

(Compliance-) Risk Management System 4.0 - The digital transformation of norms, guidelines and standards

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New requirements arise almost daily: Due to the continuous internal and external changes, it becomes clear that a rigid organizational system is doomed to failure. Only an extremely flexible system that makes it possible to adapt processes and the many networked components of an organization to new requirements quickly and without outside help and at low cost can be effective.

Nearly every (process) topic area of an organization, such as risk, compliance, personnel, purchasing, sales, and IT management, is now not only legally infiltrated by requirements from legislation, jurisdiction, and (internal) guidelines [see Scherer/Fruth 2016 a, pp. 74-76], but also „standardized“ in numerous standards of various standard families (ISO, COSO, IDW, DIIR, etc.) [see Scherer/Fruth 2017, pp. 79-81].

All these norms, guidelines and standards contain requirements for a dutiful, conscientious management of organizations. They are to be assessed by means of assessments of various types (tests, certifications, audits, internal investigations, revision audits, etc.) with regard to the degree of maturity for implementation and represent liability traps for management and employees and sources of various risks in the event of disregard.

The structure of these many standards differs very strongly in some cases, but the content fortunately less [cf. Scherer/Fruth 2018a].

Which structure of a standard (for example the High Level Structure of the ISO) is more logical, more meaningful or better suited for an integrated system is left open at this point, since all the existing structures have a common weak point: They are strictly linear, just as our way of thinking has been for thousands of years. Our brain, however, does not work linearly, but networked.

Excursus: Partial, complete and networked writing and information systems in the change of time

Due to the growing complexity of societies after the „agricultural revolution“ (around 10,000 years ago), data and figures became congruently more important. A revolutionary invention was the invention of writing by the Sumerians - a first data processing system [cf. Harari 2015, p. 155 ff.].

Partial writing systems are to be regarded rather as sign systems. With the help of these sign systems, such as mathematical writing, „only very specific information from clearly defined areas can be captured“ [Harari 2015, p. 156 ff.].

A flood of data, archiving and finding stored information: Difference between the Methodology of the Brain and Bureaucracy

While unimaginable amounts of information are stored in the brain [Harari 2015, p. 164 ff.] and can be retrieved within seconds despite loose links [Harari 2015, p. 164 ff.], catalogues and folder/

search systems as well as those responsible for operating them are necessary for a functioning data processing system [Harari 2015, p. 164 ff.].

In the course of the growing popularity of data processing systems, however, a tendency away from natural human, holistic thinking [Harari 2015, p. 164 ff.] towards bureaucracy and box thinking can be discerned [Harari 2015, p. 164 ff.].

BPMN 2.0 as a partial writing system for business process and workflow management?

Business Process Model and Notation (BPMN) is an industry standard used worldwide for the graphical representation and modeling of business processes.

The individual tasks and activities that are defined within a business process are called „tasks“. In addition, additional data can be integrated into a process diagram to provide process participants with the knowledge they need to perform their tasks. This data forms the basis for workflow management systems. Novel technologies allow the interpretation of the BPMN and the integrated data and thus enable the automation of the business processes, also called „(human) workflow management“. Thus a new degree of maturity in the information management was reached by the connection of complete and partial writing systems.

From human history to networked everyday life in the digital age

In the area of management systems, however, we have not yet come to the conclusion that we really think and work in a networked manner. Our organizations, too, have always been complex networked organisms, even though they were mostly managed in a classically linear way.

Since the topics „process-oriented organization“ [Scherer/Fruth 2016 b, p. 89 ff.] and „industry 4.0“ became popular, it has become apparent that conventional structures and ways of thinking no longer fit into the „4.0 world“.

Also with regard to the various components (for example resources, guidelines, competencies, legal requirements, „tone from the top“ etc.) of any management system, it is not conducive to „effectiveness“ (being „lived“) if – as is very often the case in practice – these are depicted in a strictly linear way in standards, manuals or Excel tables and cause a „slumber“ in drawers, intranets or knowledge

databases until an auditor temporarily brings them to life for the short time of an audit or test.

Rather, these activities would have to be integrated into the process flows in such a way that effectiveness is guaranteed (and documented) in order to fulfil the various requirements (from law, state of the art or standards) [cf. Scherer 2018 b; Scherer/Fruth 2018 a].

The requirements for digitally transformed management system standards are therefore, on the one hand, to map the contents (requirements/components) in an understandable and structured way, but on the other hand, also (digitally) networked in process flows. This is possible and is already practiced, i.e. it is „state of the art“.

Networking of the components of standards, guidelines and directives in an integrated workflow management system.

The processes are at the centre of the integrated management system in a network of relationships to many components. Very often, processes in companies are not considered holistically. With

an integrated human workflow management system, the individual components of any management system with a focus on business processes can be placed in a logical relationship.

This means that in human workflow management systems each process is optimally enriched with the individually required resources (goals, strategies, requirements, tools, responsibilities, etc.). This makes it possible for every employee to „do the right thing right“.

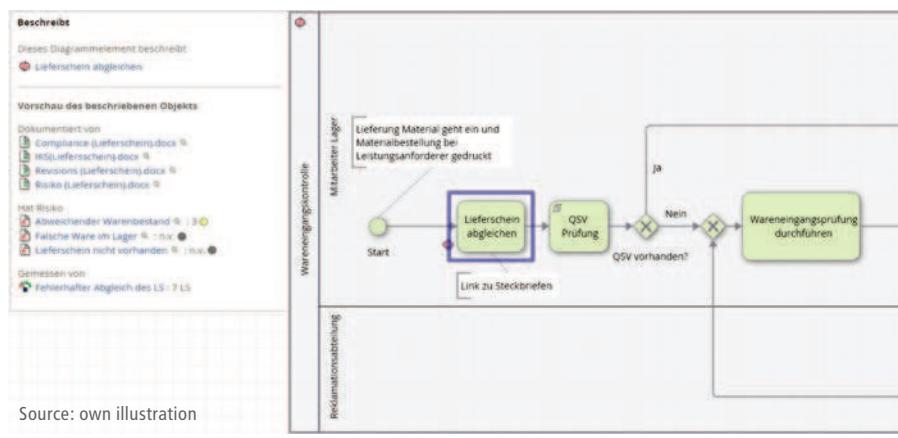
Thesis: An analog system, based on the logically linear standards, located in documents, manuals, guidelines, Excel tables or e-mail attachments, can never make the leap into digital transformation: When „non-lived analog documents“ are digitized, there are only „non-lived digitized documents“ in the end, but no lived networking, automation and digital transformation in the sense of „4.0“!

Integrated human workflow management systems are necessary for a „real digital transformation“. In order to bring „non-lived documents“ such as laws, internal guidelines, standards to life via

Fig. 01: Compliance, risk, ICS, etc. profile: A measure that kills several birds with one stone (compliance, risk, ICS, QM, etc. requirements) (sheet: Cf. IDW PS 951): Not yet alive!

Compliance/ risk/ ICS requirements	
Compliance-ID: Procurement 5 – LS1/Compliance	Comparison of the delivered goods with existing requirements. Coordination of delivery note with order and, if applicable, quality assurance agreement (QSV) (§ 377 HGB).
(Compliance-) risk manager / owner: 1. Management 2. Compliance officer / -officer 3. Purchasing management	Instruments / Tools / Methods: 1. Checklist inspection goods receipt (§377 HGB) 2. Sample: completed QSV 3. Sample: delivery note (with points to be checked) 4. List of vendors with whom a quality assurance agreement has been concluded.
Description of the compliance target: (to be filled in by the company!) <i>"The aim is to ensure that delivery notes are properly checked and that the requirements of § 377 HGB (German Commercial Code) are complied with upon receipt of goods. In addition, a quality assurance agreement is to be concluded with selected suppliers (primarily suppliers who deliver directly to the construction site). By the QSV it can be ensured that also without a complete examination after § 377 HGB claims remain valid with defects opposite the supplier.</i>	Presentation of the measures taken to achieve the compliance goals (to be filled in by the company!) 1. Conclusion of quality assurance agreements with A-suppliers 2. Reliable control/adjustment by installation of an appropriate process step 3. Training of the employees concerned
Description of compliance requirements: (to be filled in by the company!) 1. <i>Obligation of the merchant to inspect and give notice of defects with regard to defects, correct quantity and type of goods in accordance with § 377 HGB (German Commercial Code)</i> 2. <i>ISO 9001:2015: ISO 9001:2015: 8.4 Control of externally provided products and services</i> 3. <i>ISO 9001:2015: 8.4 Control of externally provided products and services</i> 4. <i>ISO 9001:2015: 8.7 Control of non-compliant process results, products and services</i> 5. <i>ISO 19600:2016: 8.3 Outsourced processes</i> 6. <i>internal guidelines for incoming goods inspection</i>	Source: own illustration

Fig. 02: Incoming goods control modeled in BPMN 2.0: Now alive!



lived process flows, they must first be fragmented, „translated“ into relevant requirements and measures to fulfill the requirements, and the respective flows assigned to the relevant process steps.

Example: Risk management and compliance:

The German Commercial Code (HGB): A „legal register“ which lists that „the HGB“ is used in the purchasing and sales departments is pointless (and only costs money). The HGB must therefore first be fragmented and the relevant standards translated into requirements and the resulting measures assigned to the correct process steps:

Example:

The obligation to immediately inspect the goods and make a complaint pursuant to § 377 HGB within the scope of incoming goods logistics: This fragmented/triggered requirement (§ 377 HGB) from the entire German Commercial Code could first be „translated“ into a „compliance, risk and ICS profile“ and assigned to the relevant process step of the purchasing process (see ► Fig. 01).

We still only have (quite good) documentation or knowledge management. But: **The process is not yet alive!**

This is now ensured by the networking of all activities to meet the requirements contained in the components of norms, standards and guidelines (see ► Fig. 02).

Conclusion

Through networked human workflow management systems, artificial intelligence, quantum chip technology and many other current topics in research and practice, man has possibly after thousands of years just managed to adapt his “writing” and management systems from the bureaucratic, analogous “civil servant organization thinking” of the real networked world in organizations, but also to the functioning of the brain.

After the first “cognitive revolution”, which made the triumphal march of homo sapiens over homo neanderthalensis possible [cf. Harari 2015, p. 10, 32 ff.], this possibly represents the next “cognitive revolution”.

Under certain circumstances, however, homo sapiens and artificial intelligence compete this time in the current “second cognitive revolution” [cf. Harari 2018]. First of all, it is necessary to fill norms, guidelines and standards with life (effectiveness) in a contemporary manner and to actually transform them digitally.

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Digital Footprints in credit scoring – opportunities and perils

Tobias Berg | Ana Gombovic

In recent FIRM-sponsored research, we study the informational value of digital footprints – traces people constantly leave in the digital sphere – for credit scoring. We find that even simple, easily accessible digital footprint variables left by simply accessing or registering on a website are valuable for predicting customers' payment behavior and contain information traditionally viewed as soft information. We argue that the expansion of data that could potentially be used for credit scoring is likely to continue with human everyday activities and communication becoming increasingly digitized. In this paper, we summarize the main findings of our research and discuss the potential risks and benefits of digital footprints for borrowers and society.

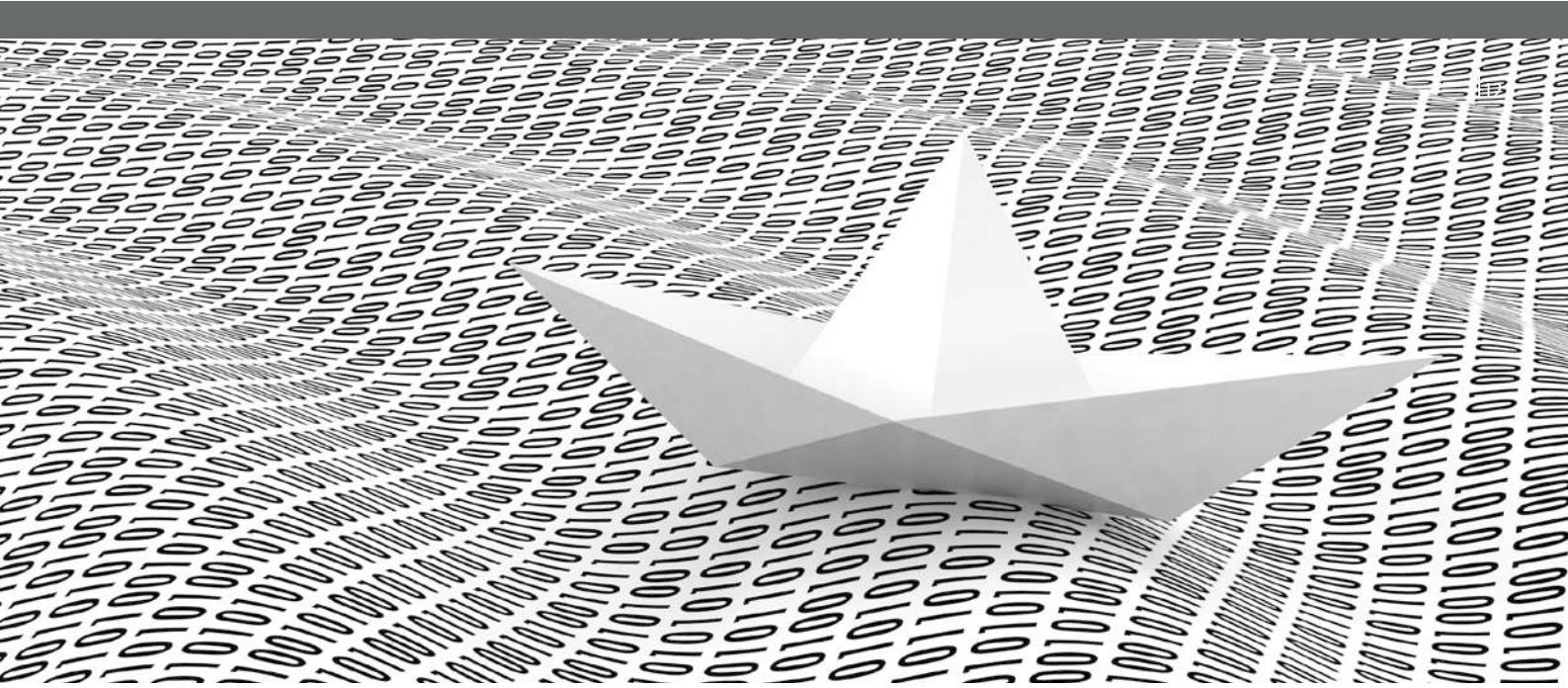
Digitization has long evolved from a trend into a central component of modern everyday life. With a growing portion of human everyday activities generating footprints in the digital sphere, the resulting digital information potentially provide unparalleled insights into characteristics, personality and habits of any individual accessing the internet. In recent FIRM-sponsored research [see Berg et al. 2018a; Berg et al. 2018b] we analyze the informational value of ten digital footprint variables that stand out in their simplicity and ease of collection, as they are left by any individual who accesses

or registers on any website (see ► Tab. 01 for variable definitions). We use a comprehensive dataset from a German e-commerce company that – like most e-commerce firms – offers to ship orders first and requests payment via invoice later. Based on a sample of over 250,000 purchase orders, we find that even simple, easily accessible digital footprint variables are valuable for predicting customers' payment behavior. For example, orders from an Android device are almost twice as likely to default as orders from an iOS device (see Fig. ► 01). Whether a customer orders at night, the channel through

Tab. 01: Digital footprint variable definitions

Variable	Description
Device	Device type: e.g. desktop, tablet, or mobile
Operating system	Operating system: e.g. Windows, iOS, Android, Macintosh
Email domain	Email domain: e.g. Gmx, Web, T-Online, Gmail, Yahoo, Hotmail etc.
Channel	Channel through which the customer arrives at the website: e.g. click on paid ad, through price comparison site, direct URL, or search engine
Check-Out Time	Time of day of the purchase
Do-not-track setting	Dummy equal to one if customer does not allow tracking device and operating system information and channel
Name in email	Dummy equal to one if first or last name of customer is part of email address.
Number in email	Dummy equal to one if a number is part of email address
Is lower case	Dummy equal to one if first name, last name, street, or city are written in lower case when registering on the website
Email Error	Dummy equal to one if the provided email address contains an error in the first attempt

Source: own illustration

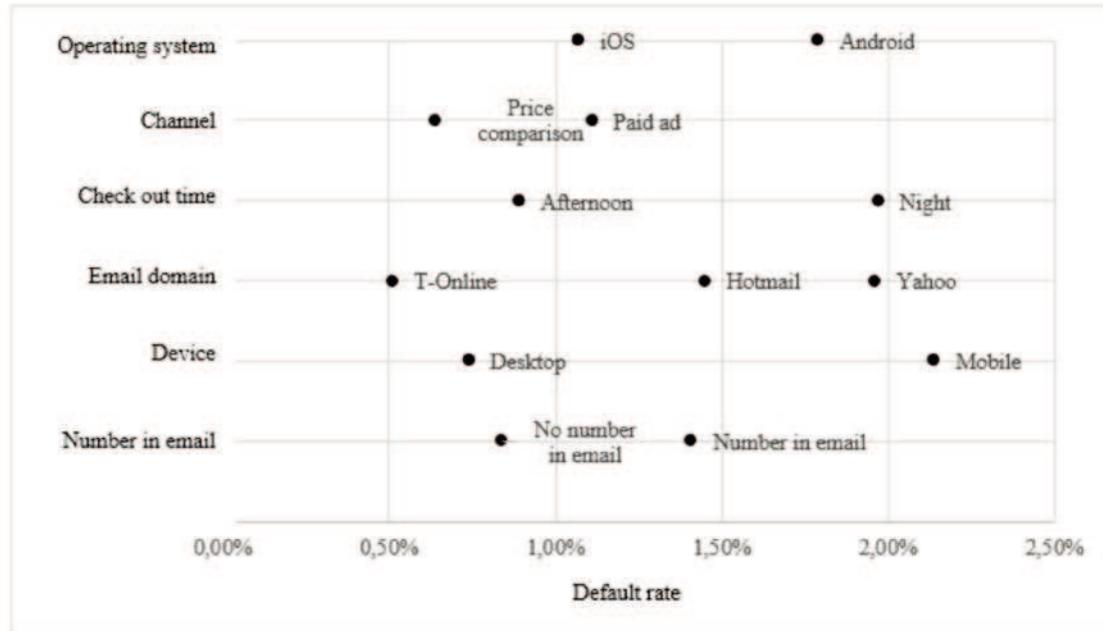


which he arrives at the website, and whether he uses capital letters or makes typing errors are likewise significantly related to the likelihood of default. Even just an email address contains valuable information that are indicative of the default likelihood.

We further find that the digital footprint complements rather than substitutes for traditional credit bureau information, suggesting that digital footprints can potentially enhance information traditionally considered important for default prediction. In fact,

many companies have already started employing a wide range of digital footprint variables in evaluating their customers' creditworthiness. For example, Admiral Insurance – the UK's leading car insurance company with 3 million users – finds that some e-mail domain names are associated with more accidents than others and charged Hotmail users up to 7.2% higher premia than Gmail users [see Hodge and Leo 2018]. KrediTech, one of the largest German FinTech startups with over 2 million users, developed a scoring model that assesses up to 20,000 data points per application,

Fig. 01: Default rates for selected digital footprint variables



Source: own illustration

including device and operating system data or fonts installed on the computer. Another example, Pentaquark built a scoring model that rejects loan applicants who post too much spiritual content on Facebook, because it judges them too concerned about the far future rather than the fine print of today's life [see BBVA 2017]. In developing economies, the recent dramatic increase in mobile phones motivated numerous innovative financing solutions by FinTech players who use digital footprints to extend credit to customers without formal credit records.

It is easy to imagine the scope of digital footprint variables becoming even more extensive in the future. With the increasing digitization of human daily activities and communication, the digital footprint can offer insights into otherwise hard to collect soft information. The digital footprint could thereby improve scoring models and give more people a fair chance of access to credit. While traditional lending has generally favored individuals with solid credit history, digital footprints may empower borrowers who have either no or poor credit scores (such as the unbanked, young people or recent immigrants) by allowing them to demonstrate creditworthiness through numerous digitized activities of daily life. Moreover, those trying to improve their credit score may be able to alter some digital footprint variables – either at a cost (e.g. by buying the newest smart device or signing up for a paid email domain), or by changing certain personal habits (e.g. resisting to paid advertisement or using electronic devices only at favorable times of the day).

However, analyzing borrowers based on information that go beyond variables directly related to their past or future financial situation is a double-edged sword. As new variables evolve and digital footprints grow more complex, optimizing a credit rating may no longer only require a prudent financial behavior, but can have a considerable impact on everyday life, causing borrowers to act with permanent caution in all their daily activities, entertainment and social interactions that leave digital information. Ultimately, consumers could become hesitant to express their individual personality freely in order to portray a positive image. This potential downside relates to the important issue of the violation of privacy rights. With the increasing digitization of human daily life, digital footprint variables may grow more extensive and intrusive than is ethically and legally permissible. It also relates to the peril of big data becoming "bad data" and recently growing concerns that "big data will create winners and losers" [see Bean 2018]. In particular, analyzing and sorting individuals according to variables that proxy for innate characteristics and habits may reinforce unfair exclusion and bias against groups who are unable to change certain inherent characteristics. It is therefore important that regulators watch closely whether digital footprints violate individuals' privacy rights and to what extent digital footprints proxy for variables that are legally prohibited to be used in lending decisions, such as race, religion, gender and other protected statuses. Due to the opaqueness of big data, however, supervision and auditing of such scoring models is likely to be increasingly difficult.

Conclusion

We find that digital footprints are valuable for the prediction of consumer payment behavior and defaults. Our findings suggest that digital footprints do not purely proxy for financial characteristics, but are likely to also proxy for information that is traditionally viewed as soft information. However, we recognize that future research might need to look at whether the type of information

contained in the digital footprint supercedes or substitutes for bank-internal soft information. Nevertheless, as the digitization of human daily activities, social interactions, entertainment, and communication continues, digital footprints may provide an easily accessible and inexpensive information infrastructure covering almost every individual worldwide. At the same time, digital footprints may generate challenges in enforcing privacy and anti-discrimination laws. The impacts of the use of digital footprints on the economy and society should thus be monitored closely.

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Added value guaranteed: Credit risk early warning systems as a development lab for innovative new technologies

Stephan Kloock | Illya Payanov | Andreas Peter

Financial institutions are currently facing numerous developments that illustrate the need for efficient automated solutions to obtain insights from data. This is particularly true for credit risk early warning systems, which are set to become extremely important in the coming years because of the historically good rating level and the cliff effects induced by the IFRS 9 impairment model. This is even more significant as credit risk early warning systems can be designed to be much more flexible than the strictly regulated IRB methods. Growing volumes of customer-related information combined with increasing cost pressure in credit risk management and risk controlling call for the use of new technologies and thus make credit risk early warning systems the ideal prototypes for the use of big data and machine learning (ML).

This assessment is confirmed by a recent market study on the use of ML in the financial sector [Fintegral 2019]: 77 percent of respondents cited the area of risk management early warning systems (followed by applications for cyber risk identification at 66 percent) as the most frequent candidates for internal use of ML over the next three to five years.

A key driver here is that the output of a credit risk early warning system is not a new credit risk parameter. Instead, it results in signals that increased attention should be devoted to particular situations of individual borrowers or portfolios in order to counter negative developments with appropriate credit risk management methods early on. Since people continue to act as the final decision-making instance, a reasonable number of "false positives" is acceptable, while "false negatives" should be avoided wherever possible. Nevertheless, one of the central challenges remains achieving low error rates, in order to avoid jeopardising the acceptance of the system. Therefore, when implementing prototypes it is essential to manage expectations, and it is useful to position the system as a support instrument for prioritising information for credit analysts.

Credit risk early warning system overview

This section will highlight how a basic form of early warning system can be set up, expanded and calibrated. ► Fig. 01 provides an overview of the different modules in the system.

On the input side, the system is based on a large number of internal and external data sources, some of which are already elementary components of banks' credit risk processes. This is followed by automatic processing of the data, with the aim of deriving overall conclusions about imminent threats. This includes mutual integration and back testing of the findings from the different data sources.

Correctly linking external and internal data represents a key challenge in networking the different data sources. For a large, stock market listed corporate client this is frequently quite simple. For the imaginary "Miller LLP" other determining attributes (sector, region, etc.) need to be taken into account in the networking as public or private reference data instruments do not have sufficient regional coverage.

At this stage, the special characteristics of the data inputs and their specific suitability for the issue in question needs to be taken into account. For example, no genuine early warning signals can be generated from financial reports. However, they can be used for calibrating individual threshold values depending on the financial stability of the borrower or for validating signals with a certain delay time. For market data, the relevance for financing has to be considered. For example, while CDS spreads are very relevant, significant share price fluctuations are frequently triggered by issues that have no fundamental influence on a customer's ability to service debt.

On the output side of the system, the ultimate aim is to provide the signals generated in a management information system in a way that is appropriate for the relevant requirements and recipients, in order to deliver optimum support for credit risk management processes and, in a subsequent expansion stage, to enable third parties to later comprehend the assessment made of a signal.

Text analytics as a starting point for modular development

Banks frequently make less systematic use of traditional media than of market data and financial reports, for example. As technology advances, in many cases it now makes sense to start modular development of the system on the basis of the text analytics module. This enables an initial analysis function for media articles and news items to be implemented relatively quickly and cost-effectively, and by efficient processing added value can be delivered at an early stage. Other elements can then be connected to the system gradually after consideration of cost/benefit aspects.

At the heart of the text analytics module lies the sentiment analysis, an example of which is shown on the left in ► Fig. 02. The relevant media articles identified by a keyword search (name of company, subsidiary, name of CEO, etc.) are investigated for positive or negative terms and text patterns (e.g. negations, reinforcing adjectives). This results in polarity scores between -1.0 (very negative) and +1.0 (very positive). Relevance-weighted aggregation of the polarity scores for individual sentences results in a total score for each article. Since negative articles are frequently characterised by a succession of accusations and denials, the total score also



takes into account the variance in the underlying individual scores. When implementing sentiment analysis, various open source based algorithms or proprietary tools can be used (for example Google Language Tools).

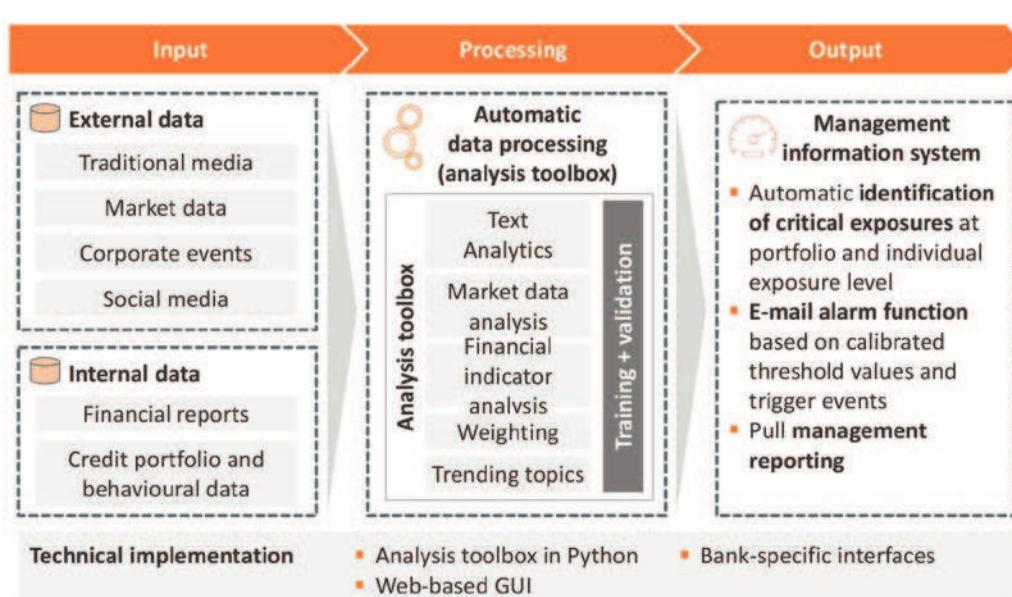
The next step is aggregation of the individual article scores to give a borrower-specific index that is monitored over time and triggers a warning signal if a predefined index threshold value is exceeded.

Gradual ongoing development using ML and other data

The analysis quality can be significantly increased by using ML. Example applications are shown in the centre of ► Fig. 02. The ML algorithm learns from articles being marked by experts as "relevant" or "not relevant", enabling future irrelevant articles to be winnowed out with a significantly better accuracy. ML algorithms can also be used to identify connections (for example between existing and new terms or different entities of a borrower unit) or to assess the relevance of individual sentences in an article. The use of ML requires availability of large training samples with marked data points (supervised learning). Thus, development and calibration of such a method calls for intensive collaboration with experts in the field.

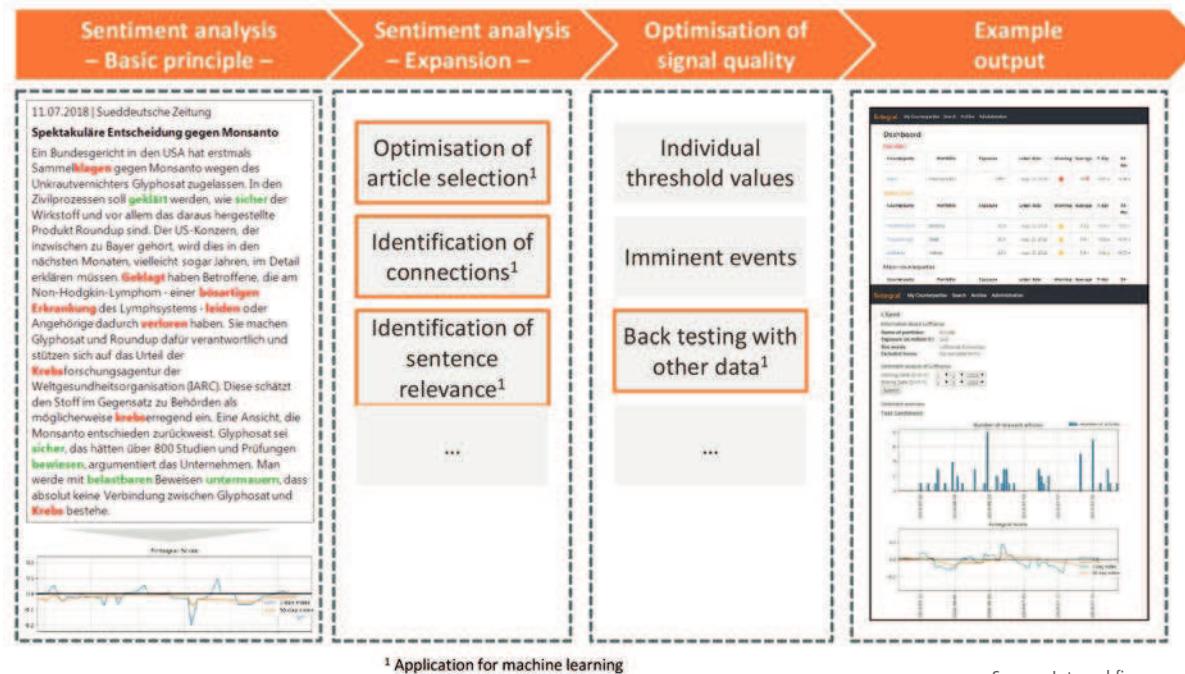
Back testing of the warning signals with signals from other data sources (for example CDS spreads, rating migrations, increasingly also exported account transaction data and manual ratings overrides) enables the quality of the system to be assessed and gradually improved. ML can also be usefully deployed here, as the ML algorithm learns which patterns are associated with positive and negative back testing results and reduces the future number of incorrect signals without human intervention. Furthermore, the findings obtained from back testing can be utilised for other borrowers in the portfolio who operate in the same sector, for which insufficient market data is available. Further optimisation of the signal quality can be achieved using borrower-specific threshold values in the sentiment analysis. A company's financial stability and its basic public perception should be included when defining these. Other areas for ongoing development of the system are obvious. Pending events relating to an individual address or sector (for example product launches, court decisions) can be used as a basis for early warning signals. Additional customer or industry related information from social media can be integrated, although this normally requires more comprehensive learning and calibration (think "fake news"). Expansion to portfolio or country level can be achieved by incorporating additional general search expressions, information (elections, legislation, etc.) and exposure-weighted aggregation of the individual sentiment analysis scores.

Fig. 01: Credit risk early warning system overview



Source: Internal figure

Fig. 02: Gradual optimisation of the text analytics module



Source: Internal figure

Summary

Increasing cost pressure for banks combined with the sharp increase in the need for high quality early warning signals in the lending field make credit risk early warning systems the ideal application for prototyping new innovative technologies. With modular development, starting from a systematic media analysis based on a text analytics module, added value can be generated quickly, and then gradually expanded by connecting more data sources and using of ML. As a result, a large volume of information can be aggregated in such a way that analysts performing a credit monitoring function can get to grips with the serious risks in the portfolio earlier and in a more focused way with less human resource requirements. The learning from new data inherent to ML supports gradual quality improvement and reduced use of resources over time.

