

# **13<sup>th</sup> Annual Financial Market Liquidity Conference**

**10<sup>th</sup> – 11<sup>th</sup> November 2022**  
**Budapest and online**



**BOOK OF  
ABSTRACTS**

13<sup>th</sup> Annual Financial Market Liquidity Conference  
Hungary Budapest and online  
10<sup>th</sup> – 11<sup>th</sup> November 2022

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## Welcome from the Chair

A warm welcome to all the participants of the 13th Annual Financial Market Liquidity (AFML) Conference, 2022. We are very pleased that after the pandemic years, the majority of the participants are joining us here in Budapest. This year, we keep the hybrid format that lends flexibility to the online participants. We continue to focus on financial markets and financial liquidity, and we include topics from a range of current economic events driven by the ever-changing environment and external shocks. The launch of the conference in 2010 was prompted by the contagion of the global financial crisis. Now, after more than a decade of recovery, the economy is back in recession. It is time to see if the scientific research of recent years helps tackle these issues.

The AFML conference offers a unique opportunity to refresh and further build our network with more than 150 registered participants, many of whom are regular lecturers and participants of this conference.

Many colleagues contributed to this event. I would like to thank our invited guests, the speakers, the participants, and the session chairs for their participation, and I thank our sponsors for their continued support.

I wish to thank the members of the scientific committee, local organizers, and colleagues of the Institute of Finance at Corvinus University of Budapest, including our assistants, all did an excellent job in taking care of ongoing tasks and challenges.

I trust all of us will contribute to the friendly and interactive atmosphere.

Enjoy the 13th AFML Conference.

We are committed to organizing the 14th AFML Conference in 2023, details to be announced soon.

Warm regards,

Barbara Dömötör  
*Chair of the Organizing Committee*

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## Keynote speakers

### Efficiency or Resiliency? Corporate Choice between Financial and Operational Hedging

**Viral V. Acharya, Heitor Almeida, Yakov Amihud, Ping Liu**

We propose and model that firms face two potential defaults: Financial default on their debt obligations and operational default such as a failure to deliver on obligations to customers. Hence, firms with limitations on outside financing substitute between saving cash for financial hedging to mitigate financial default risk, and spending on operational hedging to mitigate operational default risk. Whereas financial hedging increases in financial leverage, operational hedging declines in leverage. This results in a positive relationship between operational spread (markup) of the firm and its financial leverage or credit risk, which is stronger for firms facing financing constraints. We present empirical evidence supporting the relationship by employing two proxies for operational hedging, viz., inventory and supply chain diversification, exploiting recessions and the global financial crisis as exogenous correlated shocks to operational and credit risks.

### Sustainability or Performance? Ratings and Fund Managers' Incentive

**Nickolay Gantchev, Mariassunta Giannetti, Rachel Li**

We explore how mutual funds react when the tradeoff between sustainability and performance becomes salient. Following the introduction of Morningstar's sustainability ratings (the "globe" ratings), mutual funds increased their holdings of sustainable stocks in order to improve their globe ratings. This trading behavior created buying pressure, decreasing the returns of stocks with high sustainability ratings. Consequently, a tradeoff between sustainability and performance emerged. Since performance appears to be more important in attracting flows than sustainability, in the new equilibrium, funds do not trade to improve their globe ratings and the globe ratings do not affect investor flows.

### Why government bond markets get dysfunctional - And what to do about it

**Darrel Duffie**

The size of government bond markets has recently stressed the intermediation capacity of dealers, leading in some cases to market dysfunction. This happened, for example, in March 2020, when the World Health Organization declared that COVID is a global pandemic. This talk will diagnose the problem, explain its importance to global market stability and the ability of governments to finance themselves, and propose some policies for improving the stability and capacity of government bond markets.



