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Reports

Transformation Needed – Report on the 6th International Conference on Credit Risk Analysis and Management

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Abstract

For the sixth time, international academics and practitioners met for a successful credit risk conference. Keynote speeches and academic sessions highlighted current developments and necessary improvements in areas such as fintech, regulation, credit ratings and risk analysis. Digitization also leaves its mark in this area and requires, to varying degrees, a transformation of affected persons as well as applied systems or models.

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JEL classification: G210, G280

For the fourth time, we could welcome international academics and practitioners to a successful credit risk conference in Basel consisting of the streams Regulation, Relationship and P2P Lending, Credit Analysis and Ratings, Credit Derivatives and Bonds, and Risk Analysis. The impact of ongoing digitalization and the growth of fintech companies on the credit risk topic became clear at the first presentation of the contributions in the P2P/Crowdlending section. Jointly organized by the University of Applied Sciences Northwestern Switzerland and the University of Basel and co-chaired by the Universities of Regensburg, Hohenheim, Oakland, Rotterdam and St. Gallen, the 6th Conference on Credit Risk Analysis and Risk Management was held on 5/6 September 2019. Oakland University in the United States hosted the first and third conferences. Around 50 international academics and practitioners gathered in Basel to discuss the keynotes and the latest academic research on credit analysis and related topics.

Frank Höner, UBS, opened the conference programme on Thursday afternoon with his keynote presentation "Tomorrow's CRO: New Tech, New Horizons for Risk Managers". He voted for a transformation in risk managers' mind-

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set as well as their skillset. After explaining the exact meaning of risk management, he gave an economic outlook including the impact of global trade tensions, Brexit, the US business cycle and the Chinese economy on Switzerland. Besides the question of whether the negative interest environment will be a long-term phenomenon, he underlined the problems of the strong CHF. Furthermore, he identified new emerging risks, driving the need for new and additional skills and a different risk control workforce composition. While traditional risks, like credit risk, market risk, operational and human risk, and liquidity and funding risk, remain, new risks, like contagion risk, model risk and cyber risk, require a different risk control approach in the future, according to the Chief Risk Officer of UBS Switzerland AG. Well-known trends, like big data, improved information technology, digitalization, robotics and smart analytics, enable exponential changes in the execution of risk control. In line with this, the number and complexity of models and algorithms will explode and require significant investment in talent and infrastructure, as forecast by Frank Höner. Additionally, he expects a significant increase in the requirements for data science, technology, model risk management and change skills. On the other side, we should see a reduction in the costs of recurring transactional tasks due to automation and smart analytics. Finally, UBS's Chief Risk Officer created the image of a caterpillar that must transform into a butterfly to become a future credit risk manager.

The first academic session covered predominantly regulation-related topics and featured three contributions. In their paper "Regulating Rating Agencies: A Conservative Behavioral Change", Laurence Jones, Noemi Mantovan, Alsakka Rasha and Owain ap Gwilym (Bangor University) investigate the impact of the new regulations for credit rating agencies in Europe after the US sub-prime crisis on the quality of financial institutions' credit ratings. Using a sample comprising the ratings of the three largest rating agencies (Moody's, S&P and Fitch) for 758 financial institutions in 27 European countries in the period from January 2006 to June 2016, the authors observe an increase in conservative ratings. EU regulation has thus achieved its goal of reducing inflated ratings. However, the paper concludes that this achievement is not the result of increased rating quality but a by-product of increased rating conservatism. Hence, the four researchers observe an increase in the occurrence of unjustified downgrades (false rating warnings), which is associated with a decrease in the information content of (and price reactions to) rating downgrades. The successful reduction of rating inflation by the new EU regulation thus comes at the cost of a reduction in the informational content of rating downgrades. Given the past unintended consequences of the regulation of rating agencies, the authors suggest that regulators should focus on both overly optimistic and overly conservative distortions in the rating industry. In line with the observed increase in rating conservatism, the authors conclude that there is increased sensitivity of the stock price to rat-

ing upgrades after July 2011. They argue that this result is due to the additional efforts and resources spent on the upgrades to ensure that they are justified in the light of increased regulation and potential legal implications.