Literature

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News-based early warning in the context of credit risk

Dana Wengrik | Carsten Demski

There are many possible uses in banks for automated and systematic analysis of texts using machine learning methods, for example automated processing and interpretation of contract documents, sales support by evaluation of intended purposes of customer payments, support for proprietary trading by systematic evaluation of text components from annual accounts or quarterly reports and investor presentations. In the context of credit risk, specific applications include supplementing existing rating systems and development of early warning systems based on analysis of news texts.

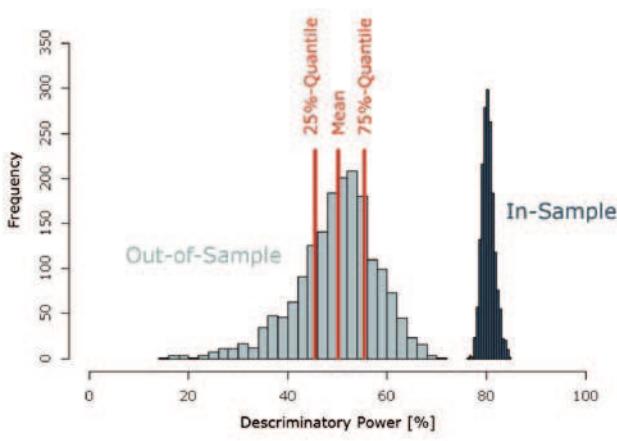
Study on news-based early warning

Against this backdrop, RSU conducted a study to investigate whether systematic and automated analysis of newspapers and business news as part of an early warning system for credit risk allows to predict company defaults up to one year in advance. The study showed some very promising results.

Data basis

For the study, a representative sample of German companies was selected from the database of RSU's Corporates rating system. The sample was made up of a total of 100 non-defaulted companies and 50 defaulted companies, comprising companies with more than 20 million euros in turnover. Around 77 percent of the companies were not stock market listed. News items about the companies in the sample starting in 2002 were obtained from a service provider. After data quality assurance measures, including assignment of news to companies and removal of identical texts, a final total of 68,752 news items from 174 different newspapers, industry journals, etc. were available for use in the subsequent analyses.

Fig. 01: Use of SVM



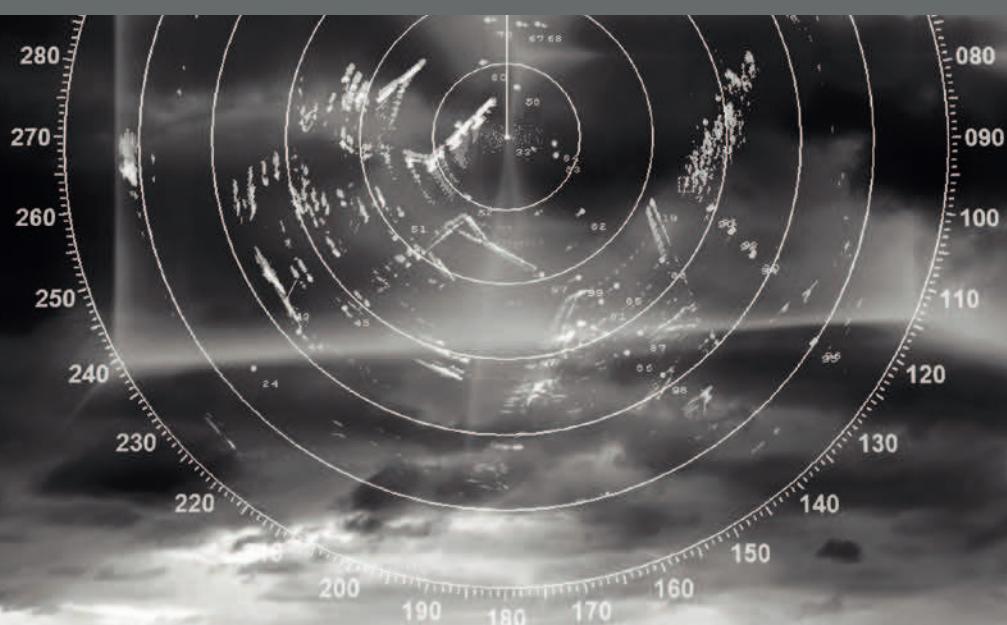
Source: RSU Rating Service Unit GmbH & Co. KG

Pre-processing of texts

The news items were pre-processed using the standard steps used in textual analysis [see Miner et al 2012, pp. 46-50]. First of all, the texts were normalised in terms of use of lower case and then adjusted by removing punctuation marks, special characters, URLs, etc. So-called stop words, which means very frequently occurring words such as articles and prepositions that play no role in terms of interpretation of the text, were then removed. Removing stop words reduces the amount of data to be processed and thus the complexity of subsequent processing steps. The words were then converted to their stem form by removing prefixes, suffixes, conjugations, etc. This prevents inflections of a word from being interpreted as different words. A standard Porter stemming algorithm was chosen to determine the stem form of the words. The word stems are then referred to as n-grams. The analysis covered 1-grams (individual stem words) and 2-grams (resulting from the combination of two stem words). However, because the stem words still produced a very large number of n-grams, they had to be filtered again before the subsequent processing steps. This was done by excluding very frequently and very rarely occurring n-grams. Despite this pre-filtering, 510,000 n-grams remained.

Creation of the term-document matrix

For the subsequent analysis steps, the processed documents have to be transferred into a term-document matrix (TRM) [see Miner et al. 2012, pp. 82-84]. In a TDM, each document represents a row and the n-grams resulting from the processing are shown in the columns. For each document, it thus shows how frequently the relevant n-gram appeared in the relevant document. In addition, the news items are categorised. News items dated within one year before a default were identified as default news (default flag = 1). Documents outside this period were classified as non-default (default flag = 0). Single factor analyses were then used to create a lexicon. In textual analysis, the term lexicon refers to a list of words that are or could be relevant for the specific analysis purpose. In this case, the lexicon was created using pre-classified documents [see Das 2014, p. 29]. Criteria for the selection of words in the lexicon were the correlation between the words in the news items and the dependent variable – default or non-default – and the number of occurrences of the word in the documents and in relation to the relevant companies in the representative sample. The lexicon created ultimately comprised 676 n-grams. This lexicon was then used to create the term-document matrix, to which the machine learning algorithms were then applied as part of the modelling process.



Comparison of different modelling methods

The use of a term-document matrix in the form outlined above for modelling is based on what is known as the bag of words method. This method is frequently used in textual analysis and assumes that the sequence of words in a document is irrelevant and only the occurrence of the word itself and the frequency of the occurrence of words matter [see Loughran/McDonald 2016, p. 14]. During modelling, three methods were tested based on the representative sample and the prepared and processed documents described above using the term-document matrix generated:

- 1. Logistic regression [see Ecke et al. 1995, pp. 170]
- 2. Naive Bayes method [see Das 2014, pp. 43-51]
- 3. Support vector machine (SVM) [see Das 2014, pp. 43-51]

The selected process is known as supervised machine learning, as the dependent variable – default/non-default – was specified during the classification of the documents.

The comparison of the modelling methods showed that higher discriminatory power can be achieved in-sample when using a support vector machine instead of logistic regression. In addition, the difference between the discriminatory power measured in-sample and out-of-sample is significantly higher for logistic regression than for the support vector machine, where the resulting models thus produce more robust results. Both the support vector machine and logistic regression achieved higher discriminatory power than the Naive Bayes method. The out-of-sample groups were taken randomly from the representative sample. Discriminatory power was measured using the CAP (cumulative accuracy profile) method. Based on these analyses, the support vector machine was selected for the next steps.

Model development

In the subsequent analyses, the stability of the results when using the modelling method was investigated. A bootstrapping approach was used, with 30 companies from the representative sample randomly assigned to an out-of-sample group using a 2:1 default/non-default ratio. Their associated news items were not included in the training sample for the relevant model. This process was repeated 2000 times. The models were then evaluated for the resulting in-sample groups (training samples).

The in-sample discriminatory power when using the support vector machine was around 80 percent on average with a very narrow fluctuation band due to the bootstrapping. The out-of-sample

discriminatory power was around 50 percent on average, naturally with somewhat broader fluctuation bands. However, in 50 percent of the bootstrapping results discriminatory power was between 45 percent and 55 percent. This demonstrates that the modelling method achieves very stable and solid results. The results of this power analyses are shown in ► Fig. 01.

Determination of sentiment index

The model analyses up to this point were based on the news items. The model forecasts can thus be used to assign scores to the individual news items to indicate the creditworthiness of the company mentioned in the news item. However, as a large number of news items can exist for a company in a period, to obtain an early warning indicator at company level a sentiment index also has to be determined. The sentiment index was calculated by aggregating the model forecasts (scores) for the news items. The moving average of the discriminatory power values was then calculated for the index. The analysis focused on how accurately the index explains the default/non-default variable for the companies within the year following the relevant reference date. Once again, the stability of the forecasting capability of the underlying models compared to the sample selection was verified based on 60 test runs.

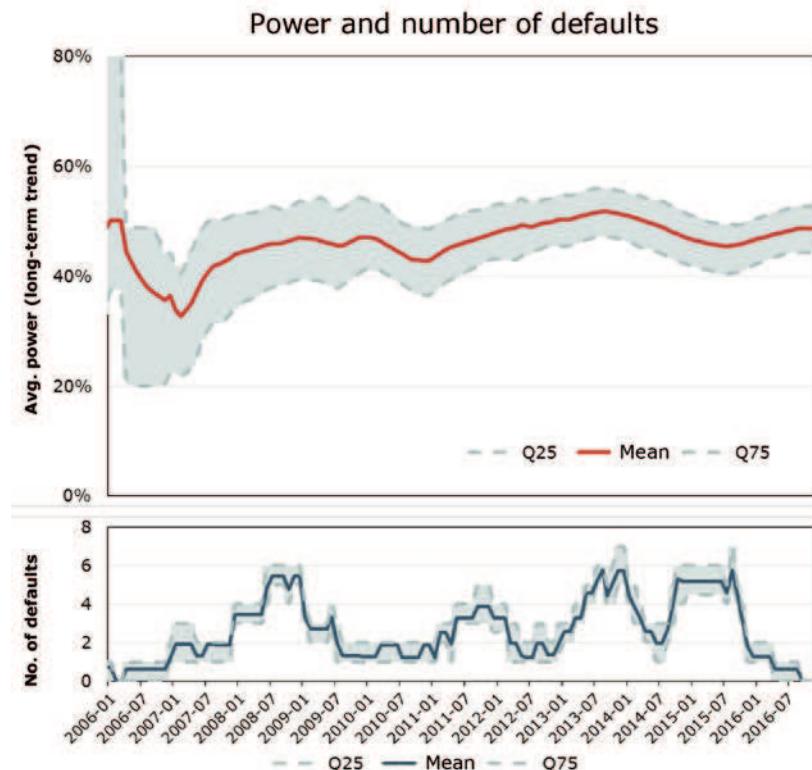
► Fig. 02 shows that the average discriminatory power was 50 percent for the sentiment index at company level. The measured discriminatory power of the index was between 45 percent and 55 percent in 50 percent of the runs.

Practical relevance

At present Risk Guard, RSU's early warning system, directly covers mainly stock market listed companies because capital markets provide pertinent information on these companies, for example share prices, CDS spreads. Using the analyses outlined, we have demonstrated that based on a representative sample for the RSU Corporates rating system, systematic analysis of news items can be used to forecast defaults of companies one year in advance. The models developed as part of the study achieve good discriminatory power in terms of predicting defaults. Daily, systematic and automated analysis of news items also enables very large quantities of news to be processed and rated in terms of its criticality. This is done using objective, statistically measurable criteria.

Based on the results of the study, RSU conducted a follow-up project using a larger dataset in the second half of 2018. Based on the results of the follow-up project, a news-based early warning model will be integrated into RSU's early warning system Risk Guard in the

Fig. 02: Discriminatory power of the sentiment index



Source: RSU Rating Service Unit GmbH & Co. KG

first half of 2019 at the same time as the RSU Merton model for non-listed companies.

Integration of these two models – news-based early warning and Merton for Privates – will considerably expand the portfolio coverage of RSU's early warning system, which will then directly cover non-listed companies.

Summary

Based on ratings for German companies used in the IRBA context, RSU has demonstrated that, as part of an early warning system, a systematic and automated analysis of newspaper and business news items allows to predict corporate defaults up to one year in advance. These results are currently being incorporated into the further development of RSU's early warning system and will be available for use from Q2 2019.

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Reputational Risk Supervision: Managing Compliance Risk by Mastering Unstructured Communi- cation Data

Todor Dobrikov | Ferdinand Graf | Samuel Stadelmann | Stefanie Ulsamer

Shortcomings in measures to prevent insider trading, rogue trading and market manipulation imply huge financial and reputational risks for financial institutions; see e.g. the LIBOR or the Forex scandal. In this context, the fines imposed by the regulatory authorities on banks with weak prevention measures have been draconic, since the traders, who were responsible for those scandals, coordinated their activities e.g. in chatrooms without disguise.

Hence, to manage these compliance and reputational risks, prevention and surveillance require among other things the analysis of huge unstructured datasets originating from standard communication channels (i.e. Email, Chat, ...). But not only the large volume of those communication items is challenging, humour, sarcasm, the mixture of different languages and several other characteristics of informal language have to be addressed adequately to draw the right conclusions and point the analyst to the relevant items. Consequently, those data is often analysed manually by scaling up teams, with well-known weaknesses: unsatisfied employees and short dwell, varying quality respectively high subjectivity, and - of course - high costs.

Recent advances in the field of natural language processing coupled with machine learning technique brought automated text analysis from theoretical domain to real-world practical applications. We leverage those advances to access and analyse unstructured data and mitigate compliance and reputational risks. Our approach consists of five cornerstones (see Fig. ▶ 01) that are consolidated in a web-application and described in the next paragraphs.

Scoring

Communication messages are manifold and usually contain more than one dimension of information, especially if the communication is informal and the communicating parties are familiar with each other. In addition, the analysis of natural speech requires sound solutions to identify synonyms and to resolve ambiguities. Linguistic and statistical concepts like stemming, word-embedding, named-entity-recognition or part-of-speech-tagging can solve those problems partly.

Concepts to measure the syntactic and semantic similarity of words, phrases and of full text passages, e.g. by representing text in a vector-space and utilize the angle between documents (as one of several available metrics for document similarity), allow to gain further insights about documents.

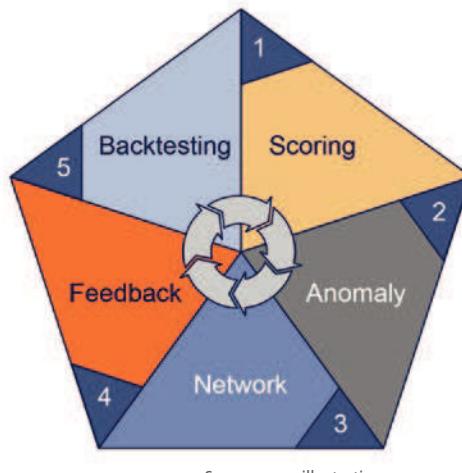
Based on verbal (e.g. words and phrases) and non-verbal information (e.g. response time, number of recipients), the internal communication is statistically scored according to its criticality. To this aim, each communication item is compared to a set of critical communication items identified over the last years, and a set of usual, uncritical items. If the new item is similar to items of the former set

and differs from (almost) all items of the latter set, it receives a high criticality score. In addition, specific keywords that were deemed critical boost to the score. Only communication items with a high criticality score are flagged for a manual review.

Anomaly

In addition to the statistical scoring, documents are clustered with respect to patterns like the usage of special characters or the contribution length. Contributions that make heavy use of the special characters might try to hide the content of the message which may not be recognized by our statistical model, e.g. via Morse code. Other examples that are easy to decode for humans – and already integrated in our models – are „\$@€€“ instead of “sale”, “6uy” instead of “buy”. Very short messages sent in a sequence from the

Fig. 01: We support manual processes by (1) scoring communication items statistically and (2) incorporating feedback from analysts dynamically, (3) detecting abnormal communication patterns, (4) analysing relationships with network theory, and (5) backtesting on the full data history.



Source: own illustration



same account might be another technique to disturb the scoring. An example for this is given in Fig. ▶ 02.

To make the analysis more robust against those attempts, contributions are clustered e.g. based on the frequency of special characters and contribution length, and critical clusters were defined. Contributions allocated deeply in a critical cluster are checked manually on a periodic frequency (typically once a month). Insights gained by this manual review are integrated into the model afterwards and can contribute to the training set as well.

Network

Communication is an interactive process and involves at least two persons. The communication indicates some relationship between these persons. And, since people communicate via different channels (e.g. different chats) with different intensities, a weighted network can be constructed based on the chat communications, see Fig. ▶ 03.

Whenever an investigation is about to be triggered based on e.g. insights of the statistical scoring or the anomaly detection, people closely connected to the suspicious individual can be easily identified via the network analysis. There, the intensity of communication between two persons is indicated by the strength of the edge and the criticality by the colour of the edge.

Feedback

The analyst is encouraged (at any time when inspecting a communication) to give model feedback by answering the question if the model classification was accurate. If so, the document under consideration is added to the set of critical communication items. If the model classification was inaccurate, the document may be added to the set of uncritical documents or the set of critical documents used for comparison might be reduced by the documents that triggered the high criticality score. The adjustments in both training sets increase the precision of future model classifications.

Fig. 02: The plot illustrates the cluster analysis. The critical cluster is coloured red-orange and uncritical clusters are grey. Communication items are marked by dots and those that are in the middle of the critical cluster should be analysed manually. Picture taken from application.

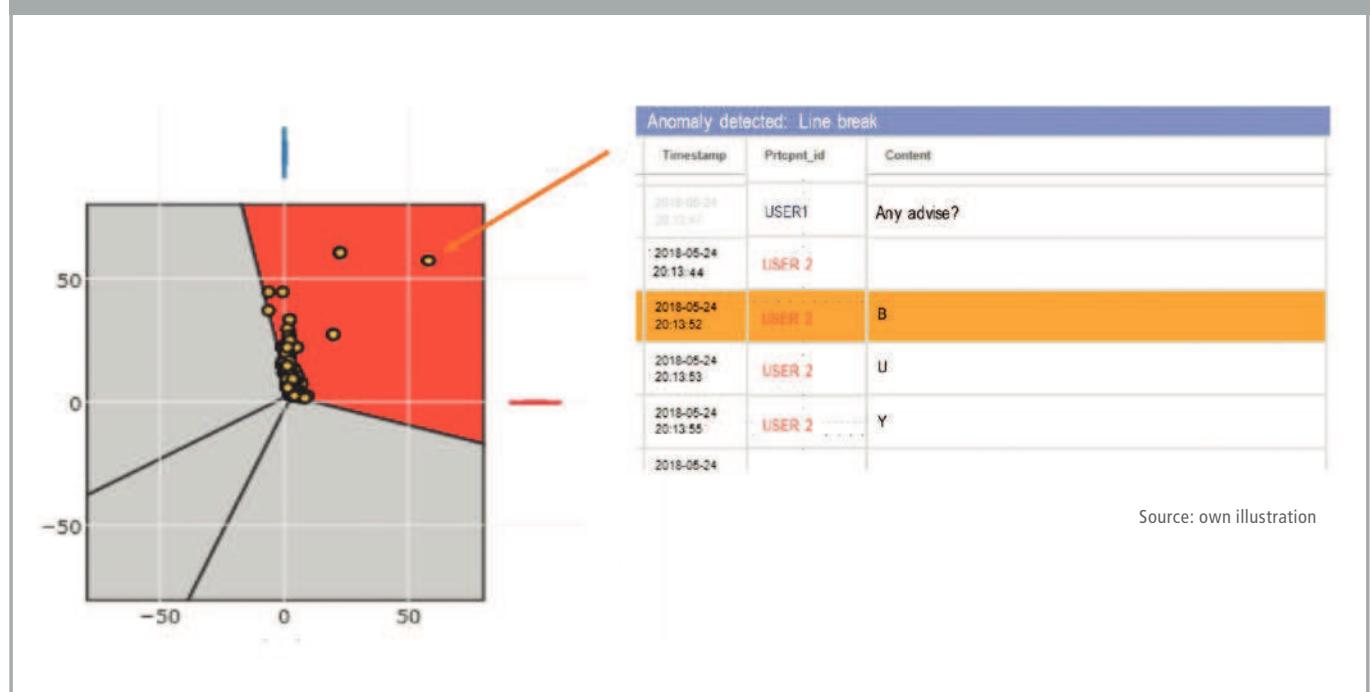
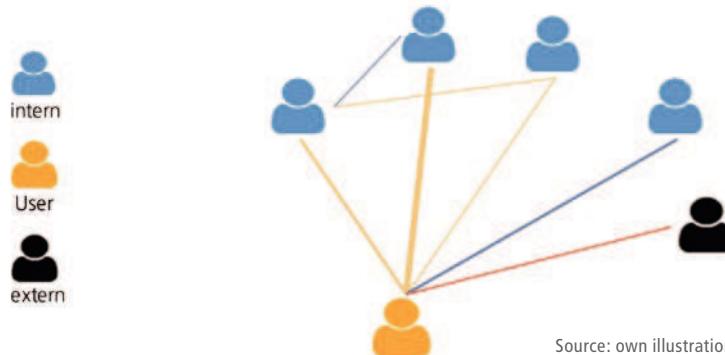


Fig. 03: The figure shows an illustrative example for a network based on communication items. Nodes represent participants and differentiate between internal user accounts and external user accounts. The edge strength is based on the intensity of communication and its colour on the criticality (blue = uncritical, yellow = for review, red = critical). Picture taken from application.



Source: own illustration

To support the manual review, the compliance officer can access the suspicious communication items where the critical words and phrases are highlighted to allow best transparency of the automatic document classification.

Backtesting and Looking Back

The former analyses usually result in new insights about communication patterns and keywords. Therefore, the model used for scoring is likely to evolve over time and anticipates critical communication with higher accuracy. Every new model parameterization can be backtested within the application using the full history of communication items. This allows a targeted model calibration. In addition to a global model, every user can define and back-test a model based on her own feedback and experience. Furthermore any re-run of the model, taking into account more insights from model feedback and training can unveil suspect communication that has not been detected in the first run of the model.

Infobox 01:

Expert Statement (S. Stadelmann)

From the beginning of 2017 to mid-2018 about 41 million messages have been classified with this approach, which breaks down to about 550,000 messages every week. The monitoring of this notable volume of unstructured data was done with a team consisting of two Compliance professionals trained to work with the application and interpret the results.

This intuitive and very dynamical model training approach based on the users' feedback supports our manual processes best. The number of false positives can be reduced significantly.

Therefore, we are highly confident that operational and reputational risks can be managed to an advantage with smart Machine Learning and Natural Language Processing methods and ergonomic processes supported by interactive dashboards. The cost for solutions as drafted above are well-balanced and the application supports Compliance in reaching the required diligence in this field. The application was presented to and discussed with the regulatory authority that deemed our approach viable.



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The future of non-financial risk management in banks

Gerhard Schröck | Michael Pieper | Markus Distler | James Weber | Benjamin Strobel

The emergence of non-financial risks (NFRs) adds new requirements and challenges to the risk management frameworks of banks. The industry has made significant progress on some framework elements, such as the development of adequate NFR risk taxonomies and in customizing governance structures to NFR. A trend can be observed towards the centralization of NFR responsibilities into one group in the second line of defence ("2LoD"), often referred to as an "umbrella function", in order to harmonize processes, systems and methodologies. Nevertheless, challenges remain, often for larger banks, to find the organizational and governance structures that best fit their business models and risk profiles and facilitate management of NFRs in an efficient and effective way.

Context

Over the past decade, banks have incurred significant losses due to risk and control failures emanated from NFRs. Going forward, the banking industry's exposure to NFRs is likely to grow, driven by the complexity of the business environment in which banks are operating, including new technologies, volatile markets and global political uncertainty.

In addition, the focus of supervisors has shifted towards NFRs (see e.g., EBA stress tests and SREP letters) and on individual NFR types (e.g., third party/outsourcing risks, as reflected in the EBA Consultation Paper 2018/11 on outsourcing arrangements). Increasing supervisory scrutiny adds pressure on top management to demonstrate proper oversight, management and control of NFRs.

Future NFR management

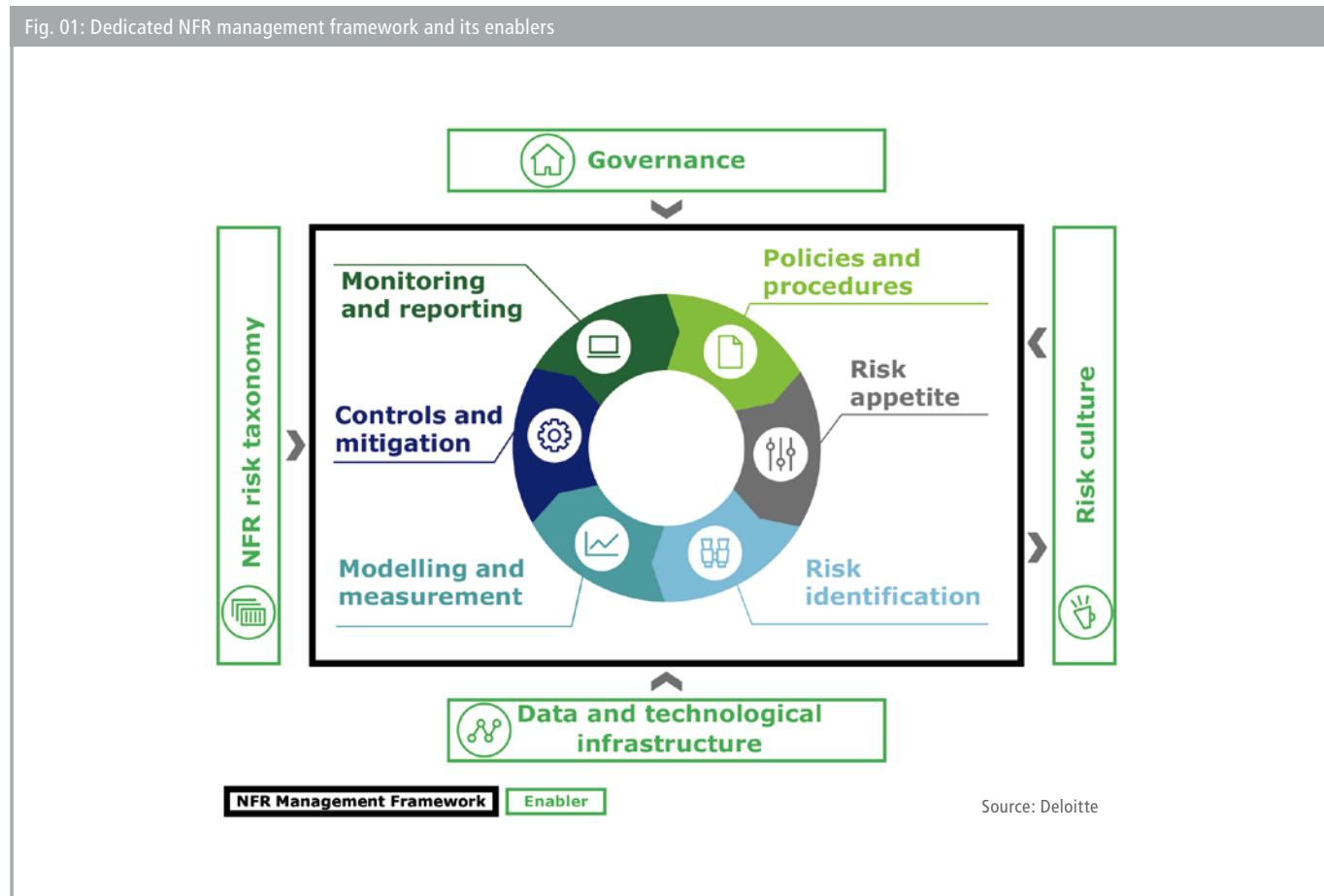
Banks will focus in the future on effective and efficient NFR management, including three core elements: a dedicated NFR management framework, a consistent NFR risk taxonomy and an adequate NFR governance model.

Dedicated NFR management framework and enablers

A framework to manage NFR effectively will consist of **six components** which are closely interconnected (see ► Fig. 01.):

- **Policies and procedures:** Policies are clearly defined and aligned across all NFRs. NFR procedures are harmonized across the three LoD and supported by an overarching risk management framework

Fig. 01: Dedicated NFR management framework and its enablers



- **Risk appetite:** The risk appetite for NFR is i) aligned with the strategy of the institution, ii) clearly defined using soft and hard thresholds and forward-looking risk appetite metrics for NFR, iii) clearly communicated across relevant functions and processes
- **Risk identification:** A comprehensive risk identification process is implemented and captures all NFRs in a consistent way
- **Modelling and measurement:** All NFRs are quantified or qualitatively assessed
- **Controls and mitigation:** A streamlined inventory of controls across a broader range of NFRs and processes is leveraged and results in cost and efficiency benefits, supporting the business case and early buy-in for NFR management
- **Monitoring and reporting:** NFRs and related metrics and key risk indicators (KRIs) are monitored and communicated across all LoDs and senior management levels, including the Board

Additionally, banks will leverage **four framework enablers** to achieve success in setting up the NFR management of the future:

- **Risk culture:** Banks have established collective attitudes and behaviours of their people in all risk taking and risk control activities
- **NFR risk taxonomy:** A comprehensive NFR risk taxonomy, including emerging risk types, is established and will evolve as required
- **Governance:** Existing organizational structures are adapted to enable effective and efficient NFR management, and roles and responsibilities are clearly defined and communicated
- **Data and technological infrastructure:** Tools and system are used across a wide range of processes to efficiently manage and mitigate risks

Among the different elements of an effective NFR management, banks will have tackled two elements first: the NFR risk taxonomy and the NFR governance.

Consistent NFR risk taxonomy

A strong risk taxonomy that comprehensively and consistently covers financial and non-financial risks is a prerequisite to implementing a sound NFR management across all NFRs relevant to the organization.

Managing NFRs can still be quite challenging, as industry standards and agreed definitions for NFRs will keep evolving. Currently, some banks adopt the original definition of Operational Risk and its seven event types originated by the Basel Committee or define NFR by exclusion as being risks other than market, credit or liquidity risk. Consequently, NFR risk taxonomies often do not necessarily include all relevant and material NFRs.

To function as a true enabler for effective NFR management, banks will have developed risk taxonomies in a structured way: they are i) comprehensive and disjunct (i.e., covering all material risks of the organization without overlap), ii) sufficiently detailed with different levels of granularity and iii) consistently applied top-down.

Hence, each organization will have designed its individual NFR risk taxonomy that helps managing NFRs and is coherent with the structure and complexity of the organisation and its business model.

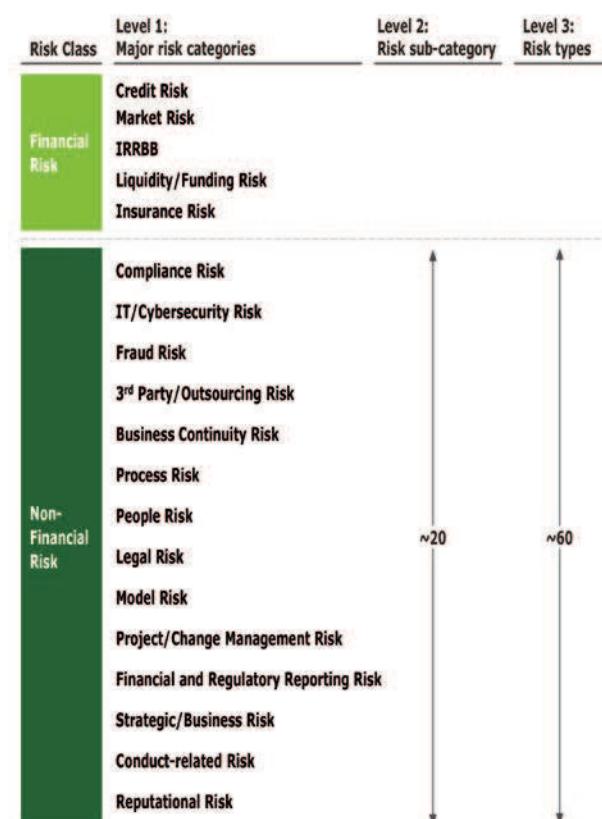
There are promising initiatives in the industry to develop a common NFR vocabulary. For example, Deloitte's Banking Union Center

has analysed multiple risk taxonomies of banks across Europe. As shown in Figure 2., a typical risk taxonomy has three levels: Level 1: Major risk categories, Level 2: Risk subcategories and Level 3: Risk types. Of the major risk categories, two-thirds are NFRs, and have ca. 60 NFR risk types subsumed under it at Level 3 (see ▶ Fig. 02).

