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Risk Appetite Frameworks for Central Banks

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Introduction

Corporate managements often implement an enterprise-wide or integrated risk appetite framework (RAF) as one of their business strategy tools. Industry standards, such as ISO or COSO, provide comprehensive guidance for integrating risk management practices into corporate governance processes. An RAF often constitutes one of the key building blocks in business strategies. According to COSO, *risk appetite helps an organization know when decisions are diverting efforts away from the mission and vision… Risk appetite is a fundamental part of setting strategy and objectives, providing context as the organization pursues a given level of performance* (Martens and Rittenberg, 2020). Banking supervision (SSM) in the EU has generally adopted a similar approach, and therefore banks and other financial institutions are encouraged to embed risk appetite in their corporate policies. The ECB considers (for credit institutions) *a well-developed RAF, articulated through the risk appetite statement, to be a cornerstone of a sound governance framework, alongside a strong risk culture and well-defined responsibilities for risk management and control functions. It is further expected that the RAF is also being used in strategic decisions and in connection with the bank's strategic processes* (ECB, 2024). A similar definition of an RAF is provided by FSB (2013).

In 2016, 30% of systemically important (SI) credit institutions supervised by SSM reported that they had developed an RAF within the last 18 months, while a further 12% had one under development (ECB, 2016). Today, the overall share of the credit institutions in the EU with a developed RAF is likely higher.

By contrast, based on the available public information, RAFs are not very common in the central banking community. Only a few central banks have disclosed their RAFs as part of their governance policies (Central Bank of Ireland, Central Bank of Egypt, Bank of Canada, Reserve Bank of Australia, Central Bank of Seychelles). It is possible that more central banks apply RAFs internally without publicly referring to them or that some central banks follow similar principles but use different terminology and definitions. This is surprising, given that many central banks also supervise credit institutions and promote the adoption of risk appetite frameworks.

This note investigates possible reasons behind such practices and proposes directions for setting a holistic and strategic risk management framework with the inclusion of RAFs for central banks.

1 How does a risk appetite framework fit into central banking governance models?

There is no single understanding of an RAF, and therefore a review of different definitions is helpful as a starting point for further discussion. The Financial Stability Board, for instance, provides the following definition of an RAF:

The overall approach, including policies, processes, controls and systems, through which risk appetite is established, communicated and monitored. It includes a risk appetite statement, risk limits, and an outline of the roles and responsibilities of those overseeing the implementation and monitoring of the RAF. The RAF should consider material risks to the financial institution, as well as to the institution's reputation vis-à-vis policyholders, depositors, investors and customers. The RAF aligns with the institution's strategy.

The Institute of Risk Management (IRM) elaborates the process of designing an RAF in an organisation, but it doesn't (possibly intentionally) define the RAF in a very concise way. This process, bespoke to an individual institution with respect to its risk maturity and capability, is built around risk appetite, i.e. *the amount of risk that an organisation is willing to seek or accept in the pursuit of its long-term objectives*. An RAF includes different levels (strategic, tactical, operational), governance, risk metrics and controls. In addition, the IRM interprets selected risk appetite as one of many feasible choices of acceptable (i.e. within risk tolerance) risk performance outcomes. The performance can have different interpretations: for companies, it is typically profit-maximisation, while for other institutions, it can be stated differently. The above definitions include not only a set of internal risk policies, but also an enterprise-wide and strategic elements that serve a range of different stakeholders.

Chamoun et al. (2019) from the IMF have devised specific criteria for assessing different risk management maturity levels in central banks. Although the paper does not include definitions of or references to RAFs, it provides a set of criteria that overlap with industry standards. The highest, i.e. the optimised level, includes a risk appetite statement and integrated risk management and governance processes.

The above examples illustrate that the RAF's key element is risk management integration in all business processes including strategic planning. RAF covers all relevant risks (e.g. financial and operational).