Artashes Karapetyan (ESSEC Business School), Hans Degryse (KU Leuven and CEPR) and Sudipto Karmakar (Bank of England), in their paper "To Ask or Not To Ask? Bank Capital Requirements and Loan Collateralization", analyse the potential impacts of higher capital requirements on bank relationship lending (loans with a relationship length one standard deviation higher) and transactional borrowers. The study is based on a data set comprising all the loans granted by banks to Portuguese companies and associated information on the relationship between company and bank. The authors conduct a quasi-natural experiment by examining the implementation of stricter capital requirements for some major European banking groups by the European Banking Authority in October 2011. The unexpected announcement increased the cost of uncollateralized loans for the banks concerned compared with the cost of collateralized loans and banks not affected by the tightened capital requirements. Therefore, the researchers were able to test the hypothesis that affected banks demand more collateral after the increase in capital requirements than non-affected banks but less for relationship borrowers than for transactional borrowers. Using a difference-in-difference approach, the paper concludes that affected banks are more likely (3–5 percentage points) to require collateral. However, as expected by the authors, the increase in the collateral required is about 40 % lower for relationship borrowers.

In their paper "How Do Credit Ratings Affect Bank Lending Under Capital Constraints?", Stijn Claessens (Bank for International Settlements BIS), Andy Law and Teng Wang (both Board of Governors of the Federal Reserve System) address the question of loan terms under capital constraints. A unique data set of 1.6 million loans covering 78 % of US corporate loans gives the authors the possibility to examine the effect of rating adjustments on corporate loan terms. The data set includes information not only on the conditions at the time when the loan is granted but also on changes in the specific terms of loans and banks' credit risk ratings over time. Applying a series of quasi-natural experiments, the authors identify the effects of ratings by investigating events that result in unexpected changes in the banks' rating system. A difference-in-difference approach helps to identify the causal relationships between rating adjustments and changes in bank lending conditions from several different perspectives, such as pricing, volume and maturity. The authors' first finding is that changes in ratings cause asymmetric changes in loan conditions. More precisely, they find an increase in interest rate spreads of 40 basis points when the rating is downgraded, whereas the spread only falls by 27 to 28 basis points when the rating changes positively. The result is similar for volume and maturity, which decline more strongly or become shorter in the case of a negative rating adjustment but

remain the same or increase only marginally in the case of an upward adjustment. This asymmetry can be attributed to the fact that, in the event of negative rating adjustments, banks change their credit conditions to avoid an adverse market or regulatory intervention. Due to the lack of pressure, however, they do not pass on the benefits to borrowers in the case of positive rating adjustments.

Further, the researchers find that larger banks increase their spreads less but "riskier" banks (i. e. those with higher loan loss provisions) and banks that are capital constrained react more to downward rating adjustments. In addition, riskier loans and borrowers face the largest upward adjustments in interest rate spreads. These findings are in line with the fact that rating adjustments change the size of the capital buffer that banks are required to hold.

In the second stream, the presenting authors spoke about the newest research results in the world of "Relationship and P2P Lending". Gianfrate Gianfranco (EDHEC Business School), Saman Adhami (Vienna Graduate School of Finance) and Sofia Johan (College of Business, Florida Atlantic University), in their paper "Risks and Returns in Crowdlending", explore the relationship between risk and return for investments in crowdlending projects. Crowdlending or peer-to-peer lending is an online platform that brings lenders and borrowers (individuals and companies) together and thus disintermediates the money lending activities. P2P lending claims to provide the lending service more efficiently than traditional institutions, as the supply and demand for capital (online) are better matched and fewer overhead costs are generated. As a result, borrowing money should be cheaper and lending money more profitable. P2P platforms usually charge a fee for their service of intermediation from the loans processed. Given some platform failures and cases of misconduct or dysfunctionality recorded in others, the perceived role of crowd financing as an economically sustainable means of supporting innovative projects and businesses should be investigated. In addition, P2P credit platforms decentralize credit risk, which means that the risk of a borrower defaulting will be carried by the crowdlenders and not by the platform. On the basis of a data set comprising more than 6000 loans processed on 73 different European crowdlending platforms between 2012 and 2018, the researchers conclude that the returns of crowdfunded loans are not consistent with the riskiness borne by lenders. More specifically, the paper concludes that the risk profile (and the tenure) of the loans is inversely related to the lenders' returns. These results suggest that crowdlending projects are evaluated not only from a financial perspective but also for non-financial reasons. One reason for this could be the environmental and social orientation of crowdlending projects. The authors find further evidence of decoupling from traditional return drivers (risk, loan amount or maturity) with their observation that the loan amount and maturity have little or no impact on excess returns. The drivers of crowdfunding's returns, according to the conclusion of the authors, should be evaluated further, especially in the light of fintech regulation.

