolidated balance sheet also bounds how much catastrophe risk a monetary sovereign can carry (Aslan 2026). Cecchetti and Hilscher (2024) estimate the fiscal cost of the recent losses. The rules for the deduction are where consolidation breaks down in practice, since they decide when, and by whose decision, the budget registers that cost.

Legal indices of central bank independence since Grilli, Masciandaro, and Tabellini (1991) and Cukierman, Webb, and Neyapti (1992) code the statute (Dincer and Eichengreen 2014; Bodea and Hicks 2015; Garriga 2016; Masciandaro and Romelli 2015; de Haan et al. 2018), and Romelli (2022) extends the coding to a dimension of financial independence that includes the allocation of profits; measures of actual independence, such as the turnover of governors (Dreher, Sturm, and de Haan 2008; Vuletin and Zhu 2011), show how far practice departs from the statute, and critics have long argued that legal indices record what statutes say rather than what governs behaviour (Forder 1996; Cukierman 2008). Accountability, which needs a standard against which decisions can be judged, is the counterpart of independence (de Haan, Amtenbrink, and Eijffinger 1999; Tucker 2018). This paper adds a margin that both kinds of measure miss, the deduction before the transfer, and answers the critics in a specific case: the statute is coded correctly, but it delegates the deduction that the accounts show was used.

Work at the International Monetary Fund and the Bank for International Settlements established that a central bank can operate with little or negative capital, since it cannot become illiquid in its own currency, but that persistently weak finances can compromise its credibility and make it dependent on the treasury (Stella 1997, 2005; Ize 2005; Buiter 2008; Archer and Moser-Boehm 2013; Bell et al. 2023); Sims (2004) argued that independence therefore has a fiscal dimension. Whether financial strength affects outcomes is disputed (Klüh and Stella 2008; Perera, Ralston, and Wickramanayake 2013; Benecká et al. 2012; Hampl and Havránek 2020), but Adler, Castro, and Tovar (2016) relate weak finances to policy rates set below a policy rule, and Goncharov, Ioannidou, and Schmalz (2023) show that central banks are discontinuously more likely to report small profits than small losses. Bholat and Darbyshire (2016) describe the accounting discretion that makes this possible; the accounts coded here show where it lies and how it was used. Surveys document the variety of distribution rules (Bunea et al. 2016; Long and Fisher 2024), normative work proposes that retention be tied to a target for capital (Archer and Moser-Boehm 2013; Wessels and Broeders 2022), and projections of central bank income show how the fiscal consequences of asset purchases depend on how income is remitted (Chiacchio, Claeys, and

Papadia 2018; Cavallo et al. 2019). The closest quantitative antecedents size the capital that central banks need (Ernhagen, Vesterlund, and Viotti 2002; Bindseil, Manzanares, and Weller 2004; Dalton and Dziobek 2005; Stella and Lönnberg 2008; Vergote et al. 2010; Milton and Sinclair 2011), and Cukierman (2011) relates central bank finances to independence or project income, remittances and capital under a given rule (Carpenter et al. 2015; Christensen, Lopez, and Rudebusch 2015; Greenlaw et al. 2013; Belhocine, Bhatia, and Frie 2023). Hall and Reis (2015) ask which remittance rules keep a central bank solvent, Martínez-Resano (2004) finds that the optimal capital policy is a band, Bonetti et al. (2024) derive a payout threshold and a recapitalisation trigger from which neither the bank nor its shareholder would wish to deviate, and Honohan (2025) notes that control theory offers ways to smooth transfers. In these analyses one decision-maker, or two who agree, choose the rule. In the Swiss rule one party negotiates the payout and the other sets the threshold, so that the threshold becomes the object of bargaining.

The actuarial theory of dividends supplies the tools for the Swiss case. In the problem of de Finetti (1957) an insurer maximises the expected discounted dividends paid before ruin, and the answer is a barrier strategy (Gerber 1969; Gerber and Shiu 2004); with a bounded payout rate the optimal strategy pays at the maximal rate above a threshold (Jeanblanc-Picqué and Shiryaev 1995; Asmussen and Taksar 1997; Gerber and Shiu 2006; Kyprianou and Loeffen 2010), and later work studies multilayer barriers (Albrecher and Hartinger 2007), discrete payment dates (Albrecher, Cheung, and Thonhauser 2011), continuation after ruin (Dickson and Waters 2004), capital injections (Kulenko and Schmidli 2008) and smoothed dividends (Avanzi and Wong 2012; Albrecher, Azcue, and Muler 2020); Avanzi (2009) and Albrecher and Thonhauser (2009) survey the field. Two features of a central bank change the problem: it is not ruined when its equity is exhausted, and no owner injects capital. Where smoothing should then be done connects the question to the literature on rainy-day funds and resource stabilisation funds (Wagner and Elder 2007; Zhao 2016; van der Ploeg and Venables 2011).

On the political economy, claims on central bank profits and reserves are a less studied channel of pressure than interest rates (Binder 2021; Bianchi et al. 2023; Drechsel 2024) or populism (Goodhart and Lastra 2018; Masciandaro and Passarelli 2020), although the common-pool problem of Tornell and Lane (1999) predicts them and the work on quasi-fiscal operations documents how governments draw on central bank resources (Fry 1993; Mackenzie and Stella 1996). A contractual view of central banking goes back to Persson and Tabellini (1993) and Walsh (1995). In Lohmann (1992) the optimal arrangement is a central bank that the government can override at a cost; the Department's option to amend the Act plays that role here, applied to the deduction rather than to monetary policy. The theory of incomplete contracts allocates the residual rights of control over what a contract leaves open (Grossman and Hart 1986; Hart and Moore 1990), and the theory of relational contracts gives the conditions under which terms that no court enforces are kept, alone or alongside formal ones (Baker, Gibbons, and Murphy 1994, 2002; Levin 2003). For Switzerland, Brunnermeier and James (2015) argue that domestic political pressure over the SNB's euro holdings contributed to the end of the minimum exchange rate in 2015, Amador et al. (2016, 2020) analyse the costs of large reserve holdings, and proposals for the distribution range from a transfer held constant over several years (Baltensperger and Jordan 1998) and a fixed amount plus a share of the excess (Brunetti and Föllmi 2021) to targets for the

provisions or for equity (Gerlach, Lengwiler, and Wyplosz 2021, 2025, 2026); Kaufmann (2021) applied the agreement of 2021 to the results of 2005 to 2019.

3. Who sets the deduction

3.1. Coding

Every central bank that transfers profit to its government places some deduction in front of the transfer: a general reserve fund, a provision for risks, a revaluation account or a target for equity. The economics of the arrangement depends on who sets the size of that deduction and on how the amount transferred is determined. I code both from the statute and, where the statute delegates the matter, from the agreement, regulation or government decision to which it delegates. Deductions prescribed by accounting rules, such as revaluation accounts for unrealised gains, are not counted. Where a statute fixes one deduction, typically a general reserve fund built up to a multiple of the capital, and leaves another to the bank, typically a provision for general risks, I code the discretionary one, since it decides the size of the deduction at the margin. The deduction is set by the bank (B), by the bank with the government's approval or by agreement with it (BG), by the government (G) or by the statute alone (S). A decision of the bank's own board counts as the bank's even where a minister sits on or chairs it, as at the central banks of Colombia, Costa Rica and Taiwan; approval by a body outside the bank on which the government sits, such as Brazil's National Monetary Council, counts as the government's; and a statement or consultation that the bank must seek but need not follow, as in Iceland, does not. Coding the four banks just named as BG instead changes no conclusion below except where noted. The transfer is a residual fixed by statute, agreed with the government for a term, proposed by the bank and approved by the government, or set by the bank or by the government.

The comparison covers 55 central banks: the ECB and 20 national central banks of the euro area, including that of Bulgaria, which joined in January 2026, eleven other central banks of Europe and 23 of the Americas, Asia, Africa and the Pacific, among which I count Türkiye. It includes the central banks of the major advanced economies, every euro-area national central bank whose statute could be read in an authoritative version, which excludes only the Bank of Greece, and the largest other holders of foreign reserves whose statutes are public. The legislation archive of the CBIE index served as the starting point (Romelli 2025a); every entry rests on the provisions quoted in the online appendix (Table D1). The codes refer to the statutes in force in October 2026. Checked against the statutes in force on 1 January 2023, before most of the losses of 2022 to 2024 were booked, they are the same for every bank: Sweden's new Riksbank Act took effect on that day, and the amendments since then, recorded in Table D3, left the codes unchanged. The central banks of China and Saudi Arabia publish no income statement and enter only the classification.

Table 1. Who sets the deduction before the transfer and how the transfer is set, 55 central banks

	Transfer					
Deduction before the transfer set by	Statutory residual	Agreed with the government	Bank proposes, government approves	Set by the bank	Set by the government	Banks
The bank	ECB, Germany, Italy, Belgium, Czechia, Poland, Canada, Mexico, Chile, India, Türkiye, South Africa, Finland, Estonia, Latvia, Lithuania, Ireland, Cyprus, Luxembourg, Slovenia, Slovakia, Malta, Croatia, Romania, Bulgaria, Iceland, Colombia, Costa Rica, Argentina	Switzerland	Portugal, Taiwan	Singapore		33
The bank with the government's approval or agreement	Spain, Austria, Denmark, Brazil, Japan, Korea, Thailand	Netherlands, United Kingdom	France			10
The government	Australia, China				Norway, New Zealand, Hong Kong, Saudi Arabia	6
The statute	Sweden, Hungary, United States, Israel, Indonesia, Russia					6

Note: Rows: the body that sets the size of the discretionary deduction placed before the transfer to the government, such as a provision for general risks or an allocation to reserves; columns: how the amount transferred is set. Statutes in force in October 2026 and the agreements, regulations or government decisions to which they delegate. Deductions prescribed by accounting rules, such as revaluation accounts for unrealised gains, are not counted. For the ECB, the transfer is the distribution to the national central banks. Appendix D gives the legal basis for each entry. Sources: statutes and agreements listed in Table D1; Romelli (2025a).