As outlined in the introduction, only a few central banks publicly disclose RAF. On the other hand, the Risk Management Benchmark 2025 reports that almost 60% of central banks have institutional risk appetite, while this share is lower for European central banks (40%). The survey was performed in the context of operational risk (business continuity plans), and therefore it is not entirely clear whether these results are also representative for enterprise-wide RAFs. If central banks have integrated RAFs in line with industry standards, one could argue that such risk management and governance set-ups would be also publicly disclosed. Central banks' resilience to risks is nevertheless an important topic of interest for both the general public and the financial markets. The working assumption in this discussion is that central banks use risk appetite in different contexts but that an enterprise-level RAF including strategic, financial and other risks is (still) not prevailing among central banks.

If the above assumption is correct, one would look for a reasonable explanation for why central banks do not apply enterprise-wide risk management policies more generally, especially given that many central banks advocate RAF implementation in a supervisory role (at least those central banks that are responsible for a banking supervision function). A possible explanation is that central banks follow strict statutory policy mandates (e.g. price and financial stability). In line with this reasoning, central banks do not have many choices in defining different feasible risk performance options as key objectives are set by law. Furthermore, central banks have unlimited liquidity and can always repay liabilities in their currency. As central banks can operate with zero or even negative capital, their solvency (defining risk absorbing capacity in the corporate sphere) might seem irrelevant for achieving policy goals. Chile, the Czech Republic and Israel are cases where central banks have experienced persistent negative capital but have pursued credible inflation mandates (Bell et al., 2024). In this sense, central banks are, arguably, less sensitive to financial and strategic risks.

Another possible explanation is that central banking policies typically include a specifically tailored risk management framework that also defines readiness and limits for risk-taking. For instance, the famous Bagehot dictum – *to avert panic, central banks should lend early and freely (i.e. without limit) to solvent firms, against good collateral and at "high" rates* – contains several risk management elements. It defines the objective (financial stability), risk and other constraints (solvent counterparties, collateral requirements and punitive interest rate), and state-contingency (in financial distress react timely and without limit). The other well-known example of a central banking policy stance from the past is Alan Greenspan's "put". This refers to market expectations in 1990s that the Federal Reserve System would react to increased market uncertainty by counter-active monetary policy measures. Similarly, the Greenspan "put" contains elements of a risk appetite statement, as it reflects expectations about central banks' policies regarding risk-taking. The third example is Mario Draghi's "whatever it takes" speech in 2012. The President of the ECB at that time provided assurance of the willingness and ability of the Eurosystem to intervene and adopt non-standard monetary measures.

Moving away from more conceptual narratives to more concrete bespoke risk management examples, the ECB has published a thorough review of the risk management policies of the Eurosystem's monetary policy operations (ECB, 2015). The document includes principles of the Eurosystem's risk management functions (for instance risk management as an integral part of decision-making). It also describes risk efficiency as minimal possible risk taking for a given targeted policy impact, whereas target policy objectives are determined exogenously, i.e. outside the risk management framework. Although the document does not explicitly refer to RAFs, content-wise, the reader can find similarities (limited to the monetary policy implementation framework) with the purpose of an RAF.

The above examples show that risk management in central banks is already adequately embedded in the existing polices. Central banks are unique institutions with mandatory objectives. Arguably, there is no need or room for setting an additional strategic or enterprise-wide risk management framework similar to best practices found in the corporate sphere (companies can choose their objectives and the associated risk/return, whereas central banks cannot). Since central bank policies are conditional on the prevailing state of the world, which can abruptly change (e.g. the COVID-19 shock), a formalised RAF could prove too restrictive. The fact that only a small number of central

banks, as mentioned in the introductory section, disclose their RAF can be seen as supportive of this conclusion.

Despite the above, the following section argues that an enterprise-wide perspective on a risk management framework for central banks is nevertheless worth pursuing. If policy or strategy (i.e. inflation or financial stability) risks have been dominating in the past, other risks, namely operational and financial, are gaining in importance due to ongoing structural changes and the more complex social and business environment. This could motivate central banks to implement enterprise-wide RAFs as part of holistic decision-making processes and strategy planning.

