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Calculating capital requirements for operational risk

1. Continuum of measurement approaches for operational risk

The Capital Requirements Regulation (CRR) aims to standardise bank regulation within the EU. It therefore regulates the amount and requirements of the regulatory capital base of institutions, financial holding companies and mixed financial holding companies. The regulation has direct legal effect in the EU states, so that any conflicting national regulations are superseded by the regulation (Andrae 2014, 9; European Council 2020). According to art. 92 (3)(e) CRR, institutions must back their operational risks with own funds. From a regulatory point of view, the operational risk of an institution is understood as the risk of loss resulting from the inadequateness or failure of internal processes, people, and systems or from the occurrence of external events. This definition also includes the legal risks of an institution (art. 4 (1) no. 52 CRR). The need for own funds results from the knowledge that institutions bear considerable operational risks, especially against the background of growing IT dependency and the increasing complexity of their activities (Federal Ministry of Finance 2007, 116).

The CRR provides a tiered concept for calculating the capital required to cover operational risks. According to Part 3 Title III CRR, an institution may use either the Basic Indicator Approach, the (Alternative) Standardised Approach or a so-called Advanced Measurement Approach to determine the capital requirements for operational risk (see Figure 1).

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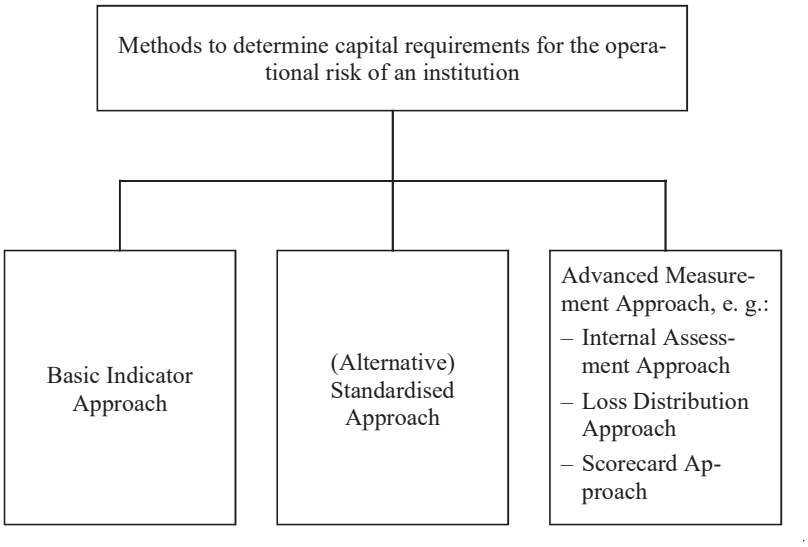

Figure 1. Methods to determine capital requirements for the operational risk of an institution

The various measurement methods of Part 3 Title III CRR are characterized by a different level of risk sensitivity and implementation effort respectively requirements for risk management (see Figure 2). In doing so, they specify the basic order in which these methods should be used by the institutions (Basel Committee on Banking Supervision 2006, 144). If certain qualitative and quantitative minimum standards are met, however, a more risk-sensitive measurement approach can be used right from the start (Basel Committee on Banking Supervision 2001a, 4). The use of an Advanced Measurement Approach instead of the Basic Indicator Approach or (Alternative) Standardised Approach is expected by internationally active institutions as well as by institutions with a significant risk from operational risks (e.g. banks specializing in the processing of transactions) (Basel Committee on Banking Supervision 2006, 144). The various measurement methods are therefore designed in such a way that institutions are rewarded for improving their risk management, because the more advanced the measurement method used, the lower the minimum capital requirements are likely to be (Basel Committee on Banking Supervision 2001a, 14; Buzziol, Steffi 2004, 16–17; Deutsche Bundesbank 2004, 86; Schulte-Mattler, Hermann 2007, 58; Conlon et al. 2020, 34).

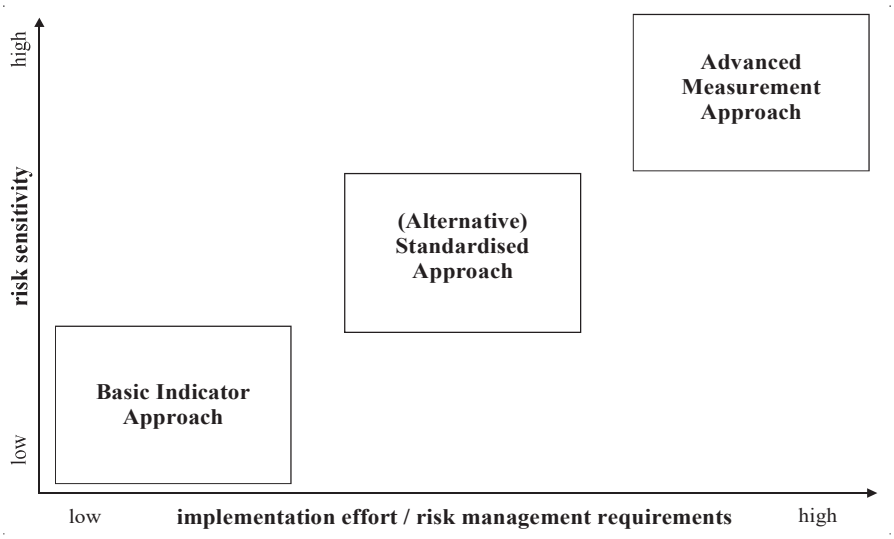

Figure 2. Risk sensitivity and implementation effort respectively risk management requirements of the methods to determine the capital requirements for the operational risk of an institution