## Invited speakers

### Research on Social Development Goals in Business, Economics and Finance

**Jonathan A. Batten**

In a recent editorial, *Nature*, argued that the UN Social Development goals are still not a priority research area in developed economies despite the criticality of meeting these goals over the next decade. This presentation will highlight the latest trends in the business disciplines with a focus on economics and finance. A case study on research on Green Bonds will be provided to illustrate issues and concerns. Overall, the related pillars of Environmental Social Governance (ESG) with a focus on climate (e.g., climate finance) remains the greatest research challenge in the business disciplines going forward. While research in SDG-ESG has increased significantly in the past few years it remains small compared to efforts in the hard sciences- such as engineering. Problem identification and motivation (significance and contribution) remains an important first step in facilitating this research going forward.

### The impact of natural disasters on the performance and solvency of US banks

**Thomas Walker, Yixin Xu, Dieter Gramlich, Yunfei Zhao**

**Purpose:** This paper explores the effect of natural disasters on the profitability and solvency of US banks.

**Design/methodology/approach:** Employing a sample of 187 large-scale natural disasters that occurred in the United States between 2000 and 2014 and a sample of 2,891 banks, we examine whether and how disaster-related damages affect various measures of bank profitability and bank solvency. We differentiate between different types of banks (with local, regional and national operations) based on a breakdown of their state-level deposits and explore the reaction of these banks to damages weighted by the GDP of the states they operate in.

**Findings:** We find that natural disasters have a pronounced effect on the net-income-to-assets and the net-income-to-equity ratio of banks, as well as the banks' impaired loans and return on average assets. We also observe significant effects on the equity ratio and the tier-1 capital ratio (two solvency measures). Interestingly, the latter are positive for regional banks which appear to benefit from increased customer deposits related to safekeeping, government payments for post-disaster recovery, insurance payouts and decreased withdrawals, while they are significantly negative for banks that operate locally or nationally.

## **The Propagation of Corporate Social Responsibility through Multinational Companies**

**Xiaoxue Hu, Dongxu Li, Rose Liao**

We study how multinational companies may propagate Environmental, Social, and Governance (ESG) practices through subsidiaries in foreign countries with stricter ESG policies. Using regulatory changes in a foreign country's ESG strictness as an exogenous shock, we find that multinational firms with subsidiaries in countries that increased ESG strictness would significantly increase their R&D investments, build more green inventions in domestic operations, and have higher ESG ratings. Cities with more multinationals exposed to foreign ESG regulatory changes experience a greater reduction in air pollutant emissions. Our results are consistent with the argument that multinationals promote and propagate ESG practices across countries, likely to sustain access to finance in a foreign country with high ESG standards.

## **Understanding sovereign credit ratings: text-based evidence from the credit rating reports**

**Ursula Slapnik, Igor Lončarski**

In this paper we apply a novel approach to identifying the qualitative judgement of the rating committee in sovereign credit ratings. We extend the traditional regression with new measures - sentiment and subjectivity scores - obtained by textual sentiment analysis methods. By using an ordered logit with random effects for 98 countries in the period from 1996 to 2017, we find evidence that the subjectivity score provides additional information not captured by previously identified determinants of sovereign credit ratings, even after controlling for political risk, institutional strength and potential bias. The results from the bivariate and multivariate analysis confirm differences in textual sentiment and subjectivity between emerging markets and advanced economies, as well as before and after the 2008 global financial crisis.

## **Valuation of Bank Assets with Early Government Intervention**

**Antje Berndt, Mick Schaefer, Alexander Szimayer**

We propose a dynamic structural model for valuing bank debt and equity that allows for the possibility of government intervention both prior to and at insolvency. We derive closed-form solutions for the optimal insolvency threshold level of bank assets, and characterize the intervention scheme that minimizes the cost to the government associated with potential pre-insolvency capital injections and bailouts at insolvency. We document that early intervention schemes, especially schemes that require cost sharing between existing shareholders and the government, can lower the government's cost of bailing out an insolvent bank.

