

Digital Euro: An assessment of the first two progress reports



External author:
Dirk NIEPELT

Supporting EU economic governance scrutiny



Digital Euro: An assessment of the first two progress reports

Abstract

The two progress reports provide an insightful overview over some of the thinking underlying the digital euro project. The reports remain vague in some respects, which is not surprising given the early stage of the project.

This paper was provided by the Economic Governance and EMU Scrutiny Unit at the request of the ECON Committee.

This document was requested by the European Parliament's Committee on Economic and Monetary Affairs.

AUTHORS

Dirk NIEPELT

ADMINISTRATORS RESPONSIBLE

Giacomo LOI

Kai Gereon SPITZER

EDITORIAL ASSISTANT

Donella BOLDI

LINGUISTIC VERSIONS

Original: EN

ABOUT THE EDITOR

The Economic Governance and EMU Scrutiny Unit provides in-house and external expertise to support EP committees and other parliamentary bodies in shaping legislation and exercising democratic scrutiny over EU internal policies.

To contact the Economic Governance and EMU Scrutiny Unit or to subscribe to its newsletter please write to:

Economic Governance and EMU Scrutiny Unit

European Parliament

B-1047 Brussels

E-mail: egov@ep.europa.eu

Manuscript completed in April 2023

© European Union, 2023

This document and other supporting analyses are available on the internet at:

<http://www.europarl.europa.eu/supporting-analyses>

DISCLAIMER AND COPYRIGHT

The opinions expressed in this document are the sole responsibility of the authors and do not necessarily represent the official position of the European Parliament.

Reproduction and translation for non-commercial purposes are authorised, provided the source is acknowledged and the European Parliament is given prior notice and sent a copy.

CONTENTS

LIST OF ABBREVIATIONS	6
EXECUTIVE SUMMARY	7
1. BACKGROUND AND OBJECTIVE OF THIS NOTE	8
2. FIRST PROGRESS REPORT ON THE INVESTIGATION PHASE OF A DIGITAL EURO	8
2.1. Overview	8
2.2. Access	8
2.3. Monetary anchor	8
2.4. Strategic autonomy	9
2.5. Use Cases	9
2.6. Transfer mechanism	10
2.7. Privacy	10
2.8. Tools to control amounts in circulation	10
3. SECOND PROGRESS REPORT ON THE INVESTIGATION PHASE OF A DIGITAL EURO	13
3.1. Overview	13
3.2. Role of intermediaries	13
3.3. Settlement	13
3.4. Funding and defunding	13
3.5. Distribution model	14
4. SOME ISSUES NOT ADDRESSED IN THE REPORTS	14
REFERENCES	16

LIST OF ABBREVIATIONS

CBDC Central bank digital currency

ECB European Central Bank

EXECUTIVE SUMMARY

The two progress reports provide an insightful overview over some of the thinking underlying the digital euro project. The reports remain vague in some respects, which is not surprising given the early stage of the project and the division of tasks between the ECB and the Commission.

The first report suggests that the digital euro can help preserve public money as the anchor of the payment system, but it does not explain how the decline in cash use endangers the anchor role or how a digital euro would mitigate the associated risks. It motivates the digital euro as contributing to Europe's strategic autonomy, but does not clarify whether the autonomy concerns national security, cheaper payment services, or monetary sovereignty, and why either of these would suggest a focus on consumers rather than business users. More generally, the report discusses few economic motives for a digital euro in depth and this raises doubts about the proper sequencing of design choices. Some arguments for privacy restrictions are not fully convincing. The most important shortcoming of the first report is the lack of analysis of why digital euro holdings as stores of value are not desirable (or why this issue is beyond discussion) and whether strategies to limit such holdings cause collateral damage.

The second report lacks a discussion of incentive compatibility of the envisioned public-private partnership model. It also lacks detail on the proposed settlement, funding and defunding models and on the incidence of the payment scheme's costs.

The reports do not discuss implications for central bank balance sheets, interest rates, political interference, and the ECB's mandate to introduce a digital euro.

1. BACKGROUND AND OBJECTIVE OF THIS NOTE

The ECON Committee of the European Parliament follows the ECB's work on the digital euro through regular oral updates. The European Commission intends to table a legislative proposal to provide a legal basis and framework for an eventual issuance of digital euro.