3.2. Control of the deduction

Table 1 gives the result. In most cases the transfer is a residual fixed by statute, and what varies is control over the deduction. At 33 of the banks the deduction is sized by the central bank itself, at ten by the bank with the government's approval or by agreement with it, at six by the government and at six by the statute alone. The Bundesbank Act is typical of the first group: the Bundesbank forms provisions for general risks at its own commercial judgement (s. 26(2)), while its statutory reserve is capped at €2.5 billion (s. 27); at the end of 2022 the Bundesbank's provision for general risks was €19.2 billion (Deutsche Bundesbank 2024). Switzerland is the only case in which the amount transferred is agreed with the government for a term while the deduction in front of it is left to the bank. At the Banco de Portugal and the central bank of Taiwan the bank sets the deduction and the government approves the transfer each year, and the Monetary Authority of Singapore sets both.

Control of the deduction also decides who may release it. I code from the same texts whether the bank's buffer may be used against a loss at its own discretion, must be used before a loss is carried forward, or may be used only for particular losses. The release is permitted but not required

at 18 banks, among them the ECB and most national central banks of the euro area, whose common accounting guideline states that each "shall decide on the size and use of the provision" (ECB 2024); it is required at eleven, including Belgium, Denmark, Korea and Singapore, and restricted at three, Poland, Japan and Estonia. The texts of the other 23 banks, the SNB among them, do not settle the question. A quantitative standard for the deduction, a target level or a stated risk-coverage standard, is published at 19 of the 55 banks: at all six whose statute fixes it by formula, at four of the ten that size it with the government, often in an agreement such as De Nederlandsche Bank's capital policy or the Bank of England's memorandum, and at only seven of the 33 that size it alone, and at two of the six where the government sets it, Norway and New Zealand; the SNB, whose allocation follows a growth rule without a target level, is not among them (Table D1).

4. How the control was used: two loss episodes

4.1. Measuring how a loss was absorbed

The deduction matters most when results turn negative. For every bank whose accounts could be read I record, for each financial year, the result before any use of the bank's buffer, the stock of the buffer at the start of the year, its use, the use of other reserves, the loss carried forward, the transfer and any public funds (Table D2 in the online appendix). Because some banks draw on their buffers in the income statement and others in the appropriation of the result, I classify each loss by what remained of it after the bank's own buffer, and where the transfer is computed on a result that excludes unrealised gains, as in Bulgaria, Iceland and Israel, by that result. For the SNB I treat the provisions as the buffer and the distribution reserve as an other reserve, because the provisions are the deduction that the bank sets, whereas the distribution reserve is what remains of past net profits after the payouts agreed with the government. A loss was absorbed if the buffer took all of it, the buffer was used up if it fell short, and the buffer was kept if the bank left it largely untouched and carried the loss forward or charged it to other reserves; a statutory or government rule may instead have absorbed it, or the bank had no buffer. A buffer is profit withheld from the government in earlier years, and a loss carried forward is recouped from later transfers, so the government bears these losses in the end. What differs is when they reach the budget, which Section 7 measures, whether they appear in the net result, the result after the buffer on which the transfer is computed, and who decides. The loss before the buffer is visible in every set of accounts, which is where I take it from; what a release changes is the net result and the transfer.

4.2. Financial years 2022 to 2024

As the interest paid on the reserves created by asset purchases rose and some currencies moved against foreign holdings, 41 of the 51 central banks whose accounts could be read had a loss before using any buffer in at least one of the financial years ending in 2022 to 2024, 82 bank-years in all. Figure 1 shows the outcome for every bank and year, and Table 2 counts the outcomes by who sets the deduction.

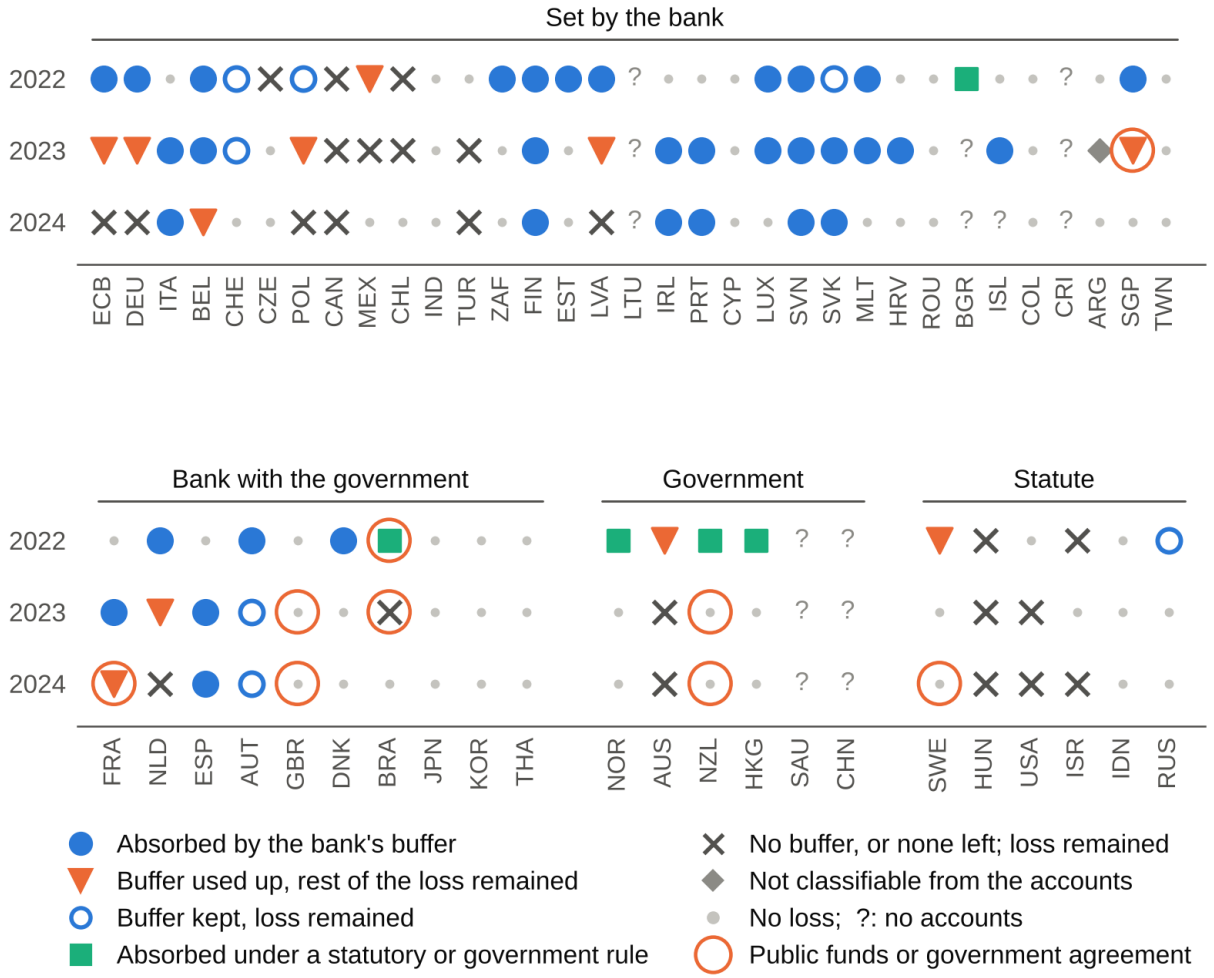


Figure 1. How the losses of 2022 to 2024 were absorbed, by who sets the deduction before the transfer (Table 1): banks that set it alone (upper panel) and the others (lower panel). One column per central bank, one row per financial year (years ending in 2022, 2023 and 2024; the Bank of England's ends in February, those of Australia, New Zealand, India, Japan and South Africa in March or June and that of Singapore in March). A loss is a negative result before any use of a buffer; it remained if it was carried forward, deferred or charged to capital. The ring marks the years whose losses public funds or an agreement with the government covered in part, or in which such funds were paid, including the Treasury's payments to the Bank of England's asset purchase facility, which is outside its own accounts. ?: the accounts of Lithuania and Costa Rica, of Iceland for 2024 and of Bulgaria for 2023 and 2024 could not be retrieved from the banks' websites when the data were coded. Source: Table D2.

Where the bank sets the deduction, alone or with the government's approval, it also decided whether a loss reached its net result. Only such banks had a buffer of their own that could cover a loss, so the comparison is among them rather than across the columns of Table 2. In 34 of the 38 bank-years in which the bank's own provision or reserve could have covered the loss, the bank absorbed it: in 29 it released exactly enough, to within the larger of 1 million in its currency and 0.1% of the loss, to report a result of zero or to carry nothing forward (at the Bundesbank in 2022 together with a smaller reserve required by commercial law), and in the other five, at the Banca d'Italia, the Banco de Portugal and Banka Slovenije, it released more and reported a small profit. Most of these years fall in the Eurosystem, under one accounting guideline: 30 of its 33 covered years were absorbed, against four of the five covered years elsewhere, at Danmarks Nationalbank, the Central Bank of Iceland, the Monetary Authority of Singapore and the South

African Reserve Bank, with the SNB the exception. In the remaining four, the Oesterreichische Nationalbank in 2023 and 2024, the SNB in 2023 and Národná banka Slovenska in 2022, the bank kept its buffer and carried the loss forward: the OeNB, which had released its provision against the loss of 2022, then used it only for write-downs and realised losses, the SNB allocates to its provisions irrespective of the annual result, and Národná banka Slovenska set the loss against gains on derivatives booked in equity.