In order to facilitate the development of a more risk-sensitive measurement approach, the institutions are given the opportunity – at least temporarily – to move only partially along the intended spectrum of measurement methods, i.e. initially only using a more risk-sensitive measurement method for individual areas of their business activities (so-called 'partial use') if certain minimum requirements are met (Basel Committee on Banking Supervision 2006, 144 and 156). This way an institution can use the Advanced Measurement Approach with either the Basic Indicator Approach or the Standardized Approach. A combination of different approaches, however, always requires permission from the competent supervisory authority (art. 314 (1) CRR). A prerequisite for such a permit is the that the selected combination of approaches captures all operational risks of the institution. In addition, the methodology used by an institution to cover different activities, geographical locations, legal structures or other significant divisions is to be found satisfactory by competent supervisory authorities (art. 314 (2)(a) CRR). Moreover, the criteria set out in art. 320 CRR for the application of the Standardised Approach and the requirements in accordance with art. 321 and 322 CRR for the application of the Advanced Measurement Approaches must be met for those activities covered by the Standardised Approach or the Advanced Measurement Approaches (art. 314 (2)(b) CRR, see Table 3). Additional conditions for a transitional approval of the combination of an Advanced Measurement

Approach with either the Basic Indicator Approach or with the Standardised Approach are that on the date of implementation of an Advanced Measurement Approach a significant part of the institution's operational risks are captured by that approach and that the institution takes a commitment to apply the Advanced Measurement Approach across a substantial part of its operations according to a time schedule approved by the competent supervisory authority (art. 314 (3) CRR). The purpose of these requirements is for institutions to introduce an Advanced Measurement Approach, which goes hand in hand with an improvement in internal management of operational risk, in as large an area of their business activities as possible. It should therefore be ensured that almost all business operations are covered by an Advanced Measurement Approach and, for reasons of practicality, at most an insignificant part of business activity is covered by a simpler measurement method in the long term (Federal Ministry of Finance 2007, 134). However, only in exceptional cases – e.g. the recent acquisition of new business to which the Standardised Approach may only be applied after a transitional period – a permit for the use of the combination of the Basic Indicator Approach and the Standardised Approach may be requested (art. 314 (4)(1) CRR). Here too, the institution must commit itself to applying the Standardised Approach within a time schedule submitted and approved by the competent supervisory authority (art. 314 (4)(2) CRR). This is ultimately intended to establish a consistent method for determining the capital requirements for the operational risk of an institution and thus avoid capital arbitrage (Federal Ministry of Finance 2007, 124).

The progression from a simple measurement method to a more risk-sensitive measurement method usually represents a 'one-way street'. According to art. 313 (1) and (2) CRR, an institution that uses a Standardised Approach or an Advanced Measurement Approach to determine capital requirements for operational risk may only revert to a less sophisticated approach if that institution can prove to the competent supervisory authority, 'that the use of a less sophisticated approach is not proposed in order to reduce the operational risk related own funds requirements of the institution, is necessary on the basis of nature and complexity of the institution and would not have a material adverse impact on the solvency of the institution or its ability to manage operational risk effectively' (art. 313 (3)(a) CRR). Approval from the competent supervisory authority to return to a less sophisticated method must be applied for in advance by the institution (art. 313 (3)(b) CRR).

2. Basic Indicator Approach

The Basic Indicator Approach is the simplest method for determining the own funds that an institution must hold for its operational risks. According to

the rules of this measurement procedure, the calculation of the capital requirement for operational risks of an institution is based on a single risk indicator, which serves as an approximation for the full scope of operational risks of this institution. This risk indicator is the so-called 'relevant indicator'. In accordance with art. 315 (1)(1) CRR, the capital requirements for operational risks of an institution using the Basic Indicator Approach are equal to 15% of the three-year average of the relevant indicator. The three-year average of the relevant indicator is calculated based on the last three twelve-monthly observations at the end of the financial year (art. 315 (1)(2) sentence 1 CRR). If no audited figures are available, the calculation may also be based on internal estimates of these annual values (art. 315 (1)(2) sentence 2 CRR). The purpose of using a three-year average is to reduce variation in the capital requirements for operational risk (Federal Ministry of Finance 2007, 118). When determining the three-year average of the relevant indicator, however, only annual values with a positive value are taken into account (art. 315 (4)(1) CRR). The three-year average of the relevant indicator is therefore always calculated 'as the sum of positive figures divided by the number of positive figures' (art. 315 (4) sentence 2 CRR). Therefore, if a negative relevant indicator occurs in one of the last three years, the determination of the capital requirements for operational risk is based only on the two-year average of the years with a positive relevant indicator. For institutions whose relevant indicator is equal to zero or negative in all three years considered, this results in an own funds requirement for operational risk equal to zero. However, this case is unlikely to be of any significance in practice. The rule that only annual values with a positive value are to be considered in the calculation is intended to ensure that even in case of a negative earnings situation of the institution the operational risks inherent in the business of this specific institution are still backed with own funds (Federal Ministry of Finance 2007, 118). Pattern 1 summarizes the above remarks in a formula.

$$CR_{OR} = 0{,}15 \cdot \left[\frac{1}{n} \cdot \sum_{i=1}^{n} rI_i \right]$$

CR_{OR} = capital requirements for operational risk
i = financial year i
n = number of financial years i with a positive relevant indicator (a maximum of three years)