The Committee has requested an assessment of the first two progress reports published by the ECB, which set out “design choices” made by the ECB's Governing Council during the digital euro “investigation phase”. This briefing seeks to provide useful input into the Committee's scrutiny of the ECB's work, offering recommendations on aspects that have not, or not sufficiently been considered in the progress reports ahead of the upcoming legislative work.

2. FIRST PROGRESS REPORT ON THE INVESTIGATION PHASE OF A DIGITAL EURO

2.1. Overview

The [first progress report](#) motivates the case for a digital euro and lays out a first set of foundational design options endorsed by the ECB Governing Council. First, the Governing Council foresees two transfer mechanisms to validate digital euro transactions: Online, validated by a third party; and offline, peer-to-peer validated. Allowing cash-like features to enable greater privacy for low-value transactions is an option. Second, the Governing Council considers curbing digital euro use for investment rather than payment purposes by limiting individual take-up and/or applying a low remuneration to digital euro holdings above a certain threshold.

The report also sketches a timeline: European Commission proposal on regulation to establish the digital euro (first quarter of 2023)¹; further engagement with stakeholders throughout the remainder of the investigation phase; and Governing Council decision to start a “realisation phase” developing and testing technical solutions and business arrangements (October 2023).

2.2. Access

The report characterises a digital euro as an electronic means of payment for all retail users in the euro area (p. 2). It remains vague on what this means. Are tourists visiting the euro area such retail users? And if yes, do they lose the opportunity to hold digital euros upon leaving the euro area again? What about workers or shoppers that cross, say, from Switzerland to France on a daily basis?

2.3. Monetary anchor

The report motivates the digital euro as an instrument to preserve the role of public money as anchor of the payment system in the digital age (p. 3; see also Brunnermeier and Landau (2022)). But it is silent on the exact reasons why the trend decline in cash use for payment purposes endangers the role of public money as anchor of the payment system.

There is wide agreement that central bank money usefully serves as the unit of account that anchors the monetary and payment system (Issing, 1999). Central banks as lenders of last resort, bank regulation, deposit insurance, interbank payment systems and markets, and the option of bank customers to withdraw cash, among others, help ensure that private monies such as bank deposits and

¹ According to the latest tentative Commission planning, a proposal on the digital euro and its legal tender status could be tabled at the end of May 2023.

central bank money typically are convertible at par (during some crisis periods they are not). As a consequence, users of private monies typically do not need to worry about the issuer and can use private means of payment with “no questions asked”.

The digitisation of payments does not change the role of central banks as lenders of last resort. Nor does it change interbank payment systems, in which banks settle by transferring central bank money (reserves). It does not, on its own, undermine the option to withdraw cash either, as long as the ECB ensures the availability of banknotes (as it intends to do, see fn. 3 in the report). Against this background it is unclear which concrete dangers the Governing Council foresees and how a digital euro would reduce the associated risks.

2.4. Strategic autonomy

The report also motivates the digital euro as a contribution to Europe's strategic autonomy (p. 3). It emphasises that the digital euro project comprises two aspects, namely a digital means of payment and a European infrastructure.

The second aspect deserves clarification. Is the intention to build a parallel payment infrastructure under European control, or an infrastructure that would only be accessible by “European” users? If current payment infrastructures do not safeguard Europe's strategic autonomy, why is this? Pursuing strategic autonomy in the payment sphere could concern national security considerations or simply be motivated by the aim to offer a payment mechanism that disciplines expensive overseas service providers. As far as national security considerations are concerned, it is useful to recall that the Belgian domicile of SWIFT did not furnish European policymakers with substantial leeway when they disagreed with their American counterparts about the proper scope of sanctions against Iran.

Strategic autonomy in the sense of monetary sovereignty (defence against “dollarisation”) likely is strengthened if the European payment landscape makes it attractive for users not to switch to foreign platforms. It would seem most promising, then, to develop attractive solutions for the most mobile user groups. Most likely, these are business, not retail users. Against that background, a digital euro solution for business clients (a means of payment compatible with “logistics 4.0”) might be more promising than some of the use cases the project focuses on (see below).

2.5. Use Cases

The report motivates the main “use cases” or market segments to be served based on potential market size and the policy objectives “*harmonisation of payment solutions*” and “*European strategic autonomy*” (p. 4).