The release was a decision, not an accounting requirement. In 31 of the 38 covered years the bank's rules permitted the release without requiring it, and the bank released in 28 of them; only four fell at banks obliged to use the buffer first, the National Bank of Belgium twice, Danmarks Nationalbank and the Monetary Authority of Singapore. A bank that releases its provision against a loss will naturally release exactly the loss; the choice lies in releasing at all, and in reporting a zero rather than a loss that the provision could have absorbed later. Where the bank's own buffer fell short, it was used up in 9 of 12 cases and the rest of the loss was carried forward or charged to capital or reserves, as at the ECB, the Bundesbank and De Nederlandsche Bank in 2023, at the Banque de France and the National Bank of Belgium in 2024 and at the Monetary Authority of Singapore in the year to March 2023; the Narodowy Bank Polski and the SNB kept most of their buffers in 2022. Banks without a buffer that could absorb an operating loss, or with none left, deferred their losses, as the Federal Reserve does, or carried them forward with negative equity, as the central banks of Czechia, Canada, Mexico, Chile, Türkiye and Israel did.

4.3. Financial years 2008 to 2015

The earlier episode was smaller and concentrated among banks with large foreign reserves or crisis exposures. A scan of the results for 2008 to 2015, which could be completed for all banks except those of Bulgaria, Croatia, Iceland, Romania and Saudi Arabia and the People's Bank of China, which publishes no income statement, found losses at 20 of them, 57 bank-years, which I coded in the same way (panel B of Table 2; Table D5). The bank's own buffer could have covered the loss in 14 of them. The bank absorbed it in eight, at the central banks of Colombia, Luxembourg, Poland, Singapore, Sweden and South Africa, in five of them by releasing exactly the loss, and kept its buffer in six, four of them at the SNB, which charged its losses of 2008, 2010, 2013 and 2015 to the distribution reserve while continuing to allocate to its provisions. Across both episodes, banks other than the SNB absorbed the loss in 42 of the 47 loss years that their buffer could have covered; the SNB released its provisions in none of its five. Counting the SNB's distribution reserve as a buffer, it absorbed its losses of 2008 and 2015, and the banks absorbed 44 of 52 covered losses. In 2010, moreover, the SNB cut its planned allocation to keep its payout, a release in all but name to which Section 6 returns. Of the 43 banks with a loss, 18 had losses in both episodes. These counts describe how the control was used; they do not identify its effect, since only banks that control a buffer can release one, and the episodes within each bank are few. Changes in control within a bank are too few to help: Sweden is the only bank with losses in both episodes whose control changed in between, and its loss of 2022 exceeded any buffer it had. That central banks avoid reporting small losses is known (Goncharov, Ioannidou, and Schmalz 2023). What the accounts add is the mechanism, the release of a buffer that the

Table 2. How central bank losses were absorbed in two episodes, and events since 2007, by who sets the deduction before the transfer

	Set by the bank	Bank with the government	Government	Statute	All
A. Financial years ending in 2022 to 2024					
Central banks	33	10	6	6	55
with a loss before the buffer in at least one year	26	6	4	5	41
Bank-years with a loss	54	13	6	9	82
absorbed by the bank's own buffer	28	6	0	0	34
buffer used up, rest carried forward or charged to capital	7	2	1	1	11
buffer kept, loss carried forward	4	2	0	1	7
absorbed under a statutory or government rule	1	1	3	0	5
no buffer, or none left	13	2	2	7	24
not classifiable from the accounts	1	0	0	0	1
Bank-years in which the bank's own buffer covered the loss	30	8	0	0	38
Banks whose losses public funds or a government agreement absorbed in part	1	3	1	1	6
B. Financial years ending in 2008 to 2015					
Bank-years with a loss	31	9	7	10	57
absorbed by the bank's own buffer	7	1	0	0	8
buffer used up, rest carried forward or charged to capital	1	0	0	0	1
buffer kept, loss carried forward	9	7	0	0	16
absorbed under a statutory or government rule	1	0	7	3	11
no buffer, or none left	6	0	0	7	13
not classifiable from the accounts	7	1	0	0	8
Bank-years in which the bank's own buffer covered the loss	13	1	0	0	14
Banks whose losses public funds absorbed in part	2	0	0	0	2
C. Changes since 2007					
A government or legislature took or capped a buffer the bank had built	3	1	2	8	14
Indemnity, capital injection, grant or loss-sharing arrangement	8	3	3	3	17
Promise to cover the bank's losses withdrawn or made conditional	0	0	0	1	1
Payout raised as the buffer grew	10	1	0	4	15
Rule raising what the bank retains	19	2	2	3	26
Deduction written into statute or an agreement	5	2	0	0	7

Note: Columns as in Table 1; in panel B Sweden is counted with the bank setting the deduction with the government's approval, as before the Riksbank Act of 2023. A loss is a negative result for a financial year before any use of a buffer, the provision, fund or reserve that the bank sets, alone or with the government's approval, or whose use a statute or government rule fixes. Absorbed: the bank's own buffer absorbed the loss, including the five years in 2022 to 2024 in which the Banca d'Italia, the Banco de Portugal and Banka Slovenije released slightly more and reported small profits. Used up: the buffer was used up and the rest of the loss was carried forward or charged to capital or reserves. Kept: the bank kept all or most of its buffer and carried the loss forward or charged it to other reserves; this includes years in which the buffer could not have covered the whole loss (the SNB, the Narodowy Bank Polski and the Bank of Russia in 2022; Czechia, Slovakia and Thailand in 2008 to 2015). Covered: the buffer at the start of the year was at least the loss. Not classifiable: the published accounts do not separate the movement in the buffer. In panel A the first row counts all banks of Table 1 and the rows on losses the 51 whose accounts could be read; panel B counts the twenty banks with a loss in 2008 to 2015 found by a scan of their results, which could not be completed for Bulgaria, Croatia, Iceland, Romania and Saudi Arabia, nor for China, which publishes no income statement. Panel C counts the events of Table D3 by who set the deduction before each event; the last row counts formal changes to the rules for the deduction, of which only the Riksbank Act of 2023 changed who sets it, while the Federal Reserve's surplus cap of 2015, which did so too, is counted as a taking. The Bank of England's losses arose in its asset purchase facility, which is outside its own accounts, so that it counts among the banks with public funds but not among those with a loss. Sources: Tables D2 and D3; replication files.

bank controls, and that the decision lies with whoever controls the deduction.

4.4. Who paid

Whether the government paid for losses at once differed less sharply. In 2022 to 2024 public funds, or an agreement with the government, absorbed part of the losses at six banks: HM Treasury paid a net GBP 45 billion to the Bank of England's asset purchase facility under its indemnity in the two years to February 2024 (Bank of England 2024), the New Zealand Treasury paid NZD 3.2 billion to the Reserve Bank under the Crown's indemnity of its asset purchases in the year to June 2023 and injected NZD 1.8 billion of capital in the following year (Reserve Bank of New Zealand 2023, 2024), the Brazilian Treasury covered, as a law of 2019 requires, the part of the central bank's losses of 2022 and 2023 that its result reserve and capital did not absorb, BRL 148 billion in all (Banco Central do Brasil 2026), the Riksdag injected SEK 25 billion of capital into the Riksbank in 2024 (Sveriges Riksbank 2024), an amended agreement with the French State moved EUR 6.2 billion from the revaluation reserve of the State's gold and foreign exchange to the Banque de France's fund for general risks (Banque de France 2025), and the paid-up capital of the Monetary Authority of Singapore, whose sole shareholder is the government, was raised by SGD 25 billion in March 2023 (Monetary Authority of Singapore 2023). Among the 42 banks with a loss, counting the Bank of England, public funds thus reached five of the 16 whose deduction the government sets or co-decides, or the statute fixes, and one of the 26 that set it alone (Fisher exact test, $p = 0.02$ one-sided). The difference rests on arrangements made before the losses. The United Kingdom's indemnity and Brazil's law of 2019 predate them, as does New Zealand's indemnity, and counting only the support decided after the losses (the French agreement, New Zealand's capital injection of 2024, Sweden and Singapore) the difference is not significant ($p = 0.15$). A penalised logit on the 36 of these banks that report equity for 2021, with controls for that equity, the size of the largest loss relative to the balance sheet and membership of the euro area, estimates a coefficient on the government's say of 1.92 (robust standard error 1.24, Wald $p = 0.12$; a permutation of the government's say across banks gives $p = 0.03$; Table D4). With six positive outcomes it cannot separate control from the arrangements that preceded the losses. The Singapore case rests on a capital increase whose payer the accounts do not name; without it the comparison is five of 16 against none of 26. In 2008 to 2015 the pattern reverses, unless Colombia, whose minister chairs the board, is counted with the government: among the banks with a coded loss year, the two that received public funds set the deduction alone, the central bank of Colombia, whose statutes oblige the government to cover the losses that its stabilisation reserve does not absorb (Banco de la República 2015), and the Monetary Authority of Singapore, whose paid-up capital the government raised from SGD 0.1 billion to 17 billion in March 2009; the Treasury also recapitalised the Central Bank of Iceland at the end of 2008, but its accounts for those years could not be read, and the Australian government's grant of 2013 to the Reserve Bank's fund did not follow a coded loss year (Table D3). Control of the deduction decides whether and when a loss reaches the net result; who pays for it is settled by other arrangements, several of them made before the loss.