Pattern 1. Conception of the Basic Indicator Approach

The relevant indicator is defined in art. 316 CRR. Accordingly, the relevant indicator is to be calculated based on the items listed in Pattern 2, considering

the structure of the profit and loss accounts of institutions according to art. 27 of the directive on consolidated financial statements (art. 316 (1)(1) CRR). The directive on consolidated financial statements aims to harmonise the accounting standards of credit institutions within the EU (Rogler 2020, 204–205).

relevant indicator = interest receivable and similar income

–	interest payable and similar charges
+	income from shares and other variable/fixed-yield securities
+	commissions/fees receivable
–	commissions/fees payable
+/–	net profit or net loss on financial operations
+	other operating income

Pattern 2. Calculation of the relevant indicator according to art. 316 CRR

The list in Pattern 2 makes it clear that the calculation of the relevant indicator does not include any deductions in the form of provisions, risk provision amounts and operating expenses (art. 316 (1)(2)(a) sentence 1 CRR). In addition, expenses for outsourced services that are provided by third parties may only reduce the relevant indicator if the expenditure is incurred by a company that is also subject to the CRR or equivalent regulations (art. 316 (1)(2)(a) sentence 3 CRR). This also applies if they are included in the operating expenses. Furthermore, the following items must not be included in the calculation of the relevant indicator (art. 316 (1)(2)(b) CRR):

1) realised profits/losses from the sale of non-trading book items,
2) income from extraordinary or irregular items,
3) income derived from insurance.

The removal of extraordinary or irregular income and realised profits/losses from the sale of non-trading book items from the calculation of the relevant indicator can be justified by the fact that in this way larger variations in the relevant indicator can be avoided. The disregard of income derived from insurance in the calculation of the relevant indicator can be explained by the separate supervision of companies conducting insurance business. Since commissions received from insurance brokerage is not included in income derived from insurance, it is part of the relevant indicator (Federal Ministry of Finance 2007, 119).

If revaluations of trading items are part of the profit and loss statement of an institution, they may be included in the calculation of the relevant indicator (art. 316 (1)(2)(c) sentence 1 CRR). If an institution applies art. 36 (2) of the

directive on consolidated financial statements and accounts for transferable securities which are not held as financial fixed assets at the higher market value at the balance sheet date, there is an obligation to include revaluations booked in the profit and loss account in the calculation of the relevant indicator (art. 316 (1)(2)(c) sentence 2 CRR).

If an institution does not prepare its annual financial statements according to the specifications of the directive on consolidated financial statements or its implementation in national law, but according to other accounting standards (e.g. according to IFRS), the calculation of the relevant indicator must be based on data that best reflect the definition set out in art. 316 CRR (art. 316 (2) CRR).

The Basic Indicator Approach represents the entry-level method for calculating the capital requirements for an institution's operational risk. Therefore, the CRR does not provide any special requirements for the use of this measurement method (Buzziol 2004, 17; Köhne 2005, 282). Nonetheless, those institutions that decide to use the Basic Indicator Approach are asked to follow the guidelines set out by the Basel Committee on Banking Supervision in the paper 'Principles for the Sound Management of Operational Risk' (Lenzmann 2008, 290; Basel Committee on Banking Supervision 2011; Kiszka 2018, 44–49). In 2021, the Basel Committee on Banking Supervision published a revised version of these principles (Waschbusch, Kiszka 2020b, Basel Committee on Banking Supervision 2021). Ultimately, however, the application of the Basic Indicator Approach is in no way equal to a 'real risk measurement' (Schulte-Mattler 2007, 59). Although the relevant indicator is a variable that can largely be derived from the institutions' profit and loss account, a connection to the actual operational risk profile of an institution cannot be established with the aid of the relevant indicator. In this context, the Federal Ministry of Finance of Germany speaks of an indirect measure of the scope of business activities and thus also of the operational risks of an institution (Federal Ministry of Finance 2007, 118). A simple connection between the earnings and the operational risk profile of an institution is assumed (Auer 2008, 45). In particular, however, the regulatory 'punishment' of additional income by the Basic Indicator Approach is diametrically opposed to the business policy goals of an institution (Schulte-Mattler 2007, 59). After all, the fixing of the multiplication factor at 15% is only a blanket estimate by the banking supervisory authority. In this respect, the Basic Indicator Approach does not identify weaknesses of operational nature in an institution and consequently cannot make any significant contribution to the management of operational risk. Institutions are not given any incentive to improve their operational risk profile or risk management, since ultimately only a reduction in the income generated enables a reduction in capital requirements (Buchmüller 2001, 12). Finally, when

using the Basic Indicator Approach operational risks that have materialized result in a reduction of capital requirement due to the decline in earnings that those risks have caused (Capobianco 2014, 4; Enrique 2015, 8), rather than increasing the capital requirements because of a higher risk profile.

3. Standardised Approach

If an institution intends to use the Standardised Approach to calculate the capital requirements for operational risk instead of the Basic Indicator Approach, it has to qualify for the use of the Standardised Approach by meeting the requirements of art. 320 CRR (art. 312 (1)(1) sentence 1 CRR; see Table 3). The institution must notify the competent authorities prior to using the Standardised Approach (art. 312 (1)(1) sentence 2 CRR). If an institution decides to use the Standardised Approach, it must first assign its business activities to the eight regulatory business lines listed in art. 317 (4) CRR (art. 317 (1) CRR), which are shown in Table 1. The relevant indicator to be determined in accordance with the requirements of art. 316 (1) CRR is then allocated proportionally to these eight regulatory business lines (art. 317 (2) sentence 2 CRR). The last three financial year values are also decisive for the calculation of the relevant indicator in the Standardised Approach (art. 317 (2) sentence 1 in conjunction with (4)(1) sentence 1 CRR). If no audited figures are available, business estimates of these annual values can also be used for the calculation (art. 317 (4)(1) sentence 2 CRR).