Adequate NFR governance model

Pervasive NFR governance models are often fragmented with differing responsibilities (e.g., separate structures for compliance, IT/cybersecurity risk, third party/outsourcing risk). In general, institutions are increasingly focusing on customizing their NFR governance model to better reflect their individual business models and NFR exposure. Increased risk of personal liability for executives (see e.g., Bank of England/PRA Senior Managers Regime for the financial industry) has contributed to additional focus on NFR governance. Key elements necessary to implement an adequate NFR governance model of the future are:

Fig. 02: Consistent NFR Risk Taxonomy



Source: Deloitte

- **Organizational structures:** NFR responsibilities are assigned to a centralized group in the second LoD, often referred to as "umbrella function". This group has a coordination role across the institution, effectively setting minimum standards across the risk and controls cycle. NFR management requires awareness and strong strategic prioritization at Board level
- **Roles and responsibilities:** Roles and responsibilities across the three LoD (including NFRs) are clearly defined and communicated throughout the organization. A comprehensive end-to-end perspective and collaboration foster effective NFR and control management
- **Oversight committee structures:** The increased importance of NFR is appropriately reflected and a senior NFR committee is established at the Board level and composed of first and second LoD representatives

There are **three key governance models**, each of which may be adequate for different institutions:

- **CRO-Model:** found at larger banks with a business model focusing on retail and wholesale clients. This model aims to centralize the management of all risks under the responsibility of the Chief Risk Officer (CRO) and fosters a consistent management across all risk types, utilizing common reporting and monitoring platforms as well as enabling a common risk culture and processes between risk control functions and business lines
- **CCO-Model:** found at larger banks, but tilted towards universal and investment banks. This model places some NFR categories (e.g., compliance and conduct) with the Chief Compliance Officer (CCO) at the Board level. The rationale behind such a set-up is based on the need for a differentiated set of skills and specialization for managing these types of NFR. Nevertheless, the harmonization of processes, systems, methodologies and reporting structures in this model needs to be actively addressed in order to improve the cost base for such an institution's control functions
- **COO-Model:** applicable to smaller banks. This model adopts the separation of NFR from financial risks on the Board level by placing the NFR oversight with the Chief Operating Officer (COO), who focuses on process efficiency in managing risks

Other appropriate governance models may exist, including the allocation of NFR management to the Chief Financial Officer (CFO) or the Chief Regulatory Officer (CRegO).

Conclusion

In the future, banks will manage their NFRs in an umbrella function located in the second LoD, which has the benefit of harmonizing processes, systems and methodologies. Effective NFR management will include three core elements: a dedicated NFR management framework, a consistent NFR risk taxonomy and an adequate NFR governance model.



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Reputational risks, step-in risks and climate related risks as catalysts in the risk landscape

Thomas Kaiser

New risk types such as reputational risks, step-in risks and climate related risks have numerous overlaps with more conventional risk types and can be catalysts that promote changes between risk types. The instruments used in risk management and controlling should take appropriate account of these relationships, starting with the risk inventory.

Reputation risks, step-in risks and climate related risks

The list of risk types relevant to banks is constantly growing. On the one hand, totally new causes for losses in banks are being identified and, on the other hand, an increasingly differentiated view is being taken of known risk types, such as operational risks and non-financial risks.

Reputational risks have been part of the discussion for more than ten years, but only started to attract more widespread attention when they were explicitly mentioned in the EBA SREP Guidelines. Step-in risks were introduced by the Basel Committee in 2017 as a mandatory risk type to be managed. Finally, climate related risks have been addressed by the FSB (Task Force on Climate-Related Financial Disclosures (TCFD)) and will be incorporated into the new version of the CRR/CRD.

The common feature of all these relatively new risk types is that they do not manifest themselves exclusively as one risk type but contribute to complex cause and effect relationships across a wide range of financial and non-financial risks.

Although reputational risks, the risk of unexpected losses due to the reaction of stakeholders, can be viewed as a risk type of its own (for example as a consequence of marketing campaigns or executive board statements), they often result from the occurrence of events involving other risk types (operational risks such as misselling or IT failures, spectacular trading losses, large credit defaults, etc.). On the other hand, they lead to effects on business and liquidity risks and can intensify the impact of operational risks [see Kaiser/Merl 2014]. Therefore, in the EBA SREP Guidelines they are addressed in the section on operational risks but the analysis is primarily conducted in the context of liquidity risks and business model analysis.

Step-in risks are defined by the Basel Committee as the risk of a bank deciding to give financial support to a non-performing, non-consolidated unit with no contractual obligation (or going beyond such an obligation). They can result in the reputational risks primarily addressed in the supervisory document (negative stakeholder reactions both in the event of support for a non-performing unit and in the opposite case) and also operational risks (particularly liability of bodies) and business risks (loss of income sources, cost rises) [see Kaiser 2018].

Climate related risks [see Voit 2017] are the risks of climate change, which could directly or indirectly lead to losses for banks, andulti-

mately represent not just a strategic or business risk, but could also lead to effects in other risk types. These particularly include credit risk (increase in default risk, reduction of security values) and market risk (including in the form of investment risk). It is important to note that climate related risks can impact not just on customers but also on the bank itself (for example destruction of buildings due to extreme weather) or on other market agents. There are also the influences of legislative initiatives, which could have an effect on demand and prices of individual products (transition risk). One example here is stipulation of minimum energy standards for office buildings, which banks own as rental properties themselves or which represent security for mortgages.

In addition, there are risk types or categories that cut across established risk types and thus should not be viewed in isolation. These include issues such as cyber risk (overlaps or interactions with IT risks, IT security risks and information security risks) and conduct risks (overlap with legal risks and compliance risks).

Influences on risk management

The risk management process includes risk identification, assessment, reporting, management, and monitoring. Responsibilities are split among different units based on a "3 lines of defence" model.

The starting point for risk identification is typically the risk inventory. Traditionally, individual risk types are analysed independently of one another and their materiality is individually estimated. In light of the dependencies between risk types outlined above, however, a combined analysis appears to be more appropriate. Methods such as dynamic risk assessment aim to derive dependencies between risks from expert assessments [see Kristamuljana et al 2018].

The dominant method used for the specified risk types is a qualitative or semi-quantitative risk assessment in the form of self-assessments and scenario analyses [see Kaiser 2016]. The composition, design, and assessment of the scenarios should take appropriate account of the relationships between risk types. In the case of quantitative methods, the use of copula functions is useful, although their parameters tend to be less robust because of the required assumptions.

Reporting should also make the relationships between risk types transparent. On the one hand, it is vital to avoid over-estimation of the risks due to multiple recording in reporting. On the other hand, it is important to highlight intensifying or combined effects involving different risk types.



By its nature, management should also keep an eye on the interactions between risk types. For example, the links between risks can lead to risk management measures being given a positive assessment although they would not be cost-efficient in relation to a single risk type. For example, climate related risks should be integrated into lending processes and reputational risks incorporated into management of operational risks.

In turn, monitoring of risks should also take into account the extent to which risk management measures adopted have influenced not only the primary risk type addressed, but also associated risk types and categories.

The relationships between risk types can also have an impact on governance. Cooperation between numerous areas is essential to create a successful risk management process. Relationships between financial risks and non-financial risks are also becoming increasingly important. Although the separation of risk controlling into these two major blocks, which happens in some banks, does have positive aspects, the need for regular discussions should not be underestimated.

Summary

Explicit analysis of newer risk types such as reputational risks, step-in risks and climate related risks is further increasing the complexity of the risk map. An isolated analysis of these and the established risk types and categories does not seem to be the most effective solution. Structured expert assessments of the cause and effect links between individual elements appear to be an appropriate method and should be taken into account in risk identification and assessment. In turn, the results have a formative influence on risk reporting, management and monitoring.

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Completion of the European Banking Union: A “common backstop” for the Single Resolution Fund

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More than ten years after the outbreak of the global financial crisis, the European regulatory response to the crisis is still not completed. Regulators are still working flat out on effectively uncoupling the “toxic” bank-sovereign nexus. Completion of the European Banking Union appears to be an essential element of this. While the progress achieved to date in the area of risk containment is undisputed, the lack of collective risk sharing remains an Achilles heel in the event of a systemic crisis.

The decisions of the Euro summit in December 2018 overcame another hurdle on the way to completing the Banking Union. After the Euro group agreed on the principle of introducing a “common backstop” for the bank resolution fund back in 2013, its establishment has now been firmed up.

Financial crisis as the starting point

The financial crisis of 2007/2008 was a watershed for global financial markets. In Europe, it set in motion epoch-making dynamics. To avert the imminent collapse of the financial system, some Euro states rescued domestic banks from insolvency with public money. A direct consequence of state bail-outs was an appreciable rise in sovereign debt which led to increased doubts about state solvency. As many banks held high levels of sovereign bonds from their own country, they found themselves in a very tough situation again (bank-sovereign nexus). It is important to emphasise at this point that the many state bank bail-outs undertaken during the crisis ran counter to the inseparability of “action” and “liability”, and affected the credibility of fundamental market economy principles [see Deutsche Bundesbank 2013, p. 16 f.].

The “too-big-to-fail”-issue in particular revealed the conflict of interests between avoiding system-destabilising feedback effects caused by uncontrolled bank insolvencies and a state bail-out that is questionable from an economic and political perspective.

Proposed solution: European Banking Union

The major project European Banking Union launched by the European Commission in 2012 is commonly viewed as the central response to the financial crisis. The idea is to stabilise the European banking sector in the long term through banking supervision, bank resolution and deposit guarantees based on supranational institutions. The key challenge remains effectively capping the bank-sovereign nexus. In addition to the noticeably improved shock-absorbing capability due to reformed micro-prudential regulation, a key role has been played by the standard resolution mechanism (SRM) and the underlying harmonised bank recovery and resolution directive (BRRD) [see European Commission 2015]. The declared objective is for bank resolution in the event of insolvency to protect the system as far as possible: this means minimising the negative feedback effects on financial system stability, while at the same time protecting public funds and the money and assets of bank customers. To achieve this, Art. 37 of the BRRD allows recourse to various resolution instruments, including sale of the business, transfer of critical bank functions to a bridge institution, and separation of assets. The bail-in instrument, which includes involvement of shareholders and creditors, is only used where these measures

prove ineffective. Assuming that the bail-in liability is at least eight percent of the total balance sheet (BS), funding from the Single Resolution Fund (SRF) can also be accessed [see Deutsche Bundesbank 2014, p. 31 ff.].

Insufficient impact of SRF

The Single Resolution Fund has been in the development phase since 2016. The national coffers are fed by the bank levy. In 2024, at the end of the eight-year transitional phase and gradual communitarisation, the SRF should have reached a target level of one percent of covered deposits, approximately 55 billion Euro. Because of this relatively low capital ratio, the mechanism appears to have limited functionality in crisis situations. In fact, based on current legal judgements there is a threat of the bank-sovereign nexus continuing. The reason for this is Art. 56 of the BRRD, which provides for the use of national fiscal hedging instruments if the SRF is exhausted.

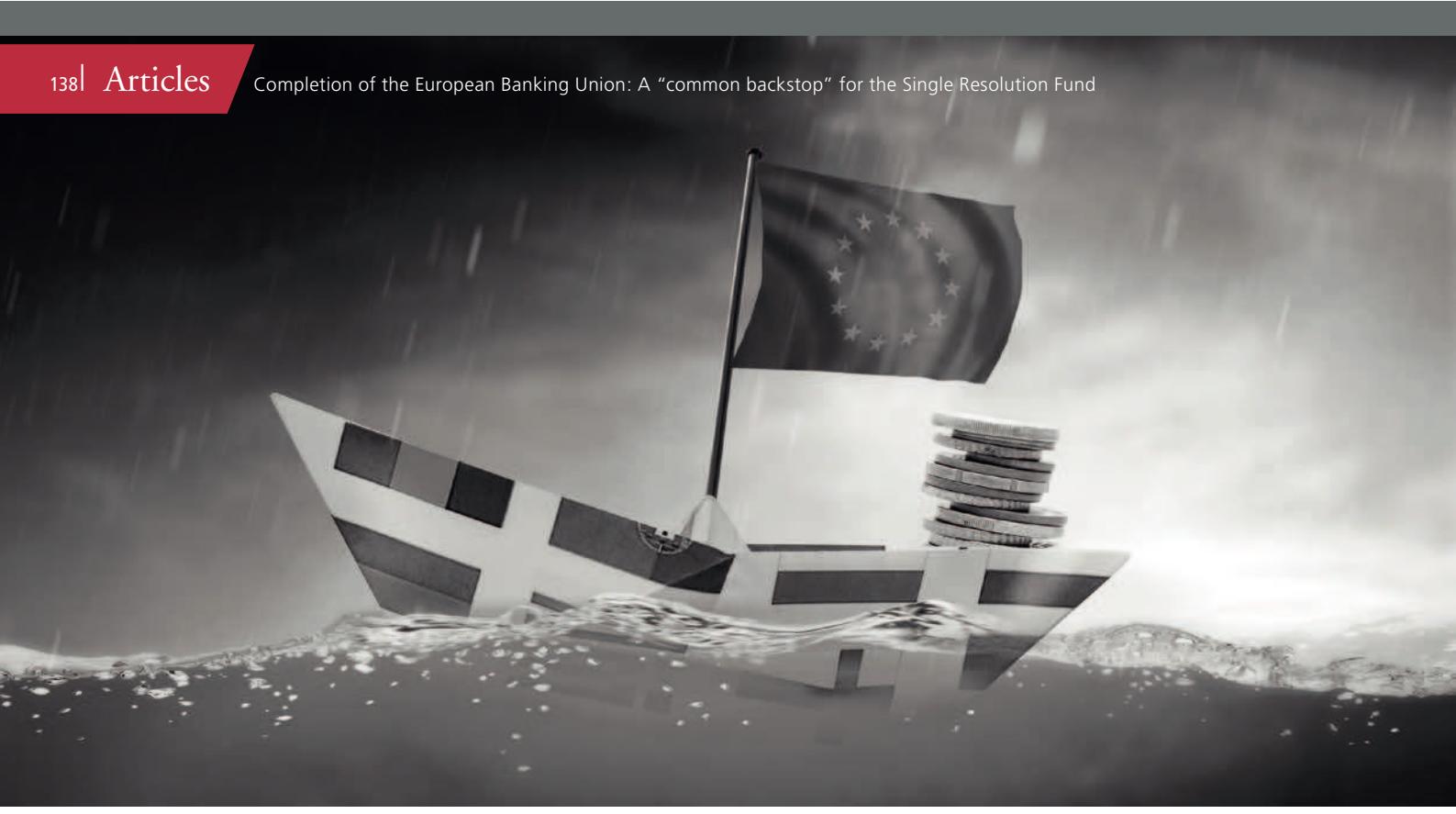
“Common backstop” for the SRF

To prevent this scenario, in December 2013 the Euro group agreed on the introduction of a “common backstop” for the SRF within 10 years. A “backstop” is generally understood to mean a hedging instrument of last resort. The “SRF backstop” thus not only provides protection from a system crisis, but also contributes to breaking down the bank-sovereign nexus [see Schoenmaker 2014].

In December 2018, the Euro group agreed to introduce this backstop by 2024 at the latest [see Euro Group 2018]. Under certain circumstances, early activation of the instrument can be agreed from 2020. However, the prerequisite for this is a reduction in the existing risks in the European banking sector. Further technical details are set to be announced in 2019.

Form, tasks & level of the “backstop”

The backstop will be provided by the European Stability Mechanism (ESM) in the form of a revolving creditline. At the same time this replaces the current ESM instrument of direct bank recapitalisation. The area in which the backstop can be used is essentially the same as that of the bank resolution fund. In addition, it is intended to provide liquidity assistance to banks. The level of the line of credit will initially be based on the target level of the SRF, around 55 bil-



lion Euro. A higher nominal upper limit will be defined by the ESM board of governors.

Basic principles

The prerequisite for activation is correct application of the SRM procedure and the BRRD. The liability cascade is also unaffected. The backstop must also represent the last remaining form of assistance and the ESM must have the corresponding capacity. Huge significance is also attached to medium-term budget neutrality: any funds accessed are to be repaid by the entire banking sector within 3 to 5 years. In terms of interest costs, for the first three years a premium of 35 base points (BP) on the ESM refinancing rate is set. If the repayment period is extended by a further two years, the interest rate increases by a further 15 BP.

Governance

At the request of the Single Resolution Board (SRB), the ESM directorate will decide on activation of the backstop in individual cases. Depending on the complexity, the board will have 12 to 24 hours to do this. As the activation decision is subject to the unanimity principle, there is an intention to introduce an accelerated procedure.

Conclusion

It is undisputed that the common fiscal backstop provided by the bank resolution fund contributes to breaking the bank-sovereign nexus. The key factor here is substitution of the existing national backstops with an ESM line of credit. The principle of unanimity protects the interests of individual member states, for example Germany. Compliance with the self-imposed principles will ensure that the hedging instrument does not inadvertently become a transfer mechanism. Specifically, this means that the minimum share of private creditor liability of eight percent is not incorrectly interpreted as an upper limit.

The article reflects the opinion of the authors.

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Level Playing Field for Banks in the EU: a Chimera?

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An international level playing field (LPF) for banks would exist if banks would operate under the same legal and economic conditions everywhere in the world. This is obviously not true. While some countries may enjoy an economic upturn and low unemployment, others may suffer from a downturn and high unemployment. In some countries laws are stricter than in others. Even in the presence of similar laws, the enforcement of laws by courts varies considerably. Legal conditions for banks include bank regulation and supervision. In the European Union (EU), the SSM applies to all banks so as to assure the same regulation and supervision while the SRM assures the same rules of recovery and resolution for all systemically important banks. Also a European deposit insurance scheme which still needs to be agreed upon, is considered an important pillar of the European Banking Union. This Union is regarded as essential for a LPF of banks in the EU.

The standard argument for uniform international bank regulation and supervision (R&S) is that otherwise banks attempt to benefit from regulatory arbitrage. This may be true, but the argument is misleading. R&S represent only a subset of the conditions which govern bank transactions in different locations. Whether a bank prefers to do business in one or another location, depends on all location conditions. Adverse economic and legal conditions and political instability may impose various costs on bank transactions in some countries, in others favorable conditions may benefit banks. A bank compares all its locations for their private costs and private benefits and then may choose for some transaction the location with the highest net private benefit. Private costs and private benefits are those accruing to the bank. This behavior is motivated by a broadly defined institutional arbitrage, not by a narrowly defined regulatory/supervisory arbitrage.

As economic and legal conditions vary substantially across the EU-countries, a LPF for banks does not exist in the EU. Although the EU fosters economic and legal convergence in the EU, discrepancies between countries are (still) strong and will not be removed in the near future. Should R&S nevertheless be the same across all EU-countries or should it be differentiated so as to reduce current imbalances relative to a LPF?

R&S should be governed by social costs and benefits of bank operations. Social costs/benefits equal the sum of private and external costs/benefits. External costs/benefits accrue to economic agents other than the bank. For example, bank transactions which destabilize financial markets, perhaps leading to a crisis with heavy burdens on other market participants and the taxpayer, generate external costs. Bank transactions which stimulate economic growth so that more jobs are created and per capita income increases, generate external benefits. R&S should motivate banks to operate with low social costs and high social benefits. Hence, R&S should be chosen so as to maximize the social net benefit of bank operations. As the regulator and the supervisor cannot force the bank to maximize the social net benefit, they can try to choose R&S so that banks may operate in a manner which aligns private and social net benefits.

Even though the SSM applies to every EU-country, R&S varies across countries. Regulation can be varied nationally in the EU within pre-defined limits set by the SSM. In order to constrain systemic risk,

national regulators can impose stricter requirements on mortgage loans such as a higher LTV-ratio. Or they can raise the anticyclical capital buffer to curb excessive risk-taking by banks. "In downturns, the regime should help to reduce the risk that the supply of credit will be constrained by regulatory capital requirements that could undermine the performance of the real economy and result in additional credit losses in the banking system". This BIS statement [see BIS 2018] for the anticyclical buffer emphasizes that economic conditions in a country matter for country-specific regulation.

Also supervision varies substantially as indicated by the „Convergence report on supervisory practices”, published annually since 2014 by the EBA [see EBA 2017]. The EBA pursues convergence in European supervision [see EBA 2017, p.7]. Following Angeloni, lower quality of supervision is more likely in "softer" areas [Angeloni 2018]. Thus, southern Europe is likely supervised in a less strict manner [see Lehmann 2018 and Reuters 2018]. Also it appears impossible to fastly tighten supervision in a country with weak legal and economic conditions without triggering a shock for banks and their customers and eventually systemic risks. Countries with weak former R&S which joined the EU recently need time to implement European rules.

Should national differentiation of R&S help to achieve a LPF in the EU? Even though a LPF is an objective guiding R&S, the EU also pursues important objectives such as economic convergence between the EU-countries (such as convergence in per capita-income) and financial stability. Are these objectives conflicting? If yes, which objectives should be pursued first? To get insight into these issues, consider some empirical evidence.

Some Empirical Evidence

Consider economic and legal conditions in EU-countries. European statistics show that differences in per capita-income diminished at the start of the century until the financial crisis and then increased substantially, in particular after the onset of the Euro crisis a few years later. Income still differs a lot between northern and southern European countries. Similarly, unemployment statistics show particularly high unemployment rates for southern countries. To portray legal conditions, the World Bank publishes a Worldwide Governance Indicator of Regulatory Quality and Rule of Law. ► Fig. 01 [see del Hoyo et al 2017, p. 44] shows this indicator for the EU-countries. On the horizontal axis the indicator is shown for



1998 and on the vertical axis its improvement until 2015. Again, many southern countries rank badly in 1998 and mostly deteriorate instead of improve until 2015.

There exists a surprising correspondence between economic and legal conditions on one hand and financing opportunities of SMEs on the other hand. The EU publishes a SME-finance index combining volumes of loans, credit, leasing and equity finance to portray SME-access to financing sources, and an indicator of macroeconomic conditions. Again, except for Spain, southern countries rank badly in ► Fig. 02. Similar results are obtained using acceptance rates of banks for loan requests of SMEs. Not surprisingly, NPL ratios of banks are particularly high in southern countries.

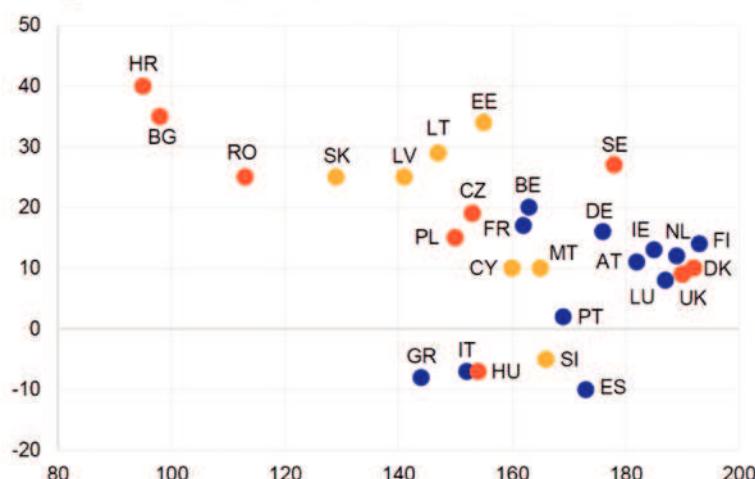
These findings indicate across EU-countries a substantial positive correlation between economic well-being, legal strength, strong SME-access to finance and low NPL-ratios. In other words, the findings indicate a close relationship between legal governance, economic prosperity and SME-access to funding across MS in the EU. Hence a LPF for banks does not exist in the EU. Banking appears to be more burdensome in southern Europe. The private net benefit of banks financing SMEs appears to be smaller in southern countries so that SMEs have stronger funding difficulties. But in these countries external benefits of funding SMEs by stimulating economic growth and raising per capita might be higher. In other words, the gap between social and private net benefits of SME-funding appears to be higher in southern countries. This raises two questions: Can differentiated

Fig. 01: Worldwide Governance Indicators of Regulatory Quality and Rule of Law

Notes: The chart shows the unweighted average of the Regulatory Quality and Rule of Law governance indicators. The higher the indicator, the better the relative performance. The comparison may be distorted by breaks in the sample.

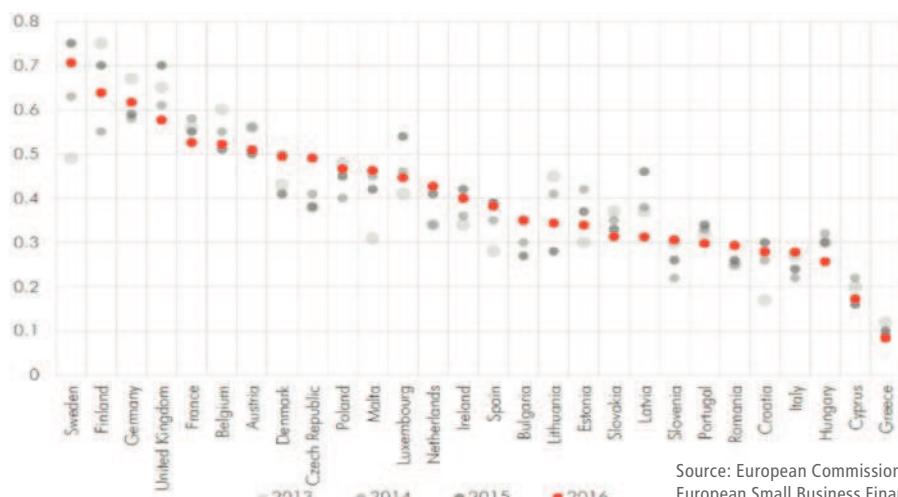
(initial indicator versus cumulative change; horizontal axis: indicator in 1998; vertical axis: difference in the indicator 1998–2015)

- joined euro area before 2002
- joined euro area after 2002
- non-euro area EU countries



Source: del Hoyo et al 2017, p. 44 based on World Bank

Fig. 02: Results of the EIF SME finance index



R&S eliminate part of these discrepancies in the EU-countries? If yes, should it be differentiated [see Franke 2018] for a deeper analysis?

Differentiated Regulation and Supervision?

The private net benefit of banks funding SMEs might be raised by milder R&S. An example would be more generous credit ratings, combined with weaker rules on building reserves for distressed loans and less stringent application of the SREP. This would allow banks to expand their SME-loans with lower additional equity requirements. Milder R&S imposes less restrictions on banks so that their private net benefit of doing business increases. In particular, it lowers their private costs of SME-funding. Whether this actually induces banks to expand their business, is not obvious. But empirical evidence indicates that stricter equity requirements reduce bank lending to SMEs so that SMEs invest less and create less jobs [see Groppe et al 2017; de Nicolò 2016]. Thus, milder R&S might help to mitigate the higher lending costs of banks in southern countries and, thereby, approach a LPF.

But there is a flipside to this approach. If R&S is weaker in some countries, then this might foster misallocation of money, for example lending to zombie firms, and thus strengthen systemic risk. Thus, even though additional SME-funding in these countries may generate higher social benefits, it also may generate higher social costs. To constrain these costs, supervisors need to carefully constrain their generosity. They should choose the strength of supervision so as to maximize social benefits of bank transactions. Whether the net social benefit declines or increases, depends on the evaluation of the social costs and benefits. In the example, the costs of financial instability need to be weighed against the benefits of stronger economic growth. This evaluation requires a normative approach of the regulator and the supervisor.

Would milder R&S in countries with weaker economic and legal conditions eliminate all barriers to a LPF for banks? The answer is clearly no. Milder R&S can mitigate those barriers. The justification for differentiated R&S would be the heterogeneity of economic and legal conditions across EU-countries. As long as this heterogeneity continues to be strong, a LPF will not exist. It is likely that this heterogeneity can be removed at best only in the long run. Therefore a LPF can only be achieved in the long run. In the medium-term a LPF will remain a chimera.

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Potential for optimisation in the management of regulatory requirements

Martin Rohmann

Regulation of the financial industry is becoming increasingly complex and detailed, while at the same time the frequency of new requirements is increasing and there are often major uncertainties regarding their interpretation. According to the most recent surveys [see English/Hammond 2018] regulation remains one of the biggest challenges in banks' risk and compliance environment. The increasing expectations of stakeholders in terms of compliance, transparency and rapid availability of information, alongside responsible managers' personal accountability, only increase the pressure. The ideal solution is for management of regulatory changes to be linked to all other management processes. It is beneficial to structure these processes as efficiently and as effectively as possible and to identify potential for optimisation.

Integration into strategic control

Regulation is key to successful control of a financial institution, which has to constantly keep an eye on the effects of changing regulations on its business strategy. Regulatory requirements need to be viewed as part of the overriding economic, political and competitive landscape. Regulatory compliance is no longer merely a mandatory exercise, it is a strategic task with the aim of achieving improvements in both compliance and performance.

Strategic impact analysis includes a clarification of the institution's regulatory agenda, which requirements have to be implemented and how they are related to each other. In addition, the effects of every new regulation on the existing strategy and prioritisation of key requirements need to be determined. This leads to ongoing optimisation and adaptation of the business model, not just guaranteeing compliance with regulatory requirements but also contributing to improved performance.

The business unit responsible for regulation – for example the regulatory office – is then responsible not merely for monitoring all the requirements, but also for consolidating them, identifying best practices for implementation as well as potential for optimisation, analysis, decision-making and of course tracking the status of the implementation of measures and the overall compliance status.

Efficient and effective organisation and processes

In addition to integration into strategic control, an efficient and effective structural and process organisation is essential. The following challenges are the starting point here:

- Prompt identification of all regulatory requirements and changes thereof by comprehensive monitoring of all sources of regulatory changes and new regulations.
- Identification of business units, employees, processes, internal instructions, procedures and systems that are affected by regulatory changes.
- Ensuring adequate implementation (appropriate and effective).
- Clear assignment of duties for instructions, procedures, audits, monitoring and training.
- Prompt and accurate provision of information and transparency in respect of the implementation status of regulatory requirements.

The following steps are generally seen as prerequisites for successful management of regulatory changes:

- Standardisation of the risk, regulation and business taxonomy employed across the organisation.
- Clear definition of roles and responsibilities, both in the regulatory units and in other business units.
- Clear definitions of processes for managing regulatory changes, taking into account the entire life cycle of regulatory change management.
- Establishment of effective governance structures and ensuring continuous involvement of senior management.

Use of information technology / digitalisation of compliance processes

To enable the processes discussed above to be effectively established, support from appropriate modern information technology is needed. This is the only way to fully utilise the potential for optimisation. For regulatory monitoring, the use of reliable established solutions such as Regupedia.de is recommended, as they guarantee full daily monitoring of all relevant regulatory developments. This information then provides a basis for further processing as part of internal processes and can be directly incorporated into the institution's legal inventory or workflow solution, internally analysed and pursued.

Instead of complex Excel spreadsheets, technological solutions are increasingly gaining in significance when it comes to supporting the ongoing process of regulatory change management. Within a system, relevant regulatory changes are recorded and assessed, stakeholders are notified, impact analyses are documented, planned measures are agreed and initiated, problems are highlighted and reports are generated. Of course, these tools have to be used consistently across all affected business units. The technology allows documented assignment of requirements to processes, controls, business units and internal instructions, thus simplifying the change process. Automatic notifications, the systematic approach and continuous transparency regarding the status of all aspects sustainably speeds up and simplifies internal agreement processes, helps avoid redundancies and duplicated effort and ensures a consistent flow of information.

Success factors for integrated workflow solutions

This advancing digitalisation of compliance processes, in this case support for the processes of managing regulatory requirements, demands some preliminary work and also a clear definition of the level of ambition. In the simplest case, the IT solution only includes



the legal and regulatory management process and is not (yet) integrated with related processes such as the rest of compliance management or money laundering, nor into the overall management analysis of all non-financial risks. Solutions are available from various providers that aim to achieve integrated control of all GRC (governance, risk, compliance) issues. However, successful implementation of this kind of comprehensive GRC solution represents a challenge that should not be underestimated, not only requiring sufficient time and budget to be set aside but also that other prerequisites are met.

Rigid organisational structures are the biggest barrier for companies as they move into the digital age [see Hypovereinsbank]. The required changes to the organisational structure go hand in hand with the necessary cultural change, away from hierarchical structures towards more agile, open forms of working. These findings can also be applied to the implementation of compliance management solutions. They require identification of the organisational units that will be involved from all three lines of defence, as well as definition and clear specification of responsibilities. In addition, definition of the processes to be mapped is necessary, and in many cases this is not done sufficiently well. Implementation has to be accompanied by communication, and gaining support from key stakeholders is essential. Available technical solutions generally have comparable functionality. The most important thing is that they are intuitive and user-friendly and, above all, they must be easy and comprehensible for employees at the first line of defence. The solution is not to turn all employees into compliance specialists, but to design processes and solutions so that "normal" employees can operate them.

If these requirements are met, it is possible to take advantage of considerable potential for optimisation in management of regulatory requirements, while managing the flood of regulatory requirements in a structured way and simultaneously increasing the level of compliance.

Summary

The huge workload involved in implementing and satisfying regulatory requirements, the increasing pressure from auditors and growing formal requirements for regulatory compliance call for new approaches to comprehensive management of these requirements. Technological solutions under the heading of GRC – governance, risk and compliance – not only deliver efficient and effective pro-

cess support, but also ensure sustainable handling of regulatory complexity and guarantee regulatory compliance. Which solution is best suited for a specific institution depends to a great extent on the complexity of the business model and the size of the company. However, equally crucial for successful implementation are parallel organisational adjustments and effective structuring of the business processes to be mapped and thus frequently a large-scale change in management processes and project-based implementation. Consistently satisfying these conditions enables the advantages of digitalised processes to be utilised for regulatory compliance in the medium term and allows the cost block for regulation to be sustainably reduced.