The paper "Alternative Facts in Peer-to-Peer Loans? Borrower Misreporting Dynamics and Implications", written by Vesa Pursiainen (Imperial College London and HKU), focuses on borrower misreporting in peer-to-peer loans for credit card repayment and consolidation. Since P2P loan platforms use technology to automate credit analysis, they rely on self-reported data (i. e., borrowers' income, use of funds), making misreporting of borrowers a problem in this industry. Based on three indicators, the author therefore constructs a "Misreporting Index". The first indicator, the consistency of the loan amount with the outstanding credit balance, attempts to identify any observable discrepancies between the stated purpose of the loan and the requested loan amount. The author explains that a truthful borrower will apply for a loan amount that is close to the current revolving credit balance. The second indicator, the roundness of reported income, is based on people's well-documented tendency to use round figures when there is a lack of information or general knowledge. In addition, the literature suggests a link between misreporting and delinquency rates. The third indicator, the roundness of the loan amount, is a mix of the other two indicators. It states that, if the purpose of the loan is correctly stated (credit card repayment or debt consolidation), the loan amounts required should not be clustered around round numbers. By applying a regression, the author finds that loans with higher Misreporting Index values are significantly more likely to default than other loans. The probability of default also increases monotonically with the index value. A further finding of the paper is that loans with a higher Misreporting Index value do not compensate investors for the higher default risk with higher interest rates. Moreover, all three indicators on their own appear to have significant predictive power over the probability of default. Furthermore, the author wonders what the cause of the misreporting could be and identifies two possible causes: a deliberate attempt to mislead lenders to obtain better credit terms or uncertainty or cognitive impairment of the borrower. An analysis of the determinants and dynamics of the Misreporting Index, especially the strength of social norms, measured with social capital and borrower honesty proxied by the perceived trustworthiness of the borrower's stated profession, confirms the two expected causes of misreporting. An additional conclusion of the paper is that misreporting increased after Q2 2017, especially among low-income and low-credit-grade borrowers. With a regression, the author relates this increase in misreporting to the inauguration of US President Trump without any claims about causality.

In his paper "Cross Border Bank Lending: Evidence from the Syndicated Loan Market", Umit Yilmaz (Swiss Finance Institute and USI) investigates the motives and opportunities behind cross-border banking activities. Precisely, the study sheds light on the question of differences in loan terms, the characteristics of borrowers and the performance of loans of cross-border lenders compared with domestic lenders. Using a sample of loan terms and revolving credit lines in the