Table 1

Mapping of business activities into the regulatory business lines of the Standardised Approach

Regulatory business line	List of activities
Corporate Finance	– underwriting of financial instruments or placing of financial instruments on a firm commitment basis – services related to underwriting – investment advice – advice to undertakings on capital structure, industrial strategy and related matters and advice and services relating to the mergers and the purchase of undertakings – investment research and financial analysis and other forms of general recommendation relating to transactions in financial instruments

Table 1 cont.

Trading and Sales	– dealing on own account – money broking – reception and transmission of orders in relation to one or more financial instruments – execution of orders on behalf of clients – placing of financial instruments without a firm commitment basis – operation of Multilateral Trading Facilities Corresponding transactions with retail customers are assigned to Retail Brokerage.
Payment and Settlement	– money transmission services – issuing and administering means of payment
Agency Services	– safekeeping and administration of financial instruments for the account of clients, including custodianship and related services such as cash/collateral management
Commercial Banking	– acceptance of deposits and other repayable funds – lending – financial leasing – guarantees and commitments Corresponding transactions with retail customers are assigned to Retail Banking.
Retail Banking[1]	– acceptance of deposits and other repayable funds – lending – financial leasing – guarantees and commitments
Asset Management	– portfolio management – managing of UCITS – other forms of asset management
Retail Brokerage[1]	– reception and transmission of orders in relation to one or more financial instruments – execution of orders on behalf of clients – placing of financial instruments without a firm commitment basis

[1] These are transactions with retail customers. Business with retail customers includes business with natural persons or small and medium-sized companies, which are to be classified as retail exposure in analogous application of the criteria of art. 123 CRR.

In addition to the mapping of an institution's business activities into the separate regulatory business lines, the CRR determines a beta factor in the form of

a fixed percentage for each of the eight regulatory business lines listed (art. 317 (2) sentence 2 CRR in conjunction with table 2 in art. 317 (4) CRR). These beta factors represent the relationship between the industry-wide operating losses in a specific regulatory business line and the industry-wide relevant indicators for this regulatory business line (Basel Committee on Banking Supervision 2001b, 7; Basel Committee on Banking Supervision 2006, 147). A beta factor of e.g. 12% in the 'Asset Management' business line means that the operational losses that have occurred in this business line amount to 12% of the relevant indicator generated in the 'Asset Management' business line across the industry. Table 2 provides a summary of the regulatory business lines, relevant indicators and beta factors defined in the Standardised Approach. The allocation of the relevant indicator from an institution's own business lines and activities to the separate regulatory business lines must be made in accordance with the requirements of art. 318 CRR. In this regard, art. 318 (1) CRR calls for the development of specific policies and criteria for mapping the relevant indicators for current business lines and activities into the standardised framework shown in Table 1. These policies and criteria are to be documented, reviewed and adjusted regarding new or changed business activities and risks.

Table 2

Regulatory business lines, risk indicators and beta factors in the Standardised Approach

Regulatory Business Line	Risk Indicator	Beta factor
Corporate Finance	relevant indicator$_1$	β_1 = 18%
Trading and Sales	relevant indicator$_2$	β_2 = 18%
Payment and Settlement	relevant indicator$_3$	β_3 = 18%
Agency Services	relevant indicator$_4$	β_4 = 15%
Commercial Banking	relevant indicator$_5$	β_5 = 15%
Retail Banking	relevant indicator$_6$	β_6 = 12%
Asset Management	relevant indicator$_7$	β_7 = 12%
Retail Brokerage	relevant indicator$_8$	β_8 = 12%

Art. 318 (2) CRR also includes the following requirements for the development of policies and criteria for the mapping of business activities into the regulatory business lines in the Standardised Approach:

1. Every business activity can be assigned to exactly one regulatory business line. In this context it must be considered that the regulatory business lines do not necessarily have to correspond to the internal business lines or business

areas originating from the internal organisation of the institution (Federal Ministry of Finance 2007, 122). In case of need, a corresponding reconciliation is therefore necessary.

2. Supporting activities that cannot be directly assigned to a regulatory business line are to be assigned to the regulatory business line that they support. If an activity supports several business activities that can be assigned to different regulatory business lines, an objective criterion must be used for the assignment of this supporting activity.
3. Business activities which cannot be assigned to any regulatory business line, including the activities that support them, are to be fully assigned to a regulatory business line with the highest beta factor.
4. When allocating the relevant indicator to regulatory business lines, internal pricing methods can be used. However, this must be factually justified. In addition, costs generated that arise within one regulatory business line but are imputable to a different regulatory business line may be assigned to the regulatory business line to which they pertain.
5. The criteria for mapping business activities into the regulatory business lines must be consistent with the criteria used in the credit and market risk area.
6. The responsibility for the policies and criteria for the mapping of business activities and the relevant indicator into the separate regulatory business lines lies with the senior management under the control of the management body of the institution.
7. The mapping process must be subject to an independent review by internal or external auditors. This is to be understood as a person who is not identical to the person who conducted the mapping process and who is not dependent on the instructions of the latter (Federal Ministry of Finance 2007, 133).