In addition to fulfilling policy objectives, central banks carry out many other important tasks, such as banknote distribution, developing and maintaining payment systems, and providing banking services for governments. Many of these tasks are critical and necessary irrespective of general economic conditions. Companies can adapt to a recession by reducing costs, for example by scaling down or even discontinuing certain less profitable operations. Central banks, on the other hand, cannot behave in this manner. Many of the central banking functions and operations are part of the nationwide critical infrastructure. These critical functions must be provided during economic shocks or natural disasters, when many commercial substitutes could operate at inadequate levels. Due to possible withdrawal of commercial substitutes in stressed conditions, central banking contingency plans must be robust enough to cover any potential service outages and prevent market dysfunctions. Because of rapid technological advancements, particular in information technologies, the complexities of financial services are increasingly challenging. The Eurosystem, for instance, is a provider of payment systems and is in the process of developing the digital euro. A disruption to these services could affect not only financial stability, but also the functioning of critical infrastructure. Criticality assessment, contingency planning and business continuity, among other things, based on realistic scenarios are necessary to ensure the smooth functioning of key financial functions. Although central banking services such as banknote distribution have also been critical in the past, technological advances might lead to profound changes in market functioning in the future. Artificial intelligence, new digital assets and payment channels will likely increase co-dependencies, create new risks, and shorten reaction times for service providers and regulators. These changes will increase the required central banking operational resilience not only as a short-term operational goal but also as a strategic objective.

Similarly to operational resilience, the financial soundness of central banks is becoming recognised as strategically important. Since central banks act as lenders and investors of last resort, their strong balance sheets support their credibility for conducting successful operations. A growing body of literature discusses and evidences cases of the positive relationship between central banking effectiveness and strong central banking finances or financial soundness. Examples include Stella (2005), Buiter (2008), Archer et al. (2013) and Broeders et al. (2022). Financial independence contributes to central bank credibility, which positively affects effectiveness in achieving policy goals. A high (financial) dependence on public finances might hamper the required policy independence and create conflicts of interest. Central banking financial independence has special relevance in the Eurosystem because of the singleness of the monetary policy on the one hand and the multitude of national fiscal policies on the other. A strong dependence between fiscal authorities and central banks at the national level may interfere with the harmonised and independent Eurosystem monetary policy decisions. For this

reason, the ECB annually monitors national central bank independence as part of the ECB Convergence Report (ECB, 2025).

The post COVID-19 inflation shock, followed by sharp increases in reference interest rates across all developed economies, highlighted the actual relevance of central bank financial soundness. Many of the Eurosystem national central banks have experienced a prolonged period of negative profitability due to the interest rate mismatch between long-term (mostly) monetary portfolios on the asset side and short-term liabilities. These recent events serve as lessons learnt that central banks can be exposed to substantial financial losses and capital depletion. Since these losses were related to monetary policy objectives and appear to have been properly communicated to the general public, Eurosystem central banks have maintained their credibility. However, if losses of that magnitude were related to less credible objectives or resulted from a weak risk management framework, the effective implementation of central bank policy could be impaired.

Since central banks are not profit-maximising institutions, financial objectives cannot be central to policy decisions and strategic planning. However, in the process of designing policy tools, through-the-cycle or structural profitability is required for long-term sustainability. A central bank toolkit that generates negative long-term financial results would weaken independence as it would at some point require fiscal support. Wessels (2024) argues that it may be useful to start considering profitability more explicitly when designing central bank policies. Explicit financial objectives–such as long-term or structural profitability and sufficient capital buffers–are becoming more relevant due to structural changes in central banking balance sheets. Traditionally, non-interest-bearing banknotes were a dominant central bank liability. Since the great financial crisis, the structure of major central banks' balance sheets has changed significantly. Because of quantitative easing, central banks have effectively borrowed from commercial banks to a much greater extent. A combination of higher interest rate exposure on the asset side and a costlier, interest-bearing liability side increases the volatility of central bank revenues. Furthermore, in some jurisdiction, demand for banknotes is decreasing, which is further increasing revenue uncertainty. The designing of financially stable and structurally positive policy operations is therefore becoming more challenging. For some central banks that face a decrease in banknote demand (for instance Nordic countries), the likelihood of capital injection could be increased (Nordström et al., 2022). For these reasons, financial considerations and ex-ante-defined financial objectives should be included in holistic central bank strategic planning as one of the supporting factors for effective central bank functioning. Cleassens et al. (2025) propose that central banks should strengthen accounting and capital frameworks, identify new revenue sources, and recalibrate monetary policy tools and financial stability policies. That would enable central banks to manage shocks more effectively.