DealScan database of Thomson Reuters Loan Pricing Corporation (LPC), the author first notes that foreign banks support a different type of borrower. The clients of foreign banks are larger, more likely to be rated, have higher leverage and often have higher market-to-book ratios. As 58 % of the loans covered by the applied database are American firms, the paper focuses solely on loans granted to US firms. Additionally, the conclusion is drawn that US firms borrowing from foreign institutions face a higher loan spread and (total) costs of borrowing than companies taking loans from domestic lenders. The most conservative result indicates on average around 8 % (17 basis points) higher spreads. The result is significant for different types of loans and cost components. These results raise the major question of why borrowers would pay higher interest rates on loans from foreign providers. The author suggests various explanations, including that these firms are riskier only in dimensions that are not observable by econometricians. The finding that, when controlling for observable firm characteristics, foreign bank loans do not experience worse operating performance or lower credit ratings contradicts this explanation. Therefore, in the next step, he examines a large number of non-price terms, like maturity, security, the presence of financial covenants and the amount, and concludes that foreign banks provide longer maturities and their loans are more likely to be secured. Additionally, cross-border loans less often include financial covenants, suggesting that foreign lenders engage less in ongoing monitoring after granting the loan. In accordance with this result, the author notes higher positive abnormal returns after the announcement of a domestic bank loan than after the announcement of a foreign loan. This suggests that corporate investors see value in a relationship with a bank that has easier access to private corporate information and can therefore monitor the company more effectively. The question remains of why foreign banks charge higher interest rates. To find a possible answer, the author looks at information asymmetries and costly monitoring for the observed effects. The finding of loan spreads increasing with geographical distance and cultural difference indicates that higher costs for banks' lending to foreign borrowers can indeed explain the higher interest rates. The finding that credit spreads are lower in multinational companies, for which the collection of private company information is relatively easier, supports this result. As a final observation, the paper concludes that borrowers are willing to pay higher interest rates when they borrow from foreign banks due to the diversification of financing sources and flexibility in negotiating (no relationship lending).

The second conference day started with the third academic stream, concentrating on "Credit Analysis and Ratings". Isabel Abinzano, Ana Gonzalez-Urteaga, Luis Muga (all from the Public University of Navarre and INARBE) and Sanchez Santiago (Public University of Navarre), in the paper "Performance of Default-Risk Measures: Sample Matters", analyse the predictive power of different default risk measures. For more than 50 years, practitioners and academics

have been searching for the best credit risk measures, starting with the classic accounting measures, such as Altman's Z-score, Ohlson's O-score, the Hannan and Hanweck model or the Zmijewski model. Bond and credit default swap spreads as well as ratings from credit agencies, so-called market-price-based measures, form the second block analysed in this paper. The last measure examined by the authors, the Black–Scholes–Merton measure, is based on firms' market share prices. Stock prices and accounting data of companies listed on the New York Stock Exchange from the Thomson Reuters Datastream database and rating and default events from Moody's Default and Recovery Database help the authors to examine the accuracy of all these methods in terms of real credit risk. The first result of the paper is the superiority of the Black–Scholes–Merton model in predicting failures in one year, while measures such as Ohlson's O and Hannan and Hanweck's probability statistics perform below average. Over a five-year horizon, the predictive power to explain credit events decreases for all the measures analysed except CDS spreads. Moreover, the researchers conclude that CDS spreads show the highest degree of accuracy over five years after Altman's Z-score. In addition, the paper examines the accuracy of credit risk measures in the case of severe default events, as many of the models were designed to reflect bankruptcy risk only. Accordingly, all the models have higher predictive power. However, there is a shift in the ranking: bond spreads and credit ratings are now more accurate than the BSM model. The authors therefore conclude that the Black–Scholes–Merton measure is more suitable for predicting the general credit risk of companies than for predicting the bankruptcy risk alone. The final but crucial finding of the paper is that the sample has a major impact on the outcome of the accuracy of the various credit risk measures. Among other things, the book-to-market ratio, the intangibility of the company and its size have an influence on the accuracy of the rating. The first variables act as a proxy for assets that are difficult to rate or difficult to arbitrate. For large samples, the small size can serve as a proxy for the difficulty of the rating, so the company size has a positive effect on the accuracy of the predictive power. By contrast, in samples with more large firms, size has a negative effect on predictive power due to the "too big to fail" effect. The researchers therefore recommend that the characteristic of the sample from which the data for measuring bankruptcy risk measures are drawn should be taken into account when assessing or comparing such measures.