From an economic perspective, the market size motivation appears odd. It would rather seem natural to focus on areas where private solutions fail because markets do not function properly. It is also not clear why the government's role should be to harmonise payment solutions, and if there is such a role, why it should not be sufficient for the government to play a coordinating role.

The figure on p. 5 of the report raises the question why the less important segment of government payments is prioritised over the market segment of business-initiated payments, which according to the report is very important.

A more convincing economic motivation for a digital euro could start from considerations such as the following (Niepelt, 2022): Does a single-tier monetary architecture, in which firms and retail users transact using central bank money, deliver payment services more efficiently than the existing two-tier architecture, in which banks serve retail users with bank money while banks pay each other using central bank money? Or, are there other problems that the introduction of a central bank digital

currency (CBDC) could solve, and do these problems specifically require CBDC or would other, simpler and cheaper instruments suffice? All subsequent deliberations concerning design and other choices should reflect on how they align with these considerations.

2.6. Transfer mechanism

The report sketches the two prioritised transfer mechanisms (online, validated by a third party; and offline, peer-to-peer validated) but does not provide much detail (pp. 5-6). Objectives and trade-offs remain unclear. Auer and Böhme (2020) describe a “CBDC pyramid” which maps consumer needs (such as cash-like features, convenience, resilience, privacy protection and cross-border use) into CBDC design choices (such as platform and transfer mechanism). Others similarly argue that form must follow function. Against this background, the open questions discussed in sections 2.3, 2.4 and 2.5 above and 2.7 below about the motivations for a digital euro and relevant constraints raise the question whether design choices have been made prematurely.

2.7. Privacy

The report emphasises that a digital euro should respect the right to privacy as required by law (p. 6). At the same time, it makes clear, at least implicitly, that privacy will likely be very limited. On the one hand, anonymity would counteract anti-money laundering and counter financing of terrorism rules; on the other hand, it would make it impossible to cap per capita holdings, which is considered important for financial stability purposes (see below). The baseline scenario foresees a level of privacy similar to the one retail clients enjoy in the contemporaneous two-tier architecture: Personal and transaction data as well as information about “account” balances would be accessible to the intermediaries handling digital euro payments on behalf of the ECB.

Several aspects remain unclear. What is the proposed position regarding privacy vs censorship resistance: Are users only protected against infringements of the right to privacy (if at all), or are they also protected against discretionary restrictions on transferring or withdrawing their funds?

The report remains vague regarding the question whether users would need to register with the Eurosystem and their private service provider before starting to use the digital euro, or only with the latter. According to my understanding, current plans in the UK concerning a digital pound foresee “*digital ‘pass-through’ wallets to end users*” (Bank of England and HM Treasury, 2023, p. 11): The user's holdings of digital pounds would be recorded anonymously on the Bank's core ledger; only payment service providers that manage user wallets would have access to personalised information.

Can the Eurosystem credibly commit to not access the personal and transaction data? If not, privacy conscious users will have no reason to trust that the Eurosystem will not access the data and they will avoid using a digital euro.

The report also discusses models that offer more privacy for low-value payments in close proximity. These plans depend on future legislation. The basic model parallels the Chinese one: The larger the transmitted amounts (and the less proximity between payer and payee), the more restrictions on privacy apply.

2.8. Tools to control amounts in circulation

The report notes that a digital euro held in large amounts could result in structural substitution of bank deposits and it emphasises that undesirable consequences of a digital euro should be minimised. From there, it seems to jump to the conclusion that structural substitution of bank deposits is undesirable.

The report mentions two options to deal with the purported dangers of substitution, namely *“limit- and remuneration-based tools in the design of a digital euro to curb its use as a form of investment”* (p. 9).