The above arguments support the motivation for setting a broader risk management framework that can go beyond a more traditional approach, where risk management was primarily applied (in a subordinated way) for achieving particular policy objectives. Operational resilience and financial soundness, for instance, can be recognised as additional (supporting) objectives to the primary objective (typically price stability). Although the primary policy objectives remain central, additional operational and financial considerations have gained sufficient importance to warrant their recognition in strategic planning. A possible risk management framework, derived from the concept of the enterprise-wide approach, could identify policy objectives and accompanying risks as well as operational and financial objectives and their interdependencies. High operational

resilience for providing critical tasks, for instance, supports policy objectives (for instance financial stability). Similarly, financial objectives such as adequate financial buffers and structural profitability that foster independence and credibility also support policy objectives. This approach could help decision-makers and risk management to understand the interlinkages between different policies and risks, which is a prerequisite step to define a holistic risk management framework. A stylised example of an enterprise-wide RAF grounded on these arguments is presented in the following section.

2 A stylised example of a risk appetite framework applied to a Eurosystem national central bank

This section illustrates a possible approach to setting a risk appetite framework (RAF) in a central bank, building on the discussion in the previous section. The underlying motivation stems from the observation that the risks faced by central banks and the complexity of plausible future economic and social scenarios have been increasing over time. It is thus sensible that internal governance tools, including risk management policies, follow and adapt to this trend. The purpose of this note is to explore potential risk management and governance set-up, especially with respect to linking risk appetite with different central banking objectives. The note does not intend to serve as a guide for defining RAFs in central banks, but rather to facilitate consideration of how to optimise risk management and governance processes.

Table 1 exemplifies a possible approach for setting a holistic central banking planning and risk management framework. The simplified framework first identifies key objectives and describes available tools for achieving them. The stylised example is based on possible central banking objectives as presented in the previous section: i) policy, ii) operational and iii) financial. Policy objectives refer to the key central banking mandates. In the Eurosystem, the primary objective is the maintenance of price stability. The operational objectives reflect the need for a high level of operational resilience for ensuring key central banking services. These include, for instance, banknote distribution and payment infrastructure (e.g. the TARGET payment system in the Eurosystem). Finally, sufficient financial resources for the independent and smooth conducting of policy and the fulfilment of operational objectives are captured by financial objectives (i.e. structural profitability and adequate financial buffers for financial independence).

The presented objectives can be achieved by employing relevant policies, tools and instruments. In the Eurosystem, monetary policy objectives have been pursued through standard instruments—namely credit operations—as well as non-standard measures. Similarly, business continuity planning and operational criticality assessment as operational risk management tools help to define adequate operational readiness and resilience. For managing financial risks, many central banks use strategic asset allocation and internal financial models.

All these tools and policies are built upon risk management processes and best practices. These typically involve some distinctive steps, such as risk identification, risk assessment and risk mitigation. Traditionally, policy, operational and financial objectives and risk management policies are set relatively independently, disregarding the fact that underlying risks often share the same sources. A holistic or integrated risk management approach is more suitable for joint assessment that can better reflect the real world. For instance, geopolitical risks, inter alia, drive economic expectations, which affect monetary and financial stability policies as well as central banking finances. In addition, geopolitical risk also matters for operational resilience (e.g. the severity and probability of cyberattacks). Likewise, digitalisation is affecting a wide range of central bank activities, including micro- and macroprudential policy, monetary policy implementation, and IT-related adaptations, such as cybersecurity. From a risk management perspective, it is preferable to assess and mitigate common sources of risk in a holistic manner. An integrated approach is widely considered better suited to addressing interdependencies and capturing potential blind spots or unknown risks.