The procedure for determining the capital requirements for the operational risk of an institution that uses the Standardised Approach is regulated in art. 317 (2) CRR. According to this, the capital requirements for the operational risk of an institution correspond to 'the average over three years of the sum of the annual own funds requirements across all regulatory business lines' (art. 317 (2) sentence 1 CRR). The annual own funds requirement of each regulatory business line results from the weighting of the relevant indicator mapped to the respective regulatory business line with the beta factor assigned to this specific regulatory business line (art. 317 (2) sentence 2 CRR). If there is a negative own funds requirement in a regulatory business line in a given financial year, which results from a negative value of the relevant indicator assigned to this regulatory business line, this negative own funds requirement can be offset against the positive own funds requirements in other regulatory business lines of this

financial year without limitation (art. 317 (3) sentence 1 CRR). However, if the sum of the capital requirements of all regulatory business lines within a given financial year is negative, the relevant indicator for this year will be considered as zero within the numerator (art. 317 (3) sentence 2 CRR). In contrast to the calculation of the capital requirements for an institution's operational risk using the Basic Indicator Approach, the value of the denominator of the three-year average does not decrease in such a case; rather it is still "3" (Federal Ministry of Finance 2007, 121). The following Pattern 3 summarizes the above statements in a formula.

$$CR_{OR} = \frac{1}{3} \cdot \sum_{i=1}^{n} \left(\max \left\{ 0; \sum_{j=1}^{k} rI_j \cdot \beta_j \right\} \right)_i$$

CR_{OR} = capital requirements for operational risk
i = financial year i ($i = 1, 2, 3$)
n = number of financial years i with a positive relevant indicator ($n = 3$)
j = regulatory business line j ($j = 1, \ldots, 8$)
k = number of regulatory business lines j ($k = 8$)
rI_j = relevant indicator of the regulatory business line j
β_j = beta factor of the regulatory business line j
$rI_j \cdot \beta_j$ = capital requirement of the regulatory business line j

Pattern 3. Conception of the Standardised Approach

Art. 319 CRR gives institutions the option of using the so-called Alternative Standardized Approach instead of the Standardized Approach. In the Alternative Standardized Approach, an institution is allowed to replace the relevant indicator for the calculation of the capital requirements in the regulatory business lines 'Retail banking' and 'Commercial banking' with an alternative indicator, which corresponds to 0.035 times the nominal amount of loans and advances (art. 319 (1)(a) CRR). The loans and advances in Retail Banking and Commercial Banking consist of the total drawn amounts in the respective credit portfolios in accordance with art. 319 (1)(b) sentence 1 CRR. In Commercial banking the securities held in the non-trading book must also be added in accordance with art. 319 (1) (b) sentence 2 CRR. Otherwise, the calculation of the own funds requirements for the operational risk of an institution corresponds to the procedure in the Standardised Approach. In particular, the same beta factors as in the Standardised Approach apply to these two regulatory business lines. Pattern 4 demonstrates the calculation of the capital requirement for the operational risks of an institution using the Alternative Standardised Approach.

The use of the Alternative Standardised Approach for calculating the capital requirements for the operational risk of an institution, however, is only permitted if the following conditions are cumulatively met (art. 319 (2) CRR):

- At least 90% of the institution's income is derived from the two regulatory business lines 'Retail Banking' and 'Commercial Banking'.
- A significant proportion of the retail or commercial banking activities consists of loans associated with a high probability of default.
- The Alternative Standardised Approach provides an appropriate basis for calculating the capital requirements for operational risk.

The application of the Alternative Standardised Approach is also subject to prior approval by the competent supervisory authorities (art. 312 (1)(2) CRR).

$$CR_{OR} = \frac{1}{3} \cdot \sum_{i=1}^{n} \left(\max \left\{ 0; \sum_{j=1}^{k} (rI_j \cdot \beta_j) + m \cdot nala_{RB} \cdot \beta_{RB} + m \cdot nala_{CB} \cdot \beta_{CB} \right\} \right)_i$$

CR_{OR} = capital requirements for operational risk
i = financial year i (i = 1, 2, 3)
n = number of financial years i with a positive relevant indicator (n = 3)
j = regulatory business line j (j = 1, …, 6); this does not include the two regulatory business lines 'Retail Banking' and 'Commercial Banking'
k = number of regulatory business lines j (k = 6)
rI_j = relevant indicator of the regulatory business line j
β_j = beta factor of the regulatory business line j
$rI_j \cdot \beta_j$ = capital requirement of the regulatory business line j
m = factor of 0.035
$nala_{RB}$ = nominal amount of loans and advances of the regulatory business line 'Retail Banking'
$nala_{CB}$ = nominal amount of loans and advances of the regulatory business line 'Commercial Banking'
β_{RB} = beta factor of the regulatory business line 'Retail Banking'
β_{CB} = beta factor of the regulatory business line 'Commercial Banking'