4.5. Changes in control since 2007

Control over the deduction, and its size, is not fixed (panel C of Table 2 and Table D3, which codes 80 events since 2007). Three times a government or legislature took a buffer that the bank had built under its own control. In 2015 the United States Congress capped the surplus that the Board had set for the Federal Reserve Banks, in a part of a highway bill headed "Offsets", and USD 19.3 billion went to the Treasury (United States Congress 2015); in 2019 Türkiye's parliament transferred its central bank's reserve funds to the Treasury (Republic of Türkiye 2019); and in India a framework adopted in 2019, after a public dispute between the government and the Reserve Bank, released INR 526 billion of provisions for transfer to the government (Reserve Bank of India 2019). Where the statute or the government already controls the deduction, takings are routine rather than contested, as in Russia between 2012 and 2020 (Bank of Russia 2021) and China in 2022 (China Securities Journal 2022). Even a statutory promise proved revisable: in Hungary, where the statute obliged the budget to restore the central bank's equity within five years, parliament made the obligation conditional in December 2023, as the losses arrived (State Audit Office of Hungary 2024). In Switzerland the pressure on visible buffers runs through the Act and so through parliament and the people: popular initiatives on the SNB's profits and gold were rejected in 2002, 2006 and 2014, and since 2018 parliament has dealt with proposals to use its profits for old-age insurance, the repayment of debt and the army, the latest rejected in September 2026 (Federal Council 2002b, 2006, 2015, 2026).

Two limits apply. Conventions differ in where buffers are drawn on, in whether results are reported before or after tax and in what counts as equity, so I compare outcomes rather than the size of buffers. And 139 loss years at 43 banks support descriptive statements: they show that the deduction is managed, and by whom, more firmly than they show how the losses it leaves reach the government.

5. What independence indices record

5.1. Items V.9 and V.10 of the CBIE index

The CBIE index of Romelli (2022, 2025b) measures financial independence with twelve items, two of which concern the deduction and the transfer (Romelli 2024). The allocation of net profits (item V.9) scores highest if it is "prescribed by the statute", less if it is "left to the discretion of the central bank" and less still if it results from "a kind of negotiation between the government and the central bank". The allocation of profits to the general reserve fund (item V.10) scores highest if it is decided "on objective criteria established precisely by the statute", less if it is at the discretion of the bank and least if the government is consulted or decides. The index codes item V.10 as fixed by statute for 38 of the 53 central banks of Table 1 that it covers (Table D1). For the general reserve fund that coding is correct: the Bundesbank Act, for example, fixes the statutory reserve. But for 35 of these banks the statute also leaves another deduction to the bank, alone at 27 and with the government's approval at eight, and only at three does the statute fix every deduction. The index has no item for the deduction that the statute leaves open.

That deduction is the one that absorbed the losses. Of the 30 banks whose allocation item V.10 codes as statutory and which made a loss in 2022 to 2024, 28 had a deduction sized by the bank, alone or with the government's approval, and 21 used it to absorb a loss; of the 22 banks that absorbed a loss with their own buffer, 21 are coded as having a statutory allocation. Item V.10 thus places on the same footing a bank whose statute fixes all that is withheld from the government and a bank that, like the Bundesbank, holds nearly eight times its statutory reserve in a provision whose size and use it decides.

The SNB illustrates the gap from the other side. The index codes its financial independence at 0.58 in every year from 1953 to 2023, and 123 of its 156 entries score higher on that dimension (Romelli 2025a). Items V.9 and V.10 both give the SNB the maximum, coding the allocation of net profits and of profits to reserves as prescribed by statute. Article 31 of the National Bank Act leaves the amount distributed to an agreement with the Department, however, and Article 30 leaves the provisions, which precede any distributable profit, to the bank under a qualitative standard. Coded in the codebook's own categories, the two items would lower the SNB's score on financial independence from 0.58 to 0.50 and its place on the overall index from 40th to 42nd.

5.2. Why a new item rather than a recoding

Recoding items V.9 and V.10 within the codebook's categories is not the answer. The codebook ranks discretion of the bank below a criterion fixed by statute, on the view that a statute protects the bank from the government. The ECB's legal standard for the euro area takes the opposite view of the provision: national central banks "must be free to independently create financial provisions", whereas the allocation of profits may be prescribed by statute (ECB 2026a, 31–32). Recoding both items for all 53 banks to the codes that the classification implies would change 55 codes but barely move the overall index, with a rank correlation of 0.999 across its 156 entries, and the banks it would move most are those with most control over their provisions: the Banque de France would fall by 12 places, De Nederlandsche Bank by 12, the Oesterreichische Nationalbank and the Banco de Portugal by 9 and the Banco de España by 8. These moves measure how the codebook treats delegation, not a loss of independence.

I propose instead an item with two parts. The first records who sizes the deductions before the transfer that the statute does not fix: no one, because the statute fixes them all; the bank alone; the bank with the government's approval or by agreement with it; or the government. I order the first part, in the index's scale from 0 to 1, as the bank alone (1), the bank with the government (2/3), the statute (1/3) and the government (0). The bank alone scores highest because the ECB's standard makes freedom to create provisions part of independence. The ordering among the first three is a judgement. A deduction fixed by statute leaves the bank no discretion, but it is fixed by the legislature, which can change it without the bank's consent; the record of Table D3 shows takings under every form of control, including statutes changed to take buffers in Russia, Indonesia and, after 2015, the United States. I therefore place the statute below the bank, and below the bank acting with the government, whose agreement the government cannot change alone; placing it at the top instead, as the CBIE codebook does for item V.10, changes the score of only the six banks whose statute fixes every deduction. The

ECB's standard applies to the euro area; elsewhere the ordering rests on the same idea, that a bank which sizes its own provisions can protect its balance sheet from claims, at the cost of the accountability that the second part measures. Within the CBIE index the first part would enter the dimension of financial independence as a thirteenth item, averaged with the others as the index averages its items, and the second part the dimension of reporting and accountability. The second part records whether a quantitative standard for the level of those deductions is published, a target level or ratio or a stated risk-coverage standard such as a loss quantile, in the statute, an agreement or the bank's own policy; a described risk assessment without a stated coverage level, or a growth rule without a target, does not count. The first part measures the independence that control of the deduction confers; the second measures whether its holder can be held to account for it, which a de jure index seldom captures (de Haan, Amtenbrink, and Eijffinger 1999). Table 1 gives the first part for all 55 banks, and Table D1 both parts. The two parts measure different things. Of the 22 banks that released their own buffer to absorb a loss in 2022 to 2024, five had published a standard for its level, so that most of the releases could not be judged against a stated rule.

Control of the deduction thus strengthens the bank's hand against the government, since the bank decides how much of its result can be claimed at all, although Section 4 shows that legislatures have overridden that control when the buffers became large. Without a published standard it also weakens accountability, because the holder of the deduction decides whether a loss reaches the net result and no one can judge the decision against a stated rule. The SNB's arrangement, to which I now turn, shows what happens when this margin sits inside an agreement with the government.

6. The Swiss case

6.1. The arrangement

The National Bank Act of 2003 makes the deduction and the transfer a sequence. The SNB first sets up "provisions permitting it to maintain the currency reserves at a level necessary for monetary policy" (Art. 30 para. 1); the allocation is deducted from the annual result, and the remainder, added to the distribution reserve brought forward, gives the net profit or loss. The distribution, one-third to the Confederation and two-thirds to the cantons, is paid out of a net profit, and its amount is agreed: "The Department and the National Bank shall, for a specified period of time, agree on the amount of the annual profit distribution with the aim of smoothing these distributions in the medium term" (Art. 31 para. 2; Swiss Confederation 2003).[1] The Bank Council approves the level of the provisions (Art. 42 para. 2 lit. d), and the Department has no say in them, whose determination the Federal Council has described as lying in the SNB's sole discretion (Federal Council 2021). Table 3 summarises the agreements since 2002; that of 1 October 2026 repeats for 2026 to 2030 the stepped schedule of 2021, capped at CHF 6 billion (FDF and SNB 2026a).

[1] Quotations from the Act follow the English translation published by the federal authorities (Swiss Confederation 2003), which has no legal force.

Table 3. Profit distribution agreements between the Federal Department of Finance and the SNB, 2002 to 2026

Agreement	Financial years	Annual distribution to the Confederation and the cantons	Conditions
April 2002	2002–2012; replaced from 2008	CHF 2.5 billion	Set on the expectation that the distribution reserve would be exhausted by the end of 2012
March 2008	2008–2017; replaced from 2011	CHF 2.5 billion	Paid as long as the distribution reserve does not fall below −CHF 5 billion; review after five years
November 2011	2011–2015	CHF 1 billion	Paid only if it does not make the distribution reserve negative; an increase to be agreed once the reserve exceeds CHF 10 billion (a further CHF 1 billion for 2014)
November 2016	2016–2020; replaced for 2020	CHF 1 billion, raised to at most CHF 2 billion to the extent that the reserve exceeds CHF 20 billion	Subject to a positive distribution reserve; omitted distributions made up in later years if the reserve allows
February 2020 (supplement)	2019–2020; applied for 2019	A further CHF 1 billion each if the reserve exceeds CHF 30 billion and CHF 40 billion	Maximum CHF 4 billion
January 2021	2020–2025	Net profit up to CHF 2 billion; CHF 3, 4, 5 and 6 billion for net profits of at least CHF 10, 20, 30 and 40 billion	Paid only out of a net profit, so that the distribution reserve does not become negative
1 October 2026	2026–2030	As in 2021	As in 2021

Note: The net profit is the annual result less the allocation to the provisions plus the distribution reserve brought forward. A dividend of at most CHF 1.5 million to the shareholders is paid in addition. Alongside the agreement of 2026 the SNB announced that it would lower its minimum allocation to the provisions from 10% to 8%, subject to the annual approval of its Bank Council. Sources: SNB (2008, 2015, 2016a, 2020, 2021a, 2026g); FDF and SNB (2011, 2021b, 2026a, 2026b).

The allocation to the provisions is set outside the agreements (Table B2). The Bank Council doubled its growth rate in December 2009, introduced a minimum of 8% of the provisions in December 2016, five weeks after a new agreement had been signed, and raised it to 10% from 2020; with the agreement of 2026 the SNB announced that it would lower it to 8%, subject to the Bank Council's annual approval (SNB 2010, 2016b, 2026g; FDF and SNB 2021a, 2026b). In every year since 2016 the allocation has been exactly the minimum, made "irrespective of the annual result" (SNB 2026c). Of the CHF 156.1 billion that the SNB earned over 2011 to 2025, 60.9% went to the provisions, 21.6% to the Confederation and the cantons and 17.5% remained in the distribution reserve.