Table 1: **Stylised enterprise-wide risk management framework**

	Policy objectives	**Operational objectives**	**Financial objectives**
Description	Price stability, financial stability (microprudential supervision, macroprudential policy and bank resolution)	High operational resilience for smooth performance of critical (infrastructure) tasks	Sufficient financial resources and structural profitability to foster financial independence and high credibility
Tools and instruments to achieve objectives:	Monetary and financial stability toolkit	Business continuity planning, adequate infrastructure and resources, strategic planning	Design of policy toolkit Strategic asset allocation for own funds
Risk identification (underlying common factors of uncertainly)	Geopolitical uncertainty Economic uncertainty New information technologies (cybersecurity, crypto assets, etc) Environmental risks (transition and physical risks, e.g. natural disasters) Demographic changes Social instability, etc.		
Risk assessment	Traditional, independent assessment of financial and non-financial risks (legal, compliance, reputational, etc. risk) Holistic strategic analysis and planning (i.e. risk appetite framework), i.e. strategic foresight for joint financial and non-financial risk assessment Integration of risks		
Risk mitigation	Enterprise-wide governance and organisation of the risk management function Specific policies covering different business areas (financial, operational, cybersecurity, etc.)		
Risk appetite	**Policy/strategy risk**	**Operational risks**	**Financial risks**
	Potentially high state-dependent willingness to take risk due to the primary objective ("whatever it takes")	Low willingness to take risks due to the criticality of central banking services (banknote distribution, payment systems, etc.)	Potentially high willingness with respect to fulfilling key policy objectives Low to moderate willingness to take additional non-policy-related financial risk to ensure structural profitability

Integrating risks is challenging due to differences in their underlying characteristics and the availability of data. Financial risks can be evaluated from many available and rich market data sources that allow relatively statistically robust quantitative risk modelling. Financial risks are therefore normally quantitatively expresses as potential losses. By contrast, non-financial risks are known for their relative data scarcity. Operational risk scores are often subjective, based on descriptive definitions of risk severity and frequency. Consequently, statistical risk modelling of non-financial risks proves much more challenging. For this reason, most central banks apply more qualitative risk assessment and risk mitigation approach for non-financial risks. These underlying differences in the assessment of financial and non-financial risk (despite the fact that some underlying sources of risks are shared) remains a practical challenge in applying an integrated risk management framework. Meaningful comparability of all relevant risks is essential for setting priorities and effectively building risk mitigants on an enterprise-wide level.

One possible avenue for more effective integration of financial and non-financial risks is strategic foresight. This technique is a possible and helpful addition to the traditional risk management. It is a structured and systematic approach of exploring plausible fu-

tures to anticipate and better prepare for change. It helps policymakers improve effectiveness by identifying opportunities, challenges, risks and disruptions that may arise over the coming years. Examples of strategic foresight techniques include horizon scanning, megatrends analysis, scenario planning, and visioning and back-casting (OECD, 2025). Strategic foresight provides views on probable scenarios that help decision-makers to set out appropriate policies to address future challenges. It facilitates designing future policies and policy tools in joint assessment of financial and non-financial risks. In that sense, traditional risk management techniques and strategic foresight are complementary, and they are both valuable for the design of holistic and coherent risk management policies. A combination of traditional risk management analyses and techniques coupled with more forward-looking tools such a strategic foresight could bring different objectives and associated risks to a common denominator and assist in closing the gap between, for instance, financial and non-financial risks.

Quantitative assessment of operational risk can also facilitate further integration of financial and non-financial risks, as loss estimates can be directly comparable. Reliable operational loss and incident databases and other information sources are needed for proper calibration of operational risk models. Given that each central bank operates in a specific environment, internal information (e.g. datasets on incident reporting) would probably be the most suitable source. But even if central banks lack such data and internal operational risk modelling capabilities, the prospect of integrating operational and financial risk could motivate further developments in this area. The ongoing digitalisation trends (developments in data sources and non-structural statistical data modelling) could accelerate further improvements in financial, non-financial and possibly joint risk assessment.