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The IBOR Reform – Challenges for banks in the course of the transition to Risk Free Rates

Christoph Betz | Stefano Hartl | Franz Lorenz

In the course of the manipulation scandal, the IBOR reference interest rates (e.g. LIBOR and EURIBOR) increasingly came into criticism. In response, the internationally driven IBOR reform aims at replacing the existing benchmarks with the so-called Risk Free Rates (RFRs) by the end of 2021. Furthermore, in the euro area the European Benchmark Regulation established clear criteria with regards to authorized reference interest rates. Although the transition is scheduled within a narrow time frame many of the details remain uncertain, including timing, jurisdictional issues, and the definition of the methodology for creating an interest rate term structure. At the same time, the impact is immense: almost all financial products with variable rates are affected which is why process, system, model, and document adjustments are necessary. Against this background, financial institutions in particular will be facing a huge challenge over the next few years.

Background of the IBOR transition

Due to manipulations of the reference interest rates, the LIBOR scandal, a need of a comprehensive transition developed. In this context, the IBOR reform was globally initiated in 2012. It comprises a number of rectified initiatives established by supranational committees and central banks which have been developing alternative RFRs and have been working on reformed term rates as basis for an interest rate term structure. However, the implementation speed and the methodological and procedural approaches vary significantly depending on the currency area. In the UK the changes were triggered by the Financial Conduct Authority's statement that panel banks are no longer compelled to submit LIBOR contribution after 2021. For EU Member States the European Benchmark Regulation (BMR) was adopted. As a consequence, reference interest rates, including EONIA and EURIBOR, that are not authorized by supervisory bodies will not be admissible as of 2020. An extension of the transition period for 2 years is likely as the EU parliament publicly spoke in favor of it on December 12, 2018.

Challenges

The IBOR transition raises various challenges: on the one hand the impact is big, on the other hand it is not yet clear how the transition scenarios will be like, which contracts need to be adapted, and how these changes will affect risk management and product assessment. While almost all financial market participants are affected, the upcoming challenges will have a huge impact especially on banks due to their role as financial intermediaries.

Impact

The transition has a direct impact on almost all financial products with variable rates maturing after 2021. In addition, fixed rate products such as fixed rate loans with a cancellation option that depend on variable rates can also be affected. In this context, it is important to analyse the impact of the transition on corresponding processes, systems, models, and documents and determine a potential need for adjustment. In the case of banks, the whole value chain, from the market segments through to risk controlling and accounting, is affected by the transition.

Transition scenarios

For the transition to the new RFRs three possible broad scenarios

are being considered:

- **The Big Bang:** the switch takes place at a fixed date for new and existing business agreed as part of a legal and regulatory framework.
- **Proactive market adoption:** an accelerated, market-driven adoption of new RFRs for new business with simultaneous and coordinated adoption of the existing business by means of bilateral negotiations or industry solutions.
- **A steady market adoption:** a market-driven switch to new RFRs over an extended transition period while using the natural run-off of the existing business.

For the time being, there is a preference within the major currency areas for the market-driven adaption scenarios that require a transitional simultaneous availability of the old and the new rate.

Contract Adjustments

Due to the big impact on various new and existing business, firms need to assess the legal framework and potential contract adjustments. The key challenge is to define consistent fallback clauses for the documentation of various financial products. For example, one has to ensure that a variable rate loan and the respective derivative can be adjusted to the same new reference interest rate. At the same time, all parties need to be included in the contract adjustment process to minimize legal risk.

Risk management and product assessment

The transition of the reference interest rates is a challenging plan for the risk management and the risk assessment unit. During the transition phase financial market participants need to manage basis risks between new RFRs and the existing reference interest rate, e.g. the basis between EONIA and ESTER. With non-consistent fallback clauses, which can possibly lead to different reference rates or different conventions, hedged business can potentially implicate new risks. While these aspects can affect the assessment quantitatively, an adjustment of the evaluation method is also an option, e.g. for the discounting of collateralised derivatives. In the course of the upcoming development, the process of measuring and modelling of market price risks will also need to be adjusted.



Possible solutions

Given the scope of impact, the diversity of the challenges, and the various dependencies, it is advisable to establish a cross-functional project or programme. Besides an efficient project management of all adaptions, the following aspects are of great relevance with regards to risk management:

- **Contract arrangement for new business:** The upcoming reform of reference interest rates needs to be taken into account while drafting new contracts or transaction confirmations. In the case of EURIBOR-referenced products it is recommended to enclose a legally solid fallback clause to reduce both legal and economic risks.
- **Analysis of contracts of existing business:** The identification of all contracts with dependencies on relevant reference interest rates helps determining potential legal and economic risks. Moreover, the analysis creates a basis for a legal assessment of fallback clauses and other dependencies. Due to the volume of impacted business, it is advisable to use optical character recognition and machine learning tools.
- **Transition management from a portfolio perspective:** While preparing contract and product amendments to manage basic risks and valuation impacts, banks need to take into account the above stated aspects and economic hedge relationships. As an example, it can be advisable to adjust derivatives, bonds, and loan packages simultaneously instead of treating the different product groups isolated.

Conclusion

The IBOR transition will be one of the key challenges for all financial market participants over the next few years. Especially banks, as their product range and process landscape is massively impacted along the whole value chain, will be facing complex and essential problems from the risk management perspective. It is still uncertain whether LIBOR, EURIBOR and EONIA will be replaced by new RFRs already by the end of 2021. Therefore, it is important for financial market participants to monitor this development and proceed with their transition planning.



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ECB Guideline for non-performing loans: Using the market to manage risk

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The EU's NPL Action Plan has never been as topical as it is today: while economic growth prospects are clouding over, public debt in Europe is rising. The clearest example is provided by Italy: the already highly indebted banks are being additionally burdened by the excessive budget policy of the government in Rome. The institutions hold Italian government bonds to a considerable extent in their balance sheets. Numerous German institutions are also active in Italy. In addition, banks not only in Italy but throughout Europe are busy reducing their old portfolios of non-performing loans (NPLs). In order to speed up these processes, the ECB has enacted a corresponding set of rules. However, implementation is progressing only hesitantly. One of the main reasons is that the NPL market is not yet uniformly instrumentalised. The financial industry and political institutions have been working for months on various initiatives to develop a viable solution and to combine concepts that have already been implemented in some areas into an efficient whole.

NPLs in Europe are also a risk for German banks

There is no doubt that European credit institutions have recently made progress in reducing NPLs. At the end of the second quarter of 2018, the NPL volume amounted to 657 billion euros or 4.4 percent [see ECB 2018]. According to the European Banking Authority (EBA), this figure had been 779.2 billion euros a year earlier [see EBA 2018]. However, this is still significantly more than in 2008, at the height of the financial crisis. At that time, 2.8 percent of the EU loan volume was non-performing [see ECB 2018]. At around 1.7 per cent, the default rate in Germany is the second lowest in the euro zone after Luxembourg [see ECB 2018].

The main problem is that in some EU countries the share of NPLs is several times higher than the European average: In Italy, NPLs accounted for 9.7 per cent of the credit volume in the second quarter of 2018. In Greece, half of the total gross value of loans is still non-performing [see ECB 2018]. The Federal Ministry of Finance (BMF) continues to describe NPLs as a "risk to the stability of the European financial system", which also endangers economic development in some European countries [see BMF 2017].

In Italy, several factors come together that represent a potential danger for German credit institutions: With around EUR 159 billion in non-performing loans, Italy has the highest NPL volume of all eurozone countries. Italy accounts for more than one fifth of all NPLs in the euro zone. This is aggravated by the fact that Italian banks hold a high proportion of national government bonds. According to surveys by the Bank for International Settlements (BIS), almost 20 percent of the assets of Italian banks consist of debt instruments issued by their own government [see BIS 2018]. The excessive financial policy currently being pursued in Rome will place new burdens on banks. Several German banks are also quite heavily invested in Italian government securities: According to the European banking supervisory authority German banks hold around 32 billion euros in Italian government debt [see EBA 2018]. If the Italian state were no longer able to service its payment obligations at a certain point in time the Italian banks would be at risk. This would also have a direct negative impact on the German financial sector.

In addition, there are potential dangers and requirements from the domestic market which German banks should prepare themselves

for. There are increasing signs that the economic upswing that has lasted for ten years is coming to an end. Past experience shows that in such a phase loan defaults also increase significantly in countries such as Germany. The banks are therefore called upon to create the necessary infrastructure for such a scenario today. On the other hand, however, the banks are required to further reduce their spending. Above all, investors and financial analysts are continually calling on German banks to improve their cost/income ratio. The banks are thus faced with two opposing challenges that can hardly be reconciled.

One solution to overcoming this contradiction is to develop an effective and professional secondary market. Firstly, the NPLs would no longer burden the balance sheets of the institutions and secondly, they would only cause low costs.

There is already a set of rules that can make NPL dismantling efficient. The EU's NPL Action Plan of 14 March 2018 [see European Commission 2018] defines the main steps and takes up the proposals from the European Council's Action Plan of 11 July 2017. It had called for measures in the following areas:

- 1. installation of a banking supervisory authority
- 2. reform of the rules on insolvency and debt recovery
- 3. development of secondary markets for non-performing loans
- 4. restructuring the banking system.

The main political decisions on the legal framework (points (1), (2) and (4)) have already been taken and are being implemented. But the best set of rules is worthless if it is not filled with life. It is therefore time to shape the secondary market for non-performing loans.

The secondary market is developing in the right direction

Trading in NPL portfolios has existed for a long time. However, the market lacks the dynamism that would be necessary to reduce the existing burdens more quickly and to better manage future crises. The market dynamics are dominated by several factors:

- Positive development in Germany – NPL portfolio was significantly reduced and the current default rate is 1.7 percent.
- Overcapacities in the internal workout are still being maintained.
- No single market, for example there are considerable national differences in insolvency law and regulation.



- As a result of the German three-pillar principle, the cooperative and savings bank sectors process their NPLs almost without exception within their own association.

A better infrastructure, effective risk systems and the use of innovative models (more on this later) would be the hallmarks of an efficient secondary market. In addition, banks should realise that they will need a Plan B for their overall bank management during the crisis, which will enable them to free themselves quickly from non-performing receivables in a critical scenario.

NPL trading instruments exist

Already today, banks are using different ways to manage problem loans and transfer them to an efficient market. These include

- The outsourcing of NPL portfolios to a servicer for a certain fee, which the bank has to pay to the service provider.
- The sale of receivables – to a credit fund or to an investor/servicer. Credit funds buy NPL portfolios of all kinds. This also includes receivables portfolios from consumer loans.
- Asset management: Formation of a joint venture between bank and investor/servicer – either by portfolio transfer or carve-out. In the latter case, not only a portfolio but the entire workout unit is outsourced. This option is new in NPL business and was successfully implemented for the first time by Intrum and the Italian major investment bank Intesa Sanpaolo in spring 2018.

Asset management company for the realisation and value enhancement of NPLs

The transaction completed in April/May 2018 differs significantly from a classic portfolio sale: loan portfolios were outsourced to an asset management company operated jointly by a service provider and a major bank. It is therefore worth taking a closer look at the underlying concept. Intrum holds 51 percent of the shares in the joint venture, Intesa Sanpaolo 49 percent. Intrum contributed most of its activities in Italy to the joint venture, while the bank contributed its NPL service platform. It employs around 600 people and manages non-performing loans amounting to EUR 30 billion. Some of these loans belong to an NPL portfolio of Intesa with a gross book value (GBV) of EUR 10.8 billion. Intrum acquired 51 percent of this together with another investor as part of the transaction. The advantage of this construction is that it meets the interests of all stakeholders. This means in detail:

- The debt purchaser gains additional business.
- The seller shortens his balance sheet, reduces his risk, releases equity and gains room for additional, new lending.
- By outsourcing or selling its workout unit, the bank as a whole achieves a considerable reduction in costs. It also simplifies its operating model.
- With the profitable realisation of its NPLs, it increases its own earnings and participates both in the know-how of the debt buyer and in the growth potential of the joint platform.

- The will of the legislator is also satisfied, as capital market and accounting rules require the reduction of risks and proactive handling of impairments.

In view of all these advantages, which certainly result from a particular constellation, one would be inclined to see the transaction as a kind of blueprint. It is certainly a guide, but every deal is different. For example, a bank may be forced to sell its entire NPL portfolio quickly. Or, to increase its efficiency, it may want to sell only one NPL service platform, for example. However, if the bank is looking to increase its value, the Intrum and Intesa Sanpaolo transaction can be considered a deal that will give an important boost to the industry.

An NPL market that considers all relevant options for action

The use of new instruments such as the jointly operated asset management company should be accompanied by the creation of more flexible structures that meet the requirements of European banking supervision. This will not be achieved overnight. But the financial community would do well not only to wait for regulatory requirements, but also to examine the existing options and develop its own requirements.

One option to make the NPL market more flexible and faster is platforms. Initial examples from the Fintech scene show that this approach can be successful. Market participants have been making use of this option for several years [see Maisch 2017].

The ECB's platform model and the free play of market forces

The ECB thinks in much larger dimensions than the Fintechs [see Fell/Grodzicki/Krusec/Martin/O'Brien 2017]. There, considerations

are being made as to whether the entire receivables market should be handled via platforms. One of the central elements is standardisation, for example the standardisation of IT, non-disclosure agreements and post-trade settlement. According to the ECB, the positive effects could be lower transaction costs, faster NPL deals, simplified due diligence and more attractive prices for both sellers and buyers. In addition, the platform could significantly improve the interaction between the different ways of bringing NPLs to the market. It is also conceivable to the ECB that there will be a greater diversity of assets traded: Not only non-performing consumer loans, but also ship financing, corporate and real estate loans/portfolios could be traded on this platform [see Fell/Grodzicki/Krusec/Martin/O'Brien 2017].

Overall, the ECB's approach would be a radical market-based solution. This is to be welcomed because it brings movement to the market. But even a trading centre like the one the ECB has in mind must meet the requirements of banking supervision. In addition, the desired standardisation also requires the standardisation of many provisions that are currently regulated at national level. First and foremost is insolvency law. Numerous political decision-making processes must be initiated for this purpose. There is therefore still a long way to go before such an NPL platform can be implemented.

The first steps – what the industry should do now

In the scenario described at the beginning, the financial industry needs concepts for NPL reduction, the effects of which are immediately noticeable. Apart from individual measures that can improve the interaction of forces in the NPL market, a change in mentality in parts of the banking industry would also be desirable. In the majority of cases, banks regard non-performing loans as a portfolio that needs to be managed rather than as an asset capable of generating returns.

In this context, it could be helpful to open up the market more to investors than in the past. This could stimulate demand, increase transparency and improve price competition. With better prices, it would be much more attractive for institutions currently holding large NPL portfolios to make more frequent use of the NPL reduction instruments described here, thereby improving their balance sheets and costs. At the same time, banks could provide for downturn scenarios by creating the necessary infrastructure.

Investors and service providers such as Intrum are suitable for shaping this infrastructure. As a rule, they have automated all processes – from onboarding to the back office. High volumes also lead to economies of scale that an institution can hardly achieve on its own. And finally, they create innovative and market-driven solutions such as the Asset Management Company, which makes it easier for banks to deal effectively with current and future challenges.

Summary and outlook

With the current regulatory framework, the financial industry has the opportunity to create a highly efficient market in which NPLs can be transferred more effectively and quickly into a successful recovery process.

Three components are relevant: an efficient secondary market, new instruments such as the asset management company for NPLs, and the automation of all processes relevant to NPL management. In this way, the market can become an effective risk manager for non-performing loans.

Investors and service providers could play a key role in addressing current and future NPL issues: Their technological leadership, their know-how and their ability to develop innovative solutions predestine them for this task.

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Challenges in implementing remuneration requirements at group level

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In August 2017, the new Remuneration Ordinance for Institutions (IVV) came into force, and has to be implemented between the beginning of the 2018 financial year and the beginning of the 2019 financial year. The reason for its delayed implementation in many companies was not so much the fact that there were transitional arrangements for individual requirements, but rather that the "Interpretative Guidance for the Remuneration Ordinance for Institutions" issued by the BaFin was not actually published until February 2018.

Since the first half of 2018, implementation of the group regulations for banks' remuneration systems has thrown up significant challenges for many institutions. Even after publication of the interpretative guidance, there is much that remains unclear and in need of further interpretation, which means that companies directly subject to the ordinance are now individually responsible for implementing and applying the normative requirements in an appropriate way. Questions relating to implementation of the group regulations have also become relevant for many companies because the possibility set out in Section 27 Para. 3 of the old version of IVV of not including insignificant subordinate companies in individual cases has been almost completely eliminated from the new version of the IVV without being replaced, and individual companies in a group can only be excluded in very tightly restricted exceptional circumstances.

The aim of this article is firstly to briefly analyse the remuneration requirements that companies have to comply with at group level, and then move onto how compliance with the requirements can be ensured and how individual requirements relating to groups can be applied.

Normative requirements for remuneration systems in group structures

The regulation in Section 25a Para. 1 p. 3 section 6 of the German Banking Act (KWG) states that an appropriate risk management system must encompass appropriate and transparent remuneration systems for senior executives and employees, with a focus on sustainable development of the institution. Under the regulation in Section 25a Para. 3 of the German Banking Act, this also applies to institutional groups, financial holding groups and mixed financial holding groups, and sub-consolidation groups as defined in Article 22 of the Capital Requirement Regulation (EU) No. 575/2013 (CRR), with the stipulation that senior executives of the parent company or the company with a sub-consolidation obligation are responsible for proper business organisation of the institutional group, financial holding group, mixed financial holding group or sub-consolidation group.

The general clause type requirements of the German Banking Act are described in more detail in the IVV, which is intended to set out specific regulations under Section 25 Para. 6 of the German Banking Act.

Here, the central standard for application of remuneration regulations at group level is the regulation in Section 27 of the IVV. Paragraph 1 of this standard stipulates that the parent company must set out a group-wide remuneration strategy that implements the requirements of Section 25a Para. 5 of the German Banking

Act and Sections 4 to 13 of the IVV in respect of all employees in companies affiliated to the group.

In addition, if the parent company is significant as defined in Section 17 of the IVV, the rules for risk analysis and group risk bearers apply, as set out in Section 27 Para. 2 of the IVV. Comment: Under Section 2 Para. 8 of the IVV, the term "risk bearers" refers to those employees whose professional activities have a significant impact on an institution's risk profile. Group risk bearers are employees whose professional activities have a significant impact on the overall risk profile of a group. According to the requirement in Section 18 Para. 2 of the IVV, risk bearers are to be determined based on a risk analysis.

Within the IVV, various requirements refer to the concept of the "group" [for example Section 5 Para. 5 IVV; Section 7 Para. 1 IVV, Section 18 Para. 5 IVV, Section 19 Para. 1 IVV].

Group concept as defined in IVV

What is meant by a "group" as defined in the IVV is drawn directly from the legal definition in Section 2 Para. 12.

This states that the group concept and the concepts of parent and subordinate company are based on the requirements of Section 10a Para. 1 to 3 of the German Banking Act. Thus, what is known as the "supervisory consolidation group" is directly relevant, i.e. the group of companies that are combined for the purposes of equity capital determination under Article 11 ff. of the CRR. The supervisory consolidation group therefore includes subsidiaries that are institutions themselves, capital management companies, financial companies, providers of secondary services and payment services supervision institutions.

To this extent, it initially appears relatively clear which companies are covered by the group concept and how the rules for the group concept are to be understood.

Consistency of the IVV group concept with the group concept from AT 4.5. MaRisk

In addition to the group concept as defined in IVV, which is linked to the supervisory consolidation group, the rules in the BaFin Circular 09/2017 – Minimum requirements for risk management



(MaRisk) include an extended understanding of what constitutes a group. MaRisk AT 4.5. section 1 p. 2 states that the scope of risk management at group level should extend to all significant risks in the group, regardless of whether or not they are caused by companies subject to consolidation. Consequently, by taking this risk-based perspective MaRisk moves away from the bank supervisory consolidation group and extends it to incorporate the special purpose companies not subject to consolidation listed as examples in brackets following MaRisk AT 4.5 section 1 p. 2, but also industrial companies for example.

For the purposes of regulating remuneration systems, this issue is relevant to the extent that risk management as defined in Section 25a Para. 1 p. 3 of the German Banking Act therefore now has to include these companies in respect of remuneration. If, according to MaRisk AT 4.5, a group business strategy and group risk strategy at group level also includes companies that are not part of the supervisory consolidation group, this must also apply to risks caused by remuneration systems in companies outside the supervisory consolidation group.

The group concept set out in the IVV is therefore insufficient. MaRisk AT 4.5. also requires consideration of the remuneration systems of other companies with which there is a relationship under company law, where their remuneration systems can result in risks (auditing practices show that these issues are only rarely taken into account by institutions).

The group concept as part of performance measurement at group level

In addition to the discrepancy between the group concepts in IVV and MaRisk discussed above, there is also a need for clarification on the question of the extent to which the group concept in IVV can include companies that fall outside the legal definition. Specifically, the question is to what extent the consolidation group relevant for accounting purposes can be used as an exception for individual regulations that relate to groups. Comment: The consolidation group for accounting purposes is based on Section 290 of the German Commercial Code for companies reporting under the German Commercial Code, with the consolidation obligation based purely on holding and size relationships. In contrast to the supervisory consolidation group, activity and thus classification as bank-related activity is not taken into account; the same

applies to the risk relevance, which is to be taken into account as a decision-making criterion for risk management purposes under AT 4.5.

In terms of implementing the requirements for remuneration systems, the accounting-related consolidation group is primarily relevant if it represents the basis for performance measurement using indicators and the parameters used are based on (audited) consolidated accounts. This raises the specific question of the extent to which this kind of accounting-related indicator can be relevant at group level if the consolidation group for accounting purposes differs from the supervisory consolidation group.

According to Section 19 Para. 1 of IVV, the critical criterion is an appropriate consideration of the "performance of the group". Since "group" is defined in Section 2 Para. 12 of IVV, based on the IVV wording the supervisory consolidation group would be chosen as the benchmark.

In this context, a situation can occur where, in consolidated accounts for a mixed group, a much more positive picture of the asset, financing and income position can be obtained than would be the case with an isolated analysis of the supervisory consolidation group (for example when including very profitable companies outside the financial sector). In this case, if the agreed targets include a target based on the consolidated balance sheet, the question arises of whether or not adaptation is necessary.

To focus the question: In this kind of situation, would a supervisory board be forced to measure the performance of a senior executive at the level of the supervisory consolidation group, as the IVV stipulates based on the wording of the requirement in Section 2 Para. 9 of the IVV combined with Section 2 Para. 12 of the IVV? Or is there scope here for taking as a benchmark a group target based on the accounting-related consolidation group?

The fact that mixed groups can be an issue in terms of the IVV is demonstrated by the interpretative guidance for the IVV, which provides a marginal opinion on the question of "group bonuses". Where a group bonus is paid, this must be treated as variable remuneration under the IVV definitions, even if assessment of the bonus is based exclusively on overall consolidated results. This should apply regardless of whether or not the employees or the institu-



tion itself can actually influence the overall consolidated results [See interpretative guidance for Section 2 "Definitions of terms"].

Therefore it appears reasonable to initially measure both performance and negative contributions to results based on the group relevant for accounting purposes, if the relevant senior executive or employee has an influence on this. Agreed targets with a group component are generally based on the results of the group relevant for accounting purposes. This procedure is not in contradiction with the principles of the IVV. This is because the obligation to comply with the requirements of Section 7 of the IVV in terms of bonus pool auditing using the regulatory indicators to be taken into account in this context provides a sufficient corrective. However, if in exceptional cases the consolidated results are positive despite negative institution results or negative performance at the level of the supervisory consolidation group (due to the positive influence of units in the non-financial sector), an overall bonus pool would only be defined if the requirements of Section 7 of the IVV are met. Comment: For example, under Section 7 of the IVV a bonus pot may only be defined if the risk bearing capacity, multi-year capital planning and income situation of the institution and the group allow this.

Therefore, for the purposes of Section 19 of the IVV, a parameter can be accepted as part of performance measurement even though it relates to the results for a group that is not congruent with the supervisory consolidation group.

Inclusion of employees from all group companies in risk bearer analysis

Under Section 27 Para. 2 p. 1 and 2 of the IVV, the parent company has an obligation to determine all of the employees in group companies whose professional activities have a significant impact on the group's risk profile (group risk bearers as defined in Section 2 Para. 8 p. 2 of the IVV).

The question arises as to the extent to which individual employee groups or companies can be ignored from the outset of the analysis if the whole population of employees to be assessed is defined. In this regard, the interpretative guidance only stipulates that subordinate companies excluded from the scope of the group-wide remuneration strategy under Section 27 Para. 1 of the IVV can be ignored.

This question primarily becomes relevant if the examination depth of the subordinate companies has to be defined. Based on the definition in Art. 3 section 18 of the CRR, a provider of secondary services is a company whose main activity consists of ownership or management of real estate, management of data processing services or a similar activity, which has the nature of a secondary activity in relation to an institution's main activity. In this context, at the level of subordinate company employees, by applying Section 2 Para. 7 of the IVV it could certainly be allowable to exclude all those employees whose activity clearly has no relationship to the operation of banking business or the provision of financial services. The senior executives of the subordinate company have to be assessed differently. They always have to be included in a risk analysis as their "professional activities" involve leading and controlling the subordinate company and thus can constantly contribute to influencing the overall risk profile of the group. This applies even if a subordinate unit only appears marginal from a size perspective. The reason for this is that, in the event of mismanagement, any economic difficulty or insolvency of a company in an institutional group can involve at the very least reputation damage for the units involved in banking business or financial services. Furthermore, the senior executives have a responsibility or an obligation to pass on various information (for example providing balance sheet items) in order for the parent company to fulfil supervisory obligations. Therefore, inclusion of the senior executives from these subordinate companies in the risk bearer analysis is mandatory.

Treatment of senior executives and employees of companies affiliated to the group that do not receive separate remuneration for their activity in subordinate companies

In addition to the question of whether employees of subordinate companies are to be included in the risk bearer analysis, the question arises as to how to proceed if the employee's activity has a relationship to banking business or the employee has been identified as a risk bearer but the employee is remunerated by the parent company and does not receive separate remuneration from the subordinate company.

There is a frequently occurring situation in which the senior executive positions in subordinate companies are held by people from the second or third level of management at parent company level. Example: A parent company with a consolidation obligation has

various subsidiaries, one of which is involved in finance leasing and manages several properties. Despite their activity as a pure property manager, these companies are classed as regulated financial service providers, and have to comply with all supervisory requirements for financial services institutions.

In practice, in this situation the activity of an employee employed in the parent company is carried out solely at the level of the parent company. This occurs to a greater extent the less operational the activity in the subordinate company is. In these cases, internal cost allocation is frequently carried out in such a way that the subordinate company pays a "service fee" to the parent company for the employees' activities.

These situations represent a challenge in terms of implementing the IVV requirements. Where the subordinate company is licensed as a financial services institution itself, it must implement the IVV requirements as set out in Section 1 of the IVV. This also applies if the company does not pay any wages to the employee in an individual case. In these cases, it would also make sense to have regulations for which parameters are used in performance measurement and, particularly, how misconduct is dealt with. In an individual case, it may transpire that there are performance deficits in the activity at the level of the subordinate company but no performance assessment is carried out there because no remuneration is paid. At the level of the parent company, it frequently occurs that the direct line manager carrying out an assessment has no insight into specific activities in the subordinate company and thus cannot make a genuine performance assessment or gain an understanding of any violations of obligations.

To take appropriate account of contributions to results in line with the requirements of Section 5 Para. 2 and Sections 18 ff of the IVV – including negative individual contributions to results and personal misconduct – in these cases the performance measurement at the level of the parent company must also assess the employee's performance for the subordinate institution. A process must be in place that enables the responsible assessor in the parent company to systematically monitor performance in the subordinate company and ensures that negative contributions to results or any misconduct is identified.

Summary

Implementation of the remuneration requirements remains challenging at group level. Publication of the Interpretative Guidance for the Remuneration Ordinance for Institutions has done little to help in this area.

Although the intention of the issuers of the ordinance is for management of institutional groups to be primarily based on the supervisory consolidation group, it appears pragmatic – in individual cases even essential – to apply the group concept from MaRisk AT 4.5 or the accounting-related consolidation group when implementing the normative requirements from the IVV.

It remains to be seen to what extent the necessary inclusion of even insignificant subordinate companies in the group, as defined in Section 27 of the IVV, can be implemented in such a way that, on the one hand, all employees in the supervisory consolidation group are reasonably included without, on the other hand, giving disproportionate emphasis to the underlying work and the resulting impacts of institutions and employees.



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A factor-model approach for correlation scenarios and correlation stress testing

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How can we assess the portfolio risk impact of adverse changes in correlations? A given adverse correlation scenario should be extreme, yet realistic and economically meaningful; it must be mathematically consistent; and it should be simple yet flexible enough to cover correlation risk drivers that are specific to a portfolio. We explain how such a correlation stress testing methodology can be constructed.

Diversification – typically captured by correlation – lies at the heart of many financial applications: a diversified portfolio is less risky than a concentrated portfolio; hedging strategies may involve only imperfectly correlated assets instead of perfect substitutes. It is well-known that correlations are not constant over time and may be strongly affected by specific events [Longin and Solnik 2001; Ang and Bekaert 2002; Adams et al. 2017] and that changes in correlation may lead to potentially unexpected or unquantified losses. This can be witnessed in cases such as LTCM [Jorion 2000], Amaranth Advisors [Chincarini 2007], the London Whale [Packham and Woebbeking 2018a].

The prominent role of correlation in financial portfolios prompted regulatory agencies to require risk model stress tests that account for "significant shifts in correlations" [BCBS 2006, p. 207 ff.].

In Packham and Woebbeking (2018b), we develop a technique for generating stressed correlation matrices from specific risk factor scenarios. The correlation stress testing method borrows elements from parameterising correlation matrices in interest rate modelling (e.g. [Rebonato 2002]; [Schoenmakers and Coffey, 2003]). These parameterisations have in common that the degree of correlation depends on the maturity difference of the underlying interest rates (e.g. swap rates). The correlation between two entities is modelled as a parametric function of risk factor differences. In other words, if two assets differ in a specific aspect, then this decreases the correlation between the assets. For example, in a portfolio of credit derivatives, risk factors would typically include maturity and differences in investment grade (e.g. investment grade vs. high-yield). The risk factor weights can be calibrated for example from historical data.

The parametric relationship between risk factors and correlations allows to challenge diversification benefits in a realistic way by quantifying potential losses from correlation changes or by simulating a correlation break-down due to various scenarios. Quantifying these risks is particularly important if a portfolio or a hedging strategy may be adversely affected by a correlation breakdown amongst the portfolio constituents. For example, hedging strategies involving non-perfect substitutes, such as a stock portfolio hedged by index futures, are sensitive to correlation changes and thus vulnerable to adverse correlation scenarios.

Correlation changes do not instantaneously impact profits and losses, but rather affect the co-movements of two or more assets

over time, and as such determine the effectiveness of diversification and hedging strategies. As a consequence, correlation stress tests must be integrated into existing risk measures such as value-at-risk (VaR) or expected shortfall (ES). The correlation risk component can be isolated by comparing risk measures under different correlation scenarios. In addition, as adverse correlation scenarios often occur jointly with volatility shocks [Alexander and Sheedy 2008; Longin and Solnik 2001], we develop a joint correlation and volatility stress test model.

Within the framework we show how the factor structure of worst case correlation scenarios can be identified. As each parameter represents an economically relevant correlation risk factor, it is therefore possible to identify critical portfolio structures that might require particular attention from a risk management perspective.

Aside from the impact of a given scenario, one is also interested in the plausibility of the chosen scenarios. This can be implemented by assigning a joint probability distribution to the correlation parameters in order to define a constraint for correlation scenarios. Such a constraint would typically be defined as a probability (i.e., plausibility) of a scenario. This can be implemented via the so-called Mahalanobis distance, which measures the distance of normally distributed random variables from the center of the distribution.

The joint correlation and volatility stress scenario is obtained by assuming that a vector of asset returns follows a Student t-distribution. The t-distribution belongs to the class of normal variance mixture distributions, which allow for a decomposition into a correlated normal distribution and a common scaling variable. A joint stress scenario is then achieved by independently modifying the correlation matrix of the normal distribution component and modifying the scaling variable, which is set to a high quantile to simulate a high volatility.

► Fig. 01 provides an illustration of the correlation as well as the joint correlation and volatility stress test. The graphs show the one-day 99% Value at Risk (VaR) for a stylized long-only portfolio with 2^m assets, which corresponds to the number of correlation combinations that can be achieved with m risk factor dummy variables. The joint correlation and volatility stress test on the right-hand side is presented as a function of v , which is the "degrees of freedom" parameter of the t -distribution, measuring the heaviness of the tails. For a long-only portfolio, the increase in VaR from correlation stress must be fully attributed to diminishing diversification,



caused by increasing correlations. The results can be more extreme for portfolios that include hedges, where a reasonable correlation stress test must also include scenarios of increasing and decreasing correlations.