6.2. The provisions as a barrier

Because a payout is made only out of a net profit, nothing is paid unless equity exceeds the share capital plus the provisions, which rise each year by the allocation. In the terms of the actuarial theory of dividends, the schedule is a capped payout applied once a year to the equity above a barrier that the bank alone raises (de Finetti 1957; Gerber and Shiu 2006); unlike an insurer, the central bank continues to operate below the barrier, and no shareholder injects capital (SNB 2026c). Appendix S sets out the model, calibrated to the SNB's returns since 2000 and to its

Table 4. Payouts under the agreement of October 2026, financial years 2026 to 2030

	Expected result 1%	Expected result 2%	Expected result 3%
Single years			
Probability of no payout for 2026	3.8	3.4	2.9
Probability of the maximum for 2026	77.7	78.9	80.0
Probability of no payout for 2030	41.9	29.8	19.8
Probability of the maximum for 2030	43.7	57.2	69.5
2026 to 2030			
Expected payout per year (CHF billion)	3.99	4.44	4.82
Total payout: median (CHF billion)	22	26	28
Total payout: 10th percentile (CHF billion)	6	7	11
Probability of at least one year without payout	53.6	43.1	33.5
Probability of two consecutive years without payout	36.9	27.0	18.7
Probability of the maximum in every year	27.1	36.4	45.1
Probability of no payout in any year	1.3	0.8	0.5
Probability of negative equity at a year-end	2.5	1.2	0.5
Expected payout by year (CHF billion)			
2026	5.33	5.39	5.44
2027	4.33	4.61	4.86
2028	3.77	4.25	4.67
2029	3.40	4.04	4.59
2030	3.12	3.89	4.55
Distribution reserve at the end of 2030 (CHF billion)			
Median	19	55	95
10th percentile	−121	−86	−51
90th percentile	163	208	255

Note: Probabilities in per cent. Allocation 8% of the provisions; smoothed bootstrap; the result for 2026 is the published result for the first three quarters plus a simulated fourth quarter. Allocations total CHF 65.7 billion in every scenario. 1,000,000 paths. With the expected result drawn for each path (Appendix S), the probability of at least one year without payout is 44% with the historical estimate and 48% with the combined estimate, and that of negative equity at some year-end 1.6% and 1.9%. With an allocation rate of 10% and without the information of the first three quarters of 2026, expected payouts for 2027 to 2030 average CHF 3.1 billion.

result for the first three quarters of 2026. Under the agreement of October 2026 a year without payout before 2031 has a probability of 43% at an expected return of 2%, and between 33.5% and 54% for expected returns between 3% and 1% (Table 4). Within a term the negotiated schedule matters little: scaling it to a cap of CHF 2 billion or CHF 10 billion moves the share of years without payout only from 18.4% to 21.5%, and the concession of 2026, a lower allocation, raises expected payouts over the term by only CHF 1.1 billion. Over longer horizons a constant allocation rate makes the provisions grow faster than the income that feeds them.

Continuity is therefore cheaper to buy outside the bank. A fund held by the recipients, drawn on when the payout falls short of the budget and rebuilt from payouts above it, meets budgets set at the expected payouts of 2026 to 2030 with a probability of 90% if it holds CHF 15 billion; for the bank's own payouts to do so it would need an opening distribution reserve of CHF 158 billion, about its entire equity. Several recipients have moved that way: the Confederation budgets the expected average payout, and eleven cantons budgeted no distribution for 2026 (Federal Assembly 2026b; Sigrist 2025).

The agreement is incomplete by design. The statute gives the Department a say over the

distribution and none over the provisions, so that the term that decides the outcome is left to the bank, as the residual right of control is in the theory of incomplete contracts (Grossman and Hart 1986; Hart and Moore 1990), although here it is assigned by law. The SNB's revocable promise of a lower allocation can nevertheless be relied on, because the formal terms that would replace it, a credit line or a notional allocation rate written into the agreement, would cost the bank either more risk or its control (Appendix S; Baker, Gibbons, and Murphy 2002; Levin 2003). The record fits this reading: in January 2011 the SNB cut its allocation for 2010 to exactly the amount that left the distribution reserve at the floor of the agreement then in force, so that the budgeted payout could be made (SNB 2011a; Table B1). What the Swiss case adds is a view of the deduction inside a negotiation: only where the transfer is negotiated and the deduction is not does the deduction become the term that decides the outcome while staying outside the contract.

7. When the losses reached budgets

7.1. Timing, not cost

The comparison of Section 4 shows who decided whether a loss reached the net result. For the budget, the question is when it pays. Let E_t be the central bank's equity at the end of year t, π_t its result before any deduction, T_t its transfer to the government and G_t the public funds paid to it, so that

$$E_t = E_{t-1} + \pi_t - T_t + G_t.$$

The government's net receipts from the bank are $N_t = T_t - G_t$. Discounting at the rate r at which the government borrows, $\delta = 1/(1+r)$, and summing by parts over a horizon H gives

$$\sum_{t=1}^{H} \delta^t N_t \;=\; E_0 - \delta^H E_H + \sum_{t=1}^{H} \delta^t \left(\pi_t - r E_{t-1}\right). \tag{1}$$

Each unit of equity that the bank keeps replaces a unit of reserves on which it would pay the policy rate i_t, so that $\pi_t = \pi_t^0 + i_t E_{t-1}$, where π_t^0 is the result of the same balance sheet financed without equity. It depends on the policy rate, the assets bought and the exchange rate, but not on the deduction. Substituting,

$$\sum_{t=1}^{H} \delta^t N_t \;=\; E_0 - \delta^H E_H + \sum_{t=1}^{H} \delta^t \pi_t^0 + \sum_{t=1}^{H} \delta^t (i_t - r) E_{t-1}. \tag{2}$$

Proposition 1. *Given the path of π_t^0, two deduction rules that leave the bank with the same equity at the horizon differ in the present value of the government's net receipts only by $\sum_t \delta^t (i_t - r)\,\Delta E_{t-1}$, the spread between the policy rate and the government's borrowing rate on the difference in the equity they leave in the bank.*

The proof is the derivation above (Appendix F). The same losses therefore cost the government the same under any rule, up to that spread and to what is left in the bank at the end; what the rule decides is the date. A buffer moves receipts from the years before a loss to the years of the

loss, a loss carried forward moves them from the years after it, and public funds paid in the loss years and recouped through later transfers move them back again. The equivalence fails in three ways that Sections 4 and 6 document. Visible buffers attract claims: when a legislature takes a buffer that the bank built, as in the United States in 2015 and Türkiye in 2019, the receipts it re-timed are spent at once and are not there for the loss. Rules that tie spending to current receipts, such as the debt brake under which the Confederation budgets the SNB's expected payout, turn a change in timing into a change in spending. And if weak central bank finances affect the setting of policy rates (Adler, Castro, and Tovar 2016), π_t^0 itself is not independent of the rule. The deduction rule is thus a fiscal timing device, and where budgets are constrained by rules or by markets, timing is what matters for stabilisation: whether the cost of tightening reaches the budget while monetary policy is tight. Section 8 asks how much that matters.

7.2. Measured incidence, 2022 to 2024

I split each bank's losses of 2022 to 2024 into three parts by when they reach the budget. *Before*: the part absorbed by the buffer that the deduction built, profit that the government had already forgone. *Later*: the part charged to capital or other reserves, carried forward or recorded as a deferred asset, which the bank recoups from later results before its transfers resume. *Now*: the part met in the loss years by public funds, namely the indemnity payments in the United Kingdom and New Zealand, Brazil's statutory coverage, the capital injections in Sweden and Singapore and the transfer of the French State's reserve to the Banque de France. Injections and the transferred reserve are counted against what had been charged to capital or carried forward. The parts come from the accounts of Table D2 and are expressed as shares of each bank's loss and, where Eurostat or the Office for National Statistics report GDP, as a percentage of GDP (Eurostat 2026; Office for National Statistics 2026). Appendix F gives the figures for every bank.

Table 5 and Figure 2 give the result. Across the 41 banks, buffers absorbed on average 54% of the loss, 38% went into later years and 8% was met from public funds, which reached six banks. Buffers absorbed the whole loss at 16 banks, and nine carried all of it into later years. The split follows the control of the deduction. Where the bank sets it, buffers absorbed 64% on average; where the statute fixes it, as at the Federal Reserve, the Magyar Nemzeti Bank and the Bank of Israel, 93% went into later years, since a statute that fixes the deduction rarely builds a buffer that can take an operating loss. Public funds were concentrated where the government sets or co-decides the deduction or the statute fixes it, as Section 4.4 showed. At the 19 banks of the Eurosystem with a loss, losses of €143 billion, 1.0% of euro-area GDP, were 60% absorbed by buffers, 36% carried into later years, 0.35% of euro-area GDP, and 4% met by the French State. Counting the use of other reserves, which were also built from earlier profits, as absorbed before rather than recouped later raises the average share absorbed by buffers to 63% and the Eurosystem's to 67%.