An advantage of a holistic risk management and strategic planning framework is that it also facilitates a coherent expression of risk appetite. A key building block of an RAF is defining how much risk an institution is willing to take to fulfil its goals (i.e. risk appetite) and its ability to take risk (i.e. risk capacity). Since a central bank can identify different objectives, it is meaningful to express risk appetite in relation to those. Too generalised a risk appetite statement, based on statutory central bank tasks, might lack concrete orientation for building coherent and integrated policies and practices for covering all relevant risks across an entire organisation. In this stylised example, three different risk appetite statements are therefore proposed, each corresponding to a specific presented objective. This approach allows the inclusion of dependencies and hierarchy between different objectives.

For the policy objectives described in Table 1, risk appetite in a central bank can be very high. The adoption and the scale of the quantitative easing measures for ensuring price and financial stability taken by all the major global central banks after the GFC increased the financial risks to the central banks' balance sheets to unprecedented levels. Since then, enlarged central banks' balance sheets and ample liquidity have become a part of the standard monetary policy toolkit. As discussed in the previous section, central banks have shown very high readiness to take risks to fulfil policy objectives.

With respect to operational risk, as discussed previously in this note, central banks are expected to ensure services that support normal functioning (e.g. payment systems) of a broader economic environment (for instance elements of the critical infrastructure). Therefore risk appetite is arguably relatively low. This is characteristically reflected in conservative operational policies in central banks (including security and other internal

controls, adequate back-up facilities, regular continuity planning, emergency procedures, etc.)

Setting the risk appetite for financial objectives is somehow different, because central banks' finances are to a various extent determined by policy objectives. Most financial exposures (and risks) often stem directly from the monetary or foreign exchange policy implementation framework. If financial exposures from policy operations also satisfy financial objectives (e.g. policy operations generate adequate financial resources, i.e. seigniorage), then there is arguably limited ground for additional financial risk taking. Realised financial losses that are not attributed to policy objectives could be seen as excess risk taking and a sign of weak governance, leading to the loss of the central bank's credibility. If policy operations do not satisfy financial objectives and cannot ensure central bank (financial) independency, a central bank could increase risk appetite subject to sufficient risk capacity (e.g. available capital buffers) up to the point of satisfying the financial independence objective. In the Eurosystem, national central banks could leverage additional flexibility by using own funds or ANFA portfolios[1] for fine-tuning the risk/return profile for achieving adequate financial resources. The least desirable situation arises when a central bank cannot simultaneously achieve policy and financial objectives. For instance, if a central bank cannot increase expected returns on its investments due to insufficient risk capacity or prevailing market conditions (i.e. a low yield environment), it might end up in a "conflicting scenario", under which a central bank cannot simultaneously achieve both objectives. Under such a scenario, a central bank would potentially have to rethink and ultimately modify policy objectives. Although this situation might appear more theoretical than practical for central banks with price stability as their primary (policy) objective, it is more relevant for central banks that primarily focus on foreign exchange targets. In that case, after depleting all foreign exchange reserves in currency interventions, a central bank can no longer effectively maintain the target exchange rate and would have to change the foreign exchange policy. A well defined risk appetite can facilitate finding a balance between long term policy objectives and profitability.

Overall, this section outlines proposals for developing an enterprise-wide risk management framework to effectively support decision-making in a central bank. Despite the challenges presented, the stylised framework could also be implemented in practice. From a risk management perspective, the framework would allow a more coherent and holistic approach that can evolve from a traditional risk governance set-up.

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[1] The national central banks of the Eurosystem can discretionarily invest in financial assets within the limits and under the conditions set out by the Agreement on Net Financial Assets (ECB, 2024).

3 Closing remarks

This note briefly examines the extent to which an integrated or holistic risk management framework is present across central banks. Based on the limited available information, the analysis suggests that central banks may employ an integrated risk appetite framework to a lesser extent than other financial institutions.

In contrast to these empirical findings, the arguments in this note support the view that a holistic risk management framework can enhance governance central banks. This is motivated by the observation that central banks, like other financial institutions, are exposed to increasingly complex and evolving risks.

Following the great financial crisis, many major central banks introduced non-standard policy measures that have increased their exposures to financial risks. At the same time, new information technologies, digitalisation and geostrategic risks pose additional challenges and vulnerabilities.