Antonio Diaz (University de Castilla-La Mancha), Abad Pilar (University Rey Juan Carlos of Madrid), Ana Escribano (University of Castilla-La Mancha) and M-Dolores Robles (University Complutense of Madrid), in the paper "Crossing Boundaries beyond the Investment-Grade: Induced Trading by Rating-Contingent Investment Constraint", analyse the impact of rating-based portfolio constraints on the US corporate bond market. Institutional investors in particular have informal investment guidelines that restrict or even prohibit investments

in bonds below a certain credit rating category. The paper analyses 1634 downgrades of straight bonds from 2002 to 2014, using bond trading data from the Trade and Reporting Compliance Engine (TRACE) database and information on bond issues, issuers and rating information from the Fixed Income Securities Database (FISD). As the informal restrictions are more conservative than the official regulatory standards, the authors investigate whether and to what extent institutional investors react to downgrades that exceed the limits normally used in these informal investment guidelines. They provide several findings by analysing bond trading activity, trading volumes and price reactions and comparing these results with downgrades that have regulatory implications, that is, from investment grade to speculative grade. Firstly, the researchers find a significant abnormal increase in trading frequency and volume as well as small decreases in prices after all downgrades. Using a regression analysis, the authors conclude that downgrades that cross informal boundaries have different reactions in terms of liquidity measures and prices from downgrades that have regulatory implications. Especially the A2 rating level seems to be an important boundary for institutional investors. In addition, there is evidence that the market reactions to informal threshold downgrades are more persistent and intense than those observed for downgrades with regulatory implications. Therefore, the perceived importance of informal investment guidelines is examined further by looking not only at ratings that are below the specified internal investment limits after the downgrade but also at those that are just on the edge of the rating limit after the downgrade. This in-depth analysis confirms the result of the first regression analysis that the A2 rating is the most relevant threshold in internal guidelines with regard to the reactions of the corporate bond market to downgrades. The authors therefore conclude that institutional investors react to downgrades to maintain the rating quality of the portfolios that they manage and therefore cause greater frictional disruption in the corporate bond market than portfolio adjustments due to regulatory downgrades.

In the paper "Credit Risk and Financing Costs of SMEs: Evidence from Switzerland", Hannes Mettler (St. Galler Kantonalbank) studies the relationship between banks' internal credit risk assessment and SMEs' financing costs. The results of the paper are based on a data set of more than 120,000 non-public annual financial statements of 30,033 unique SMEs that were collected by 24 Swiss banks during the period 2002 to 2015 as well as the corresponding 3 internal ratings used by the respective regional bank. While a software program (mathematical–statistical model) generates the first rating, reflecting the probability of default of an SME, the second rating is proposed by the credit relationship manager and the third and final rating is the rating approved by the credit risk officers. Based on a cross-sectional analysis, the first result of the paper shows that the pricing of unsecured bank loans is more dependent on the credit rating of a borrower than the pricing of mortgages. Indeed, when considering first-time

borrowers, the author notes that banks apply a risk-adjusted pricing strategy for unsecured credit lines and investment loans. As expected following the theory and existing literature, the examined sample shows an increase in financing costs in accordance with the initial credit risk rating. This observation is statistically and economically significant only for the best and worst rating categories. An additional finding of the paper is the relevance of collateral, shown by the lower financing costs for secured mortgages in comparison with unsecured credit. Furthermore, the qualitative credit risk assessment of credit risk officers also affects the financing costs.

In the second part of the paper, based on a panel analysis, the author demonstrates that banks do not always adopt a consistent risk-adjusted pricing strategy over time but that the rating path plays an important role in the loan price setting of banks. The paper demonstrates evidence of larger changes in financing costs for firms that received two consecutive rating transitions. However, it is not only the rating path but also the way in which SMEs with very high credit risks are processed that seem to explain the deviations from the purely risk-adjusted pricing approach. In the final conclusion, the author states that the financing costs for SMEs with high credit risks are systematically lower than one would expect from theory and in comparison with SMEs with good ratings.

In the second keynote session on Friday, Elod Takats (Bank for International Settlements) captured the conference audience with his speech about "Financial Globalization after the Crises: The Role of Monetary and Macroprudential Policies". First, he identified a trade-off created by financial globalization: a web of sophisticated interdependencies and thus a vehicle for contagion but also for risk sharing and efficient allocation of resources. Looking for remedies in the area where monetary and macroprudential policies meet, he proposed a sophisticated analysis of the costs/risks and benefits. According to the keynote speaker, credit is the link between large-scale monetary policy, which influences the macroeconomic cycle through credit, and large-scale macroprudential policy, which influences financial stability through credit. In a research paper, the BIS therefore tries to understand the interaction between the two possible policy implications, that is, whether there is room for coordination within and between countries. The conference audience received the answer that there is a real interaction, more specifically that macroprudential tightening of the lending systems of the originating banks mitigates the impact of monetary tightening by currency issuers on banks' cross-border lending. The speaker identified this finding as relevant for domestic macroprudential and monetary policy authorities as well as for possible international coordination and cooperation.