Pattern 4. Conception of the Alternative Standardised Approach

In general, the assignment of business activities and the relevant indicator of an institution to the separate regulatory business lines in the Standardised Approach represents a step forward compared to the procedure of the Basic Indicator Approach. If it is possible to delimit the regulatory business lines of an institution in a useful way and to determine the beta factors in such a way that they estimate the specific operational risks of the individual regulatory business line with sufficient accuracy in relation to the relevant indicator assigned, the Standardised Approach

possesses a higher risk sensitivity compared to the Basic Indicator Approach. It is obvious that the consideration of the focus of activity within an institution leads in principle to a more realistic mapping of the operational risks than the use of a single indicator that represents the entire operational risks of an institution. In practice, however, the precise delimitation of the eight regulatory business lines is seen as a major problem. The mapping of the different business activities of an institution into the individual regulatory business lines usually causes a high level of implementation effort. In addition, the beta factors specified by the banking supervisory authorities do not exhibit any statistically significant relationships between the operational risks and the relevant indicator of the individual regulatory business lines. Thus, the Basel Committee on Banking Supervision found inconsistencies in the assessment of the risk potential of the individual regulatory business lines in the past (Federal Financial Supervisory Authority 2009, 15; Basel Committee on Banking Supervision 2014, 7). Therefore, the Standardised Approach is unlikely to be suitable for adequately mapping the operational risks inherent in the individual regulatory business lines of an institution. The Standardized Approach, just like the Basic Indicator Approach, does not allow a precise measurement of the operational risk profile of an institution (Schulte-Mattler 2007, 59). Ultimately, this is due to the fact that the calculation of the capital requirements for the operational risk of an institution in both measurement methods is not based on any institution-specific loss data (Schulte-Mattler 2007, 59). The above conclusion that neither the Basic Indicator Approach nor the Standardised Approach are linked to the actual operational risk profile of an institution applies equally to the Alternative Standardised Approach.

4. Advanced Measurement Approaches

According to art. 312 (2)(1) CRR, an institution may use an Advanced Measurement Approach instead of the Basic Indicator Approach or the (Alternative) Standardised Approach to determine the capital requirements for operational risk. However, the use of an Advanced Measurement Approach requires prior approval by the competent supervisory authority. Apart from this, the CRR grants the institutions a high degree of flexibility in developing Advanced Measurement Approaches for calculating the capital requirement for operational risks. Institutions can use measurement approaches that are based on their own systems for measuring operational risk, as long as they meet all the qualitative and quantitative requirements of art. 321 and 322 CRR as well as the general risk management standards of art. 74 and 85 CRD (art. 312 (2)(1) CRR). Table 3 summarizes these minimum requirements.

Table 3

Minimum requirements for the use of the (Alternative) Standardised Approach or Advanced Measurement Approaches

<table>
<tr><th>(Alternative) Standardised Approach</th><th>Advanced Measurement Approach</th></tr>
<tr><td colspan="2">establishment of a well-documented system for identifying, assessing, managing and controlling of operational risk with clearly assigned responsibilities</td></tr>
<tr><td colspan="2">regular independent reviews of the risk management system for operational risks by internal or external auditors</td></tr>
<tr><td colspan="2">integration of the system for assessing operational risks in the risk management processes of the institution</td></tr>
<tr><td colspan="2">establishment of a management reporting system and methods to take appropriate corrective action</td></tr>
<tr><td>collection of the relevant data for operational risk, including material loss data</td><td>independent central risk management function</td></tr>
<tr><td rowspan="2">consideration of the results of the system for assessing operational risks as an integral part of the processes for monitoring and controlling the operational risk profile of the institution</td><td>solid and effective validation processes</td></tr>
<tr><td>transparent and accessible data flows and processes related to the risk measurement system</td></tr>
<tr><td></td><td>methods that capture both expected and unexpected losses from operational risks, severe events on the edge of distribution, key risk drivers and correlations</td></tr>
<tr><td></td><td>calculation of the capital requirements for operational risk based on internal loss data, external data, scenario analyses as well as bank-specific business environment and internal control factors, including expert judgments</td></tr>
<tr><td></td><td>ensuring the internal coherence of the risk measurement system and avoidance of multiple counting of qualitative assessments or risk reduction techniques that are recognized in other parts of the CRR</td></tr>
<tr><td></td><td>at least five-year observation period for internal loss data (three years if the method is approved for the first time)</td></tr>
<tr><td></td><td>documentation of the framework for risk measurement, internal review and audit by the competent supervisory authority</td></tr>
</table>

According to art. 312 (2)(2) CRR, significant changes and extensions to an Advanced Measurement Approach that has already been approved require renewed approval from the competent supervisory authority. In addition, the competent supervisory authority must be notified of any change made to an Advanced Measurement Approach (art. 312 (3) CRR).

In addition to these minimum requirements for the usage of an Advanced Measurement Approach, further requirements for the use of internal and external data, scenario analyses and factors that affect the business environment and the internal control systems of the institution are included in art. 322 CRR. For example, an institution must be able to map its historical internal loss data into the business lines of the Standardised Approach according to art. 317 CRR and, in addition, into the event types according to art. 324 CRR (art. 322 (3)(b) CRR) – as shown in Table 4.

Table 4

Event categories for mapping historical internal loss data

Event-type Category	Losses due to:
Internal fraud	– acts of a type intended to defraud – misappropriate property – circumvent regulations, the law or company policy This does not apply to losses due to diversity or discrimination events if at least one internal party is involved.
External fraud	– acts of a type intended to defraud, – misappropriate property – circumvent the law These losses must each be caused by a third party.
Employment Practices and Workplace Safety	– acts inconsistent with employment, health or safety laws or agreements – payment of personal injury claims – diversity or discrimination events
Clients, Products & Business Practices	– an unintentional or negligent failure to meet a professional obligation to specific clients (including fiduciary and suitability requirements) – the nature or design of a product
Damage to Physical Assets	– loss or damage to physical assets from natural disaster or other events
Business disruption and system failures	– disruption of business – system failures
Execution, Delivery & Process Management	– failed transaction processing or process management – relations with trade counterparties and vendors.