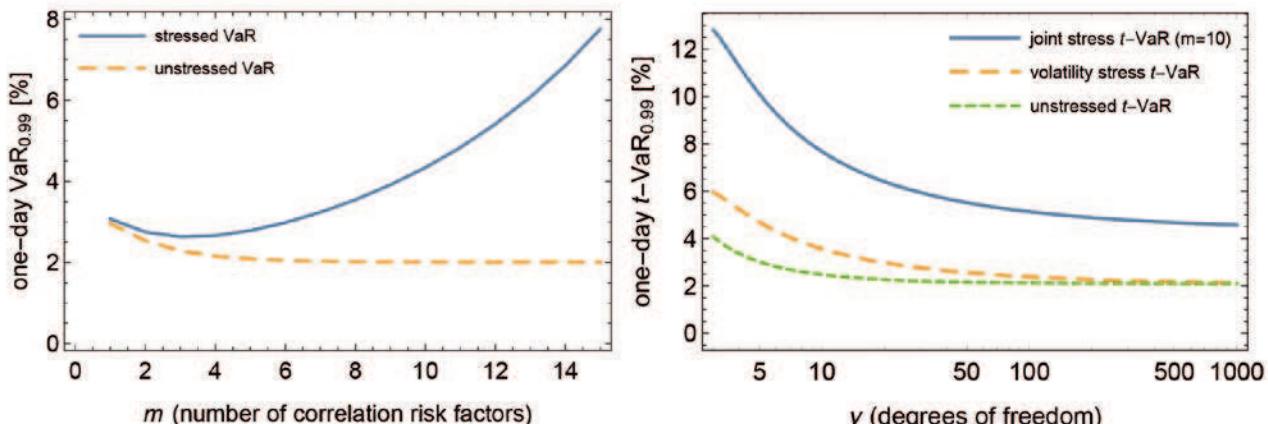
To demonstrate the technique in a realistic setting, correlation stress tests are applied to the portfolio of the so-called "London Whale", a term used in the finance industry to denote a USD 6.2 billion loss in 2012 of a credit derivative portfolio consisting of CDX and iTraxx credit derivatives run by JPMorgan. In late 2011, in an effort to reduce the risk of the position without monetising losses, the notional amount of the portfolio was increased, while relying on the ability of similar credit index positions to act as hedges for each other [JPMorgan 2013]. Our analysis shows that correlation scenarios and stress tests reveal the high riskiness of this position

and thus might have led to a more appropriate risk assessment of the position.

For the London Whale case, we identify 5 relevant correlation risk factors: maturity, index series, investment grade (yes/no), CDX vs. iTraxx, index vs. tranche. Based on the exact portfolio composition as of March 23, 2012, the one-day 99% portfolio VaR increases by up to 83% through applying correlation scenarios. Accounting for both stressed correlation and stressed volatility increases the VaR by as much as 253%.

We conclude that the dependence structure amongst portfolio components is of great relevance to the risk inherent in a financial portfolio, and as such, stress testing correlation provides important information about portfolio risk. Correlation stress tests are par-

Fig. 01: Illustration of a correlation stressed (left) and joint stressed (right) Value at Risk.



Source: own illustration



ticularly insightful on portfolios with large positions, as adverse correlation moves may be triggered from the market impact of large trades. More specifically, the ordinary co-movement of two or more assets may be disturbed by the market price impact of large trades.

A further application of correlation stress testing as developed in this paper would be the analysis of central counterparties (CCP), which clear exceptionally large financial portfolios. More specifically, to account for diversification benefits and to reduce clients' clearing costs, initial margins are typically calculated on a portfolio basis. The resulting margin requirements may be highly correlation-sensitive. Moreover, adverse correlation scenarios may affect many or even all clients, creating simultaneous margin calls to post additional collateral. The correlation stress testing method developed here is capable of identifying these kinds of systemic risk events.

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Changes in asset management in the light of Solvency II

Steffen M. Hahn | Matthias Müller-Reichart | Frank Romeike

The social and economic significance of the insurance industry within a risk society is obvious. A modern economy is inconceivable without the supply of professional risk carriers as well as without a functioning monetary and credit system. Insurance companies create planning security by assuming ex-post stochastic risks by making ex-ante deterministic premium payments. With these premium payments and their existing equity capital, the insurance companies act as investors on the capital market. With an investment portfolio of around EUR 1.6 trillion at the end of 2017 for German insurers and reinsurers alone, the insurance industry is one of the most important investors in the German economy (see ► Tab. 01). The relevance of the insurance industry worldwide must be assessed similarly in all economies.

With the financial crisis of 2008/2009, the regulation of the financial services industry was tightened accordingly. Against the background of the high investment volume of the insurance industry, the question arises as to what influence the current regulation of insurance companies has on the investment strategies and activities of this sector. At the centre of the discussion is the problem of whether an investment strategy (and the corresponding product strategy) should be driven by regulatory constructs (which primarily pursue a different, purely consumer-oriented objective). These and other questions were examined in the form of a qualitative evaluation study conducted by Invesco, one of the largest independent investment companies in the world, in cooperation with the RiskNET competence portal and under the scientific direction of the Rhine-Main University of Applied Sciences exclusively for investors in Germany and Austria. Some selected results are summarized below.

The risk landscape of insurers

Many insurers have been facing a strategic and economic dilemma for years in a politically induced low-interest phase that has lasted for many years. The continuing density of regulation, coupled with an extremely low interest rate environment and a continuing rather hesitant monetary policy normalisation of the European Central Bank (ECB) (compared with the US Fed), are among the factors that characterise the risk portfolio of insurers (see ► Fig. 01). In addition, there are other factors that have a massive impact on the risk map. These include, for example, (geo)political and regulatory uncertainties as well as the entry of new market participants with disruptive business models (see Lemonade or Oscar as fully digital providers whose business model is based on artificial intelligence methods, among other things). These developments are complemented by a societal change in values of the so-called "digital natives", a generation that has grown up in and moves within the digital world. Thus – based on independent studies – the young generation is also characterized by a willingness to take risks and quick action, analogous to computer games, where risk behavior quickly leads to the goal - after a "game over", you simply restart again. This "generation Z" is diametrically opposed to the "generation X" of "fully comprehensive insurance" and will have a massive influence on the business model of many insurers.

To illustrate the relevance of investments in the insurance industry, selected economic variables are compared in ► Tab. 01. The

current study "Study on the impact of Solvency II on the asset management of insurance companies" [Invesco Asset Management Deutschland GmbH/RiskNET GmbH/Hochschule RheinMain 2018] focuses on the question of whether insurers have changed their tactical and strategic asset allocation due to Solvency II and in what form this has taken place. In addition, the study discussed the question of whether further changes driven by Solvency II are to be expected for the business model of the insurance industry. In this context, potential conflicts of objectives (e.g. in the context of accounting under the German Commercial Code) or specific questions regarding the structure of investments (e.g. leverage in real estate investments) were also analysed. The study was conducted as a qualitative evaluation study and is based on narrative interviews with 17 selected experts from the fields of asset management and risk management (usually at board level) from insurance companies. The study is intended only for investors in Germany and Austria.

After a consultation period of around 12 years, the European Solvency II regulatory framework has been in force since January 2016. The Framework Directive 2009/138/EC was already published in 2009. Under the modified framework, insurers must now have sufficient capital at their disposal to be able to cope with even negative events or risk events which, statistically speaking, occur only once in 200 years (safety level of 99.5 percent). These losses can result, for example, from massive distortions on the capital markets (so-called market risk). Against this background, Solvency II places high demands on governance and regulatory reporting of market risks, particularly in the investment area. The assumed stress values for capital market risks represent the strongest driver for the regulatory capital requirements for insurance companies. Here the basic rule applies: the riskier an insurer invests the money, the more equity must be reserved for risk materialisation.

Governance of investment activity at the heart of Solvency II

At the heart of the regulatory requirements of investment policy is the governance of investment activity required by Solvency II. Insurance undertakings must provide for their investment governance within the framework of proper business organisation pursuant to § 23 VAG and Art. 258 Solvency II Regulation EU2015/35. In accordance with the "Prudent Person Principle" (§ 124 VAG), the Three Lines of Defense (TLoD) must be taken into account accordingly:

1st line of defence: Implementation of the Prudent Person Principles by naming, training and further education (fit and proper) of the risk takers and risk owners of the investment.

2nd line of defence: Implementation of the risk management and risk controlling function in capital investment by ensuring the sub-tasks asset liability management, asset allocation with special consideration of derivatives trading, management of liquidity and concentration risk, use of external ratings, management and control of investments in securitisation positions, management and control of possible lending, allocation in infrastructure investments and mapping of investment risk in the Own Risk and Solvency Assessment (ORSA) as part of the risk and solvency assessment.

3rd line of defence: The internal audit process reviews an investment that is commensurate with the risk.

Solvency II: "Tick mentality" and "compelling" secondary condition

With regard to tactical and strategic asset allocation, the study results show that the majority of insurers continue to rely on safe forms of investment despite Solvency II. The influence of Solvency II on asset allocation is considered negligible by the majority – also due to the good and long-term corporate capitalisation. However, in the course of the low-interest phase, it has become apparent

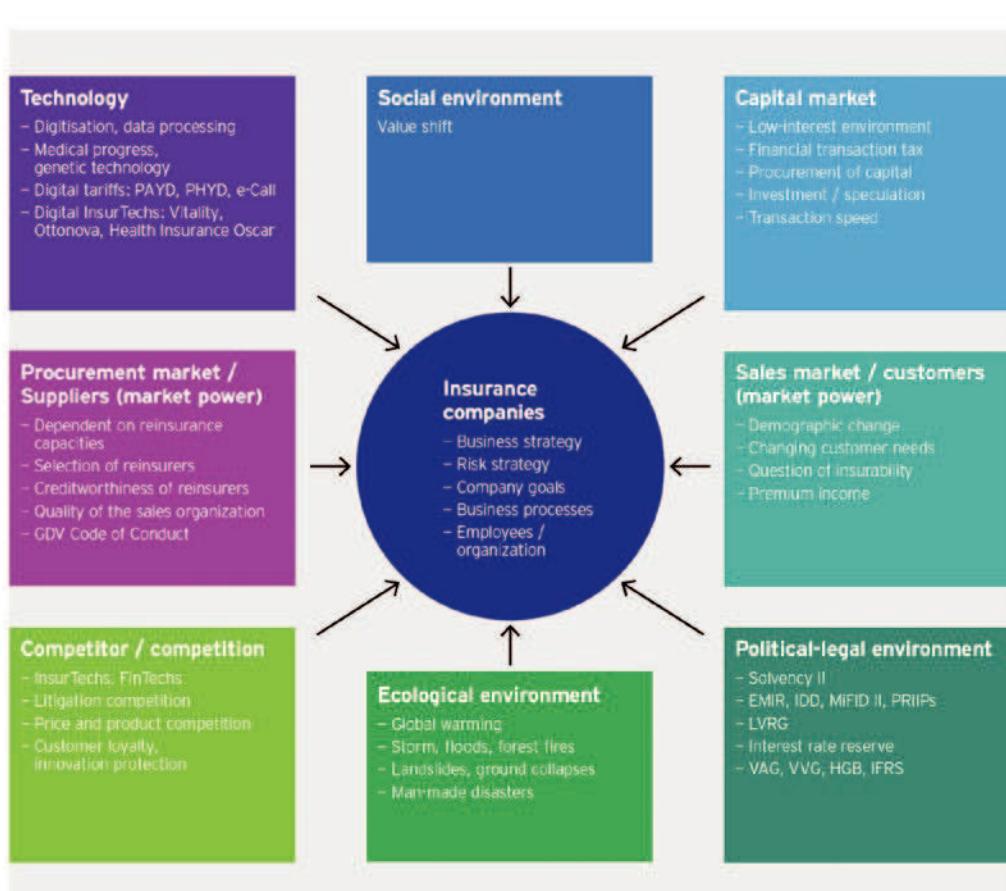
that alternatives are increasingly being sought, especially for new business.

The partly high administrative and organisational effort is seen as critical, which leads to a "principle-based" view of investment processes. This increases the risk of only having to invest a minimal amount of time and effort in order to comply with guidelines and to fulfil what is formally important with a kind of "tick mentality". The negative consequences of an investment policy induced by Solvency II for long-term investment income are also viewed critically. In conjunction with a large administrative and organisational outlay for Solvency II, the insurance company's total income also suffers as a result.

The future influence of Solvency II on asset allocation is consistently assessed by the majority of insurers surveyed as negligible. In the question of the application of internal models versus the standard approach, both approaches are taken and, depending on the organisational structure and size, both model approaches are applied.

In principle, Solvency II does not prove to be the decisive influencing factor of insurance business corporate policy, but rather a "mandatory" secondary condition that often has to play a role in the insurers' regular operations and leads to a not inconsiderable effort.

Fig. 01: The risk map of the insurance industry



Source: Invesco Asset Management Deutschland GmbH/RiskNET/Hochschule RheinMain 2018, S. 10



Different paths, knowledge transfer and black box

In the opinion of the majority of the insurers surveyed, an adjustment of the standard model of Solvency II should be advocated. The reasons vary and range from a risk weighting that is not always comprehensible (lack of risk capital backing for European government bonds) to criticism of real estate risk, which cannot be transferred to the German market with a capital backing of 25% of the market value. When criticising the often granular orientation of the standard model, however, it should also be borne in mind that readjustment with the aim of greater accuracy can also lead to increasing complexity - a point that insurers often shy away from, particularly because of the increasing administrative and organisational extra work involved. The avoidance of this additional effort could also be one reason why many of the companies surveyed tend to prefer a pragmatic approach when using the standard model and the internal model.

The principle-based approach of Solvency II also shows the different approaches of insurance companies when looking at the "Prudent Person Principle" (PPP). The standard approach does not exist – depending on the organisation, the majority of insurance companies merely observe internal and external guidelines and organisation-wide processes as master plans. The majority of interviewees does not even name the risk manager to be maintained according to governance criteria as an important link and control authority in the entire organisational process. This function in particular would be a central task for the entire organisation in the Solvency II process.

The lack of awareness and significance of risk management could also be an indicator of why the design of governance requirements in terms of employee training and further education shows that

Tab. 01: Investments of the insurance industry in comparison to comparative economic figures

	in billi- on EUR
Investments of the insurance industry	1,596
Federal budget Germany	317
Capitalization DAX 30	938
Gross domestic product in Germany	3,144
Investment funds (mutual funds)	916
Pensions funds	35

Sources: BaFin, GDV, BMF, BVI, Deutsche Börse, StBA. Status of the data: 31.12.2017

in many cases there is a lack of verifiability of skills and qualifications. The important cross-cutting function of risk management is not fulfilled to the extent that it should exist. This lack of radiation of risk management competencies generates supposed knowledge that disappears in a kind of black box or is passed on by employees in their own organization without quality checks. Obviously, the monitoring and controlling function of a risk manager seems to be missing in insurance companies.

Lack of risk culture, Solvency II runs with

Although the majority of policyholders rely on internal guidelines, reporting and an internal control system (ICS pursuant to §29 VAG), this is usually of a formal and less lived nature. Against this background, the lack of consideration of a lived risk culture seems less surprising – de facto, none of the companies surveyed explicitly mentioned the topic of a developed and above all lived risk culture in the sense of the overall organisation. It is precisely this point, however, that is understood as a prerequisite and task of the management (see §§ 23 ff. VAG): The entire management is thus also responsible for ensuring that the company has an appropriate and effective risk management and internal control system. In order to live up to their overall responsibility, the managing directors must also develop a risk culture that is appropriate for the company and that is lived in the company and continuously further developed.

Ultimately, Solvency II as the decisive and value-oriented influencing factor is missing in the majority of responses. Rather, Solvency II is included in the overall process of the vast majority of insurers surveyed - but only as one of many factors that exist in the regulatory world of insurers.

Conclusion

One of the key findings of the study is that Solvency II is only a secondary condition for determining tactical and strategic asset allocation for almost all participating insurance companies and is by no means regarded as the main driver. However, a majority of insurers point out that Solvency II is at least one of the dominant constraints. Solvency II, due to its risk-adjusted, co-adjusted requirements, leads to negative consequences for long-term investment income and, due to administrative and organisational expenses, also for the total income of a company. Therefore, according to the study participants, Solvency II leads to an economically less sensible asset allocation that only conserves the solvency capital.

It should be critically assessed that the topic of risk culture in particular has not yet reached the agenda of all companies. By only linking all other elements of risk management – methods, organisation and processes – in a “lived risk culture”, this shortcoming thwarts an efficient risk management system for insurance companies. Without a risk culture, risk management remains an empty and bureaucratic shell. Appropriate regulation and supervision can provide an impetus to improve the risk culture in the financial sector. However, inadequate regulation can also have exactly the opposite effect, so that risk management is all the more understood as an additional and bureaucratic burden. A living risk culture is essentially about the following four elements: an adequate, risk and value-oriented management culture (“tone from the top”), clear responsibilities (“accountability”), open communication and critical dialogue (“effective communication and challenge”) and appropriate incentive structures (“incentives”).

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Sustainable fund investments in SME economic capital

Wolfgang Hartmann | Dirk Notheis | Marc Pahlow

Since 2013, Rantum Capital – a fund asset management company domiciled in Germany – has been investing in German SMEs in the form of subordinated loans. Over this period, they have provided financing to a large number of SMEs in different situations. In this article, the authors will provide a detailed exploration of their experience with this investment strategy, its sustainability requirements, the associated risks and return opportunities, from their perspective as senior executives at Rantum Capital, and also give a detailed appraisal of future prospects.

Reasons for requiring economic capital

As well as representing the majority of jobs and domestic value creation, in many ways German SMEs are the backbone of our society and a foundation of its stability. To enhance their position in their respective niches in international markets, and to effectively realise their growth potential, SMEs have increased requirements in terms of working capital financing, which to date have largely been covered by domestic banks, supported by liquidity and low ECB interest rates.

However, when SMEs are faced with exceptional challenges, such as those associated with very significant growth or technological shifts or as a result of acquisitions or changes of ownership that trigger high one-off financing requirements, the conventional credit supply based on primary collateralisation through the banking system is often insufficient. To strengthen equity and to improve a company's individual rating, they either need a direct increase in share capital or supplementary economic capital, such as formation of mezzanine capital or subordinated loans.

In specific situations, to avoid watering down many companies – particularly those that are family-run – prefer to strengthen the balance sheet with supplementary subordinated loans, rather than equity from third parties. The advantages of keeping operational control of the business in house and remaining master of their own destiny are generally considered to more than outweigh the ongoing interest costs associated with subordinated loans.

After implementation of Basel III and the increased regulatory costs it brings, subordinated loans are now very rare on banks' balance sheets. Before the financial crisis, state banks in particular were leading suppliers in the market. This gap is now being filled by the capital market through specialist loan funds, such as Rantum Capital. In recent times, many SMEs have had very positive experiences working in conjunction with these kinds of funds.

Sustainability as an imperative in the investment strategy

Both ethically and operationally, investing third party capital demands an exceptionally high degree of care and sustainability in terms of the decisions made. Since investment resources in the form of economic capital are only available for a longer term, in many cases 7 to 10 years, it is essential to adopt a long-term perspective of the development of the investment object. This long-term perspective is part of sustainable due diligence and should incorporate factors such as the dynamic and cyclical nature of markets, the disruptive risk of new technologies, the quality and loyalty of

managers, the investment profile or a company's productivity and cashflow situation.

Rational, risk-appropriate documentation is another central element of sustainable investment. When issuing subordinated loans, key issues include the appropriateness of the covenant, the carefully weighed up information and co-determination rights, and the structure and adjustment of terms. The need for sustainability is a dialectic one – in other words it has to simultaneously incorporate not just the perspective of the investor but also that of the borrower. Putting an excessive burden on the borrower in a desire to maximise short-term profit is not in the investor's long-term interests, and in marginal cases will lead to failure or result in an increased risk of loss. Only a responsible balance of interests allows defaults to be minimised and, as a consequence, delivers sustainable success from the investment strategy.

In terms of Rantum Capital's specific investment strategy, the sustainability argument is underlined by the involvement of what are known as industrial partners. These are people in the investment team with decades of senior management experience in their respective sectors. With their in-depth know how, they are effective not just as part of the due diligence process but also once the loan has been issued as sparring partners and strategic advisors to the company or family, thus generating sustainable additional benefits. Rantum Capital views a subordinated loan as a long-term relationship that extends well beyond the collection of interest, serving to reduce the default risk and sustainably support the borrower's performance.

Recognition as economic capital in bank rating system

When offering subordinated financing, its recognition as economic capital in banks' rating systems is very significant. The banks that are actively involved with German SMEs use essentially similar criteria: Firstly, the secondary creditor must sign an appropriate contractual subordination statement, which ensures that in the event of insolvency or liquidation claims from banks will be fully settled before secondary creditors and owners are repaid. The appropriateness of the term is also of crucial importance. A subordinated loan that is only available for a few years or even months misses its purpose of acting as an economic buffer to improve the financing banks' risk position through the cycle. For this reason, in Rantum's strategy all subordinated loans have a minimum term of five years ("non-call-5"). In addition, the financing banks have a preference for interest-only subordinate financing as this protects the company's cashflow and thus improves its creditworthiness over time.



Finally, harmonisation of the documentation of the subordinated loan with the financing contracts for senior loan agreements is significant. For example, this includes the form and threshold values for covenants, information and exceptional termination rights and the key features of the cooperation between senior and secondary investors ("inter-creditor agreement").

Including the credit check, a subordinated loan can be issued in around 4-6 weeks from the initial approach, giving SMEs access to targeted support even for transactions with increased time pressure.

Possible returns from sustainable investments in economic capital

Sustainable fund investments in economic capital through subordinate loans offer potential returns after costs in the high single digit to low double digit percentage range. In the case of Rantum's strategy, the most important element of the returns are the ongoing cash interest payments that are distributed to investors quarterly. To a lesser extent, the fund's total return can also be made up of one-off payments by the borrower on issue (up front fees), interest due on maturity (PIK) and possible prepayment penalties. Fund investors also benefit from diversification effects, as the fund's total capital is subject to a broad spread of individual, industry and financing risks.

Corporate governance performance through sustainable investment

Based on its own careful due diligence process, Rantum Capital produces a detailed "term sheet" containing the significant terms of the contract with the customer, as well as an "Investment Committee memorandum" (see ► Tabl. 01), which provides a forward-looking analysis of the past strategic development of the company and the industry.

Based on evaluation of the financial figures for recent years, the crucial factor is assiduous planning of the earnings statement (profit and loss account) and balance sheet figures (assets and liabilities) for the period in which the economic capital is issued. In line with the Business Judgement Rule, this is done on the basis of a "most realistic case" and a "downside case". Structural interruptions or so-called "hockey stick approaches" are carefully scrutinised and compared to developments in the relevant industries, markets and products. Technological change, innovations, IT capabilities and changes in the competitive situation resulting from globalisation are all carefully analysed.

All of the company's weaknesses are forecast over the term of the loan and are analysed along with the opportunities for counter-measures or mitigation. The basis for this is an appropriate analysis of "Financials" and "Qualitative Criteria" (see ► Tab. 02).

The usual indicators for indebtedness, liquidity, profitability and activity are studied and assessed using a time series comparison and a cross-section comparison with the industry.

Tab. 01: Contents of a recently produced Investment Committee memorandum

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Source: own illustration

Tab. 02: Investment criteria

Financials	Qualitative Criteria
Asset Position/ Development	Corporate Planning/ Strategy
Financial Position/ Development	Ownership/ Management/ Human Resources
Accounting and Tax Policy	Market Position (Distribution/ Suppliers)
Earnings Position/ Development	Products/ Technology/ Innovation
Cash Flow Analysis	Industry Stability/ Volatility and Growth
Growth Analysis	Legal/ Regulatory/ Compliance Risk

Source: own illustration

The result is an outline of all significant investment risks and the company's (management and owners) ability to counter them with the support of Rantum Capital. This assessment and the risk of loss of the invested capital derived from it ultimately determine whether or not Rantum Capital pursues the investment object. To prevent the Rantum management's preliminary work from getting out of hand, the Investment Committee works with "pre-screener".

Thanks to Rantum Capital, SMEs are not only able to tap into additional growth potential but also an expert corporate governance function during the term of the subordinated loan, including early risk detection. Here, there is a clear identity of interests between the owners of the company and Rantum.

Because of its position in the capital structure, Rantum takes a more in-depth and long-term view of the company than lending banks, for example. As a result, Rantum supports SME owners with strategic control of their businesses. This aspect is what ultimately gives a sustainable fund investment approach its macroeconomic significance.

Summary

The sustainability of the investment method is a fundamental factor in the successful provision of economic capital in the form of sub-ordinated loans. This applies to the fund company and its investors and also to the borrowing SME itself. As well as the ethical and economic basis of the investment strategy, this manifests itself in the specific implementation of the loan process, as well as in the form and intensity of subsequent support for the borrower by the fund company over the entire term of the loan. If a sustainable investment strategy is consistently implemented, as well as strengthening the independence and growth capabilities of the borrower it generates net returns in the high single digit to low double digit percentage range, and also creates macroeconomic benefit.

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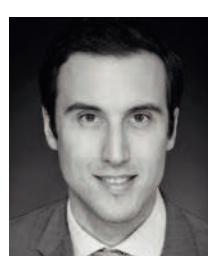


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Measuring the success of compliance

Sebastian Rick | Ralf Jasny | Markus Jüttner | Sebastian Koch

Companies spend huge amounts of money attempting to ensure that they do not do anything wrong when it comes to compliance (adherence to legal and internal regulations). In recent years, banks in particular have introduced comprehensive compliance management systems that aim to prevent and reduce misconduct. They put in place additional controls, barriers and checks but all too often money is being thrown out of the window. To prevent this happening in future, the Compliance Index Model enables the implementation and effectiveness of formal compliance management systems to be effectively controlled and allows measurement of whether a change in the compliance culture has actually occurred due to adherence to the measures adopted. This lays the foundations for effective compliance management.

Compliance and corporate culture

Companies are advised to introduce a compliance management system to limit and prevent misconduct. Compliance management systems can generally be characterised as formal control systems used in companies, i.e. systems that make employee behaviour predictable and have the aim of achieving congruence between employee behaviour patterns and the expectations of the organisation. In organisational science and sociology literature, control systems have been studied many times and a range of different dimensions of these systems have been established. As a result, control systems are usually differentiated according to whether they create regularity in employee behaviour by enforcing particular behaviours, while also ensuring that employees identify with collective organisational norms and values and commit to them. In the first case, a control system is viewed as necessary to bring employee behaviour into congruence with the expectations of the organisation, occasionally with the use of compulsion. In the second case, we start from the assumption that the objectives of the organisation are such that employees can identify with them and therefore behave in line with the objectives, perhaps also because they are consistent with the individual employee's requirements, objectives or identity.

Formal compliance management systems can be characterised in a similar way. For example, there are: (1) formal ethical or behavioural codes, which represent an organisation's expectations in relation to ethical and legal standards, (2) ethics or compliance commissions, whose task is to draw up guidelines, evaluate the actions of employees or companies and/or investigate violations and give judgements on them, (3) communication systems (e.g. whistle blower systems, telephone hotlines) that enable employees to report violations or get advice, (4) a compliance officer whose duties involve coordination of measures, ongoing training of employees and investigating suspicious incidents, (5) ongoing training measures designed to help employees to identify ethical and legal problems and respond to them, and (6) disciplinary procedures to punish unethical or illegal behaviour.

The effects of formal compliance management systems can be very diverse and every measure can somehow have a positive effect on employees' attitudes and behaviours. However, as long as the exact mode of action of the measures is not known, these effects cannot be controlled and verified. Therefore, the aim must be to highlight how the measures contribute to success, so that available resources

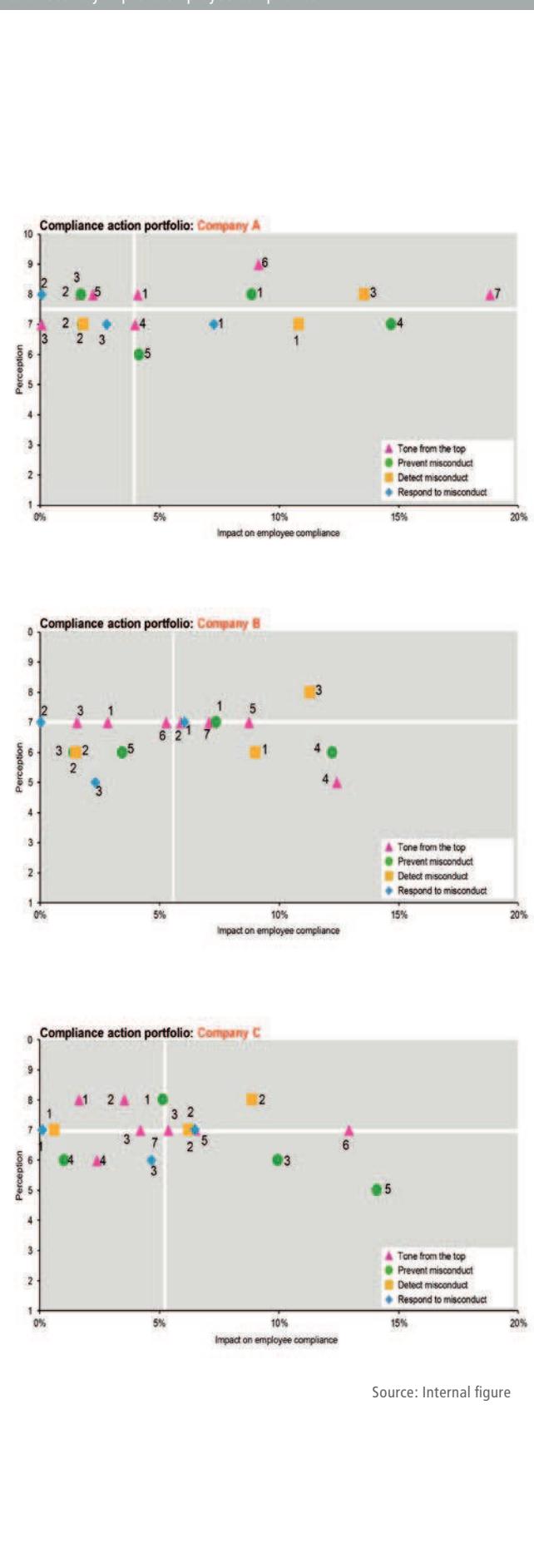
Fig. 01: Effectively measuring and controlling the implementation and effectiveness of compliance using the Compliance Index



* i.e. on a scale of 0-100. Note: The reference indices are based on the results of two empirical studies carried out at the Frankfurt University of Applied Sciences with the support of the Frankfurt Institute of Risk Management and Regulation (FIRM) in the period 2016 to 2017.

Source: Internal figure

Fig. 02: Perceptions and impacts determine the prioritization of measures to effectively improve employee compliance



(for example budget, time, personnel) can be allocated and used optimally.

Measure of practised compliance

This objective is supported by the Compliance Index Model [see Rick 2018]. It is the result of two empirical studies carried out at the Frankfurt University of Applied Sciences with the support of the Frankfurt Institute of Risk Management and Regulation (FIRM). It highlights which measures are actually capable of effectively driving employee compliance.

In principle, the model comprises a series of statistical procedures that investigate complex relationship structures between measures and employee behaviour and allow a quantitative estimation of interdependencies. To do this, the interdependencies are represented in a linear simultaneous equation system (structural equations) and the model parameters are estimated using the partial least squares (PLS) method [for example, see Wold 1973, 1975, 1982], in such a way that the discrepancy between empirical and estimated case data is minimised. In principle, the PLS algorithm used is a sequence of ordinary least square (OLS) regressions in the form of weighted vectors that satisfy fixed point equations by their convergence. In other words, the model formally expresses the interdependencies between measures and employee behaviour in a way that makes them effectively measurable and thus controllable.

The result is a Compliance Index (KPI) based on which the success of the measures within the organisation can be measured, controlled and monitored (see ► Fig. 01).

The variable, measured based on anonymous employee surveys, combines different aspects of employee compliance such as compliance awareness, to create an index.

The index can also be broken down into individual components. It thus represents an effective analysis instrument and is a powerful controlling instrument for compliance management in a company. The Compliance Index is used to identify strengths and weaknesses in compliance management and, if necessary, to derive specific measures to improve it.