In the fourth stream, "Credit Derivatives and Bonds", the following works caught participants' attention. Florian Kiesel (Grenoble Ecole de Management), Sascha Kolaric (Technische Universität Darmstadt), Lars Norden (Brazilian

School of Public and Business Administration) and Dirk Schiereck (Technische Universität Darmstadt) presented the paper "Does the CDS Market Anticipate Future Changes in Firm Risk?" They monitor corporate CDS spreads before and during credit rating reviews to provide an answer to the question of whether the CDS market contains information about future changes in corporate risk. The study is based on an international sample of 527 US and European listed companies with long-term issuer ratings from S&P, Moody's or Fitch and 1520 credit rating reviews from the period 2004–2015 from Thomson Reuters Composite EOD. The first of the three main findings is that CDS spreads systematically change during the rating review process in the direction that the future outcome of the review suggests. More specifically, CDS spreads widen during the review if downgrades follow but narrow significantly during the review if the rating is confirmed. Most of the reaction is observed at the beginning of the review process. If there is a rating downgrade, CDS spreads widen even before the rating review process. Second, the authors find an anticipation of future increases in leverage and future decreases in interest coverage and the Altman Z-score through CDS spreads. Abnormal stock returns, on the other hand, do not anticipate either the review of the rating or the results of the review of the rating according to the third finding of the paper. In summary, the authors interpret their results as suggesting that the CDS market accurately anticipates the financial decisions of companies that lead to a future increase in default risk.

In the paper "Creditor Control Rights and the Non-Synchronicity of Global Corporate CDS Excess Return", Hasan Iftekhar (Fordham University and Bank of Finland), Miriam Marra (University of Reading), Eliza Wu (University of Sydney) and Gaiyan Zhang (University of Missouru-St. Louis) analyse creditor control rights in different countries. Using 5-year CDS price data from the IHS Markit database for 929 companies in 25 countries between 2001 and 2016, the authors investigate how credit control rights affect the information production of firms in the credit market and thus the non-synchronicity of credit prices. Based on previous research, they imply that greater non-synchrony with the market indicates that prices contain more company-specific information. The first striking finding of the paper is that corporate CDS prices are less informative in countries with stronger creditor rights. The authors interpret the lower production of firm-specific information in such countries as the dominance of the moral hazard problem and the fact that firms want to avoid creditor intervention as opposed to the disciplining effect of creditors' rights. An analysis of a sub-sample shows that the negative relationship between the creditor rights and the non-synchrony of CDSs is more pronounced among speculative companies, among companies with greater investment intensity and growth capacity and among companies with greater information intransparency. The interpretation of these results is that, in such firms, the benefit of moral hazard for creditors is higher and the shareholder–creditor conflicts are worse, so managers have

stronger motives to disguise information strategically. More opportunities for managers to hide information to avoid creditors' intervention are also found in countries with a higher degree of trust and tolerance of uncertainty. Finally, the paper observes a significant decrease in the non-synchrony of CDSs of firms in countries that have adopted exogenous reforms of the bankruptcy law, which strengthened creditor control rights.