This raises several questions. First, why is structural substitution of bank deposits undesirable? Do we know that the status-quo two-tier monetary architecture is ideal? Clearly, certain groups benefit from that architecture and risk averse central banks hesitate to change it. But taxpayers and other groups bear costs. Eminent economists have pointed to risks and/or proposed change (Knight et al., 1933; Fisher, 1935; Tobin, 1987; Chari and Phelan, 2014). In the words of Andy Haldane on his last day in office at the Bank of England (June 2021): *“On financial stability, a widely-used digital currency could change the topology of banking fundamentally. It could result in something akin to narrow banking, with safe, payments-based activities segregated from banks’ riskier credit-provision activities. In other words, the traditional model of banking familiar for over 800 years could be disrupted. While the focus of debate so far has been on the costs of this disruption, largely in the form of disintermediation of existing agents, there are significant potential benefits to be had too. Specifically, this could lead to a closer alignment of risk for those institutions, new and old, offering these services—narrow banking for payments (money backed by safe assets) and limited purpose banking for lending (risky assets backed by risky liabilities). This radically different topology, while not costless, would reduce at source the fragilities in the banking model that have been causing financial crises for over 800 years. Given the costs of those crises—large and rising—this is a benefit that needs to be weighed”*. For a recent analysis of some of the trade-offs involved see Niepelt (2022) who points to social cost differences in several areas: Operating costs of banks (in the two-tier system) and the central bank (in the single-tier architecture) differ; “liquidity substitution” costs of banks to make up for maturity mismatch only arise in the two-tier system with fractional reserve banking; fiscal and regulatory interventions to correct market failure in the banking sector cause collateral damage (e.g., due to tax distortions) in the two-tier system; and the single-tier architecture allocates more economic power to the central bank, enabling graver policy mistakes and more damaging political interference.

Second, even if universal banks in their current size and structure are socially valuable, do they need to finance themselves with deposits? The answer is less obvious than often suggested. Banks can intermediate between savers and investors without creating liquidity. Central banks can pass the funds raised from CBDC issuance through to banks, replacing the deposits on the liability side of bank balance sheets by central bank loans. If properly executed such pass-through funding can insulate banks and their lending from CBDC issuance (Brunnermeier and Niepelt, 2019). That is, the central bank can ensure that banks are able and willing to continue lending to the real economy by extending new loans to commercial banks at terms that parallel those of deposit funding.

Third, how strongly would *“limit- and remuneration based tools”* such as a small (e.g., EUR 3,000) cap on digital euro holdings or negative interest rates on digital euro balances in excess of some threshold reduce demand for digital euros? What does this imply for the objectives of the digital euro project? Depositors in the Eurozone currently benefit from deposit insurance protection up to amounts far higher than EUR 3,000. If this protection is credible, it is unclear why depositors should exchange a small part of their savings into digital euros.

Fourth, what would be the implications for financial markets of introducing shadow exchange rates?² A cap on digital euro holdings would imply that constrained users who have reached the threshold but wish to hold a larger quantity of digital euros value a digital euro more highly than a bank deposit although officially, and in trades of unconstrained users, deposits and digital euros trade at par. Similar

² An implicit or “shadow” exchange rate refers to the relative price of two assets that are not traded on a market.

situations arise when countries declare official exchange rates that deviate from fundamentals. Shadow exchange rates different from one would provide incentives to circumvent the cap and might unleash other destabilising forces, which we may not anticipate now. They would not support the objective of providing a solid monetary anchor.

Finally, how does the objective to curb the digital euro's use as a form of investment square with the Eurosystem's cash strategy of ensuring the availability of banknotes as payment instruments *and store of value* (fn. 3)? What arguments support the notion that physical forms of public money are acceptable as stores of value but digital ones are not? How does the lack of support for digital public money as store of value affect the credibility of the Eurosystem's cash strategy?

It seems worthwhile to study these issues very carefully. As a point of reference, it seems useful to note that current plans in the UK concerning a digital pound also foresee holding limits but higher than what the ECB communicates. Moreover, the UK plans foresee these limits *"during an introductory period at least"* (Bank of England and HM Treasury, 2023, p. 14).

The report suggests that the exact parameters governing the circulation of digital euros could be set in the future, potentially depending on circumstances. It remains unclear who would be in charge of setting them. It is not obvious that this should be the ECB (or the European System of Central Banks), whose core competences include monetary policy, foreign-exchange operations, reserves management, and the promotion of payment systems (art. 127 TFEU). In fact, some digital euro motivations and considerations discussed earlier (e.g., specific aspects of strategic autonomy, competition policy, or protection of bank business models) suggest that the issuance of CBDC transcends the domains of monetary and financial stability as well as payments. Responsibility for the introduction of CBDC and its implications for the national and international monetary architecture therefore should lie with parliaments. Central banks in countries such as Canada or Sweden, which are thought leaders in CBDC discussions, recognise and acknowledge this.