## Speakers

### **A sophisticated measure of market depth**

**Yang Yue**

This paper advocates an illiquidity measure for the limit order book market with reference to a theoretical model. The measure is the slope of the limit order book. Based on the high-frequency data, the paper aggregates the intraday liquidity at the daily level and explores the low-frequency properties of liquidity. Examining the relationship with returns and volatility, it finds that the summation of the bid- and ask-side slopes is negatively related to contemporaneous return, implying that this measure reflects trading costs. It is also positively associated with volatility, suggesting volatility is primarily driven by informed trading. Additionally, the relationships between the slopes of the two sides of the book and returns indicate that liquidity suppliers learn information better than they do for larger stocks, and liquidity demanders of smaller stocks are more informed than liquidity suppliers. Values of the probability of informed trading for a few smaller stocks are below 50%, which is due to the low probability of information events occurring instead of the low arrival rates of informed traders. Via the HAR-X model, it finds that the in-sample forecasting power for realised volatility is significant for 57% securities but the out-of-sample forecasting ability under-performs the HAR model.

### **A study of liquidity commonality in the commodity futures market - Testing for robustness and the effects of financialization**

**Milán Csaba Badics, Margaréta Németh**

Liquidity commonality refers to co-movements in liquidity, when market-wide liquidity is correlated with individual proxies and there is a systematic risk that needs to be hedged. Our contribution to the liquidity commonality literature is threefold. First we investigate whether commonality is present in the commodity market from 1997 to 2022 Q2. Our second and main contribution to previous research is the implementation of low-frequency liquidity proxies. Studies regarding liquidity commonality usually use only one or just a few high-frequency liquidity measures. We construct six liquidity proxies from two categories, using three Price Impact-Based and three Transaction Cost-Based ratios. We test for robustness, and we expect liquidity commonality to be present by all liquidity measures. We also investigate whether there is a difference in liquidity commonality between the two liquidity measure categories. Thirdly we also investigate how commodity financialization affects liquidity commonality using 3 sub-periods. Commodity futures have become a popular asset class for financial investors (non-commercial traders). Open interest rose dramatically from 2004 onward. We can refer to this process as the financialization of the commodity markets. We expect that financialization and other crisis situations (financial crisis, coronavirus, Russo-Ukrainian War) also have an effect on commodity liquidity commonality.

## **All tinsel and glitter – The effectiveness of ESG in a share repurchase environment**

**Nina Anolick**

We examine the effectiveness of ESG in the context of share buybacks for European countries from 2002 to mid-2021. Within the framework of the stakeholder theory and the shareholder theory, information asymmetries and agency costs play an important role in the investigation of the influence of ESG activities on share buyback valuations. However, no influence of ESG on the valuation effect can be demonstrated. This is true both when considering different ESG scores as well as for different model specifications. Due to the lack of relation between ESG and share buybacks, no reputation- or value enhancing potential can be attributed to ESG activities. Therefore, the effectiveness of ESG engagement is questionable.

## **Alternative Risk Financing-Developing the Market Potential of Polish Companies**

**Łukasz Popławski, Michał Thlon**

The primary objective of this paper to identify the key characteristics of enterprises which use Alternative risk transfer (ART) tools as a part of their risk management policy. The empirical studies were based on data derived from a survey questionnaire carried out on a representative sample of 750 medium-sized and large enterprises running a business in Poland. The research was conducted in the first quarter of 2022. The study is the next edition of the research on ART described in (Thlon et al 2021) in terms of changes related to the COVID19 crisis. The paper identifies the key characteristics of enterprises which use ART tools as part of their risk management policy. Firstly this study contributes to the knowledge base on the adoption of ART by exploring these determinants. Secondly, this is the first paper to examine the application of ART in Poland in the economic conditions after the COVID19 pandemic.