Implicit government guarantees for corporate bonds in China are the subject of the paper "The Great Wall and Beyond: The Value of Implicit Government Guarantees for Corporate Bonds" by Thomas Walker (Concordia University), Xueying Zhang (Shandong University of Finance and Economics), Aoran Zhang (Concordia University) and Yulin Wang (Shandong University of Finance and Economics). So-called "Chengtou" bonds are issued in China by local government financing vehicles (LGFVs), companies that are majority- or fully owned by the respective local governments and are therefore quasi-municipal. The Chinese corporate bond market is therefore identified as a fertile laboratory for academic research on the impact of an implicit government guarantee on the yield spread of a bond. Applying a panel regression analysis to data on publicly traded quasi-municipal corporate bonds on the Shanghai and Shenzhen stock exchanges as well as in the interbank market from the "China Bond Database" during the period January 2010 to December 2017, the first result of the paper is that the yield spreads of quasi-municipal corporate bonds are significantly lower than the yield spreads of corporate bonds issued by private Chinese companies. This result leads the authors to the conclusion that implicit government guarantees are an effective means of reducing the risks of corporate debt in China. In addition, a more effective impact of implicit government guarantees for bonds with the highest probability of default is observed. Local business and economic conditions are other factors that influence the risk of Chinese corporate bonds. More specifically, in Northeast China, a region with poorer financial conditions and less economic development than other Chinese regions, bond issuers are paying higher bond yields that compensate for the higher perceived risk. However, the yield spreads are still lower than for corporate bonds of private issuers; that is, the implicit government support is also effective in this region. Moreover, the authors demonstrate that the expected government support is most valuable for bonds issued in the cities with the lowest level of administration, as such issuers are most likely to face financial distress. In contrast, issuers in Chinese municipalities, the highest administrative level, have the lowest probability of bond defaults and thus the lowest value of expected government bailouts. Using a difference-in-difference regression, the final part of the paper examines the impact of three recent regulation attempts by the Chinese central authorities on bond yield spreads. While the first policy change was not effective in reducing the gap in yield spreads between quasi-municipal bonds and private corporate bonds, the second and third regulations significantly reduced the

yield gap. The authors therefore conclude that these policy measures have successfully mitigated, but not eliminated, investors' expectations of an implicit government guarantee for Chengtou bonds. They foresee a move towards market-oriented practices and therefore expect a more accurate assessment of bond risk considering market forces in the Chinese corporate bond market in the future.

In their paper "The Impact of Central Clearing on the Pricing of Sovereign Credit Default Swaps", Joséphine Molleyres and Heinz Zimmermann (both University of Basel) analyse the role of central counterparty clearing in sovereign credit default swap CDS spreads. Central counterparty clearing (CCP) provides intermediation, stability and risk management in a highly regulated environment. These newly introduced institutions were designed to eliminate the credit risk of a CDS buyer vis-à-vis the seller of the swap. Therefore, CCPs act as buyers for each seller of derivative contracts and vice versa. Nevertheless, a CCP is not an exchange, as prices are still negotiated over the counter, but clearing house participants are obliged to send the agreed quotes to the CCP. This mechanism significantly improves the price transparency on the OTC market, according to the authors' introductory explanations. The structural shift between September 2013 and March 2014, when the percentage of centrally cleared contracts rose from essentially zero to around 80 %, allows an analysis of the impact of CDS-specific market liquidity and counterparty risk on the spreads of sovereign CDS in an OTC or CCP clearing system. The study is based on daily 5-year sovereign single-name CDS spreads for 13 countries (Portugal, Italy, Spain, Ireland, France, Germany, Finland, Belgium, Austria, the Netherlands, the United Kingdom, the US and Japan) obtained from Markit through EikonThomson Reuters, covering the time period from 28 June 2010 to 9 May 2017. The analysis of these data shows an improvement in the mitigation of counterparty risk but no significant impact on CDS market liquidity through the introduction of CCPs. A further finding of the authors is that CDS spreads are mainly driven by local factors and not by global factors, regardless of the clearing regime (OTC or CCP).

The last stream, "Risk Analysis", completes the academic programme with three papers aiming to break new soil in risk analysis. Kanno Masayasu (Nihon University), in his paper "Credit Risk Assessment in Real Estate Investment Trust: A Perspective on Blockholding and Lending Networks", focuses on the credit risk in blockholding and lending networks of Japan's real estate investment trusts (J-REITs). The paper first examines the credit risk factors of a J-REIT. The probability of default of a sponsor is identified as the leading warning indicator of default. In the second step, the author concludes that the increase in the number of commercial banks following the global financial crisis can be interpreted as an indication that J-REITS' loans are growing. Data from the Nikkei NEEDS–FinancialQuest database provided by Nikkei Inc built the

base for the examined network structures of J-REIT blockholding and credit networks. Thirdly, the paper uses a binary logistic regression model to assess the credit risk for all J-REITs with regard to the credit risk management of J-REITs and to analyse the credit risk factors that influence the default risk. The model examines the financial health of the J-REITs themselves, the downside risk of the asset or cash out of their real estate holdings, the support of their sponsor circumstances and some network centralities as representatives of the interactions through the blockholding and the lending network. In addition to the support of the sponsor, the financial health and the occupancy rate of the company are identified as important factors in assessing credit risk.