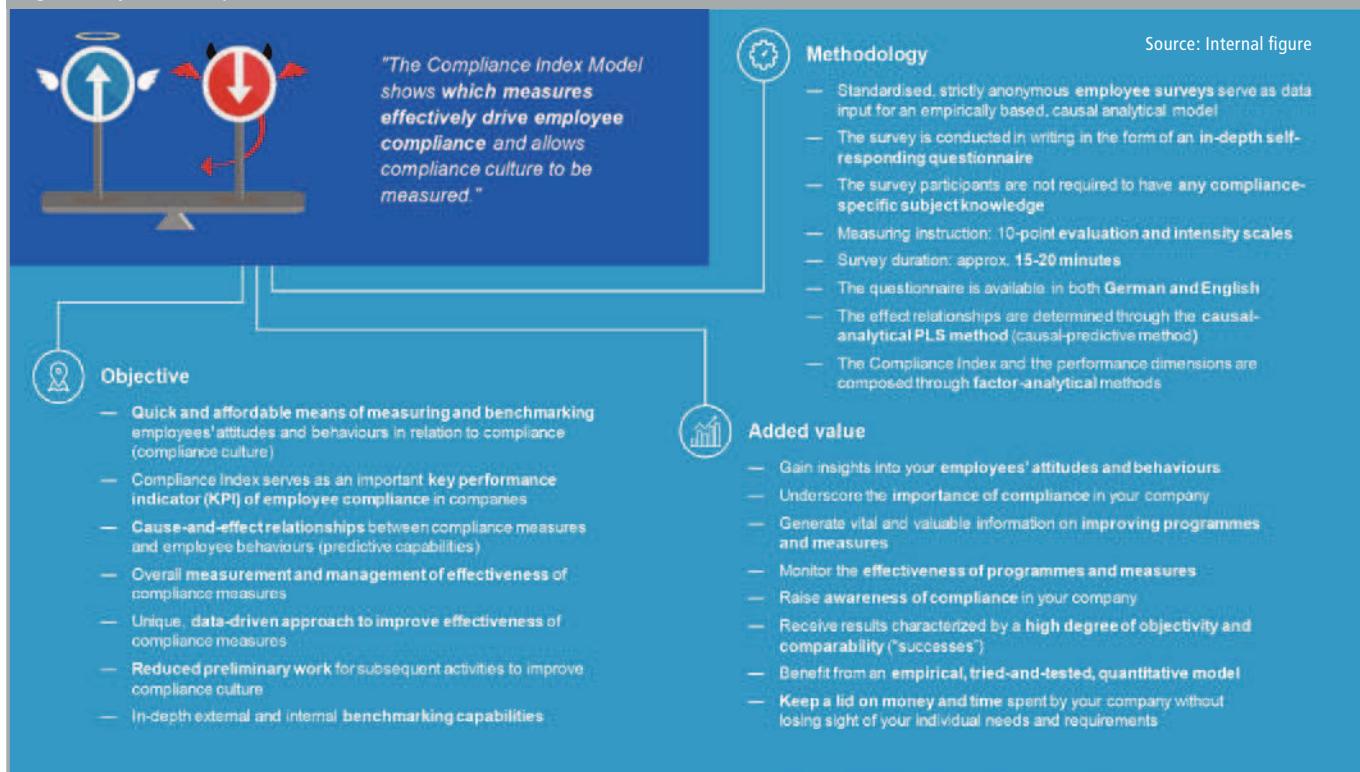
To do this, model-based, specific, data-driven action portfolios can be established, on which we should concentrate in order to utilise available resources effectively (see ► Fig. 02). To maintain the measured index level, measures in the top right quadrant have to be retained (strengths). To improve the measured index level, measures in the bottom right quadrant have to be intensified (weaknesses). Recurring measurements based on the Compliance Index Model can thus be used to highlight the effectiveness of derived measures in improving the Compliance Index over time.

Since users are adopting a quantitative approach in the Compliance Index Model, they obtain "hard", reliable results characterised by a high level of objectivity and comparability. This is one way in which we can move away from merely "more and more" towards a targeted and effective approach to compliance management.

Summary

It is important for companies to measure employee compliance at regular intervals in order to continuously improve the effectiveness of their compliance management system. To do this, model-based, specific, data-driven action portfolios can be established to high-

Fig. 03: Why is the Compliance Index Model useful?



light the impact of the different measures, including the perceived "tone from the top", on employee behaviour. As the results achieved using the Compliance Index Model are comparable between different employee groups or areas of the company, targeted measures to improve the compliance culture can be derived and the results provide a controlling instrument that can be used in various ways to improve the company's performance. Thus, the Compliance Index Model represents a powerful tool for day-to-day compliance practice for ensuring the effectiveness of the compliance management system, taking into account the necessary economic efficiency (see also ► Fig. 03).

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Italy's banks and Target-2

Markus Krall

Systemic risk is so called because its impact can affect the stability of the entire financial and economic system. In the past, it was almost always the case that systemic crises were not perceived before their occurrence or, if they were, it was only by a tiny minority. In 1929, the few critics who were warning of the harmful – and foreseeable – disastrous impacts of monetary expansion were, almost without exception, representatives of the Austrian School of macroeconomics, which was just becoming established at that time. The longer the party of the "golden 20s" went on, the more they were ridiculed.

In 2007, there were also just a vanishingly small group of people who recognised the disequilibrium that decades of falling interest rates had caused in the credit system. Apart from the US economist Nouriel Roubini and a few others, there were no warnings from academics. Among capital market participants, there were a few who had used their superior analysis to earn money on a grand scale: "The Big Short" was well-earned money, no matter how much envy it might have provoked.

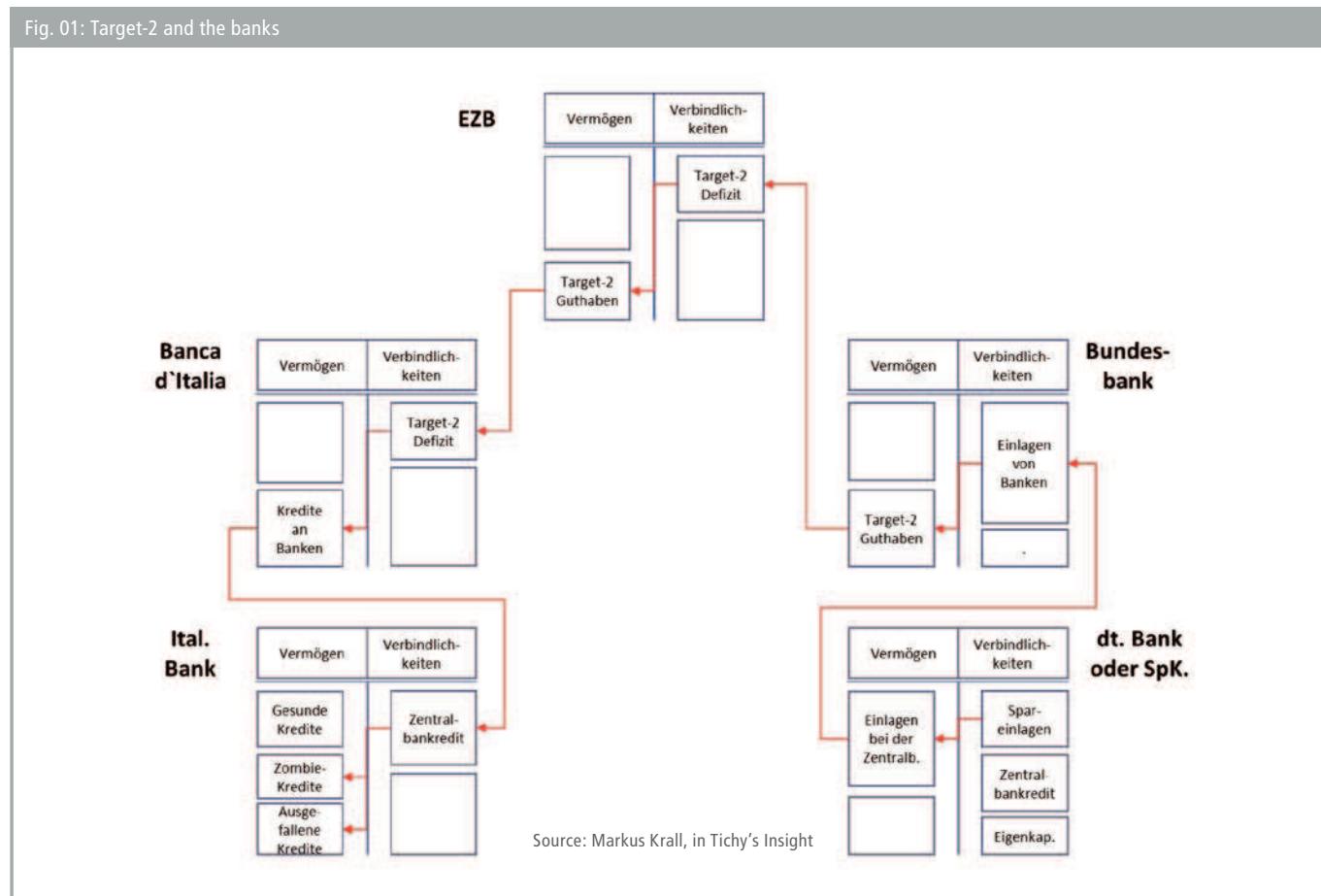
We are now in a different situation for the first time ever. What we are currently experiencing is a crash that has been advertised in advance. If you listen to capital market participants, the majority are expressing fear that the ECB "experiment" will go wrong. Certainly, the conclusion you reach is that we have to keep dancing at the party for as long as it lasts, and then abandon ship shortly before it finally sinks. It's behaviour reminiscent of the Titanic, where the band carried on playing until the end.

1,000 billion Euro of bad debt

With the forced administration of the first Italian bank, Banca Carige, with its savings deposits of over 10 billion Euro, we are now facing a situation that will see the crisis in the European banking industry gather momentum. Stock markets are punishing the banking industry with continuous falls in prices. For an increasing number of institutions, the ratio of market value to book value is heading for the magic figure of 20 percent. In other words, the markets are not confident that the equity capital is actually still there.

Banca Carige is just the first example of many that are set to come to light with increasing regularity over the coming weeks and months. The European banking system is still burdened with 1,000 billion Euro of bad debt. The apparent reduction in this figure in 2018 may essentially be attributable to balance sheet cosmetics. Insolvent borrowers are being given new loans that are immediately used to cover interest and repayment. Throwing good money after bad is

Fig. 01: Target-2 and the banks





promoting the self-delusion that these loans can subsequently be rated as performing again. The infamous "zombie debt", which the Bank for International Settlements in Basel recently rated at over 10 percent of all borrowing, is not even included in this analysis, as these borrowers' insolvency is still in the future and has not occurred yet.

The Target-2 chain reaction

However, it is the banking system whose solvency will ultimately determine whether Italy will ever be capable of meeting its liabilities towards Northern Europe – particularly the Netherlands and Germany – posted under Target-2, as illustrated in ► Fig. 01.

As shown here, the lack of creditworthiness in Italian banks' loan portfolios is propagating itself in a kind of financial chain reaction across the Euro system, with the ECB in the centre and on to the Bundesbank and banks in Germany. To a certain extent, the Bundesbank, and the German taxpayers who own it, are acting as a kind of risk buffer.

Representatives of the ECB and its associated institutions often argue that Target-2 is not a liability and is merely the result of the two-tier nature of the Euro system, in which national central banks continue to play a role purely due to historical considerations but lack economic authority.

The recently promulgated theory that for a long time the increase in Target-2 balances have been caused by the impact of the bond purchase programme rather than Southern Europe's trade and capital balance deficits, is in conflict with the realities on the financial markets. There is no ominous gravitational force causing the liquidity injected into the markets by the bond purchase programme to flow "to the centre of the Euro zone", in other words: Frankfurt.

Portfolio rebalancing

It is microeconomic decisions by investors and capital market participants that are causing a flight of capital to the North. This can euphemistically be dubbed "portfolio rebalancing". It changes nothing in terms of the lack of confidence in the survival of the Euro that is finding its expression in this capital flow. Investors are bringing their money across the Alps because they would prefer to have "German Marks" in their hands than Lira when the Euro collapses. It's that simple.

Apart from the fact that the contract concluded between banks in the Euro system to implement the Target-2 system itself unambiguously refers to liabilities and not "clearing balances", the illustration shows that the two-tier system is not the cause of the economic

disequilibrium that is finding expression in the clinical thermometer we call Target-2. If we exclude the Banca d'Italia and the Bundesbank from our considerations, it is only the credit relationship that changes: it is then directly between the ECB and the Italian banks. If the banks are unable to make repayments to the ECB, in a single-tier system the liability would flow downhill in exactly the same way, namely to the owners of the ECB, in other words the Euro member countries that remain solvent. And to eliminate any doubt, they are not the ones with a Target deficit.

Summary

Disequilibrium needs a financial outlet. Its core problem is loans issued by the Euro system to banks that are actually insolvent as part of an increasingly aggressive liquidity supply policy. Unfortunately, the fact that these debts are backed by Italian government bonds changes nothing in terms of the risk. This is the case because, in the event of a solvency crisis among banks in its own country, the Italian state would also be insolvent. There is an almost 100 percent correlation between the two risks, which makes them identical from a risk management perspective.

In 2019, or in 2020 at the latest, we will be able to watch from the creditors' exalted viewpoint how this "advertised crash" is reducing the promises of politicians and monetary policy in Europe to absurdity. An experiment is coming to an end.



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Redenomination Risk, Italy's budget problems and market fears of a second European sovereign debt crisis

Christoph Dieng | Tobias Basse | Frederik Kunze

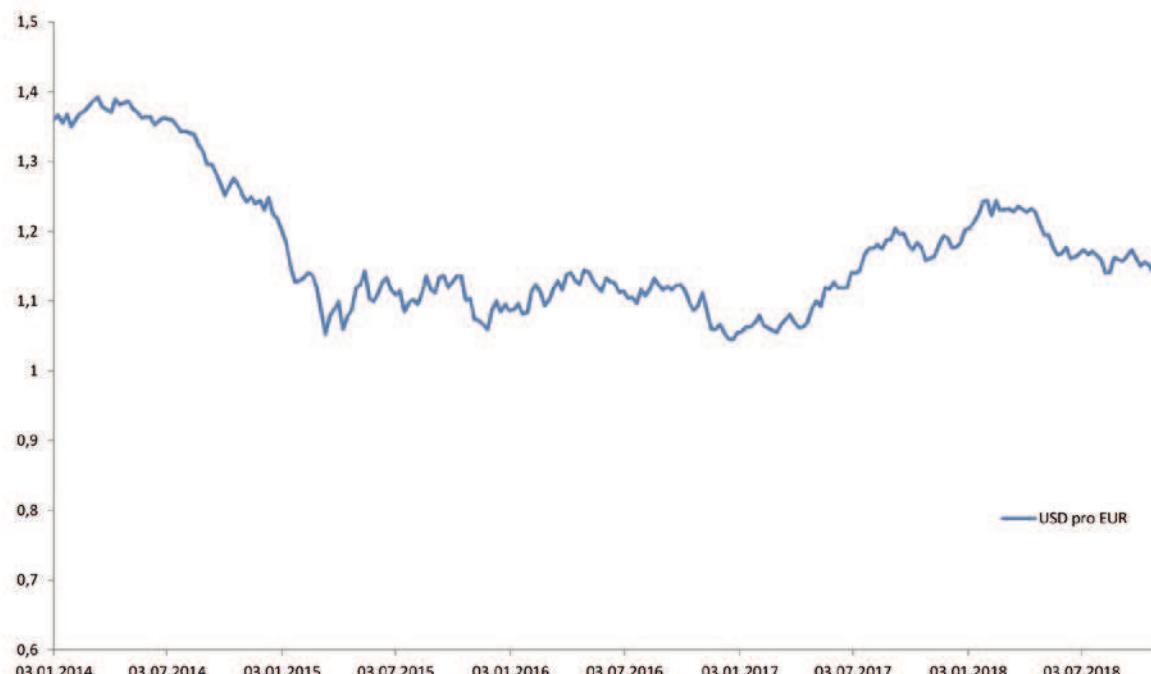
The European sovereign debt crisis had a major impact on market developments on the global bond markets. Countries whose fiscal situation was viewed more skeptically by investors had to pay significantly higher risk premiums to cover their financing needs. After some time, investors' concerns have receded into the background, but the discussions about Italy's national budget have now raised fears in the market. In this context, the study focuses on the challenges posed by the redenomination of risk and, above all, discusses the implications for risk management.

The original European sovereign debt crisis

Greece's debt haircut caused financial markets to focus increasingly on the credit risk of European Union countries. Events at that time showed that even government issuers belonging to the "illustrious" group of member states of the Monetary Union could find themselves in a very threatening fiscal situation. Moro provides an overview of the crisis [see Moro 2014, p. S10ff.]. There is no doubt that events in Greece had a major impact on the markets for European government bonds. The risk premiums for securities from countries with fiscal problems increased significantly during this period [see, for example, Gruppe und Lange 2014, p. S4ff. and Ludwig 2014, p. 812ff.]. In the meantime, there has even been

outright fear of a possible break-up of the monetary union, which has led to a further increase in risk premiums in some states [see for example Sibbertsen, Wegener and Basse 2014, pp. 110ff. and Basse 2014, pp. S33ff.]. In addition, the spreads between "solid" and "less solid" countries have widened even further due to flight-to-quality effects [see, for example, Kunze 2014, p. 171ff.]. In any case, the crisis has increased the focus of the financial markets on questions of fiscal soundness. Although progress in increasing the sustainability of public debt has now been observed in some of the nations affected, monetary policy in the euro zone has actually had to help mask the problems of refinancing by providing a lot of liquidity.

Fig. 01: Exchange rate between the euro and the US dollar



The fear of a second European sovereign debt crisis

In Italy, the early parliamentary elections in March 2018 did not lead to a genuinely clear political situation. Various complications meant that the Eurosceptic parties Lega and the Five-Star Movement were not able to form a government until June 2018. However, the situation then calmed down again for the time being. From October 2018, however, the international financial markets have once again begun to look to Rome with particular interest. The EU Commission's criticism of Italy's budget plans became a central stress factor for the European single currency. As part of these market movements, the exchange rate between the world's two leading currencies even fell below the psychologically important USD 1.1400 per EUR mark (see ▶ Fig. 01). Italy's government bonds also came under significant pressure from the dispute over Rome's budget plans. Uncertain investors demanded significantly higher risk premiums. Rome's rather offensive responses to criticism from Brussels triggered increasing concerns in the currency and bond markets about the country's possible withdrawal from the monetary union. As a consequence, the sentix Euro Break-Up Index rose significantly [see Sentix 2018].

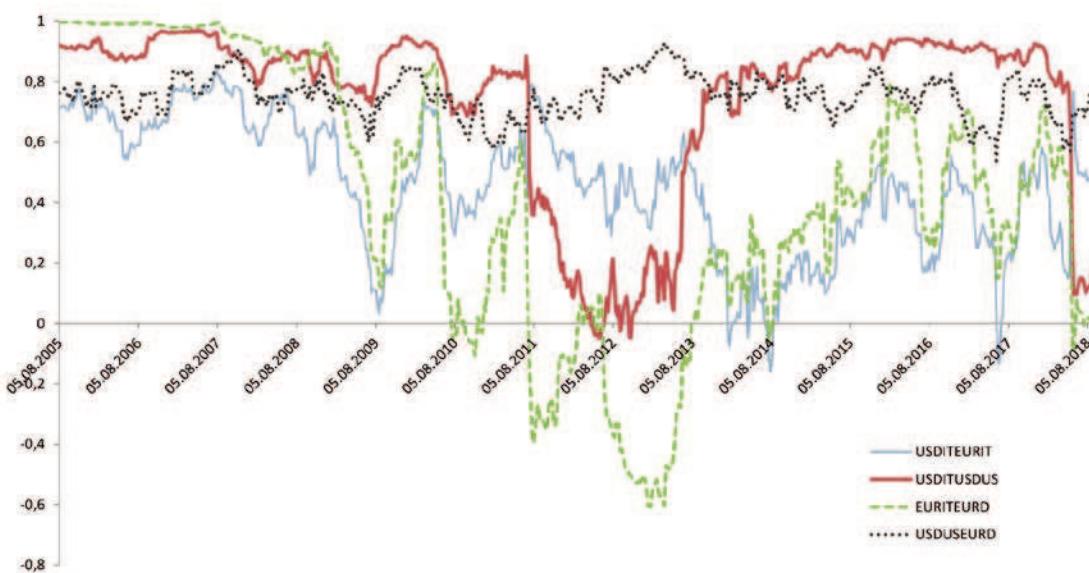
Redenomination Risk and the Bond Market

The so-called redenomination risk is a special form of exchange rate risk. It arises from the danger that a country in a monetary union will introduce a new and then devaluing currency in order to counter macroeconomic and fiscal policy problems [see Klose and Weigert 2014, p. 25ff.]. According to prevailing opinion, when a country introduces a new currency, it is likely to convert government bonds issued under national law to the new unit of account as part of a currency reform (currency sovereignty, Lex Monetae). Such a development would be particularly problematic for foreign investors, as the value of bonds expressed in units of the original

currency would probably fall significantly in a very short period as a result of the expected exchange rate movements. From a risk management perspective, bonds issued by a sovereign issuer under foreign law could, to some extent, help investors facing this problem. For such securities, changes in the national laws of the bond issuing nation would in principle have at least no direct impact on creditors' rights. For example, in this context Xouridas stresses that if a member of the monetary union withdraws from the euro, two different currency sovereignties would have to be implemented – in Greece, for example, a new drachma would become legal tender, while in the remaining countries of the euro zone the euro would remain legal tender [see Xouridas 2012, p. 379]. However, with regard to Greece or Italy, a major problem with bonds denominated in euros that have not been issued under the national law of the issuer of the sovereign debt remains the question of what would happen if the common currency were to end. In such a scenario, investors would need to pay great attention to the details (e.g. bond prospectuses) [cf. Xouridas 2012, p. 379f.].

Given the current political and economic situation in Italy, Italian government bonds denominated in the US currency under US law could be attractive, for legal reasons, for investors seeking exposure. These are already foreign currency bonds issued by the country – and in such a scenario there is no threat of an end to the US currency. Although the credit default risk would remain, the recent experience of holders of Argentine government bonds who, after some confusion, were ultimately able to enforce their claims against the South American country before US courts, should probably show that it can be advantageous for investors to hold securities issued under US law with regard to this risk factor - but attention should also be paid to details in this context [see, for example, Buchheit and Gulati 2017, p. 225ff. and Colla, Gelpert and Gulati 2017, p. 67ff.].

Fig. 02: Rolling correlations of changes in bond prices



Source: NORD/LB Research/Economics

Empirical analysis

Bradley, Cox and Gulati argue that the bond market should price the ability of certain bond holders to defend themselves more effectively against a debt haircut by a state creditor into the prices of the corresponding securities of the countries involved [see Bradley, Cox and Gulati 2010, p. 295]. This should also apply to redenomination risk. In this respect, movements in the price differences between Italian government bonds issued in US dollars in the United States and in euros under domestic law could well be a (probably imperfect) indicator of the country's redenomination risk. Here, rolling correlations (based on 30 past data points) are calculated to examine the correlations.

We will be looking at weekly data for changes in the bond prices in the period from 14.1.2006 to 31.08.2018. The focus is on four securities (Italy 6,875 09/27/2023 in USD, Italy 5,125 07/31/2024 in EUR and, as a benchmark for the interest rate market in the USA and Euro zone, the bonds USA 7,125 02/15/23 and Germany 6.25 01/04/2024).

► Fig. 02 shows four rolling correlations. In addition to the correlation between the two Italian securities (USDITEURIT), there is also the correlation between the Italian bond and the respective currency area benchmark (i.e. USDITUSDUS in the case of the US dollar and EURITEURD for the euro) and the rolling correlation coefficient between the change in the bond prices of the US bond and the German bond (USDUSEURD). The latter time series is important for analysis of the relationship between the two Italian securities, as the interest rate landscapes in both currency areas also play a role in the context considered here. More precisely, diverging yield paths in the United States and the euro area may reduce the synchronisation of bond prices of the Italian bonds considered here. In principle, it can already be seen that the correlation coefficient between the changes in the prices of the two bonds in times of crisis appears to be rather lower and has even occasionally been negative since 2014. The recent turbulence in Rome has also been accompanied by low levels of correlation. The time series for USDITUSDUS and EURITEURD are also interesting. In the European sovereign debt crisis, the correlation coefficient between the changes in bond prices in Italy and Germany fell significantly. In fact, over a long period of time, negative figures have been seen. Thus, a contrary movement of the prices of the two securities is indicated in this phase. The correlation between the prices of bonds from Italy and the USA also appears to decline during periods of crisis - but to a lesser extent. The variation of the time series USDITUSDUS from the time series EURITEURD may indeed be seen as an indicator of the presence of redenomination risk.

Conclusion

The political situation in Rome has triggered concerns in the market that a new European sovereign debt crisis could arise. Investors are again concerned about a possible break-up of the monetary union. Redenomination risk is thus playing a role again. Investors looking for exposure to Italian government bonds might consider buying Italian government bonds denominated in the US currency under US law in order to better avoid this risk. After all, these securities are already foreign currency bonds and should therefore be less vulnerable to currency reform. However, the financial markets are already likely to price in the rather specific risk character of bonds, at least to some extent. Nevertheless, investors should take appropriate legal considerations into account as part of their active risk management.

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Risk Preference and Brain Structure: Individual differences

Roopa Kalsank Pai | Alexander Niklas Häusler | Bernd Weber

Scientists and non-scientists alike are interested in studying risk-taking behavior and the reasons as to why some individuals take risks and others do not. That's because so many of the systems and activities we have in place in our society today depend on people to behave a certain way when they make decisions involving risk. Neuroscience allows us to validate theoretical models of decision-making by analyzing patterns of neural activity in implicated brain regions. A question of interest is thus how our risk attitudes are affected by differences in the structural connections between brain areas that carry out different parts of the decision-making process.

Quantifying Risk Attitudes

Risk affects decisions taken in many different domains, such as recreation (sports) and finance (investment). For us as neuroeconomic researchers, it is important to determine individual and collective beliefs and preferences regarding risk and how they are influenced. Commercially, there is an interest (e.g. in marketing) to use this information to influence purchasing behavior; on the other hand, policymakers could use this information to prevent the questionable manipulation of consumers.

Research into the neural basis of risk perception and related behaviors can be conducted by comparing structural and functional neuroimaging data with self-report data (e.g. questionnaires), and behavior in an experimental task. However, people's comfort level with risk can depend on both the context and their upbringing (socioeconomic status or cultural norms). Furthermore, the phrasing of questions or the complexity of the behavioral task can also affect the reliability of the indices [Häusler and Weber 2017].

With the growing belief that the attitude towards risk is a stable personality trait, encompassing both general and context-specific components [Frey et al. 2017], current research attempts to solve this problem of best capturing behavior in situations involving risk by creating indices composed of a variety of psychological and economic variables, as well as data from behavior tasks involving risk-laden decisions. Such indices have previously been shown to partly explain the relationship between real-life stock trading and the brain activity associated with it [Häusler et al. 2018].

Brain Structure

Discovering the structural and functional neural underpinnings of the decision making process is important because, once elucidated, they may provide an objective method to accurately gauge the influence of events or of the manner of information presentation on individuals. Furthermore, being able to identify inter-individual differences may help us identify individuals that are at greater risk of manipulation, and develop mechanisms for their protection.

Much of the information about neural activity comes from event-related MRI studies and many structural indications come from studies with T1-weighted or diffusion-weighted imaging data (see ▶ Box 01). Using these methods, we have identified regions involved in calculating expected reward, risk, and belief-updating. Combining this knowledge has resulted in a proposed network of regions involved in decision making. As these regions interact with each other, it is also of interest to characterize the connections between them.

Of particular interest to us at present are the nucleus accumbens (NAcc) and anterior insula (AI) [Häusler and Weber 2015], and the white matter tract connecting them. Activity in these regions has been correlated with financial risk seeking (NAcc) and risk averse behavior (AI) [Kuhnen and Knutson 2005]. This suggests the possibility that individuals' stable risk preferences may be related to the activity in these regions, and indeed with the help of funding from FIRM we were able to show that the correlation between AI activation and real-life risk taking can be explained by indices of risk preference [Häusler et al. 2018].

Box 01: Magnetic Resonance Imaging

Functional Magnetic Resonance Imaging (fMRI)

In functional magnetic resonance imaging (fMRI), the level of blood oxygenation is used as a proxy to measure the activity of the neurons in that region of the brain. Researchers can create experimental tasks in which subjects are required to decide between options that carry different levels of risk, and measure brain activity at different timepoints of the decision making process (see Fig. ▶ 01B). With well-thought-out hypotheses, this can help us discover which brain regions are active during a certain part of the decision process, and whether the evidence supports theoretical predictions from financial decision theory.

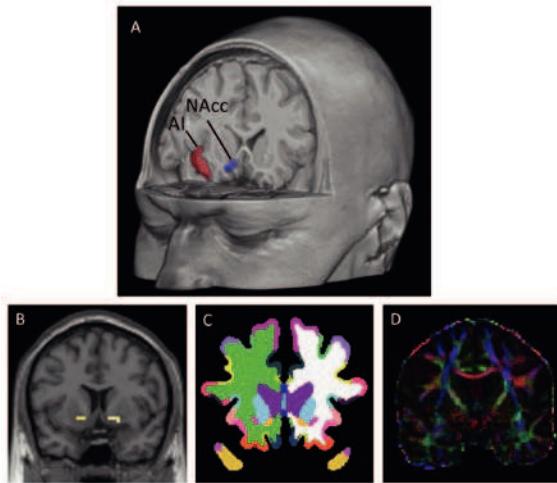
Structural Magnetic Resonance Imaging (sMRI)

The brain has millions of cells called neurons, which communicate through electrical and chemical signals passed from cell to cell via long, thin structures called axons. The "gray matter" in a brain consists primarily of cell bodies; the "white matter" consists of axons, which connect individual neurons, bundled together in rope-like or fan-like structures. Using MRI, neuroscientists can quantitatively characterize brain structure by methods such as T1-weighted magnetic resonance imaging and diffusion-weighted imaging.

T1-weighted images provide an overview of brain structure, such as whether a given area contains mainly gray matter, white matter or cerebrospinal fluid. They can also be used to divide the brain into anatomically defined regions and gain quantitative information about them, such as their area, thickness or volume. (see Fig. ▶ 01C).

Diffusion-weighted images allow us to non-invasively study white matter tracts. In this method, the diffusion of water in the brain is used to characterize the white matter tracts connecting gray matter regions (see Fig. ▶ 01D).

Fig. 01: Risk Preference and Brain Structure: Towards individual differences



The anterior insula (AI) and nucleus accumbens (NAcc) are shown in **A**. An example of fMRI results can be seen in **B**, which displays a slice similar to that in **A**. The yellow region indicates activity in the NAcc. **C** shows a processed T1-weighted image, where each color indicates a different cortical or subcortical region. **D** shows a similar slice in a diffusion-weighted image. The colors indicate whether the primary direction of diffusion is in the x, y or z axis.

Source: own illustration

A white matter tract directly connects the AI to the NAcc; greater coherence in this tract has been linked to a reduced preference for lottery-like gambles in an experimental task [Leong et al. 2016]. Current work in our lab aims to investigate whether AI-NAcc tract coherence correlates with real-life measures of risk taking (as measured by whether participants trade stocks or not) and indices of risk attitudes, reflecting individuals' belief in the positive outcome of risks as well as their tolerance for risk.

Conclusion

There is a wealth of information on how brain structure and function can impact decision making. This information can be obtained via behavioral tasks and neuroimaging data in injured and healthy subjects, as well as on the cellular or sub-cellular level, using animal models or intracranial recordings in patients. Current research suggests that attitude towards risk is a stable personality trait, and that some of an individual's preference for risk may be explained by brain structure. After showing that real-life risk-taking behavior is correlated to activity in brain regions previously linked to real-life financial risk taking, we now intend to take our analysis one step further by exploring the effect of differences in the white matter structure connecting these regions.

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The Association for Risk Management and Regulation (Gesellschaft für Risikomanagement und Regulierung e.V.), in which banks and associations, initiatives, audit firms and the State of Hessen are involved, was founded in June 2009. The purpose of the Association is to conduct and promote teaching and research in the fields of risk management and regulation, particularly within the framework of the financial industry, primarily through the Frankfurt Institute for Risk Management and Regulation (FIRM).

The Association therefore supports and finances the teaching and research activities carried out by FIRM, with the Institute making the results of its research accessible to members and the general public as well as providing training and further education for risk management in cooperation with the Goethe University and the Frankfurt School of Finance & Management. Based on that Frankfurt will be further strengthened as an important location for risk management and regulation.

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KfW Bankengruppe



Prof. Dr. Wolfgang König
President FIRM
Executive Director,
House of Finance,
Goethe University of Frankfurt



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Director General, Economic Sector,
Financial Services, Exchanges,
Ministry of Economics, Energy,
Transport and Regional Development,
State of Hessen



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Member of the Managing Board/
Chief Risk Officer,
NORD/LB Norddeutsche
Landesbank Girozentrale



Dr. Lutz Raettig
Chairman of the Supervisory Board,
Morgan Stanley Bank AG,
President,
Frankfurt Main Finance



Gerold Grasshoff
Senior Partner and Managing Director,
Global Head of Risk Management
and Regulation/Compliance,
Boston Consulting Group



Frank Romeike
Managing Partner,
RiskNET GmbH



Thomas Grob
Vice-Chairman of the Board of
Managing Directors,
Landesbank Hessen-Thüringen
(Helaba)



Frank Westhoff
Former Member of the Management Board
and Chief Risk Officer,
DZ BANK AG



Marcus Kramer
Member of the Management Board
and Chief Risk Officer,
BayernLB



Dr. Thomas Poppensieker
Senior Partner Risk Management,
McKinsey & Company, Inc.

About Firm and Mission Statement

The Frankfurt Institute for Risk Management and Regulation (FIRM) was established in 2009 under the auspices of the Society for Risk Management and Regulation, an association of members including renowned German financial institutions, corporations, advisory firms and the State of Hessen. Among its founding members are Deutsche Bank AG, DZ BANK AG and Landesbank Hessen-Thüringen, thus representing all three pillars of the German banking sector: the privately owned banks, the publicly owned savings banks (Sparkassen), and the cooperative banks (Volksbanken and Raiffeisenbanken). In addition to the participation of almost all major banks in Germany, FIRM also includes prominent representation from the insurance sector through Allianz SE, and from the securities markets through Deutsche Börse AG. FIRM cooperates with the Frankfurt School of Finance & Management, by the House of Finance of the Goethe University of Frankfurt, and by other universities and works in teaching and research closely with these renowned institutions.