## **An endogenous money theory-based explanation of the core-periphery structure in the interbank market**

**Kristóf Reizinger**

The liquidity crunch in the interbank loan market in 2008 resulted in a severe economic downturn and the bankruptcy of several firms. Most empirical models lack the appropriate theoretical foundation to explain the risk transmission between banks correctly. Our study leverages endogenous money theory to explain how the lending activities of commercial banks create interbank connections. We derive that financial intermediation- and endogenous money theory-based lendings result in the same monetary accounts when loans are withdrawn in cash from the bank or transferred to another company. A possible shortcoming of financial intermediation theory is that it treats savings as assets behind loans but not as a source of liquidity as in endogenous money theory. This difference between theories might have been why financial intermediation could not explain the collapse of the interbank loan market during the

crisis. Using endogenous money theory, we also provide a theoretical model, and a Monte Carlo simulation of the interbank market, explaining the empirical finding that interbank loan markets have a core-periphery structure. Even in a zero-interest rate environment, our model fits empirical observations, highlighting the power of endogenous money theory.

### **Anomaly Interactions in the Cross-Section of Country and Industry Returns**

**Adam Zaremba, Mehmet Umutlu, Aleksander Mercik, Zaghum Umar**

We comprehensively examine the interaction of equity anomalies in the cross-section of country and industry returns. Using nearly five decades of data from 68 countries, we build all possible bivariate portfolios based on 44 return predictors and uncover hundreds of significant interactions. An out-of-sample long-short strategy that selects the top country (industry) combinations generates an average monthly return of 0.66% (1.03%) with a Sharpe ratio of 1.06 (1.60). The strongest interactions come from implementing momentum and technical analysis signals in small and illiquid markets, highlighting the role of market frictions and segmentation in the occurrence of mispricing. Consistent with these interpretations, the magnitude of interactions declines over time as global markets mature and become more integrated.

### **Aspiration Level, Probability of Success, and Stock Returns: An Empirical Test**

**Gabor Neszveda**

The probability of achieving the aspiration level, i.e., the probability of success, is an important aspect of decision-making under risk according to empirical evidence. Motivated by this evidence, I test the hypothesis that stocks with high probability of success have a lower expected return than stocks with low probability of success. I find a significant negative relation between the probability of success and the expected stock returns. Probability of success retains its substantial predictive power for future returns even after controlling for common risk factors and a set of characteristics in both portfolio-level analyses and firm-level cross-sectional regressions. I also exclude several alternative explanations.

### **Assessing credit risk in reaction to shocks. Why is it so hard to go bankrupt?**

**Edward Altman, Rafał Sieradzki, Michał Thlon**

In this paper, we study the financial distress status for a sample of over 1000 SMEs. The estimated probability of default for the enterprises increased substantially during the COVID-19 crisis. The findings also indicate that the Z''-Score's ability to predict bankruptcies significantly worsened during the financial crisis. Also, we find evidence that supports both the market timing theory and pecking order theory of corporate finance. Finally, the results indicate that there is evidence of a structural break around the outbreak of the financial crisis, which means that the enterprises were more financially distressed in 2020-2021, relative to the years 2018 to 2019. During the crisis, the extent of financial distress grew as systemic risk, default rates and bankruptcies increased

considerably throughout the economy. In this sense, the impact of the recent crisis provides an excellent opportunity to study financial distress, as well as its implications and relations. Studying financial distress is of crucial importance in order to make an effective and correct assessment on the financial state of companies, especially in times of crisis. In this respect, strengthening the research on financial distress is vital for protection against the risk of bankruptcy for companies, as well as protecting the rights of investors and creditors. Hence, a comprehensive analysis of enterprises exposure to distress risk and investigating the risk behavior in financial distress is of utmost relevance. Generally, the predictive performance of all credit-scoring model seems to be substantially reduced as the recession escalates. Our paper has important implications for the proper financing of SMEs given their importance for the economy.