In contrast to the regulations of the Basic Indicator Approach and the (Alternative) Standardised Approach, institutions that decide to use an Advanced Measurement Approach are permitted to recognise the risk mitigating effect of insurance and other risk transfer mechanisms when calculating their own funds requirements for operational risk (art. 323 (1) CRR). By taking insurance and other risk transfer mechanisms into account, however, the capital requirements for operational risk may be reduced by a maximum of 20% compared to its amount before the recognition of risk mitigation techniques (art. 323 (5) CRR). This limitation of the recognition of the risk-reducing effect of insurance and other risk transfer mechanisms is justified by the fact that an adequate capital requirement for operational risk is to be guaranteed (Federal Ministry of Finance 2007, 131).

For an institution to be allowed to consider the risk-reducing effect of insurance contracts, all of the following requirements must be met (art. 323 (2) and (3) CRR):

- The insurance provider is authorised to provide insurance or re-insurance.
- The insurance provider has an appropriate credit rating. This is considered to be given if the insurance provider is assigned at least credit quality step 3 under the rules of the Standardised Approach for measuring credit risks.
- The insurance policy has an initial term of no less than one year.
- If the insurance policy includes a notice period for cancellation of the contract, it is at least 90 days.
- The insurance policy does not contain any exclusion clauses or limitations on insurance coverage in the event of supervisory actions, nor those which preclude the institution's receiver or liquidator from recovering the damages suffered or expenses incurred by the institution in case of a failed institution. This does not apply to events that occurred after the initiation of receivership or liquidation proceedings in respect of the institution. However, the insurance policy may exclude any fines, penalties or punitive damages resulting from actions by the competent authorities.
- The insurance coverage is calculated in a transparent and consistent manner with the likelihood and impact of loss used in the overall determination of operational risk capital.
- The insurance is provided by a third party entity. In the case of insurance through captives and affiliates, the insured risk must be transferred to an independent third party. This regulation is intended to ensure that the conclusion of an insurance policy leads to an additional coverage for risks (Federal Ministry of Finance 2007, 133).
- The framework for recognising insurance is well reasoned and documented.

In addition, art. 323 (4)(a) and (b) CRR determines that when taking into account the risk-reducing effect of insurance suitable discounts must be made for insurance policies with residual term or cancellation term being less than one year. For example, in the case of insurance policies with a residual term of less than one year, the institution applies appropriate haircuts in order to take into account the decreasing residual term of the insurance policy, up to a 100% haircut for insurance policies with a residual term of 90 days or less (art. 323 (3) (a) sentence 2 CRR). Appropriate discounts or haircuts must also be applied if there are payment uncertainties or mismatches in coverage of insurance policies (art. 323 (4)(c) CRR).

Only the Advanced Measurement Approaches, including the Internal Measurement Approach as well as various types of Loss Distribution and Scorecard Approaches can provide an individual and risk-adequate measurement of operational risk, as there is a tangible connection between the operational risk profile and the resulting capital requirements. Thus, suitable control measures can be introduced. This advantage of the Advanced Measurement Approaches is offset by the high requirements that must be met when using these approaches and that go hand in hand with considerable investments in management tools and specialist staff.

It should be noted, however, that even the Advanced Measurement Approaches do not necessarily ensure reflecting the actual risk situation, as quality defects, e.g. due to an inadequate database or the selection of unsuitable indicators or scenarios, can negatively affect the significance of the models. Furthermore, there is a certain scope for manipulation when designing the models. For this reason, when the Advanced Measurement Approaches were introduced, it was criticized that institutions can design the models just the way they want to. This is problematic due to the different objectives that are being pursued. The internal models are usually based on efforts to optimize shareholder value, whereas regulatory measurement approaches try to guarantee the solvency of the banking sector. Attempts are made to limit this scope for manipulation through the approval and monitoring of the models by the competent supervisory authorities. On top of that, the flexibility in choice of method leads to a lack of comparability of the different Advanced Measurement Approaches. Ultimately, the Basel Committee on Banking Supervision found that when using Advanced Measurement Approaches, there are large differences in the capital requirements of institutions, which, however, are difficult to justify due to similar risk profiles of these institutions (Kiszka 2018, 91–94 as well as the references given there).

5. Outlook on the changes resulting because of the Basel III finalisation

Based on the experience in the implementation of the previous measurement approaches for operational risk gained in recent years and because many of the aforementioned weaknesses of the measurement approaches have become apparent, the adequacy of the previous capital framework was reviewed by the Basel Committee on Banking Supervision (Basel Committee on Banking Supervision 2014, 5; KPMG 2014, 2; Kiszka 2018, 95). As a result of this review, the final Basel III reform package was published on December 7, 2017 (Basel Committee on Banking Supervision 2017; Feridun, Özün 2020, 8), which is currently being transposed into European and national law. According to the notion of the Basel Committee on Banking Supervision, the new requirements must be implemented by January 1, 2023 at the latest. The implementation was originally planned by January 1, 2022. However, this implementation date was postponed by one year due to the burdens on the institutions because of the corona pandemic (Waschbusch, Kiszka 2020a).

