



Central bank capital*

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In the coming years, central bank capital adequacy will be key because central banks' profits are under pressure following rising interest rates in response to higher inflation. Interestingly, central banks are not uniformly regulated and there is no consensus on the amount of capital that is considered adequate. In this context, we argue that central banks face several challenges in determining their capital adequacy. First, capital plays an indirect, auxiliary role as central banks cannot default on their own currency. Nonetheless adequate capital is necessary to maintain confidence that the central bank is effective in implementing monetary policy and is able to absorb the corresponding financial risks on a stand-alone basis, independently of the government. Second, different from commercial banks, central banks face "latent risks" in addition to the calculable financial risks from current exposures. These latent risks are financial risks from future exposures, that the central bank accepts under its mandate if needed. Examples are risks from contingent policy measures such as quantitative easing and lending of last resort. The size of these latent risks is proportional to, for instance, GDP or the size of the banking sector. We argue that a central bank's target level of capital can be calibrated with a confidence level that is lower than that used for commercial banks due to the absence of default risk yet at the same time should take into account latent risks. We propose a set of guidelines to develop such a central bank capital policy.

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1. Introduction

Central banks are national authorities with specific mandates on price stability or price stability and employment (Mishkin, 2019). Under their mandates they typically perform a number of tasks such as designing and implementing monetary policy, issuing fiat money, running a secure payment infrastructure, and acting as a lender of last resort vis-à-vis commercial banks. Often central banks also manage national reserves and hold significant amounts of securities denominated in foreign currency for the purpose of monetary policy interventions. Consequently, central banks are exposed to many of the typical financial risks that commercial banks also face. Credit risks result from the credit operations through which central banks lend money to commercial banks. Market risks originate from holding foreign currency securities, asset purchase programmes and non-monetary portfolios, while the exposure to interest rate risk comes from the duration mismatch between assets and liabilities.

Capital provides a central bank with risk absorbing capacity and therefore plays a key role in central bank risk management. Hedging or limiting risks is often not an option for a central bank as that could counteract the monetary policy stance. Capital adequacy is therefore key. Capital is defined in economic terms as the value of total assets minus the value of total liabilities. From an accounting perspective capital consists of statutory capital plus retained earnings and other provisions or reserves with unlimited loss-absorbing capacity. Many central banks indeed have a so-called general risk provision that offers this feature. Below we therefore refer to capital as including such a general risk provision.

Interestingly, central banks are not uniformly regulated and there is no consensus view on the amount of capital that is considered adequate in relation to the underlying risks. By definition, there is only one central bank in each jurisdiction, and specific goals, national laws and statutes determine the conditions under which the central bank operates. This creates diversity amongst central banks and makes it less clear how much capital is considered adequate in relation to the risks the central bank is exposed to. In addition, some of these risks are contingent on the state of the economy. In a severe economic downturn or crisis a central bank may need to absorb additional risks from the financial system in order to restore confidence. We refer to these additional risks as latent risks. Because the origin, nature and impact of latent risks is unknown it is challenging to calibrate a target capital level. Yet in anticipation of such an event, a central bank may want to have a high amount of capital, because during a severe economic downturn it will be challenging to increase capital. Conversely, there are also reasons why a low amount of capital may be considered sufficient. A central bank enjoys implicit government support and it cannot default on its own currency. In the next section we dive deeper into arguments behind capital adequacy

2. Capital adequacy and central bank independence and credibility

The central bank's balance sheet plays a key role in implementing monetary policy. Under normal economic circumstances, monetary policy is conducted in a straightforward way with lending to commercial banks, deposit-taking and the use of policy rates as the main instruments to steer inflation in the medium term. In exceptional economic circumstances, however, additional measures that involve more risk taking may be needed, such as quantitative easing, lending of last resort to commercial banks or exchange rate interventions. Following Stella (1997), Stella (2002), Bindseil, Manzanares and Weller (2004), and Stella and Lonnberg (2008) we argue that central banks should be able to absorb potential losses from these normal and exceptional operations with adequate capital for two main reasons.

Firstly, adequate capital supports a central bank's independence. A generally accepted principle in modern central banking is that monetary policy should be conducted independently of politics (Haan and Eijffinger, 2019). Monetary policy aimed at price stability and financial stability is deemed too important to be part of trade-offs that concern short-term financial interests of the government. Secondly, adequate capital supports a central bank's credibility. Credibility as a monetary authority is essential for the trust in the national, fiat currency. Further, a central bank that is independent of the government needs to be perceived as being able to deploy any monetary operations necessary (Cukierman, 2011).