The Management Board of the Society is comprised 13 members under the leadership of the Chairman of the Management Board, Prof. Dr. Dr. h.c. Udo Steffens, former President and CEO of the Frankfurt School of Finance & Management, and Deputy Chairman Stephan Wilken, Head of Anti-Financial Crime & Group and Anti-Money Laundering Officer of Deutsche Bank AG. The President of the Institute is also a member of the Executive Board of the Society. Prof. Dr. Wolfgang König, Executive Director of the House of Finance, is responsible for both research and teaching.

The Executive Board holds quarterly formal meetings, for which preparations are made by the Working Group. Every institutional member has the opportunity to participate through the Advisory Board, which serves as a forum to discuss current issues in risk management, to review the results of research projects, and to present new ideas. The Executive Board and Advisory Board, in addition, hold a joint offsite each year in order to discuss important issues in risk management and regulation in greater depth.

In both its research and educational activities, FIRM strives to help the financial industry advance the state of best practice, thus improving its international competitiveness. It is not a lobbying organisation. The FIRM Risk Round Table has set itself the goal – building upon the collective expertise of risk managers from major financial institutions – aims to develop, and to foster the adoption of, effective standards for risk modelling and quantitative approaches to deal with current issues in risk management and regulation. Four times a year the Compliance Risk Round Table meets. An open exchange of views on the further development and value-added implementation of a compliance risk management are here in the foreground. The exchange between research and practice is also strengthened by the annual research conference.

FIRM works closely with Frankfurt Main Finance, the association committed to advancing Frankfurt's position as a global financial centre. Our goals and principles will guide us as we strive to continuously broaden our range of activities in the years ahead.

Our mission statement	Our specific objectives	Our governance principles
<ul style="list-style-type: none"> ■ We will foster research and education across all aspects of risk management and regulation, specifically including educational programmes for risk managers oriented around actual practice and in the broader context of the financial institution. ■ We will encourage the understanding and adoption of "best practice" standards for risk management and regulation, toward the aim of strengthening the financial sector and thus its real economy. 	<p>FIRM strives to be among European leading institutions for risk management. It will achieve this:</p> <ul style="list-style-type: none"> ■ through its active involvement in, and financial support for, research and teaching activities in Frankfurt as well as throughout Europe, ■ by serving as the leading network for the European risk management world, bringing together professionals from the financial sector, universities, and governmental and regulatory authorities in a common forum, and ■ by encouraging a rigorous, fact-based dialogue on issues of risk management and regulation which respects the independent positions of those involved. 	<ul style="list-style-type: none"> ■ We are a non-profit organisation. Our expenditures are transparent and consistent with our institutional objectives. Our officers serve on an honorary basis. ■ We are an open organisation. We welcome members and sponsors who are professionally involved in risk management and regulation from throughout the financial sector, from academia, from industry, and from government, including personal members and alumni of our educational programmes.

Advisory Board: Review and outlook



Once again, the sun shone over the financial markets for a long time in 2018. In the second half of the year, however, the signals heralding an end to the long boom phase intensified. These global fears were prompted by the trade dispute between the USA and China, but also by European concerns. Chief amongst these were issues involving Italy, France and a disorderly Brexit. As a result, the core issues addressed by FIRM – risk management and regulation – were making headlines again. In the new year, financial intermediaries will become more aware of these issues.

There have also been several changes within FIRM itself. Frank Westhoff had taken over the position of Chairman on 1 August 2017 but handed it over to Professor Dr. Udo Steffens in May 2018 due to unforeseen family circumstances. Udo Steffens, who had been President of the Frankfurt School of Finance and Management for many years, left his position in April. We would like to take this opportunity to thank Frank Westhoff for his exemplary cooperation and commitment. He will continue to support and advise FIRM in the future. Prof. Steffens had envisaged a quieter life, but immediately stepped up to face the new challenges. Our cooperation with him has always been very fertile and constructive, and we are looking forward to supporting him in the further development of FIRM.

The management of the Advisory board has also changed. The co-chairman from the professional field, Dr. Carsten Lehr, retired from the advisory board due to a change of employer and is now an individual member of FIRM. Carsten Lehr performed his duties as Chairman of the Advisory Board with huge enthusiasm and energy. This was last demonstrated at the offsite in Glashütten in June 2018, which Carsten Lehr organized with some excellent topics. We express our heartfelt thanks to Mr Lehr and fully expect that he will continue to support FIRM actively in the future.

He was replaced by our Advisory Board member Manuela Better, a member of the Board of Management of DekaBank. She was unanimously elected Chairman of the Advisory Board in September

at the Advisory Board meeting in Munich. We thank you very much for this clear vote.

The FIRM Advisory Board has grown again this year. It now comprises 48 professional members and 34 academic members. We would like to take this opportunity to once again cordially welcome the new members.

In March, the general meeting and the first advisory board meeting of 2018 took place at the Frankfurt School. Prof. Erik Theissen from Mannheim spoke about the real economic effects of bank mergers.

In June in Glashütten, the focus was on awarding the FIRM Research Prize 2018. Three candidates who had just received their doctorates and had previously been selected by a jury presented their research results. The first prize went to Steffen Krüger from the University of Regensburg (supervised by Rösch) for his work on credit risk management in banks. FIRM has now supported several research projects in this department.

Elia Berdin from the Goethe University in Frankfurt was also honoured for his analysis of the profitability of life insurers and Marius Pfeuffer from the University of Erlangen-Nuremberg for his work on the implementation of IFRS 9. Prof. Jörg Rocholl, ESMT, presented his "EURO Zone Basket" for the decoupling of government and banking risks. Dr. Frank Schiller, Munich Re, presented a cur-

So far, the following dates have been set for 2019:**13 March 2019 (Wednesday)**

- 13:30 – 15:30 h: Members' Assembly
- 16:30 – 18:30 h: 1st Advisory board meeting
House of Finance,
Frankfurt am Main

16 May 2019 (Thursday)

- 08:30 – 16:00 h: Research conference
- 16:30 – 18:30 h: 2nd Advisory board meeting
Frankfurt School of Finance & Management,
Frankfurt am Main

17 May 2019 (Friday)

- 08:30 – 14:00 h: FIRM Offsite
Frankfurt School of Finance & Management,
Frankfurt am Main

09 October 2019 (Wednesday)

- 10:00 – 12:30 h: 3rd Advisory board meeting
- 13:30 – 15:30 h: 4th Advisory board meeting
Raiffeisenlandesbank Niederösterreich-Wien,
Vienna / Austria
(followed by a visit to a „Heurigen“ (wine taverns))

We hope to welcome you to as many events as possible this year!

rent issue in the world of insurance: "Big data in life insurance". All presentations were commented on by professional and academic representatives and then intensively discussed. A full-page report on the research conference was published in the *Börsenzeitung* (download: https://www.firm.fm/fileadmin/user_upload/FIRM/Publikationen/20180630_Forschungspreis-2018.pdf). In the subsequent advisory board meeting, Jens Obermöller, BaFin, spoke on the highly topical issue of cyber security.

The highlight of the day was a formal dinner at which Uwe Fröhlich, Co-Chairman of the Board of DZ Bank, spoke on current issues and presented the research prizes.

At the FIRM Offsite, Ullrich Hartmann, PwC, discussed the benefits of MiFID II for consumers, capital market participants, banks and supervisors. Sina Steidl-Küster and Markus Kempkes, KPMG, spoke on IT risks and cloud computing and Prof. Thomas Kaiser, KPMG and Goethe University, talked about risk culture. The main results of the Compliance Risk Round Table were presented by the coordinators for the years 2017 and 2018. Frank Romeike presented a review and outlook on FIRM's communication activities (including the FIRM Yearbook and the relaunch of the FIRM website). Prof. Wolfgang König reported on research and teaching on behalf of the Goethe University and Dr. Heike Brost on behalf of the Frankfurt School.

The third and fourth advisory board meetings took place in September in Munich at the offices of Oliver Wyman. We thank them very much for their hospitality. The meeting began with a presentation

by Dr. Kai Bender, Oliver Wyman, on digital transformation strategies. Dr. Jochen Papenbrock, firamis, then spoke about machine learning, followed by Dr. Jennifer Betz and Prof. Daniel Rösch, University of Regensburg, on the influencing factors for NPLs.

The afternoon session was again dedicated to Brexit. Benjamin Hartmann from the Brexit Task Force of the EU Council and Dr. Clemens Ladenburger from the Legal Service of the European Commission gave a detailed insight into the Brexit negotiations. In particular, they reported on the planned withdrawal agreement and the central problems that had become apparent in connection with the border between the Republic of Ireland and Northern Ireland. Mathias Graulich, EUREX Clearing, reported on EUREX's approach and success in euro clearing.

The board, supported by the chairmen of the advisory boards, is currently discussing the future strategy of FIRM. In order to strengthen the added value of FIRM for its members, the aim is for members to be more closely involved in the various activities (meetings, research funding, research prize, round tables). In addition, current issues are to be identified, which will then be dealt with quickly in small working groups by relevant professional and academic representatives and which will be presented to the public in short papers. Therefore, we would like to ask you to put forward current topics for discussion by FIRM and to make suggestions for more active involvement of our members. We are also keen to link the various FIRM activities more closely.

We strongly invite all advisory boards and individual members to submit contributions for the advisory board meetings and the offsite!

In addition, we will shortly be sending you information about the call for entries for the Research Prize 2020. We plan to broaden the thematic scope of the submissions and expand the target group to include selected European universities.

**Authors**

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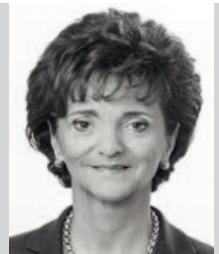
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DekaBank,
Chairman of the Advisory Board at the
Association for Risk Management
and Regulation



Prof. Dr. Dr. h.c. Günter Franke

Chairman of the Advisory Board
at the Association for Risk Management
and Regulation

Advisory Board (practitioner)



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Board FIRM,
Member of the Board of
Management,
DekaBank



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Partner,
FSO FAAS Leader Germany,
EMEA Head of Centre of
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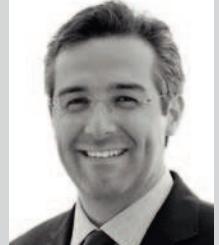
Frank Behrends
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Managing Directors,
ODDO BHF Aktiengesellschaft



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Chief Credit Officer,
DZ BANK AG



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Member of the Board
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Jürgen Steffan
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Wüstenrot Bausparkasse AG
CRO W&W AG



Alexander Stuwe
Group Head of Risk Control,
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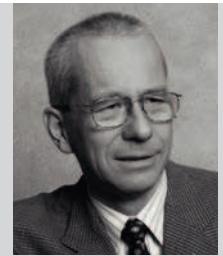


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Banking Risk Round Table

Risk controllers' extensive portfolio of duties

Even a number of years after the financial market crisis, the regulatory agenda is still packed. While European banks are still adjusting to the significant changes in supervisory monitoring and auditing practices brought about by the new interaction between the European Central Bank and national supervisory authorities, the final revision of the Basel III reform package means that the planned revision of all equity capital measuring methods is becoming the focal point of risk and capital management. These challenges have to be dealt with in parallel to actual risk management duties, to ensure that an institution has the necessary risk bearing capacity despite the sustained low interest phase, continuing high geopolitical tensions and a changed competitive environment. Therefore, the demands on risk controlling – which is where many of these duties are performed – remain very high.

Making sure these demands are met efficiently, appropriately for the risk level and the latest developments in bank supervision law, but also in line with supervisory auditing practices, calls for ongoing dialogue with the executive board, supervisory authorities and external experts as well as regular dialogue between banks. Practical implementation of the multi-layered legal regulations constantly raises new questions. How are individual aspects prioritised? How can new requirements be efficiently translated into structures and processes? What risk IT architecture is appropriate and flexible enough to respond to constant change? Which tasks can be carried out by internal project teams and where are external consultancy services required?

Focus on broad-based dialogue

The FIRM Banking Risk Round Table makes a valuable contribution in this area. The FIRM Banking Risk Round Table is an established platform and, with 20 member institutions, is very representative of the German banking sector. Its structure is also unique in Germany. Institutions from all three sectors of the industry are represented – savings banks, cooperative banks and private banks – in each case by the top management level responsible for risk management.

The FIRM Banking Risk Round Table was established as a response to the constantly increasing significance of internal bank risk bearing capacity concepts and their assessment by supervisory authorities. Back then, there was an initiative to bring together banks from across the different sectors of the industry to produce a joint study. The objective was to share opinions, adopt collective positions and provide a basis for promoting dialogue with the supervisory authorities. The participants in the initiative subsequently decided to organise further meetings and the FIRM Banking Risk Round Table was set up for this purpose in October 2011. The meetings are held every quarter and participants view them as important events providing an opportunity for dialogue on regulation and risk management. The body is especially valued for its lively, comprehensive, top-level professional discussions across the different sectors. In 2016, closer discussion with the FIRM Compliance Round Table was established to take advantage of suggestions from the more qualitative areas of risk management.

Important impetus for risk controllers

In addition to regulatory issues already in force, the leading risk managers from member institutions also discuss regulatory initia-

tives that are still at the planning or consultation stage. This regulatory radar helps banks to take into account future requirements in current projects, at least where it is feasible to integrate them into existing project planning. The body also discusses issues away from classic regulatory questions. Which new risks can be observed in the market, or which risks need to be re-assessed due to current developments? This is particularly important for those risks that are not covered by the banks' regular risk measuring methods.

Because more people provide a better view, the result is a meaningful overall picture of which risks can be identified in the different institutions. This enables strong indicators to be derived for internal risk auditing. For the body to be accepted, therefore, it is important that the added value outweighs the work involved. The structure of the meetings is thus strictly regulated and timed. Important issues are raised and discussed in turn. Abstraction of experience from day-to-day business is a very important feature of the shared discussion culture. Where necessary, the body develops joint policy papers, allowing it to make an active contribution to the ongoing dialogue with regulators and supervisory authorities. There is a regular review of whether there are any issues that require consolidated action by the FIRM Banking Risk Round Table. In view of the new risk management duties that lie ahead, this issue will once again be crucial in the future. It is often the case that in the maze of regulations there will be contradictions in implementation or the regulator will incorrectly assess the costs on the bank side. In such instances, it is the task of the FIRM Banking Risk Round Table to adopt a joint position.

FIRM sees itself primarily as a platform for promoting dialogue between academics and professionals (see FIRM teaching programmes, p. 192). In this context, the members of the FIRM Risk Round Table provide regular impetus and highlight issues that require a more in-depth academic foundation. Representatives from the academic world and consultants are regularly invited to be guests at the FIRM Banking Risk Round Table and give presentations on the latest developments. This dialogue, along with access to required data and the development of shared theses, methods or theories are crucial factors in combining suggestions from the latest research with the real-world requirements in risk management.



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Coordinator in 2018 and 2019:



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 Head of financial controlling
 and risk management,
 Wüstenrot Bausparkasse AG

Sven Boland
 Head of Risk Controlling,
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Dr. Andreas Dartsch
 Head of Financial-/ Risk-
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 Berliner Sparkasse

Alexander Stuwe
 Group Head of Risk Control,
 NORD/LB
 Norddeutsche
 Landesbank Girozentrale

Matthias Zacharias
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 Landesbank Hessen-
 Thüringen (Helaba)

Compliance Risk Round Table: Topics and outcomes 2018

The Compliance Risk Round table, founded in 2015, is a well-established institution by now. Four times a year compliance representatives of financial institutions as well as academics and business consultants specialized in that field come together and discuss compliance trending topics. Participants' list is constantly growing.

Deutsche Bank and Oliver Wyman coordinated the 2018 Compliance Risk Round Table.

This year's agenda had its focal points on the key trends in Compliance, Non-Financial Risk and Anti Financial Crime which are expected to grow in importance: integrated non-financial risk management, efficiency and digital innovation, conduct and metrics. Also on the agenda are current topics such as ECB review of internal governance and Brexit. Overall, the Compliance Risk Round Table served as an overarching forum for non-financial risks.

Integrated non-financial risk management

Many banks are managing their non-financial risks today using a siloed approach, based on manual processes associated with high

efforts. Some banks have started moving into the direction of integrating their compliance, anti-financial crime and operational risk functions. In the round tables in Q1 and Q2, we discussed the possibility of an integrated risk assessment process for all non-financial risk types. The round table in Q3 then focused on the best practices of an integrated non-financial risk management framework.

Efficiency and digital innovation

Most banks in Germany have been under enormous cost pressure for years. Recently the risk and control functions are increasingly moving into the focus of cost cutting initiatives at banks. However, when cutting costs these risk and control functions must stay effective. In addition to classical levers such as organization and mandate review, the levers around process standardization / industrialization,

Fig. 01: Compliance function's core activities and responsibility for risks as "2nd Lie of Defense"



Coordinators in 2018:



Monika Dissen
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Deutsche Bank AG



Hanjo Seibert
Principal,
Oliver Wyman GmbH



Dr. Lue Wu, CFA
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Finance & Risk Practice,
Oliver Wyman GmbH

Coordinators in 2019:



Kai-Hendrik Friese
Divisional Head of Compliance,
DZ BANK AG,
Frankfurt am Main



Norbert Gittfried
Associate Director,
Boston Consulting Group,
Frankfurt

automation and digitalization have become more important. The topics around impact of digital technologies on the compliance function were discussed in almost all sessions.

The main focus of the discussion was on how the different technologies can be applied for different purposes in different areas of the compliance function. Various case studies in KYC, AML, fraud prevention, etc. were presented (e.g. by a RegTech start up) in the round tables.

Conduct and metrics

Conduct remained a focus topic for discussion in this year's round tables. We had various presentations and group discussions on current state and challenges of conduct risk management in Germany. The main points for discussion were: How is conduct defined in the German market? How advanced are German banks in conduct risk management compared with international peers?

Related to these topics the round tables in Q1 and Q4 also discussed quantitative approach for conduct measurement and monitoring, including case studies of applying metrics to measure and make compliance more tangible.

Current topics

In Q1 the round table participants exchanged their experience with the recent ECB review of internal governance. In Q3 and Q4, Brexit was the current topic and stood on the agenda. The participants extensively discussed the opportunities and risks associated with Brexit for the German banking sector as well as the reactions / preparations undertaken by German financial institutions and governments. Finally, the question of conduct in the ECB asset quality reviews was discussed in the last round table of 2018.

Outlook 2019

The Compliance Risk Round Table will continue to meet four times a year. The hosts for 2019 will be Kai-Hendrik Friese (DZ BANK AG) and Norbert Gittfried (Boston Consulting Group). Interesting topics are already on the agenda, such as the forthcoming 5th Money Laundering Directive, challenges in MaRisk compliance, approaches to fraud and corruption prevention and the effects of digitisation on compliance. In addition, there will be close links with the scientific community.



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FIRM launches Asset Management Risk Round Table

Much has happened again in 2018. One highlight among many was certainly the start of the FIRM Asset Management Risk Round Table on the initiative of Manuela Better (Member of the Board of Management of DekaBank Deutsche Girozentrale, CRO) and Frank Westhoff (Member of the Board of the Association for Risk Management and Regulation).

The members of the Round Table are committed to promoting the exchange of experience on current trends and challenges in the area of risk controlling in asset management. They are guided by charitable values and goals as set out in the FIRM Mission Statement and Statute. The Round Table supports these efforts as an independent think tank. The purpose of the Round Table is to

- to discuss and deepen general topics of risk controlling on a common platform, also against the background of the increasing flow of regulatory innovations and changes, also with regard to the efficient handling of existing regulations;
- to discuss and develop joint positions on national and international trends and challenges in the area of risk controlling;
- to strengthen the further development of risk controlling by promoting dialogue between science and industry, also with a view to a stronger ex-ante focus on new risks arising in the market;
- to place a special focus on strengthening FIRM as a leading network in the financial sector between science, practice, politics and regulation;
- to promote and support studies, investigations, research and development projects aimed at the further development of risk controlling in the common interest;
- to make active use of the link provided by FIRM to the scientific research work of the participating universities and/or other suitable scientific institutions. In addition, the Risk Round Table can be expanded to include a direct, informal and practical dialogue with supervisors. There should be no overlap with association or lobbying activities.

At its first working session on 15 October 2018 at Union Investment, the Round Table dealt with the topic of sustainability or in short ESG – Environment, Social, Governance – and the relationship to risk management of investment companies.

Asset Management Risk Round Table, Members:

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Geschäftsführer | COO,
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Frankfurt am Main

Dr. Lutz Hahnenstein
Leiter Risiko Controlling,
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(Talanx Investment Group)

Juliet Haskanli
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Motivated by the final report of the HLEG Group on Sustainable Finance of the EU Commission published at the beginning of the year and the subsequent EU Action Plan, three speakers introduced the topic: Mr. Carsten Löffler and Prof. Moslener, Frankfurt School and Green and Sustainable Finance Cluster Germany, and Markus Quick, Partner at KPMG.

Since the BaFin (Federal Financial Supervisory Authority) also asks in its supervisory discussions about the consideration of climate risks in the risk management of investment companies, the participants were able to state at the end of the first meeting and intensive discussion that in the meantime three essential drivers for change have come together:

- Professional investors expect ESG risks to be taken into account not only in portfolio management, but also in asset managers' reporting and risk management.
- The EU Commission wants to live up to its self-imposed role as a pacemaker for sustainable growth and mobilise private capital to achieve the ambitious goals of the Paris Climate Treaty for 2050. To this end, measures in the area of financial market regulation are already in the pipeline and a "technical expert group" is already working on basic definitions and taxonomy issues.
- The European and German banking, insurance and securities supervisors are increasingly dealing with system and climate risks in internal working groups. Risk management issues are the focus of attention for supervisors.

The resulting challenges for asset managers' risk management go far beyond the classic consideration of exclusion lists in risk controlling and will also include extensions to quantitative risk models. To this end, new modeling standards will have to be created in the future. This topic will therefore have to be taken up again by the Round Table in future.

For further processing by the Risk Round Table, the topic "Challenges in risk controlling due to digitalisation, in particular due to an increase in algorithm-controlled management models in asset management" could also be appropriate. The use of digitization to make processes more efficient is only one aspect of the considerations. However, the changes that can result from the possibility of increasingly far-reaching automation in the asset management industry can be of strategic relevance for the further development of risk controlling.

Both an increase in cost pressure and an increase in the quality of algorithm-controlled management approaches can lead to their increased use. Issues such as these could be of interest here:

- What developments are foreseeable in the industry, among other things against the background of an increase in Robo Advisors as an interface to the customer?
- What challenges do algorithm-controlled management approaches pose for the methods of risk controlling as well as for an independent model validation of the management model? How are model errors dealt with?
- Is the job description of the risk controller changing and do we need adapted training?

■ What supervisory requirements does BaFin see?

In the interaction between science and industry, the questions can be examined and discussed in order to sharpen and align future requirements for risk controlling.

If we have also aroused your interest and you also consider the importance of creating communication platforms for risk controlling processes to be meaningful, we would be very pleased to receive your feedback.



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The Personal Members' Round Table is taking off

With interesting presentations, renowned participants and guests, lively discussions and a growing circle of participants, the Round Table of Personal Members provides a good opportunity for regular exchange on current developments in the banking sector.

The agenda 2018 of the "Personal Members' Round Table" focused on interest rate risk in particular and market risk in general, valuation issues in the Gone Concern case, the Bank's restructuring and liquidation, and the impact of regulatory requirements on less significant institutions.

Objective and purpose of the body

The Round Table is intended to be a forum where personal members of FIRM can get together for open discussion of ideas and opinions on "best practice" in risk management and regulation in the financial industry. It supports FIRM's efforts as an independent think tank and adheres to the FIRM constitution. In particular, it does not engage in lobbying. Like all FIRM members and bodies, the "FIRM Personal Members' Round Table" is committed to promoting sharing of experience and focuses on non-commercial values and objectives, as set out in the FIRM constitution.

Specifically, the purpose of the body is to discuss and increase understanding of general risk management and compliance issues, to discuss and adopt common positions on nationally and internationally relevant strategic problems and issues in this area, and where relevant to communicate the positions adopted as joint contributions to discussions and documents under the Round Table label. There is a particular focus on strengthening FIRM's position as a leading network in the financial sector, bringing together academics, professionals, politicians and regulators. In this context, an explicit objective is to utilise the link provided by FIRM to academic research work by participating universities and/or other suitable academic institutions.

Membership and coordination of the Round Table

Membership of the Round Table is open to all personal members of FIRM. At present, the body has more than 30 members, with an upward trend, who have many years of expertise and experience – up to executive board / CEO level – in their institutions or companies, as well as excellent networks. The diversity of personal expertise is reflected in the lively and multi-faceted discussion contributions that characterise the meetings.

At their inaugural meeting in February 2017, members voted unanimously to hold at least one meeting of the Round Table every year. There should be at least one other meeting per year. The meetings planned for 2018 will be publicised at www.firm.fm. The venue and agenda will be communicated by the two coordinators well in advance.

Every two years, two coordinators are elected from among the membership by simple majority and serve a two-year term. The Round Table is currently coordinated by Prof. Martina Brück from the University of Koblenz, representing the academic side, and Mr. Peter Bürger from Risk & More Consulting, representing the professional side.

The coordinators are responsible for the publication of results, after appropriate agreement with the members of the Round Table.

Summary

With interesting lectures, renowned participants and guests, lively discussions and a growing circle of participants, the Round Table of Personal Members provides a good opportunity for regular exchange on current developments in the banking sector. The committee currently comprises 36 members, with a rising tendency, who have many years of expertise and experience as well as excellent networks. The diversity is also reflected in the lively and multi-faceted discussions that characterise the meeting dates.

The Round Table offers its members tangible added value. This includes the discussion of technical issues and the very latest risk management and compliance topics with other experts and the opportunity for networking. It also provides personal members with access to the FIRM Research Conference and the FIRM collaboration platform.



Coordinators of the „FIRM Individual Members' Round Table“:

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Peter Bürger

Managing Director,
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Round Table, Individual Members:

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Head of DACH Region,
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Marc Ahrens
VP, Head of FS Sales
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Management Board and CRO/CFO,
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Alexander von Dobschütz
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Practice-oriented research and teaching at Goethe Business School's part-time Master in Finance program

In the wake of the globalization of financial markets, finance has become a hugely dynamic and fascinating field, which is not only a key driver of organizations but also of industries and markets. At the same time, finance is undergoing enormous changes, stemming mainly from disruptive technologies in the financial sector as well as from a regulatory wave in the aftermath of the financial crisis and the ever-increasing need for state-of-the-art risk management.

In order to take up changing market parameters in the world of finance, the well-established Master in Finance program at Goethe Business School (GBS) has recently been revised and restructured. The innovative part-time program provides a deep dive into the intriguing world of finance and into its main future drivers: financial technology and risk management & regulation. The English-language program is excellently positioned to help finance professionals manage current market drivers. The job-compatible format enables participants to fully exploit their professional potential and the well-balanced curriculum provides specific training in individual fields of knowledge.

In the abstract available below, Master in Finance graduate Laura Niederprüm discusses the sufficiency of new regulations to break the vicious circle between banks and sovereigns. Inspired by her daily work, the piece illustrates the immediate practical relevance of the program's content while boosting students' analytical capabilities.

Combination of rigorous academic standards with unique practical relevance

Goethe Business School's part-time Master in Finance program is specifically designed for ambitious young professionals who wish to deep dive into the latest concepts in financial technology and risk management & regulation. A mix of fundamental theoretical knowledge and applied concepts are incorporated, which immediately be utilized in practice to independently identify and deal with demanding challenges in modern organizations.

The program combines all key elements of modern professional training – academic depth and breadth, practical relevance and international outlook. Students are thereby able to reflect on important questions and solve them to further foster and develop their career. To this end, the program's faculty includes the latest results from research and ensures that applying knowledge to professional practice is a central element of the courses.

Graduates receive a Master of Arts in Finance degree (90 ECTS) from the AACSB-accredited Faculty of Economics and Business Administration at Goethe University. Students have the opportunity to choose a specialization in either risk management & regulation, or financial technology management. The structure of both curricula is depicted in detail in ▶ Fig. 01 below.

While foundation courses build the basis, the additional concentration courses reinforce specialist knowledge and focus on core areas of modern finance. Elective courses then build on previously learned material and offer in-depth exploration of specific topics. The master thesis builds on the concepts, techniques and understanding students have acquired over the course of study.

Spotlight Master in Finance Thesis

In their Master in Finance thesis project, students often work on a self-defined topic they have taken up in their daily workplace

environment and which is embedded into a theoretical context. An example of an up-to-date topic dealt with in a Master in Finance thesis, is the work of Laura Niederprüm, a Master in Finance Class of 2018 graduate. Her master thesis on "The Sovereign-Banking Nexus in the aftermath of the financial and sovereign debt crisis – Are new regulations sufficient to break the doom-loop?"¹, is summarized in the abstract below.

'We affirm that it is imperative to break the vicious circle between banks and sovereigns.'

(Euro Area Summit Statement, June 2012)

With this statement the euro area leaders commenced their strategic agenda in June 2012 as a reaction to the financial and sovereign debt crisis, which was just at its peak three months after the default of the Greek government. Six and a half years have passed since then and financial regulation has been subject to many reforms, most prominently the Basel III accord. However, while much has been done to protect sovereigns from banking crises, e.g. by requiring banks to hold sufficient amounts of liabilities which can absorb losses in case of the bank's resolution, the reverse contagion channel, in which sovereign debt crises endanger banks' solvency, has not been addressed sufficiently yet. Direct links from sovereigns to banks mainly stem from the substantial amounts of banks' sovereign debt holdings, which lead to direct mark-to-market losses in banks' profit and loss accounts when the government's fiscal condition is deteriorating.

► Fig. 02 above indicates that EU banks have kept their sovereign exposures at a constantly high level since the introduction of the CRR and CRD IV in 2014 and are still exposed to severe concentration risks due to the home bias, i.e. the phenomenon of holding a disproportionate amount of exposures to the domestic sovereign. This implies that if a new sovereign debt crisis with comparable consequences as the last one hit Europe at the current stage, banks'

Fig. 01: Curriculum part-time Master in Finance



solvency would again be severely threatened by the excessive sovereign exposures in their balance sheets.

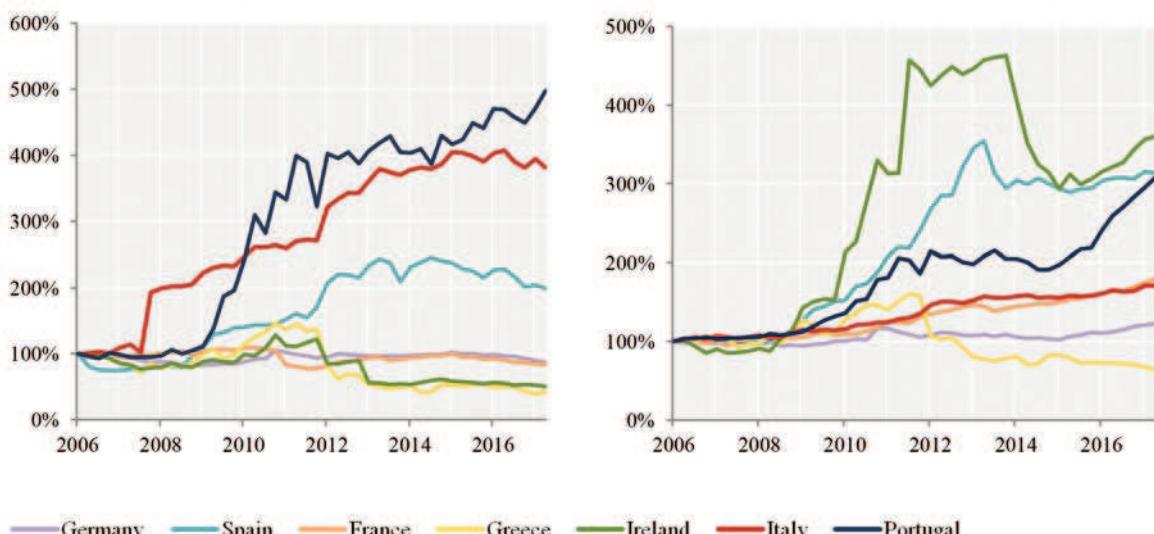
Typically, banks invest in government bonds to hold an adequate buffer of safe and liquid assets to reduce their exposure to adverse liquidity and asset price shocks. Beyond that, sovereign exposures benefit from a preferential regulatory treatment, particularly by being subject to low or zero capital requirements and being exempt from large exposure limits. Although the European debt crisis proved that sovereign debt is not risk free, no concrete policy reforms are envisaged at the moment to revise the regulatory framework. While the stricter capital requirements of the Basel III Accord have rendered banks more resilient, the preferential treatment of sovereign exposures has not been touched and new liquidity regulations even intensified the motivation for banks to invest in sovereign debt. In fact, it is not surprising that governments do not actively promote changing this situation. Due to the home bias EU governments are highly dependent on their domestic banks when issuing new debt as these absorb on average 20% of their debt issuances according to the IMF's 2017 estimates of the investor base of EU governments' debt.