The cost reached budgets in the loss years mainly where public funds were paid or where transfers had been large before the losses. For the 23 banks whose transfer for 2021 could be read, the shortfall of the transfers of 2022 to 2024 below that of 2021 was largest in relation to GDP for the SNB, 1.8% of Swiss GDP, followed by the Narodowy Bank Polski (0.9%) and the Banca d'Italia

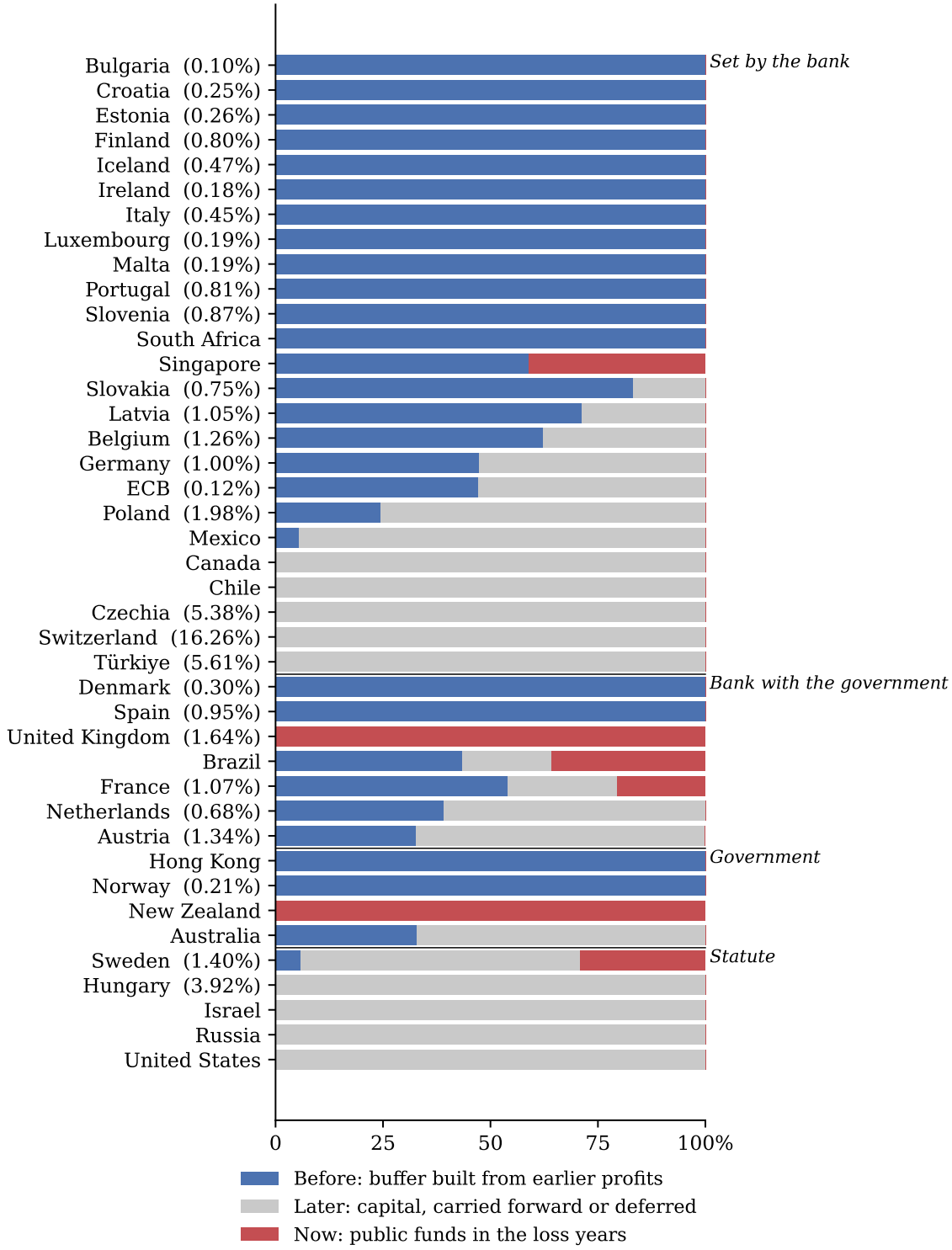


Figure 2. When the losses of 2022 to 2024 reached the budget, by bank. Shares of each bank's losses before the buffer, summed over the financial years ending in 2022 to 2024: absorbed by a buffer built from earlier profits (before), charged to capital or other reserves, carried forward or deferred (later), and met from public funds in the loss years (now). In parentheses: the losses as a percentage of GDP in 2023, where Eurostat or the Office for National Statistics report it; for the ECB, of euro-area GDP. Banks grouped by who sets the deduction before the transfer (Table 1). Sources: Tables D2 and F1.

Table 5. When the losses of 2022 to 2024 reached the budget, by who sets the deduction before the transfer

		Share of the loss (%)				European banks	
Deduction set by	Banks	Before	Later	Now	Public funds	Banks	Loss, % of GDP
Set by the bank	25	64	34	2	1	20	0.77
Bank with the government	7	53	25	22	3	6	1.01
Government	4	58	17	25	1	1	0.21
Statute	5	1	93	6	1	2	2.66
All	41	54	38	8	6	29	0.81
Eurosystem, loss-weighted	19	60	36	4	1	19	0.97[a]

Note: Banks with a loss before the buffer in a financial year ending in 2022 to 2024 whose accounts separate how it was absorbed, and the Bank of England, whose losses arose in its asset purchase facility; Argentina is excluded because its accounts do not separate the movements (Table D2). Before: absorbed by a buffer the bank had built from earlier profits. Later: charged to capital or other reserves, carried forward or deferred, and so recouped from later results before transfers resume. Now: covered in the loss years by public funds, including capital injections and the transfer of a state reserve, which are counted against what had been charged to capital or carried forward. Shares are unweighted means across banks, except in the last row. Public funds: banks with any. Loss: the bank's losses summed over 2022 to 2024 as a percentage of the country's GDP in 2023, median across the banks for which Eurostat or the Office for National Statistics report GDP. [a] Sum of the losses of the 19 Eurosystem banks with a loss as a percentage of euro-area GDP. Sources: Table D2; Eurostat (2026); Office for National Statistics (2026); Appendix F.

(0.6%). It was nil at the Bundesbank, Danmarks Nationalbank and the Czech, Hungarian and British central banks, which had transferred nothing for 2021. A shortfall in transfers is not the same as a loss, since results also fell at banks without a loss; but it is the part of the change in central bank results that the budget registered at once.

7.3. Four neighbouring central banks

The Bundesbank, Danmarks Nationalbank, Norges Bank and the SNB show four ways of timing the same kind of loss (Table 6). At the *Bundesbank*, which sets its provisions at its own commercial judgement, the losses of 2022 to 2024 equalled 1.0% of German GDP. It had added its whole profit for 2021 to its provisions and transferred nothing, and in the loss years the provisions absorbed 47% of the losses; the rest, 0.53% of GDP, was charged to reserves or carried forward. The federal budget registered none of it in the loss years. It will register it later: with a loss of €8.6 billion for 2025, the accumulated loss reached €27.8 billion, 0.6% of German GDP, which the Bundesbank intends to cover from future profits, together with new provisions, before it transfers anything (Deutsche Bundesbank 2026). At *Danmarks Nationalbank*, which sets its allocations to reserves with the government, the loss of 2022, 0.3% of Danish GDP, was absorbed in full by its capital, which had been built from profits withheld before, and the profits of 2023 and 2024 rebuilt it, followed by a profit of DKK 24.7 billion for 2025 (Danmarks Nationalbank 2026). At *Norges Bank*, where the government's rule for the transfer fund governs the deduction, the loss of 2022 was absorbed by the fund and the transfer to the Treasury continued in that year and rose in the next two; the rule set by the government smoothed the budget completely. At the *SNB*, whose provisions the bank alone sets while the payout is agreed with the government, the losses of 2022 and 2023, 16% of Swiss GDP, came from the valuation of foreign exchange

Table 6. Four neighbouring central banks and three comparisons: losses of 2022 to 2024 and when they reached the budget, per cent of GDP

			of which			Transfers forgone
	Deduction set by	Loss	Before	Later	Now	
Deutsche Bundesbank	B	1.00	0.47	0.53	0.00	0.00
Danmarks Nationalbank	BG	0.30	0.30	0.00	0.00	0.00
Norges Bank	G	0.21	0.21	0.00	0.00	0.06
Swiss National Bank	B	16.26	0.00	16.26	0.00	1.80
Bank of England	BG	1.64	0.00	0.00	1.64	0.00
Sveriges Riksbank	S	1.40	0.08	0.91	0.41	0.19
Eurosystem (19 banks)		0.97	0.58	0.35	0.04	–

Note: Losses before the buffer summed over the financial years ending in 2022 to 2024, and their parts as defined in Table 5, as a percentage of the country's GDP in 2023 (euro area for the Eurosystem). Deduction set by: codes of Table 1. Transfers forgone: the sum over 2022 to 2024 of the shortfall of each year's transfer below that for the financial year 2021, as a percentage of GDP in 2023; Norges Bank's transfers for 2023 and 2024 exceeded that for 2021. The Bank of England's losses are the Treasury's net payments to its asset purchase facility under the indemnity. Sources: Tables D2 and F1; Eurostat (2026); Office for National Statistics (2026).

reserves accumulated against safe-haven inflows. None of it reached the provisions, which the SNB went on raising; all of it was charged to the distribution reserve and carried forward, and the Confederation and the cantons lost CHF 15 billion of payouts relative to 2021, 1.8% of GDP, while its provisions rose above CHF 100 billion.

Control of the deduction, in other words, does not by itself decide the timing. The Bundesbank and the SNB both set their deductions alone, but the Bundesbank had stopped its transfers before the losses and used its provisions when they came, so that its budget felt nothing, whereas the SNB kept paying until the losses arrived and then kept its provisions, so that its recipients felt the loss at once. What decides the timing is the combination of who sets the deduction and how the transfer is computed from what remains, the two dimensions of Table 1. The Bank of England, whose losses the Treasury indemnified, and the Riksbank, which the Riksdag recapitalised in 2024, show the other end of the range: there the losses reached the budget in the loss years or soon after, through decisions made outside the central bank.