### **Banking and Credit Market Competition with AI and Cryptocurrencies**

**John Thanassoulis, Tamas Vadasz**

We study the impact of AI and cryptocurrencies on consumer surplus in banking, on the price of credit, and on the price of checking accounts. We solve a competition model of banking and credit which includes client naivety, heterogeneous client risk, and imperfect risk screening. These features, together, can explain the international pattern of banking costs. In countries where free accounts are prevalent (eg US/UK) both better AI and more crypto use lower consumer surplus, while reducing the amount of naivety improves consumer surplus. Where free-banking is not prevalent (e.g. France/Germany), only one of these three results holds.

### **Central bank swap lines: micro-level evidence**

**Gerardo Ferrara, Philippe Mueller, Ganesh Viswanath-Natraj, Junxuan Wang**

In this paper we investigate the price, volatility and micro-level effects of central bank swap lines during the 2020 pandemic. These policies lowered the ceiling on covered interest rate parity violations and reduced volatility following settlement of swap line auctions. We then combine dealer-level dollar repo auctions by the Bank of England with a trade repository that includes the universe of FX forward and swap contracts traded in the UK. We find evidence of a substitution channel: dealers that draw on swap lines reduce their demand for dollars at the forward leg in the FX market. We also find evidence that dealers that draw on swap lines increased their net supply of dollars to non-financial institutions, supporting the rationale for swap lines in providing cross-border liquidity to the real economy.

### **Post-Crisis Regulations, Trading Delays, and Increasing Corporate Bond Liquidity Premium**

**Botao Wu**

I examine corporate bond market liquidity from 2004 to 2019 through the lens of the liquidity premium. I document that while commonly-used transaction cost measures such as the bid-ask spread have been declining, the corporate bond liquidity premium has

actually increased since the financial crisis. For speculative bonds, about 30% of their yield spread now compensates for illiquidity compared to 15% before the crisis. I argue that post-crisis regulations have increased dealer's market making costs, forcing dealers to reduce their market making. This has caused investors to experience much longer trading delays, and so require a higher liquidity premium than before the crisis. Using a structural over-the-counter model, I estimate the unobserved trading delays that are implied by the size of the liquidity premium, and show that bonds that took less than one day to sell before the financial crisis now take weeks to trade. Finally, I establish a causal relationship between the major post-crisis regulations and the variations in the corporate bond liquidity premium and trading delays. I show that Basel II.5, by introducing more stringent capital requirements for credit products, contributed the most to increasing the liquidity premium and trading delays out of the regulatory changes examined.

### **Demand-Supply Imbalance Risk and Long-Term Swap Spreads**

**Samuel G. Hanson, Aytak Malkhozov, Gyuri Venter**

We develop a model in which long-term swap spreads are determined by end users' demand for swaps, constrained dealers' supply of swaps, and the risk of future imbalances between demand and supply. Exploiting the sign restrictions implied by our model, we estimate these unobserved demand and supply factors using data on swap spreads and a proxy for dealers' swap spread positions. We find that demand and supply play equally important roles in driving the observed variation in swap spreads. Yet, as predicted by the model, demand plays a more important role in shaping the expected returns on swap spread trades, which embed a premium for bearing future demand-supply imbalance risk. Hedging activity from mortgage investors seems to play a key role in driving the demand for swaps. By contrast, the supply of swaps is closely linked to proxies for the tightness of dealers' balance-sheet constraints. Our analysis also helps explain the relationship between swap spreads and other no-arbitrage violations.