3. The risk exposures of a central bank

Central banks are exposed to the normal types of financial risks such as credit risk, interest rate risk, market risk and exchange rate risk. These financial risks can be calculated based on the central bank's actual exposures using typical commercial bank risk metrics such as Value-at-Risk or Expected Shortfall. In addition to financial risks based on actual exposures, a central bank is also exposed to latent financial risks from future exposures. These latent risks become calculable financial risks once the central bank activates its monetary policy instruments. In its capacity as lender of last resort, a central bank may for instance need to provide additional credit to otherwise viable banks that have no other means of borrowing. This creates additional credit risk. Another example of latent risks are future Quantitative Easing programmes that are needed to safeguard financial stability by providing ample liquidity to the banking system or to boost inflation by keeping funding costs for governments and corporations low. Once activated, these Quantitative Easing programmes expose the central bank to additional interest rate risk and credit risk.

Latent risks can be large relative to the actual calculable financial risks leading to abrupt changes in risk exposures. As an example, Figure 1 shows the erratic annual change in calculable financial risks for the Dutch central bank (DNB) from 2002 to 2021. The years 2012 (announcement of Outright Monetary Transactions (OMT), 2015 (start of Asset Purchase Programme, APP) and 2020 (start of pandemic emergency purchase programme, PEPP) show the largest change in calculable financial risks.

Ex ante quantifying latent risks is much harder than for the calculable financial risks that stem from exposures already on the balance sheet. The origin, nature and impact of events that lead to latent risks are unknown. One way to gain insight into the latent risks is by analysing the historical evolution of a central bank's balance sheets and risks over a sufficiently long period. As the latent risks emerge during crises and downturns, the comparison between the good and bad economic times gives an indication of the historical size of latent risks compared to the on-balance sheet risks. Another tool to assess the latent risks is scenario analysis (see, e.g., Broeders, Loman and van Toor, 2019). The main tools for scenario analysis are stress tests and reverse stress tests. A stress test reveals the vulnerabilities to specific scenarios for the risk factors. The challenge here is that the results of a stress test are not a prediction but rather a sensitivity analysis. A reverse stress tests is a tool to identify core vulnerabilities. Reverse stress testing aims to find combinations of risk factors that yield a particular critical loss level. The challenge in this case is that risk managers need to select the most appropriate scenarios and demonstrate the plausibility of those scenarios.

Figure 1 also shows the annual change in the Dutch central bank's capital, including the general risk provision. An important challenge is that the calculable financial risks can change abruptly, whereas capital can only grow gradually from retaining annual profits. This challenge is however not necessarily problematic as it can be argued that the underlying drivers of latent risks develop more gradual, in line with macroeconomic parameters such as GDP and size of the financial sector. When capital is calibrated to follow GDP growth, it will develop in line with the underlying latent risks over the long term, despite short-term fluctuations in the calculable financial risks.

Figure 1: The annual change in calculable financial risks and capital and general risk provision for the Dutch central bank from 2002 to 2021.



Note: The impact of the latent risks appears in years with sudden surges in the calculable financial risks when the latent risks transform into additional calculable financial risks as a result of central bank policy actions.

4. A central bank's capitalisation

The abrupt changes in risk exposures raise the question of how much capital is considered adequate. There is no consensus within the central bank community on a target level of capital versus the level of financial risks. In their important paper, Archer and Moser-Boehm (2013) give an overview of the diversity of central bank capitalisation practices. Many central banks seem well capitalised, but some temporarily operate with negative capital. To develop a view on capital adequacy we follow two lines of reasoning where central banks differ from commercial banks.

First, the importance of capital for central banks is indirect and auxiliary. Therefore, it can be argued that central banks can operate with a lower amount of capital than commercial banks for the same risk exposures. In an extreme scenario of massive financial losses, a commercial bank defaults while a central bank in principle continues to operate normally with a negative equity. A central bank's target level of capital can therefore be calibrated with a confidence level that is lower than that used for commercial banks. Commercial banks are (roughly speaking) required to maintain a capitalisation that covers the financial risks with the 99.9% confidence level over a one-year horizon (BIS, 2005). A central bank may work with a lower confidence level of, for example, 99%. This is the confidence level that the Eurosystem uses in Expected Shortfall calculations (ECB, 2017).

Second, different from commercial banks, central banks face latent risks in addition to the regular calculable financial risks. The central bank's capital should therefore be calibrated including these latent risks. To achieve this, the capital target could be linked to one or more macroeconomic variables. The capital target could for instance be linked to GDP growth or the size of the banking sector in a country. In this way, the capital target will grow steadily in line with the underlying latent risks assuming that these broadly follow GDP or the banking sector in the long run.