3. SECOND PROGRESS REPORT ON THE INVESTIGATION PHASE OF A DIGITAL EURO

3.1. Overview

The (less dense) [second progress report](#) lays out a second set of design and distribution options. It describes the anticipated division of tasks between the euro system and private intermediaries, the prospective settlement of digital euro transactions, and a “digital euro scheme”.

3.2. Role of intermediaries

According to the report, the Eurosystem would be responsible for customer onboarding, supervision, and settlement of digital euro transactions, while private intermediaries would be responsible for the distribution of digital euros, all other customer-facing activities, and the provision of devices and interfaces.

The report does not address incentive compatibility. If the digital euro were a threat to the business model of banks, then why should one expect banks to fully engage rather than trying to subvert the public-private partnership model?

3.3. Settlement

The report notes that a digital euro would be a direct liability of the Eurosystem, as is the case with banknotes. It asserts that “[c]onsequently, the Eurosystem would need to be able to correctly record ... all settlements of its own liabilities” (p. 8).

This conclusion seems unwarranted; after all, cash payments settle without the Eurosystem's involvement so there is no fundamental necessity for the Eurosystem to know the identities of holders of Eurosystem liabilities. While there may exist technical reasons that force the Eurosystem to record digital euro settlements, the discussion preceding footnote 17 in the report as well as the UK plans mentioned earlier suggest that this does not require the Eurosystem to identify the parties involved in the settlement.

3.4. Funding and defunding

The report anticipates seamless conversion of cash and private money into digital euros, and vice versa. Liquidity in excess of a digital euro holding threshold would be pushed to linked private money accounts, and vice versa (“waterfall” and “reverse waterfall” model). The “waterfall functionality ... would allow users to make or receive payments in digital euro in excess of any holding limit set by the central bank to limit the amount in circulation” (p. 8).

While technically probably feasible this arrangement appears quite complex and fragile. Suppose user A holds 2,000 digital euros and 3,000 euros at a bank. She wants to transfer 5,000 digital euros to user B. The bank of A has to provide the missing 3,000 digital euros. Does the bank have to hold them beforehand? Or will the Eurosystem supply the 3,000 digital euros immediately on the bank's request? In the latter case, the quantity of base money as well as the money multiplier change. In the former case, banks need to engage in precautionary digital euro holdings. How much are they allowed to hold, do holding limits apply? If not, what is gained in terms of the purported financial stability risks? Once B's account is credited the quantity of digital euros outstanding may or may not contract, depending on whether (i) B's initial digital euro holdings plus the transferred amount exceed the holding limit and (ii) the Eurosystem or B's bank acquires the excess digital euros. The quantity of base money as well as the money multiplier may again change.

The holding threshold also applies when a user wants to convert cash into digital euros: When the user converts cash in excess of the digital euro holding threshold into digital euros the user is credited some digital euros and some private money. The user's bank gains some claims vis-à-vis the Eurosystem, the user loses some. This seems completely unnecessary even if one takes the financial stability concerns underlying the threshold model seriously.

The report suggests that the waterfall and reverse waterfall model could imply that digital euro balances on user accounts temporarily exceed the holding thresholds. The report suggests that such deviations should not occur for longer than a calendar day.

This raises a couple of questions. First, how exactly does the waterfall and reverse waterfall model work. Apparently, funding, transfer, and defunding do not occur in real time. Second and more importantly, how can holding thresholds limit financial stability risks if they do not apply at all times? Twenty-four hours can be a very long time during a financial crisis.

3.5. Distribution model

The report anticipates a “*digital euro scheme*” with the aim to harmonise user experience across the euro area. The report suggests that digital euros could be spent with “*any merchant in the euro area*” (p. 9) and should also be accessible to people who currently lack access to digital means of payment.

Does this imply that merchants will have to accept digital euros? Who will bear the costs of the technical infrastructure they have to install in order to being able to accept digital euros? If merchants have to bear the costs, how much of an improvement will this constitute relative to the current arrangement in which they have to pay high fees to service providers but in principle have at least a choice? Why would people who currently lack access to digital means of payment (in spite of efforts to force banks to offer cheap basic accounts) have access to digital euro accounts? Would such accounts be subsidised? Would merchants be forced to cross-subsidise user accounts?

4. SOME ISSUES NOT ADDRESSED IN THE REPORTS

From both user, financial stability, and government finances perspectives it is important whether the digital euro will pay interest. My understanding is that plans are not to pay interest. But zero is almost surely not the optimal number. Monetary theory suggests that efficient liquidity provision requires low opportunity costs of holding money, i.e., a similar interest rate on money as on other safe assets (Friedman, 1969). For an application to the CBDC context see Niepelt (2022).