But as shown by the Greek case, in which the default of the government in 2012 significantly affected domestic banks, it is crucial to change this situation in favour of a more stable banking system. A number of measures are currently discussed. Based on an impact study comprising the largest EU banks, which analyses the most prominent regulatory proposals to alleviate the transmission channel from sovereigns to banks, a combination of non-zero risk weights and introducing a soft large exposure limit leading to higher risk weights with increasing concentration risk appears to be one viable solution. Although highly controversial, the regulatory reform could be complemented with the implementation of European Safe Bonds or "ESBies", which might generate an alternative safe asset to sovereign bonds. Moreover, a fully mutualised European Deposit Insurance Scheme (EDIS) could benefit a regulatory reform by mitigating the risk of bank runs resulting from solvency problems of national governments.

Looking ahead, stricter regulations for sovereign exposures should be implemented in the near future to tackle the excessive sovereign debt holdings in European banks' balance sheets. In the interest of financial stability, governments should be willing to abandon their

Fig. 02: Evolution of selected banking systems' claims on the public sector (shown as an index with claims as of March 2006 = 100%)

a) Total sovereign exposures b) Exposures to banks' home country



Sources: ECB Statistical Data Warehouse (Balance Sheet Items), International Monetary Fund

Fig. 03: Job-compatible program and excellent infrastructure



current financing benefits resulting from the preferential regulatory treatment of sovereign exposures. This will be a crucial step to reach the EU's goal as stated in 2012 to break the vicious circle between banks and sovereigns.

Job-compatible program format – Combining studies and work
Tailored to practitioners who want to lay the foundation for a career in finance at early stages of their professional life, the Master in Finance program attracts young professionals seeking to expand their knowledge without interrupting their professional activity. The program structure provides ample scope for successfully balancing the requirements of working and studying in parallel. Lectures are scheduled every two weeks on Friday afternoons and Saturdays. Thanks to the program's format, all methods, strategies and analytical tools learned in the courses can immediately be applied at work.

Studies can be completed within 22 months. In the first two semesters, students are introduced to general fundamental concepts in finance, risk management, economics, management, accounting and statistics. In the third semester, students can select from a variety of elective courses and delve into topics according to their respective specialization from a theoretical as well as an applied perspective. The program ends with the completion of the master thesis (14 weeks).

Infrastructure and Faculty

All lectures take place in the House of Finance on the centrally located modern Campus Westend of Goethe University Frankfurt. Part-time Master in Finance students are enrolled as regular students at Goethe University and thus have access to all university student resources on campus and online.

The House of Finance is a center for interdisciplinary research and training activities in finance and financial law at Goethe University and is an important platform for academics, politicians and professionals. It hosts about 200 academics in total and, accordingly, is one of the largest groups of researchers on financial and monetary topics in Europe.

All classes are taught by renowned faculty from academia and practice, including professors from the AACSB-accredited Faculty of Economics and Business Administration of Goethe University, one of the most highly regarded business faculties in Germany, as well as national and international practitioners from the financial sector. The combination of international faculty and a curriculum taught entirely in English ensures students are prepared for an international working environment.

Extracurricular lectures by renowned experts from the network of the Frankfurt Institute for Risk Management and Regulation provide additional impetus for a successful learning experience. The „FIRM Kaminabende“ offer a platform for speakers, lecturers, students and alumni to regularly discuss current topics and forge connections forming a strong network of peers.

Open and tailor-made programs available for individualized focus

The Master in Finance curriculum is also accessible to professionals who would like to deepen their knowledge in specific fields of expertise only – as part of individually and separately bookable open programs and trainings (with or without student status). Customized programs for companies seeking to develop their professionals are developed by the GBS Executive Education Team. The tailor-made conception of the programs is carried out in close coordination with the customer and on the basis of the agreed learning and development goals in various fields of competence.

¹ Please note that the insights from the master thesis are based on the available situation as of December 2017.



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Laura Niederprüm
Graduate,
Master in Finance Class of 2018

Education in Risk Management and Regulation at the Frankfurt School

The pace of changes in regulation is slowing down, the relevant departments in banks and financial institutions have been set up and business models have been largely adjusted. In short, risk management is becoming something normal. Several years ago, the Frankfurt School of Finance & Management decided to focus academic education in risk management on the target group of non-experienced students - as in the other areas of the Master of Finance.

The Master of Finance is the only German programme in the world-wide Financial Times ranking and, with around 200 students per year, is one of the largest finance programmes in Europe. The concentration Risk Management is offered alongside the concentrations Capital Markets, Corporate Finance and Financial Accounting & Advisory. The study programme, which is completely in English, takes two years (120 ECTS). The use of Saturday as a normal study day and a well-designed curriculum, tried and tested over the years, allows students to work for up to 50% of a professional job besides studying.

In addition, Frankfurt School has developed a comprehensive and successful range of risk management and regulation offers in the context of executive education and development cooperation. Participants expect differentiated and at the same time very practice-relevant content which makes the acquired knowledge immediately tangible.

Master of Finance, Concentration in Risk Management (M.Sc.)

The risk concentration of Frankfurt School Master's programme is generously supported by scholarships and grants from FIRM. Thus, it is possible to offer students the best possible mix of general financial content and risk topics. In the Master of Finance, eight modules are dedicated to the area of Risk Management and Compliance. These are constantly adapted to practical requirements:

- Risk Management
(mandatory for all students)
- Responsible Management in Finance
(mandatory for all students)
- Risk Governance & Organization
- Structured Products and Interest Rate Models
- Credit Risk, Default Models & Credit Derivatives
- Risk Modelling
- Portfolio Risk Management
- FX Options and Structured Products

Risk management is unthinkable today without the sophisticated handling of data and models. The risk training at the Frankfurt School is therefore supplemented by modules that deal with the handling of (big) data and machine learning. Some courses are based on the programming language Python, which is mandatory for all students.

- Statistics and Econometrics
- Financial Products & Modelling
- Data Analytics and Machine Learning in Finance
- Blockchain
- Algo Trading and Financial Analysis with Python
- Human and Machine Predictions

The education in risk embedded in the Master of Finance is thus not only extensive but also future-proof.

The exchange with practice is an important element. For example, Master of Finance students who have successfully passed the examination of the GARP Global Association of Risk Professionals and gained the qualification as Financial Risk Manager (FRM®) gain the credits for an elective module. Furthermore, we intensively use the cooperation with the German GARP - Regional Chapter. There is a regular meeting of the GARP - Chapter at the Frankfurt School. At this meeting, Risk Concentration students get to know the current state of the discussions taking place in practice in exchanges with risk professionals. Master of Finance students have been participating in the PRMIA international student competition for years - the Professional Risk Managers' International Association - the Risk Management Challenge, where they regularly reach the European finals (the FS team won in 2016).

Executive Education: certificates, seminars and workshops

Learning and adapting to change is a constant and unstoppable process. This is especially true for risk managers who are well positioned with their initial academic education and work experience. It is typical for professional work of this nature that risk managers continue to face new regulatory requirements each year. So that risk managers can find suitable further training, the Frankfurt School has opted for modularized continuing executive education offerings.

The certificate programmes of the Frankfurt School with a focus on **risk management** are very well received. There are two reasons for this: On the one hand, the certificate examination can be used to prove the acquired specialist knowledge in selected areas. And on the other hand, the continuing education programme is seen as an essential contribution to a reliably high standard of knowledge. Around 100 graduates annually receive certificates as risk managers for non-financial risks, risk managers for medium-sized banks, liquidity, market price or credit risk managers; another 870 employees attend selected specialist seminars. In order to enable a focus

on continuing education in the reporting system for an exclusively English-speaking audience, the range of further training courses in risk management has been expanded: since autumn 2018, 20 experts have been trained for the first time to become **European Regulatory Reporting Specialists**.

The **Excellence Programme for Supervisory Board Members**, with a modular structure and maximum flexibility, is the flagship of the executive education market in this field. Participants can choose between attending the full programme or attending individual seminars of particular importance to them. Examples include the specialization modules for supervisory boards in the financial sector, which cover topics such as Full Bank Management, Overview of Banking Regulation and The Bank Balance Sheet - Financial Products and their Impact on the Risk Profile of the Institution. The specialization module Insurance, which takes into account the special knowledge of supervisory board members in this industry is new in the programme.

The certificate course **Certified Compliance Professional** (CCP), which takes place in two semesters with a total of 22 days of attendance and three examination days, is enjoying ever greater demand. The combination of compulsory courses, seminars as an elective subject and specialization allows tailor-made coordination of training as a compliance officer with the needs of the respective companies. The certificate course leads to the comprehensive qualification needed to efficiently and effectively implement and monitor the principles of good and sustainable corporate governance.

International Advisory Services

Frankfurt School's International Advisory Services (IAS) target developing countries and provide solutions by facilitating better access to finance for all stakeholders. With funding from leading international development institutions (such as ADB, EIB, EBRD, GIZ, IFC, KfW, World Bank) or directly from our clients, our numerous Technical Assistance projects have given us the opportunity to contribute to economic development and growth. Our position within Frankfurt School allows us to combine academic research with project implementation.

The strengthening of the financial sector is of utmost importance in promoting economic prosperity and ensuring stability in developing and transition countries and emerging markets. Well-functioning financial systems are essential for allocating funds to the most productive and efficient uses, leading in turn to increased economic growth and employment as well as decreases in poverty and income inequalities globally.

Frankfurt School's International Advisory Services (IAS) has provided comprehensive risk management solutions based on international best practice and customized to the needs of the specific financial institution and its local regulatory environment. The services span the entire risk management landscape, including the implementation of an enterprise-wide risk management (ERM) framework with all risk relevant tools, reporting templates, policies and guidelines for a leasing firm in Nigeria; training for a bank in Kenya on the Internal Capital Adequacy Assessment Process (ICAAP), as well as liquidity risk stress-testing, and advisory on model validation and calibration for a bank in Zimbabwe.

Within the framework of these projects, our team of experts focus on increasing the institutional capacity of beneficiary institutions

through high-class training programmes and tailor-made consultancy services.

Summary

With this multi-dimensional strategy, the Frankfurt School, in close cooperation with FIRM, offers attractive education opportunities for the various target groups in the area of risk management and regulation. In cooperation with other universities, professors and practitioners, the university contributes to the success of financial service providers worldwide, as well as of German and European supervision. Through its master programme, seminars, projects and research, the Frankfurt School, in cooperation with FIRM, contributes to innovation and network building in the increasingly important work area of risk management and regulation.



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Award of FIRM Research Prize 2018 and research funding



Following the established two-year cycle, the Research Prize from the Frankfurt Institute for Risk Management and Regulation (FIRM) was awarded in 2018. It honours the best economic dissertation in the field of risk management and regulation – including compliance – by financial institutions. The Hessian State Minister for Economic Affairs, Energy, Transport and Regional Development, Tarek Al-Wazir, again assumed patronage.

Writers of economic dissertations which were completed summa cum laude or magna cum laude at a German-speaking university in 2016 or 2017, and which made a significant contribution to a better understanding of risk management and regulation in the financial services sector, were eligible to apply for the research prize. In the evaluation, particular emphasis is placed on the relevance of the problem and a balanced combination of internationally recognised, high-quality theoretical and conceptual background work and innovative practical relevance.

In line with FIRM's mission statement, the jury was again formed to reflect the close link between research and practice. Anja Guthoff (DZ-Bank), Carsten Lehr (Westendbank) and Gernot Blum (d-fine) were appointed to the jury as representatives of the professional sector. Representing the academic side were Lutz Johanning (Wissenschaftliche Hochschule für Unternehmensführung, Vallendar), Andreas Pfingsten (Westfälische Wilhelms-Universität Münster) and Günter Franke (Universität Konstanz). The jury was chaired by Günter Franke.

Each pair of professional and academic representatives reviewed two dissertations. The assessment took into account various criteria, such as the motivation for the work, the quality of the theoretical and empirical analysis, the innovative content and the implementation potential for banks, regulators and central banks. Another important criterion was the applicant's documented reputation in

internationally renowned journals. After intensive discussion, the jury ultimately shortlisted three papers.

The authors of these three papers were invited to present their key research findings at the FIRM Research Conference, which took place on 14 June 2018 at the Collegium Glashütten (see follow-up report on page 201 of this yearbook). Steffen Krüger, University of Regensburg, was the first to present his work under the title "Advanced Dependency Modelling in Credit Risk". Using sophisticated statistical methods, he evaluates new regulatory requirements and accounting standards. From these, he draws conclusions for bank management, supervisory practice and academic research. The work was discussed in detail by Gernot Blum (professional) and Lutz Johanning (academic) before a lively general discussion with the participants in the research conference. Marius Pfeuffer, University of Erlangen-Nuremberg, then spoke about "Essays on the Measurement of Credit Risk". The starting point of his work is the new IFRS 9 accounting standard, which requires estimation of the expected default of a loan over its entire term. The panellists were Carsten Lehr (practice) and Günter Franke (university). Finally, Elia Berdin, University of Frankfurt, spoke about "Essays in Microprudential and Macroprudential Supervision in Insurance". At the core of the analysis are the effects of a prolonged period of low interest rates and declining mortality rates on the solvency and profitability of life insurance companies. Alexander Schalk (d-fine) for the professional side and Heinrich Schradin, managing director of the

We hope that the next call for entries for the FIRM Research Prize in autumn 2019 will fall on equally fertile ground. The subject area is broad and includes micro- and macro-prudential regulation including compliance, financial and non-financial risks, connections between financial intermediation and the real economy, bank structure and monetary policy, including from a European perspective (e.g. banking union, capital market union), internal organisation, processes, systems, use of modern IT and governance in financial institutions including shadow banks. We ask academic representatives to include this call for entries in their planning now.

Institute of Insurance Science at the University of Cologne, for the academic side, discussed the issue.

The final assessment of the three candidates was based not only on their written work but also on the quality of their presentation and subsequent discussion. The first prize was finally awarded to Steffen Krüger.

Uwe Fröhlich, Co-Chairman of the Board of DZ-Bank, gave the honorific speeches for the three prize winners at the formal dinner and then presented the prizes. Marius Pfeuffer received EUR 2,000 in prize money and his supervisor Ingo Klein also received EUR 2,000 for research purposes.

Elia Berdin and his supervisor Helmut Gründl also received 2,000 EUR. Finally, Steffen Krüger was awarded the FIRM Research Prize and prize money of EUR 15,000 for his outstanding work, as was his supervisor Daniel Rösch.

The winners of the FIRM Research Prize and the other two speakers at the research conference, Jörg Rocholl, ESMT, and Frank Schiller, Munich Re, were also honoured with a full-page summary in the *Börsenzeitung* (Download: https://www.firm.fm/fileadmin/user_upload/FIRM/Publikationen/20180630_Forschungspreis-2018.pdf).

We would like to take this opportunity to once again thank the members of the jury for their outstanding cooperation, as well as Esther Baumann and Katharina Cripps from the FIRM office for their wide-ranging support.

Since 2010, FIRM has financially supported a total of 33 research projects in German-speaking countries. In 2018, the Executive Board decided to support four applicants with total funding of EUR 211,000:

- Corporate diversification and capital structure" (Dr. Daniel Hoang, Karlsruhe Institute of Technology);
- Sovereign risk, regulatory forbearance and bank risk taking incentives" (Prof. Dr. Sascha Steffen, Frankfurt School of Finance and Management);
- Systemic risk measurement and model risk" (Prof. Dr. Peter Grundke, University of Osnabrück);
- Credit risks and payment morale in the digital age - an experimental study on nudging" (Prof. Dr. Christina E. Bannier, Justus-Liebig University Gießen).

Among the more recently funded projects is the project "LGD modelling, downturn forecasting and stress testing with advanced statistical-econometric methods of risk management" by Prof. Dr. Daniel Rösch, University of Regensburg, who supervised the FIRM award winner last year.

In the "Asset Price Bubbles and Systemic Risk" project, Prof. Dr. Isabel Schnabel, University of Bonn, concludes that asset price bubbles endanger financial stability during their formation and when they burst. This can be attributed to characteristics of both banks and the bubbles.

The "Bank bailouts and economic growth" project by Prof. Dr. Valeriya Dinger, University of Osnabrück, shows that monetary policy bank bailouts increase the growth of credit-dependent industries. This effect is smaller if the banking system is particularly hard hit by moral hazard and if the regulator intervenes disproportionately in credit allocation.

In his project "On the Rise of FinTechs - Credit Scoring using Digital Footprints", Prof. Dr. Tobias Berg, Frankfurt School, finds that even easily accessible digital footprint data provides information that is at least as good as traditional credit scores (see the article "Digital Footprints in Credit Scoring - Opportunities and Risks" by Tobias Berg and Ana Gombovic on page 120).

Tobias Berg will present his results at the first advisory board meeting in March 2019, while Valeriya Dinger and Isabel Schnabel will speak at the research conference in May 2019.



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FIRM Alumni in dialogue with CROs

Once again we look back on an eventful and exciting year. A special highlight was the event format "CRO Insights – Behind the scenes of the Executive Board", which was successfully established under the patronage of FIRM on the initiative of the two FIRM Alumni Coordinators Dr. Sebastian Rick and Philip Dreher.



"CRO Insights - Behind the Scenes of the Executive Board" offers the FIRM Alumni the unique opportunity to get in direct contact with risk boards of the FIRM member institutes and to discuss current trends and challenges in risk management and regulation in an open dialogue.

On 19 April 2018 the FIRM Alumni visited the Aareal Bank in Wiesbaden. The bank is listed in the MDAX and not only operates structured real estate financing in Europe, North America and Asia, but also offers software products and digital solutions for the real estate industry. Christiane Kunisch-Wolf (Chief Risk Officer, CRO) welcomed the FIRM Alumni together with Sylvia Trimborn-Ley and Axel Potthast. The focus of the event was on risk controlling, compliance and regulatory affairs. The event ended with a convivial lunch.

The visit to the Kreditanstalt für Wiederaufbau (KfW Group) took place on 24 September 2018 in Frankfurt. Based on total assets, KfW is the third largest bank in Germany after Deutsche Bank and DZ BANK and celebrated its 70th anniversary in 2018. Dr. Stefan Peiß (Chief Risk Officer, CRO) gave the FIRM Alumni an overview of KfW's business model with its domestic promotional business and international business. Björn Stauber presented the bank's Three-Lines-of-Defense approach using information security risks as an example. Finally, Dr. Carsten Heineke explained BaFin's new risk-bearing capacity guideline and how it is implemented within KfW. Here, too, the exchange was continued over a joint lunch.

We want to continue to encourage active and former students from the Frankfurt School of Finance & Management and the Goethe Business School, whose studies involved risk management and regulation issues to apply for membership of the FIRM Alumni organisation for a reduced annual fee of 50 Euro (instead of the usual 400 Euro for personal memberships). An application for membership of the FIRM alumni organisation can be requested from FIRM at www.firm.fm. In addition to priority access to established events such as the FIRM Research Conference, the FIRM alumni organisation offers

its members the opportunity to network with one another and with members of the FIRM board and the FIRM advisory council. In addition, members of the FIRM alumni organisation receive access to the electronic issue (ePaper) of the "RISK MANAGER" journal and unlimited access to the online archive at no extra cost. RISK MANAGER is the leading German journal for risk management. Access to the ePaper and the online archive is through the central FIRM portal (www.firm.fm).

After continuous membership growth in recent years, we are pleased to welcome new members in the future. We are deeply convinced that successful alumni work thrives on the realisation of the ideas of those involved and can only develop sustainably through their implementation.



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Support, research, setting the tone

The Glashütten College promises to provide the "best outlook for your meeting" and calls itself the "centre for communication". So it was the perfect place for the Frankfurt Institute for Risk Management and Regulation (FIRM) to hold its two-day event consisting of the FIRM Research Conference (June 14) and the "Annual Offsite" on June 15, 2018. Organisers of the expert conference promised discussion of the very latest issues in risk management and regulation. The new Chairman of FIRM, Prof. Udo Steffens, opened the first day of the conference. Steffens, the former President and Director of the Frankfurt School of Finance & Management and the new Chairman, took over the role of FIRM Chairman from Frank Westhoff. The content of the event reflected the times of economic and geopolitical change we are living in.

Risk is a hot topic

"The issue of risk has never been so widely discussed in society." That was what Uwe Fröhlich, chief representative and designated co-chairman of DZ BANK AG, stated in his honorific speech at the award of the FIRM Research Prize 2018. With this statement, Fröhlich gave a precise summary of the current situation facing companies, politicians and the economy. The reasons? Protectionism and Brexit, an openly pursued trade conflict with punitive tariffs and counter-tariffs, and a disjointed currency and refugee policy in the EU. For political and economic decision-makers, all the signs point to uncertainty and risk. In this context, as Fröhlich stated, banks are increasingly confronted with the necessity of addressing social and political risks. As an example, Uwe Fröhlich cited environmental risks, which are "increasingly coming into focus". "[...] As environmental strains increase and we start to see impacts that will destroy the basis of any economic activity in the long term without appropriate counter-measures, the explosive nature of the problem is at a whole new level" Fröhlich explained to around 50 business and academic representatives.

Cyber risks and big data

Cyber risks are also hanging over banks like the Sword of Damocles. In a presentation "Cyber security – International discussions and focus from the BaFin perspective", Jens Obermöller from the BaFin outlined the threats facing the financial system and those involved in it as a result of continuous cyber hazards. The reason is obvious. Increasing digitalisation means that IT risks and cyber risks are rapidly gaining in significance. According to the BaFin expert's presentation, based on internal information there have been around 400 reported cyber risk incidents at individual institution level to date so far in 2017/18. Wolfgang Hartmann, one of the FIRM initiators, and former Chief Risk Officer at Commerzbank, is already convinced that cyber crime will be the leviathan that will threaten our modern civilisation. "There is no doubt that we are only seeing the beginning of this trend, even though the known losses are already billions of Euros every year. The number of unrecorded cases is even higher. After all, what company would want to ruin its reputation by publicising cyber crime and the resulting losses?", Wolfgang Hartmann said.

Uwe Fröhlich from DZ Bank made similar arguments: "As digitalisation of our business increases, we have to do much more to address cyber risks. In its last cyber security report, auditors Deloitte confirmed that the number of daily attacks from the net has almost doubled in the last five years alone." From the perspective of the supervisory authorities, there is a lack of monitoring of external service providers and the supply chain, and inadequate "cyber hygiene". In addition, insufficient testing is carried out on people, processes and technologies, there is a lack of strategic planning and

control in the cyber sphere and technology tends to be centralised. This means that there is too little focus on the human factor in cyber risks. Risk management and information security have to be a permanent component of a company's DNA. The process of moving towards a genuine risk culture is crucial and, at the same time, a long road. According to Prof. Thomas Kaiser, the industry is not yet where it needs to be on this issue.

Dr. Frank Schiller from Munich Re titled his presentation: "Big Data Meets Disability Insurance". He raised the question of what big data is and how the issue is changing the world. Schiller cited Google as one of his examples. The company's search engine processes over 40,000 search requests per second and finds the optimum results for each. In addition to analysis of the words, this involves a comparison of pages, ranking and the context of the meta information. It is all based on intelligent algorithms.

Schiller thinks that one of the success factors for using big data is rapid feedback loops, which facilitate analyses and learning processes, provide consistent data and lead to an overall system that remains within a consistent framework. For Schiller, the biggest challenges lie in the field of life assurance, because only a comparatively small data basis is available. And it is not consistent. Nevertheless, the data has to be digitalised, pooled, adapted to state-of-the-art methods and effectively interpreted. One advantage that new methods could provide for customers would be a faster and more efficient assessment of loss.

Risk management in the field of research

What this toolbox could look like was outlined in the presentations by the contenders for the FIRM Research Prize 2018. The prize, under the patronage of the Hesse State Minister for Economics, Energy, Transport and State Development, Tarek Al Wazir, was awarded for the second time this year. The winner was Stefan Krüger from the University of Regensburg with his work on "Advanced Dependency Modelling in Credit Risk – Lessons for Loss Given Default, Lifetime Expected Loss and Bank Capital Requirements". "Financial institutions need risk-based capital reserves to safeguard themselves against future financial losses" was one of the motivations that Krüger gave for his work. In his explanations, the academic from the department of Statistics and Risk Management described current problems in credit risk management by banks, resulting from the conflict between regulation, accounting and banking practice. His study focused on measuring credit risk, holdings of bad debts, legal assertion of credit claims and the procyclic nature of capital requirements. For Günter Franke, retired Professor of International Financial Management at the University of Konstanz and co-chairman of the FIRM advisory council, the key strength of the research work is its high level of relevance for



bank management and regulation. "The results should be used to strengthen the banking sector's resilience in times of crisis and thus improve financial stability", was the summary of Franke, the chairman of the jury. The FIRM Research Prize comes with 15,000 Euro prize money each for Krüger and his department.

The other prize winners included Elia Berdin (International Centre for Insurance Regulation) and Marius Pfeuffer from the school of business and economics at Friedrich-Alexander University Erlangen Nuremberg (FAU). In his dissertation "Essays in Microprudential and Macroprudential Supervision in Insurance", Elia Berdin analyses the effects of a sustained period of low interest and falling mortality rates on the solvency and profitability of life assurance companies. He also addresses the systemic relevance of insurance companies. In his research entitled "Essays on the Measurement of Credit Risk", Marius Pfeuffer focuses on implementation of the IFRS 9 accounting standard by critically analysing previously used estimating methods and proposing methods for eliminating their mathematical weaknesses. The two academics each won 2,000 Euro in prize money. The same amount went to their respective departments.

FIRM has also strengthened its commitment to academic study by supporting research projects. From a total of 14 submissions from various universities in Germany, the following projects were selected: "Corporate diversification" (Dr. Daniel Hoang, Karlsruhe Institute for Technology), "Sovereign Risk" (Prof. Sascha Steffen, Frankfurt School), "Systemic risk measurement and model risk" (Prof. Peter Grunke, University of Osnabrück) and "Credit risks and payment practices in the digital age" (Prof. Christina E. Bannier, Jus-tus-Liebig University Gießen). The total funding provided is 211,100 Euro in 2018. FIRM is demonstrating how important it is to support the next generation of academics in the financial sector.

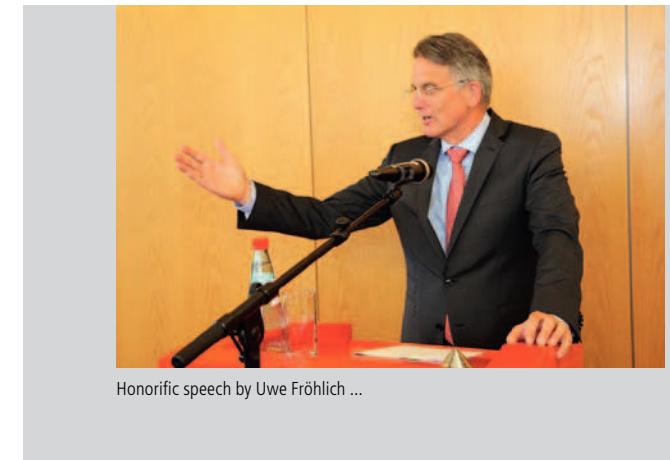
Uwe Fröhlich says it is very fortunate that an "ecosystem has managed to emerge in the Frankfurt am Main financial centre, involving not only service providers and advisors but also an effective and practically-focused research environment [...]" . On the subject of effective and practically focused by supporting the next generation of academics and research projects, FIRM is smoothing the way towards modern and sustainable risk management. And by doing this, FIRM is giving a clear signal. It is that it is supporting a critical and constructive discourse in risk management and setting the tone for the future.



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Offsite and Research Conference 2018



Honorific speech by Uwe Fröhlich ...



Presenter of the award, Uwe Fröhlich, with the winners of the FIRM Research Prize: Marius Pfeuffer, Steffen Krüger and Elia Berding (from right).



Prof. Dr. Lutz Johanning, WHU – Otto Beisheim School of Management.



Monika Dissen and Hanjo Seibert, the coordinators of the Compliance Risk Roundtable in 2018.



Top-level presentations, such as this one by Dr. Frank Schiller (Munich Re) and his topic: "Big Data Meets Disability Insurance", made a major contribution to the quality of the conference.



Break conversations.



Manuela Better, Executive Board Member, DekaBank.



Discussions between Prof Helmut Gründel (Goethe University of Frankfurt am Main) and Alexander Schalk (d-fine).



Jan-Erik Künstler (ING-DiBa) and his positive look back at the Compliance Risk Round Table.



Networking and conversation.



Side discussion between Dr. Nader Maleki (International Bankers Forum) and Jürgen Sonder (Intrum Justitia).



Dr. Bettina Mohr, LBBW Landesbank Baden-Württemberg.



Conversation during the break between Dr. Lutz Raettig (Supervisory Board Chairman at Morgan Stanley Bank AG, President, Frankfurt Main Finance) and Prof. Dr. Wolfgang König (President of FIRM, Managing Director, House of Finance, Goethe University of Frankfurt am Main).



Christoph Schwager (RiskNET) in conversation with Jochen Peppel (Oliver Wyman).



Dr. Nader Maleki (International Bankers Forum), Michael Rab (Member of the Managing Board, Raiffeisenlandesbank NÖ-Wien AG) and Rosalie Bergmann (Federal Financial Supervisory Authority, BaFin)



Prof. Dr. Thomas Kaiser (Goethe University of Frankfurt am Main), Dr. Sebastian Fritz-Morgenthal (Bain & Company) and Ralf Wollenberg (Bankhaus Lampe) share their opinions.



Prof. Wolfgang König (Goethe University of Frankfurt am Main) presents the latest FIRM-research projects.



The candidates and subsequent prize winners ...



... of the FIRM Research Prize ...



... during their respective presentations ...



... engaged the attention and stimulated discussion among the audience (here Dr. Frank Schiller, Munich Re).



Prof. Dr. Thomas Kaiser, Dr. Henning Dankenbring and Frank Romeike.

FIRM & Frankfurt Main Finance: Partners from Day One

Frankfurt Main Finance, the association to promote the Frankfurt Main region as a global financial centre, shares a common history with FIRM, along with a common mission. The two organisations have been fraternal partners from day one. And both share the goal of strengthening the position of Frankfurt as a financial centre. But in furthering this common goal, each organisation brings a very different focus and set of competencies – while Frankfurt Main Finance is a location initiative and a mouthpiece for the city as a financial centre, FIRM is committed to promoting research and teaching in the field of risk management and regulation.

The old saying that “in every crisis lies the seed of opportunity” has been proved true, time and again; the key is to be able to identify this seed and make it grow, until it becomes a mighty oak. Frankfurt Main Finance, founded in 2008, and FIRM, founded in 2009, can both, in this sense, be seen as children of the financial crisis. The seed of opportunity which has grown into Frankfurt Main Finance was to more effectively coordinate and aggressively communicate the strengths and competitive advantages of Frankfurt, as well as the significance of the financial industry for the region’s economic prosperity. For FIRM, the seed of opportunity was the need to continuously find new and more intelligent ways to meet the constantly shifting challenges of risk management and regulation. If there is one “lesson learned” from the financial crisis which stands out above all others, it is this: Banks must rethink the way that they manage risk. This recognition becomes all the more compelling when one considers that this is the nature of banking itself: The taking on, and managing, of risks. In helping to establish FIRM, Frankfurt Main Finance initially acted as a central point for coordination, until the pivotal moment on 3 June 2009 when the “Society for Risk Management and Regulation” was legally registered, giving birth to the Frankfurt Institute for Risk Management and Regulation. Today, Frankfurt Main Finance and FIRM are “fraternal twins” with cross-representation at the board level.

In the ten years since, FIRM has established itself as an essential pillar which supports Frankfurt as a vibrant financial centre. In no small part through its work, Frankfurt has built a pool of expertise in risk management and financial regulation which has come to be recognised as unique. And as the hosting city for the European Central Bank, the European Insurance and Occupational Pensions Authority, the European Systemic Risk Board and soon also the European banking supervisor, Frankfurt is the undisputed cross-roads of the European infrastructure for financial market supervision. This concentration of European institutions, which are creating an entirely new financial oversight architecture largely based in Frankfurt, has been pivotal in establishing the image of Frank-

furt as the key European centre for financial regulation, an image which will grow even stronger in the years ahead. With its unique research and education infrastructure, the SAFE Research Centre at the House of Finance at Goethe University has developed into one of the leading centres of research for creating a sustainable European financial architecture.

A vital instrument for communicating the strengths of our city is the Frankfurt Finance Summit, an annual congress which Frankfurt Main Finance and FIRM have been jointly organising since March of 2011 and which, from its beginnings, has quickly become firmly established as an important meeting point for the world’s risk and regulatory community. Each year, leading figures from central banks, from regulatory bodies supervisory authorities, from legislatures and governments, from academia and from industry assemble to exchange information and ideas on the most pressing current issues of financial market stability. Through this event in particular, the two partner organisations have done much to boost the position and visibility of Frankfurt as a centre for financial market stability and banking regulation, particularly in the eurozone. The Frankfurt Finance Summit has become an indispensable platform for discussion and interaction which plays no small part in driving the regulatory dialogue.

The cooperation between Frankfurt Main Finance and FIRM will also determine the agenda of the institutions in 2019. The current issue of Britain’s exit from the European Union is shaping the discussion of regulation and the financial center. The significance of Frankfurt as a financial center for the international financial sector, and with it also for Germany, will continue to increase. In particular, shaping relations with UK financial players will be a challenge for regulation. In the future, FIRM and Frankfurt Main Finance will continue to make use of synergy effects and work together to strengthen the financial center. Frankfurt Main Finance in an effort to highlight the advantages of Frankfurt and FIRM through initiatives that make the offerings in the course of teaching even clearer.

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Frankfurt Main, March 2019