5. Guidelines for central banks' capital adequacy

In this final section, we develop a set of guidelines that can serve as a basis a central bank's capital policy. How these guidelines work out in practice depends on the specific mandate and situation of a central bank.

Guideline 1:

A central bank's capital policy has a target capital level that may correspond to a lower confidence level than the Basel capital requirements for commercial banks.

A central bank cannot default on its own currency. Therefore, a central bank's capital is auxiliary in ensuring stand-alone effectiveness, independently of the government. In contrast to the Basel requirements for commercial banks, the central bank's capital target may cover the same financial risks with a lower level of confidence, e.g. 99% on a one-year horizon.

Guideline 2:

A central bank's capital policy is based on an assessment of financial risks, covering both calculable financial risks and latent risks.

A central bank needs adequate capital in order to absorb the financial risks in a stand-alone capacity. An important difference as compared to commercial banks is that central banks are exposed to latent risks in addition to calculable financial risks. The central bank capital policy should take these latent risks into account. Historical analyses and scenario analyses can give an indication of the order of magnitude of these latent risks.

Guideline 3:

A central bank's capital policy has a target capital level that is stable relative to the key macroeconomic variables and sustainable for a long term.

A central bank's calculable financial risks can be erratic over time due to the transformation of latent risks into calculable risks following monetary policy interventions. Latent risks are likely to be proportional to macro developments such as GDP or the size of the banking sector in the long run.

Guideline 4:

A central bank's capital policy focusses on buffers that are directly and unconditionally available to absorb losses.

In addition to shareholder equity, a general risk provision can be part of capital provided it has full loss-absorbing capacity for a broad range of assets and risk types. Revaluation reserves for specific types of assets and guarantees from the government are not equivalent substitutes for shareholder equity and a general risk provision.

Guideline 5:**A central bank's capital policy relies on the central bank's own profitability for capital growth.**

The central bank uses its annual profit as the source of capital growth. If the annual profit is insufficient to achieve the capital target, the central bank should be allowed make this up from profits in later years. Capital which is temporarily below its target level is not problematic as long as recovery is feasible in the medium term (five to ten years). Full retention of annual profit should be undisputed if necessary. In extreme circumstances, if the central bank has negative equity for a long time, a recapitalization may be necessary. Excess profits, when the capital target is reached, should be paid out to the shareholder.

Guideline 6:**A central bank's capital policy is robust and objective.**

As both annual profits and calculable financial risks show erratic behaviour, a central bank's capital policy should be robust and be able to accommodate a wide range of states of the economy, from good to bad. Defining a capital target and linking it to GDP creates objectivity.

Guideline 7:**A central bank's capital policy is simple and transparent.**

The capital policy should be made public in a way that can be easily understood by stakeholders and the public. Every year the central bank should explain how capital is growing in relation to the target and the calculable financial risks. The effectiveness of the capital policy could be evaluated and published on a regular basis, for instance every five years. ■

References

- Archer, D. and P. Moser-Boehm (2013), "Central bank finances", BIS Papers No. 71.
- Bindseil, U., A. Manzanares and B. Weller (2004), "The role of central bank capital revisited", ECB Working Paper No. 392.
- BIS (2005), "An explanatory note on the Basel II IRB risk weight functions", Basel Committee on Banking Supervision, July 2005.
- Broeders, D., H. Loman and J. van Toor (2019), "A methodology for actively managing tail risks and uncertainties", *Journal of Risk Management in Financial Institutions* 12(1), 44-56.
- Cukierman, A. (2011), "Central bank finances and independence: How much capital should a CB have?", in S. Milton and P. Sinclair (eds.), *The Capital Needs of Central Banks*, Routledge, pp. 33-46.
- ECB (2017), ECB Annual Accounts 2017, www.ecb.europa.eu/pub/pdf/annrep/ecb.annualaccounts2017.en.pdf.
- Haan, J. de and S. Eijffinger (2019), "The politics of central bank independence", in *The Oxford Handbook of Public Choice*, Volume 2, Edited by Roger D. Congleton, Bernard Grofman and Stefan Voigt, Oxford University Press.
- Mishkin, F.S. (2019), "The Economics of Money, Banking and Financial Markets", Pearson, 12th edition.
- Stella, P. (1997), "Do central banks need capital?", IMF Working Paper WP/97/83.
- Stella, P. (2002), "Central bank financial strength, transparency and policy credibility", IMF Working Paper WP/02/137.
- Stella, P. and Å. Lonnberg (2008), "Issues in central bank finance and independence", IMF Working Paper WP/08/37.
- Wessels, P. and D. Broeders (2022), "On the capitalisation of central banks", DNB Occasional Studies Volume 20 – 4.

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