To understand the macroeconomic implications of a digital euro it is crucial how the Eurosystem would invest the funds acquired by issuing digital euros. Proposals range from injection by transfer in the spirit of the Swiss “Vollgeld” initiative³ to injection by open market operations in exchange for government bonds (Kumhof and Noone, 2021).

The introduction of digital euros would likely expand the Eurosystem's balance sheet. This could further increase political pressure on the Eurosystem and further reduce the ECB's effective independence. Suppose, for example, that the ECB passed newly-gained funds from digital euro issuance through to banks, as discussed earlier. Non-banks might then ask why they should not also benefit from (cheap) ECB funding, and refusal by the ECB to accommodate demands for ‘fairness’ or ‘policies in the public interest’ could trigger complaints about double standards, while acceptance could add to credit risk on the ECB balance sheet. Insolvent companies could request ‘lender-of-last-resort’ support for their

³ See <https://www.vollgeld-initiative.ch/english/>

'systemically important' business, based on the argument that they suffer from liquidity rather than solvency problems. Under political pressure to save jobs and keep businesses alive the ECB might succumb. In addition, it might be pressured to generate more seignorage (i.e., inflation), given that a larger balance sheet amplifies the importance of seignorage for government revenue. The political economy repercussions of a digital euro might thus be of a similar or larger magnitude than the macroeconomic ones.

The decision about the introduction of retail CBDC should not be taken by a central bank. It is a political decision because the repercussions far exceed the central bank's mandate (see the discussion in section 2.8).

REFERENCES

- Auer, R. and Böhme, R. (2020). [The technology of retail central bank digital currency](#), *BIS Quarterly Review* pp. 85-100.
- Bank of England and HM Treasury (2023). [The Digital Pound: A new form of money for households and businesses](#), *Consultation paper*, Bank of England, London.
- Brunnermeier, M. K. and Landau, J.-P. (2022). [The digital Euro: Policy implications and perspectives](#), *Report*, European Parliament, Policy Department for Economic, Scientific and Quality of Life Policies, Luxembourg.
- Brunnermeier, M. K. and Niepelt, D. (2019). [On the equivalence of private and public money](#), *Journal of Monetary Economics* 106: 27-41.
- Chari, V. V. and Phelan, C. (2014). [On the social usefulness of fractional reserve banking](#), *Journal of Monetary Economics* 65(C): 1-13.
- Fisher, I. (1935). *100% Money*, Adelphi, New York.
- Friedman, M. (1969). The optimum quantity of money, in M. Friedman (ed.), *The Optimum Quantity of Money and Other Essays*, Aldine, Chicago, chapter 1, pp. 1-50.
- Issing, O. (1999). [Hayek-currency competition and European Monetary Union](#). Speech at Institute of Economic Affairs, London, May 27.
- Knight, F. H., Cox, G. V., Director, A., Douglas, P. H., Fisher, I., Hart, A. G., Mints, L. W., Schultz, H. and Simons, H. C. (1933). Memorandum on banking reform. Henry C. Wallace papers.
- Kumhof, M. and Noone, C. (2021). [Central bank digital currencies—design principles for financial stability](#), *Economic Analysis and Policy* 71: 553-572.
- Niepelt, D. (2022). [Money and banking with reserves and CBDC](#), *Discussion Paper 22-12*, University of Bern.
- Tobin, J. (1987). [The case for preserving regulatory distinctions](#), *Restructuring the Financial System, Proceedings of the Economic Policy Symposium, Jackson Hole*, Federal Reserve Bank of Kansas City, Kansas City, chapter 9, pp. 167-183.

The two progress reports provide an insightful overview over some of the thinking underlying the digital euro project. The reports remain vague in some respects, which is not surprising given the early stage of the project.

This paper was provided by the Economic Governance and EMU Scrutiny Unit at the request of the ECON Committee.

PE 741.510

IP/A/ECON-ED/IC/2023-031

Print ISBN 978-92-848-0524-2 | doi:10.2861/824962 | QA-04-23-442-EN-C

PDF ISBN 978-92-848-0525-9 | doi: 10.2861/282249 | QA-04-23-442-EN-N