Since institutions that use an Advanced Measurement Approach to determine capital requirements for operational risk have not been able to establish a consistent market standard and this ultimately resulting in a wide range of calculated capital requirements, institutions are no longer allowed to use an Advanced Measurement Approach in the future (the statements in this chapter largely refer to Deutsche Bundesbank 2018, 88–89 in conjunction with Basel Committee on Banking Supervision 2017, 128–130). Instead, the new Standardised Measurement Approach was developed, which will replace the Basic Indicator Approach and the previous Standardised Approach. This new Standardised Measurement Approach is designed similarly to the Basic Indicator Approach in that it also considers the three-year average of a single risk indicator. However, since the previous risk indicator proved to be unsuitable in the Great Financial Crisis of 2007/2008, the calculation of the capital requirement for operational risk will be based on the so-called business indicator (BI), the composition of which is shown in Table 5.

The business indicator consists of an interest, leases and dividend component (ILDC), a service component (SC) and a financial component (FC). All components are considered with a positive sign, so that a negative component does not reduce the business indicator. The three-year average is calculated for all sub-items underlined in Table 5.

Table 5

Calculation of the business indicator in the new Standardised Measurement Approach

Business Indicator	**= Interest, Leases and Dividend Component (ILDC) + Service Component (SC) + Financial Component (FC)**
ILDC	Min [Absolute Value (Interest Income – Interest Expense); 2.25% · Interest Earning Assets] + Dividend Income
SC	Max [Other Operating Income; Other Operating Expense] + Max [Fee Income; Fee Expense]
FC	Absolute Value (Net Profit/Loss Trading Book) + Absolute Value (Net Profit/Loss Banking Book)

Due to the importance of the institution's size for the operational risk profile, marginal coefficients are introduced (Feridun, Özün 2020, 15). For this purpose, the institution's business indicator – as shown in Table 6 – is assigned to three buckets.

Table 6

Buckets for determining the business indicator component in the new Standardised Measurement Approach

Bucket	**Business Indicator range (in €bn)**	**Business Indicator marginal coefficients**
1	≤ 1	12%
2	1 < BI ≤ 30	15%
3	> 30	18%

The so-called business indicator component is calculated by multiplying the business indicator by the marginal coefficients. The respective marginal coefficients relate to that portion of the business indicator that is assigned to the corresponding bucket, which is intended to counteract a sudden increase in capital requirements when the bucket limits are exceeded (Kiszka 2018, 101). For an institution a business indicator in the amount of 35 €bn, results in a business indicator component of:

$$1\ €bn \cdot 12\% + 29\ €bn \cdot 15\% + 5\ €bn \cdot 18\% = 5{,}37\ €bn.$$

To increase the risk sensitivity of the new Standardised Measurement Approach, a loss component was introduced, which represents the loss potential of

an institution, which is derived from its past loss experience. The loss component is equal to 15 times the average annual operational losses incurred over the previous 10 years. The loss component is then considered in the capital requirements using the so-called internal loss multiplier, which is calculated as follows:

$$\text{internal loss multiplier} = \text{Ln}\left\{\exp(1) - 1 + \left(\frac{\text{loss component}}{\text{business indicator component}}\right)^{0,8}\right\}$$

Ultimately, the capital requirements for operational risk in the new Standardised Measurement Approach are determined by the product of the business indicator component and the internal loss multiplier. The latter thus scales the business indicator component up or down (Kiszka 2018, 118). As a result, this means that the capital requirements for operational risk increase if the losses incurred by an institution are above average in a long-term comparison. However, by using a logarithmic function, the internal loss multiplier rises less and less as the loss component increases. If, on the other hand, comparatively few operational losses have occurred, the capital requirement can be reduced by half, so that the integration of the loss component creates an incentive for effective risk management. The above explanations are combined in a formula in Pattern 5.

$$CR_{OR} = BIC \cdot ILM$$

CROR = capital requirements for operational risk
BIC = business indicator component
ILM = internal loss multiplier

Pattern 5. Conception of the Standardised Measurement Approach

For institutions with a business indicator that does not exceed 1 bn, the loss component does not apply, so that for small institutions the capital requirements for operational risk will correspond to the business indicator component (= 12% of the business indicator). This regulation is intended to relieve smaller institutions but was criticized during the consultation phase. Smaller institutions would be discriminated against, despite a possibly existing database on historical losses, and unequal competitive conditions would be created. In this context, in the consultation phase an option to integrate the loss multiplier for small institutions was proposed, which, however, was not included in the final Basel paper (Capobianco 2016, 8).

In principle, however, the loss component is not mandatory and can therefore be disregarded at national discretion (Feridun, Özün 2020, 15), which would, however, severely limit risk sensitivity. The Deutsche Börse Group comes to the conclusion that, after 20 years of exchange and the development of a new measurement method, the new Standardised Measurement Approach is an appropriate method for calculating the capital requirement for the operational risk of an institution (Thompson, Hillen 2016, 5), even though some of the aforementioned criticism of the previous approaches is still partially valid.

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Summary

Operational risks have become increasingly important for banks, especially against the background of growing IT dependency and the increasing complexity of their activities. Further-more, the corona pandemic contributed to the increased risk potential. Therefore, banks have to back these risks with own funds. There are currently three measurement approaches for determining the capital requirements for operational risk. In recent years, and especially during the Great Financial Crisis of 2007/2008, however, some of the weaknesses inherent in these approaches have become apparent. Thus, the Basel Committee on Banking Supervision revised the current capital framework. Therefore, this article examines the various measurement approaches, addresses inherent weaknesses and moreover, presents the future measurement approach developed by the supervisory authorities.

JEL codes: G21, G22, G28, G32, M16, M21, C02

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