7.4. The renewed tightening of 2026

The rate increases of June and September 2026 meet a Eurosystem whose buffers were largely used up in 2023 and 2024, at the ECB, the Bundesbank, De Nederlandsche Bank, the Banque de France and the National Bank of Belgium among others (Table D2). The Bundesbank expected another loss for 2026 even before the increases (Deutsche Bundesbank 2026). Once the buffer is gone, the timing device works in one direction only: any new loss goes into later years, and the budgets that will register it are those of the years in which governments have taken on new commitments for defence and energy. Two implications follow. A published standard for rebuilding the buffer, the second part of the index item of Section 5, would tell governments when transfers will resume and so let them plan for the deferred cost. And claims on central bank profits for purposes such as defence, of the kind the Swiss parliament rejected in September

2026 (Federal Council 2026), would, if granted, remove the buffer that times the cost of the next tightening.

8. Stabilisation: a calibrated model

Proposition 1 says that the rule re-times the cost; whether the timing matters for stabilisation depends on how budgets respond. To put magnitudes on it I add a central bank balance sheet and a deduction rule to a standard New Keynesian model. The central bank's result before any deduction is a steady positive amount less the interest on its net floating-rate liabilities, plus interest earned on its own equity, as in equation (2). The budget responds in one of two ways. Either spending follows the government's net receipts from the central bank, one for one, as under a budget rule that ties spending to current receipts; or the shortfall is financed by debt and taxes rise with the debt, slowly or, under a debt brake, fast. Households are either all Ricardian or, as in two-agent models, a third of them consume their current income, a share of the order that Kaplan, Violante, and Weidner (2014) document for the United States and several European countries. Without a fiscal response the four rules give identical paths, as Proposition 1 implies.

The exposure is estimated rather than assumed. Regressing the results before the buffer of the ECB and seven national central banks of the euro area for 2021 to 2024 on the average deposit facility rate, with bank-specific exposures and a common run-off factor, gives net floating-rate liabilities of between 8.1% of GDP at De Nederlandsche Bank and 21.0% at the Banco de España, with a median of 14.3% across the national central banks; the Bundesbank's, 13.2%, is close to the median, and the regression explains 95% of the variation within banks (Appendix G, Table G1). I calibrate to the Bundesbank: 13% of GDP, a run-off of 0.85 a year estimated on its own results, and a starting buffer of 0.5% of GDP, its provision at the end of 2021. Its own regression overstates its loss for 2025 (€11.3 billion against €8.6 billion), so the calibration errs towards larger losses. A cost-push shock, of the kind the energy shocks of 2022 and 2026 brought, raises the policy rate by 4.5 percentage points at its peak, as from -0.5% to 4.0% in 2022 and 2023, and generates losses of 0.8% of GDP over three years, close to the 1.0% measured for the Bundesbank and the Eurosystem in Section 7. Appendix G gives the model, the estimates and the solution.

I compare four rules. Under *coverage* the Treasury pays the bank's losses as they occur, as in Brazil and, through the indemnity, the United Kingdom. Under *release* the bank uses its buffer, carries the rest forward and rebuilds the buffer from later profits before transferring anything, as the Eurosystem banks do. Under *carry* it has no buffer and carries the loss forward, as the Federal Reserve does. Under the *transfer fund*, the government's rule for Norges Bank, results go into a fund that pays out a third of its balance each year and absorbs losses while it lasts.

Table 7 and Figure 3 give the results. When spending follows receipts (panel A), coverage contracts the budget by 1.0% of GDP in the first three years, while monetary policy is tight. The contraction does part of the central bank's work: the policy rate peaks 14 basis points lower and inflation 0.13 points lower, at the cost of a deeper output gap, and the loss function

Table 7. Stabilisation under four deduction rules: a calibrated New Keynesian model

Deduction rule	Fiscal contraction, % of GDP		Difference from no fiscal response				
	Years 1–3	Years 4–10	Peak rate, bp	Peak inflation, pp	Output, years 1–3	Transfers resume, yr	Welfare loss, %
A. Spending follows receipts; exposure of the Bundesbank (net floating liabilities 13% of GDP)							
Treasury covers losses at once	1.04	0.18	−14	−0.13	−0.31	3.5	−2.1
Transfer fund, a third a year	0.27	0.70	0	0.00	0.03	10.0	−0.3
Bank releases buffer, rebuilds it	0.30	0.70	0	0.00	0.01	12.2	−0.2
No buffer, loss carried forward	0.30	0.70	0	0.00	0.01	13.0	−0.2
B. As A, with a third of households hand-to-mouth							
Treasury covers losses at once	1.03	0.17	−20	−0.18	−0.43	3.5	−2.9
Transfer fund, a third a year	0.27	0.70	0	0.00	0.04	10.0	−0.4
Bank releases buffer, rebuilds it	0.30	0.70	−1	−0.01	0.01	12.2	−0.4
No buffer, loss carried forward	0.30	0.70	0	−0.01	0.01	13.0	−0.3
C. Debt-financed, taxes on all households respond to debt (debt brake, 0.5 a year); as B							
Treasury covers losses at once	0.58	0.65	0	−0.01	0.02	3.5	−0.7
Transfer fund, a third a year	0.12	0.65	1	0.01	0.03	10.0	0.1
Bank releases buffer, rebuilds it	0.14	0.66	1	0.01	0.02	12.5	0.1
No buffer, loss carried forward	0.14	0.66	1	0.01	0.02	13.2	0.1
D. As A, net floating liabilities 40% of GDP							
Treasury covers losses at once	2.99	0.50	−42	−0.37	−0.89	3.2	−5.7
Transfer fund, a third a year	0.82	2.15	0	0.01	0.10	9.8	−0.8
Bank releases buffer, rebuilds it	0.92	2.15	−1	−0.01	0.03	12.5	−0.7
No buffer, loss carried forward	0.92	2.15	−1	−0.01	0.03	12.8	−0.6

Note: Perfect-foresight responses to a cost-push shock that raises the policy rate by 4.5 percentage points at its peak when the budget does not respond to the central bank's transfers. Fiscal contraction: cumulative cut in government spending plus increase in taxes, per cent of annual GDP. Peak rate and peak inflation: annualised. Output, years 1–3: cumulative output gap over the first three years, percentage points times years, relative to no fiscal response; the output loss without a fiscal response is 9.6. Transfers resume: years until the central bank transfers to the government again. Welfare loss: change in the discounted sum of squared inflation and 0.25 times the squared output gap. Without a fiscal response the four rules give identical paths. Calibration and further cases in Appendix G.

improves by 2.1%. Under the three other rules the budget forgoes only the steady transfer, 0.1% of GDP a year, for a decade or longer; transfers resume after 10 years with the transfer fund and after 12 to 13 years with release or carry forward, and the drag falls in years in which monetary policy has long eased, with no measurable effect on stabilisation. Hand-to-mouth households raise the multiplier, and with them coverage lowers the peak policy rate by 20 basis points and the loss by 2.9% (panel B). If the shortfall is financed by debt instead, the effects shrink, because taxes spread the cost over time whatever the rule: even under a debt brake that raises taxes by half the excess debt each year, coverage changes the peak policy rate by less than a basis point and the loss by 0.7% (panel C), and with a slow tax response the rules are barely distinguishable (Appendix G). The exposure matters in proportion: across the estimated range of national central banks, coverage lowers the peak policy rate by 9 to 23 basis points, and for a balance sheet three times as exposed as the Bundesbank's by 42 (panel D). With the run-off of 0.96 a year estimated across the eight banks, transfers under release or carry forward resume only after 15 to 16 years.

The renewed tightening of 2026 meets a different starting point. With the deposit rate at 2.0%, an exposure that reproduces the Bundesbank's loss of 0.2% of GDP for 2025, no buffer left and