"Restructuring Failure and Optimal Capital Structure" is the title of Alfred Lehar's (University of Calgary) paper examining bankruptcy costs. More specifically, the paper examines the circumstances under which a company is able to renegotiate successfully its debts with several creditors and thus avoid the costs of bankruptcy in a court decision. Therefore, the author develops a general multilateral bargaining model in which firm bankruptcy is an endogenous outcome of an unsuccessful bargaining game. As not all creditors can simultaneously agree to forgive debt, bargaining friction may lead creditors to fail to reach an agreement out of court even if all the parties would be better off. The model generates four empirical predictions. First, leverage is non-monotonic in bankruptcy costs. While firms with high bankruptcy costs are sure that they can renegotiate their debt successfully, bankruptcy is not very costly for firms with low bankruptcy costs; therefore, both are willing to take on more debt. Firms with intermediate bankruptcy costs, on the other hand, are reluctant to take on much debt, because they will have a hard time renegotiating with their creditors, according to the interpretation of the author. The second prediction is a selection bias in a sample of observed bankruptcies. Firms with low bankruptcy costs will be overrepresented, because they are more likely to be liquidated, while firms with high bankruptcy costs will be able to restructure their debts successfully, because creditors know that they will hardly be able to recover from bankruptcy. Third, the paper concludes that covenants, committing the firm to enter renegotiations at an ex-ante optimal EBIT level, are most useful for firms with medium bankruptcy costs, because otherwise renegotiation would fail. Fourth, the author predicts that riskier firms with low bankruptcy costs will choose a more concentrated debt structure, while safer firms with high bankruptcy costs will optimally choose dispersed debt. Finally, the paper draws attention to the fact that reducing bankruptcy costs by improving the efficiency of bankruptcy courts could discourage out-of-court renegotiations.

Christoph Wunderer (Sparkassen Rating- und Risikosysteme GmbH), in his paper "Asset Correlation Estimation for Inhomogeneous Exposure Pools", examines one possible data source for the estimation of asset correlations, namely default time series. The object of the investigation is precisely the systematic er-

ror made if the exposure pool's underlying default time series is erroneously assumed to be homogeneous. The paper finds an underestimation of asset correlations if homogeneity with respect to the probability of default is wrongly assumed. Second, the author observes that the error is larger the more spread out the PD is within the exposure pool. The author suggests direct implications of the paper's findings for practitioners, who should ensure that asset correlations are only estimated for homogeneous exposure pools or that estimators are used that explicitly take the inhomogeneity of the study's exposure pool into account. A further result of the paper is that asset correlations measured directly from time series of asset value changes are higher than asset correlations estimated from default time series, because they are not subject to the observed underestimation effect. Finally, the author mentions that, in a subsequent paper, the way in which the inhomogeneity effect combines with the estimation bias of different asset correlation estimators needs to be studied.

The lively discussions throughout the two conference days confirmed the significance of the current research and the need for ongoing research in the area of credit analysis and risk management. The fast-paced environment of today's global financial network and the increasing importance of digital applications challenge academics and practitioners. The current situation on the financial markets along with the ongoing low interest rates and the development of new financial products and services call for sophisticated but practicable models and effective regulation alongside well-wrought incentive schemes.

The 6th International Conference on Credit Analysis and Risk Management encouraged the exchange of knowledge and experiences among academics and practitioners and therefore contributed to the addressing of weaknesses and raising awareness of future challenges in the field of credit analysis and affiliated areas.

We are looking forward to the next Basel Workshop on Credit Risk in 2021!