To ensure central bank resilience, decision-makers will likely need to consider more risk factors and more interactions among them. A well-designed holistic risk management framework could provide additional tools to help navigating through such new challenges.

Further discussion, exchange of views and data-collection on this topic would support further developments in risk management and governance best practices.

4 Literature

Archer, D., and Mose-Boehm, P. (2013) Central bank finances, BIS Papers 71.

Bell, S., Frost, J., Hofmann, B., Sandri, D., and Shin, S. (2024) Central bank capital and trust in money: Lessons from history for the digital age, BIS Papers 146.

Buiter, W. H. (2008) Can central banks go broke? Discussion Paper 6827, Centre for Economic Research.

Broeders, D., and Wessels, P. (2022) On the capitalisation of central banks, DNB Occasional Studies, De Nederlandsche Bank.

Chamoun, E., Denewet, N., Manzanera, A., and Matai S. (2019) Risk management maturity assessment of central banks, IMF Working Paper WP 19/303, IMF, December.

Cleassens, S., Glaessner, T., and Klingebiel, D. (2025) Strengthening central bank financial resilience in a changing world, VoxEU Columns, CEPR, April, https://cepr.org/voxeu/columns/strengthening-central-bank-financial-resilience-changing-world.

ECB (2012) Verbatim of the remarks made by Mario Draghi, speech by Mario Draghi, President of the European Central Bank, at the Global Investment Conference in London, 26 July 2012, https://www.ecb.europa.eu/press/key/date/2012/html/sp120726.en.html.

ECB (2015) The financial risk management of the Eurosystem's monetary policy operations, July.

ECB (2016) SSM supervisory statement on governance and risk appetite, June.

ECB (2024) Draft guide on governance and risk culture, July.

ECB (2024) What is ANFA, updated September 2024, https://www.ecb.europa.eu/ecb-and-you/explainers/tell-me-more/html/anfa_qa.en.html.

ECB (2025) Convergence Report, June, https://www.ecb.europa.eu/press/other-publications/convergence/html/ecb.cr202506~8941e288b6.en.html#toc73.

European Commission (2024) Risks on the horizon, Insights from Horizon Scanning, Joint Research Centre, https://op.europa.eu/en/publication-detail/-/publication/0168f990-23c9-11ef-a195-01aa75ed71a1/language-en.

Financial Stability Board (2013) Principles for an effective risk appetite framework, November.

Koroes, L., Asaju, T., and Hinge, D. (2025) Risk management benchmarks 2025 report, Central Banking Institute.

Madigan, B. F. (2009) Bagehot's Dictum in practice: Formulating and implementing policies to combat the financial crisis, speech at the Federal Reserve Bank of Kansas City's Annual Economic Symposium, Jackson Hole, Wyoming, 2029, https://www.federalreserve.gov/newsevents/speech/madigan20090821a.htm.

Martens, F., and Rittenberg, L. (2020) Risk appetite – Critical to success, Committee of Sponsoring Organizations of the Treadway Commission (COSO).

Miller, M., Weller, P., and Zhang, L. (2002) Moral hazard and the US stock market: Analysing the "Greenspan put", *The Economic Journal*, March, Vol. 112, No. 478, pp. 171–186.

Nordström, A., and Vredin, A. (2022) Does central bank equity matter for monetary policy? Staff memo, Sveriges Riksbank.

OECD (2025) Strategic foresight toolkit for resilient public policy: A comprehensive foresight methodology to support sustainable and future-ready public policy, OECD Publishing, https://www.oecd.org/content/dam/oecd/en/publications/reports/2025/01/foresight-toolkit-for-resilient-public-policy_9ad1cd60/bcdd9304-en.pdf.

Stella, P. (2005) Central bank financial strength, transparency, and policy credibility, IMF Staff Papers, Vol. 52, No. 2.

The Institute of Risk Management (2011) Risk appetite and tolerance guidance paper, Crowe Horwath Global Risk Consulting, https://www.theirm.org/media/7239/64355_riskapp_a4_web.pdf.

Wessels, P. (2024) On the profitability of central banks, De Nederlandsche Bank, Occasional Studies Vol. 21–3.