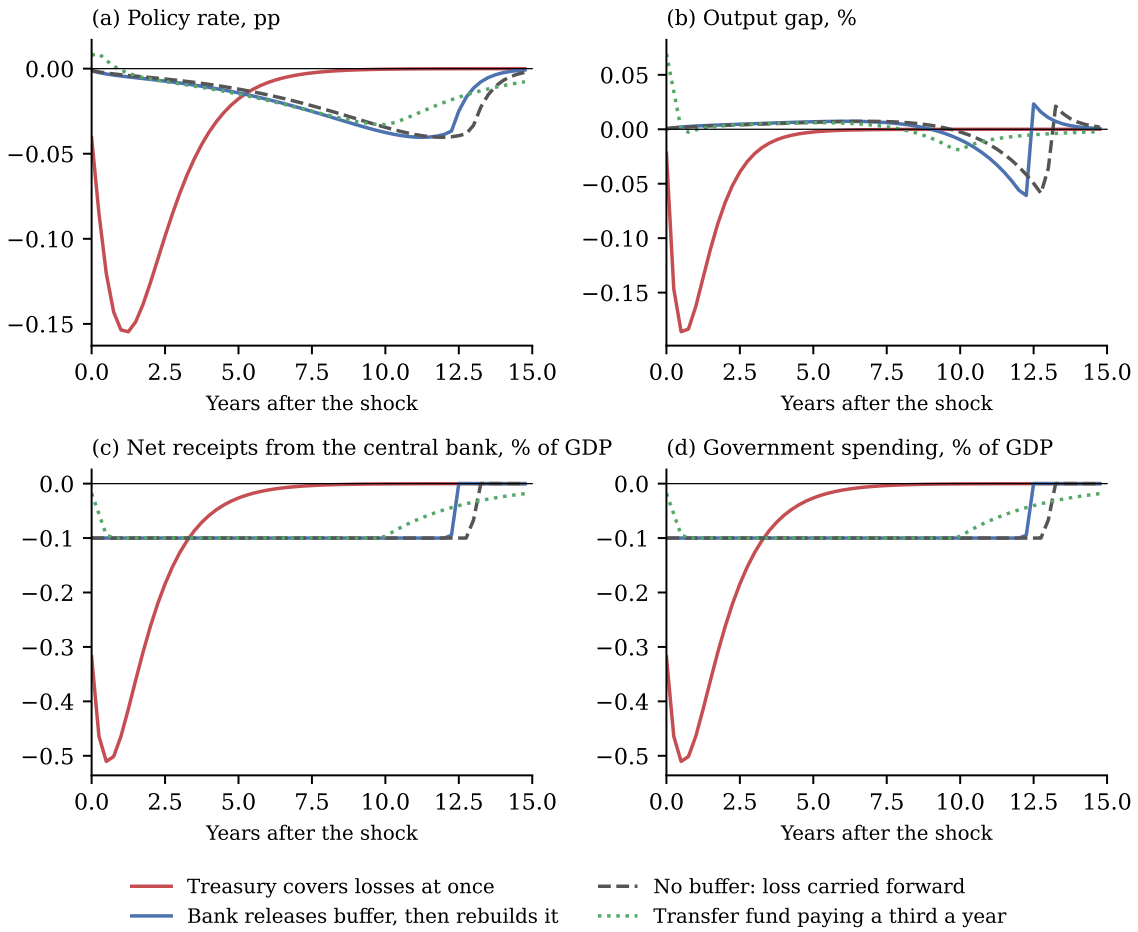


Figure 3. Responses to a tightening of the 2022 type under four deduction rules, with a budget that follows its receipts ($\gamma = 1$) and a balance sheet calibrated to the Bundesbank. Panels (a) and (b): differences from the paths without a fiscal response, which are the same under every rule. Panels (c) and (d): deviations from steady state; net receipts are transfers less public funds paid to the bank. Appendix G gives the model and the calibration.

a carried loss of 0.6% of GDP, a cost-push shock that raises the policy rate by 0.75 points adds losses of 0.19% of GDP over three years. Under the release rule, which with no buffer left works like the carry-forward rule, none of it reaches the budget within ten years; it lengthens the period without transfers. Under coverage, 0.17% of GDP would reach the budget within three years and the policy rate would peak two basis points lower.

Which share of each loss should the Treasury cover at once? Table 8 lets the share vary from none, which is the release rule, to all, which is coverage. The answer depends on why rates rise. When the tightening answers a demand shock, covering everything at once is best, since the fiscal contraction then moves output and inflation in the same direction as monetary policy, and release is 4 to 15% worse. When it answers a cost-push shock, coverage is best if the loss function weighs output lightly, and release, or a small share, is best if it weighs output as heavily as inflation, because the fiscal contraction then lowers inflation at the price of a deeper recession. After a pure policy shock release is best, but the differences are below half a per cent. Across all cases coverage is never more than about 2% worse than the best share, whereas release can be 15% worse; with a third of households hand-to-mouth the best shares are the same. Inside

Table 8. The best share of losses for the Treasury to cover at once, by the shock behind the tightening

Shock	Weight on output	Exposure 13% of GDP			Exposure 40% of GDP		
		Best share	Release, % worse	Coverage, % worse	Best share	Release, % worse	Coverage, % worse
Cost-push (energy) shock	0.25	1.00	1.7	0.0	1.00	5.2	0.0
	1.00	0.00	0.0	0.6	0.25	0.0	2.0
Demand shock	0.25	1.00	4.8	0.0	1.00	15.4	0.0
	1.00	1.00	3.8	0.0	1.00	12.3	0.0
Policy shock	0.25	0.00	0.0	0.1	0.00	0.0	0.4
	1.00	0.00	0.0	0.2	0.00	0.0	0.5

Note: The Treasury covers a share of each loss at once (0, 0.25, 0.5, 0.75 or 1); the bank absorbs the rest with its buffer and carries what remains forward, as under the release rule. Spending follows receipts ($\gamma = 1$), households Ricardian. Each shock raises the policy rate by 4.5 points at its peak without a fiscal response, except the policy shock (100 basis points). Weight on output: λ in the loss function. Release and coverage: welfare loss of a share of 0 and of 1 relative to the best share, per cent. With a third of households hand-to-mouth the best shares are the same and the differences larger (Appendix G).

the model, then, coverage is the robust rule. But the model has no channel through which a Treasury that pays the central bank's losses could press it to keep rates low, the concern behind the ECB's requirement that national central banks be free to create provisions and behind the evidence on political pressure on central banks (Binder 2021; Bianchi et al. 2023; Drechsel 2024). The case for buffers rests on independence rather than on stabilisation, and the model measures what it costs: between 2 and 5% of the stabilisation loss at euro-area exposures, depending on the shock.

The model can be checked against the horizons that central banks have published. De Nederlandsche Bank agreed with the Dutch State in December 2023 that it will resume dividends only once it has covered all its risks, which it expected to be the case in the mid-2030s, and in March 2026 it expected its losses to continue up to and including 2028 (De Nederlandsche Bank 2023, 2026). The Bundesbank expects another loss for 2026 and no transfer for some years (Deutsche Bundesbank 2026). Dated from the third quarter of 2022, the model has transfers under the release rule resume in 2035 with the Bundesbank's calibration and between 2035 and 2038 with De Nederlandsche Bank's estimated exposure and buffer, in line with the date DNB has published. It ends the losses too early, in 2026 rather than after 2028, because its policy rate returns to the level of 2021 instead of staying at 2 to 2.5%; and the exposure regressions overstate the losses of 2025, at €12.9 billion against €8.6 billion for the Bundesbank and €2.2 billion against €1.0 billion for De Nederlandsche Bank, because they leave out the repricing of assets bought at low yields. The two errors work in opposite directions on the date at which transfers resume, and the date the model gives agrees with the published one (Appendix G).

The model thus confirms the reading of Section 7 and sharpens it. For balance sheets of the euro-area kind the deduction rule is a question of when the budget pays rather than of macroeconomic stabilisation, the more so once buffers are gone. It becomes a question of stabilisation only where three things meet: a large exposure, a Treasury that pays at once, and a budget whose spending follows its receipts. Where they do, the fiscal contraction during the tightening complements monetary policy against cost-push inflation rather than working against it.

9. Conclusion

Every central bank places a deduction in front of its transfer to the government, and who sets it decides more than the transfer. At most of the 55 central banks compared, the statute leaves that deduction to the bank, alone or with the government's approval, and few of them publish a quantitative standard for it. In both loss episodes of the past two decades the banks that held it decided whether their losses reached the net result: where their buffer could cover a loss, banks other than the SNB released it in 42 of 47 cases, mostly where their rules left the release to them.

For the interaction of monetary and fiscal policy, the lesson is that the fiscal cost of monetary tightening is timed by rules that sit inside the central bank's accounts. The cost is the government's under any rule, up to a small spread; but whether it reaches the budget before, during or after the tightening depends on who sets the deduction and how the transfer is computed from what remains. In 2022 to 2024 most of it had been paid in advance or was carried into later years, and little reached budgets in the loss years except through indemnities, statutory coverage and recapitalisations, or where large transfers stopped, as in Switzerland. With buffers used up in much of the Eurosystem, the renewed tightening of 2026 will be paid later, in budgets that face other claims. Models that consolidate the central bank with the treasury abstract from exactly this margin. Adding it to a standard New Keynesian model shows where it matters: for balance sheets of the euro-area kind, buffers and carried losses spread the cost so thinly over the following decade that stabilisation is unaffected, while a Treasury that pays at once contracts the budget during the tightening and lowers the policy rate needed against cost-push inflation, by more the larger the bank's exposure. Whether that is desirable depends on the shock: covering losses at once is best when tightening answers demand pressure and never far from the best otherwise, so the case for buffers rests on the independence they protect, a trade-off that the deduction rule now settles implicitly and that could be settled openly.

For the measurement of independence, an index can be right about the statute and still miss the margin that matters. Item V.10 of the CBIE index is right about the general reserve fund, but silent about the provision that absorbed the losses. The item proposed here records who sizes the deductions that the statute does not fix and whether a standard for them is published. It is coded for 55 banks as of 2026; coding it over time, using the changes recorded since 2007, would allow its relation to transfers, net results and claims on central bank buffers to be estimated, which the descriptive evidence here cannot do.

For the design of distribution rules, the Swiss case suggests two points. Continuity of payouts within a term is the wrong task for the payout schedule, whose shape barely affects how often payouts fail, and for the bank, whose reserve would have to absorb the whole annual result; a fund held by the recipients, fed from payouts above budget, does it at a fraction of the cost, as rainy-day funds and resource stabilisation funds do elsewhere (Wagner and Elder 2007; Zhao 2016; van der Ploeg and Venables 2011). And the barrier, which governs payouts beyond a term, would gain from a published risk standard: the SNB has not published a level of equity or of provisions that it regards as sufficient (SNB 2026c), and a constant growth rate of the provisions above the expected return cannot be kept indefinitely. Publishing a rule for the

provisions would turn a relational term into a formal one while leaving the decision with the bank, and the argument of Tucker (2018), that delegated power is easier to defend when the standard it serves is public, applies to the appropriation of profit as much as to monetary policy.

The analysis has limits. The comparison is descriptive: it rests on legal texts that leave room for judgement and on accounts whose conventions differ, most covered loss years fall under one accounting regime, and public funds are too few to separate control from the arrangements that preceded the losses. The split of Section 7 assigns the use of other reserves to later years, and the shortfall of transfers mixes losses with the fall in results at banks without one. The model of Section 8 has a stylised budget, which either follows its receipts mechanically or finances the shortfall by debt, and exposures estimated from four years of accounts per bank; it gives orders of magnitude, not estimates. For the SNB, returns are exogenous, the calibration rests on twenty-six annual observations, and the expected return moves the main probabilities by about ten points either way.

Data availability

All data are from public sources documented in the online appendix. The code and data files that reproduce every number, table and figure, including the computations of Sections 7 and 8, are available from the author and will be deposited in a public repository.

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