## **Does geopolitical risk influence the cryptocurrency market? Evidence from the volatility spillovers analysis**

**Barbara Będowska-Sójka, Joanna Górkka, Adam Zaremba**

This paper aims to examine the connectedness of cryptocurrencies with various geopolitical risk measures. We apply several newly established cryptocurrency indices as well as geopolitical risk indices. We also include oil prices as those which are highly related to the geopolitical risk. The volatility spillovers are then examined and the obtained to and from spillovers are treated as the weights in the networks in which oil, cryptocurrency indices and geopolitical indices are treated as nodes. The dynamic linkages between indices and coins are also examined within the dynamic conditional correlation approach. Similar analysis are also conducted for single coins, which are the mostly capitalized ones, such as Bitcoin, Dash, Dogecoin, Litecoin, Stellar, Monero, as well as those with smaller capitalization, but with long history of listings. The data sample starts from January 2018 and ends up in May 2022 thus covering a downturn on the coin market, COVID19 pandemic and the war in Ukraine.

## **ESG Factors or Conventional Factors: Are ESG Factors Truly Unique?**

**Svetoslav Covachev, Jocelyn Martel, Sofia Ramos**

This research studies the relationships between equity risk factors related to Environment, Social and Governance (ESG) policies and standard equity risk factors in the US between July 2008 and June 2017. We find that the systematic components of recently proposed carbon and ESG risk factors are linear combinations of well-known risk factors. The carbon factor has positive loadings on the market and quality factors and negative loadings on the size and profitability factors. Conversely, the ESG factor has a positive loading on the quality factor and a negative loading on the size factor. Overall, we do not find that the ESG and carbon factors are “independent” factors, and we do not find strong evidence of their predictability.

## **Expect the unexpected: Did the equity markets anticipate the Russo-Ukrainian war?**

**Marcell Granát, Kristóf Lehmann, Olivér Nagy, Gábor Neszveda**

On the morning of February 24, 2022, Russian military operations began in Ukraine, which came as a surprise to some, while others expected it. In this study, we investigate when the impact of military operations began to be priced in the equity markets. To estimate the start of information incorporation, we use the risk-adjusted returns of 68 country-level stock market data to build a formal model assuming informed traders and estimate its parameters using both non-linear and rolling-window regressions. We find that the equity markets started to price the military conflict approximately 50 days before the invasion.



## **Extreme Illiquidity and Cross-Sectional Corporate Bond Expected Returns**

**Xi Chen, Junbo Wang, Chunchi Wu, Di Wu**

Corporate bonds carry a premium of extreme illiquidity (EIL) that permeates all rating categories. This premium increases in times of stress and periods with high uncertainty. EIL has predictive power in the cross-section for future returns up to a one-year horizon. Active investors like mutual funds have a preference of holding low EIL bonds that can be easily liquidated in bad times, whereas passive investors overweight high EIL bonds to receive the EIL premium. Although adding an EIL factor constructed from portfolios to the factor models increases explanatory power, its effect is subsumed by band-level EIL in a horserace regression.

## **Fiscal sustainability in the light of the COVID-19**

**Marianna Sávai**

Since the global financial crisis, several papers are written about the importance of fiscal sustainability. The COVID-19 causes more difficulties for the governments therefore it can seem to the importance of fiscal sustainability takes the back seat. In this paper, we evaluate the fiscal sustainability of Visegrad Group with five different methods based on the conception of the primary and medium-term tax gap in the period 1995-2022. The first test of the dataset shows differences between the results. If we use indicators searching in the short-term, as in most cases these did not show that the fiscal policy would be unsustainable. If we examined the data series with middle-term indicators, the fiscal policies of the Visegrad Group seem to be unsustainable.

## **Green factor augmented SRISK – a method to quantify the environmental factor in systemic risk analysis**

**Ewa Dziwok, Marta A. Karas, Michał Stachura, Witold Szczepaniak**

Existing systemic risk measures do not quantify environmental risk explicitly. We propose a new method that allows to do so. We extract the green factor from the environmental score (E-score) and augment systemic risk measurement. In accordance with the exposure approach, we use existing ESG scores to extract information about bank exposure to environmental risks. We apply SRISK, the econometric systemic risk model developed by Brownlees and Engle (2017) to quantify systemic risk, and we add the green factor extracted from the Refinitiv Environmental score (E-score) using a conditional sensitivity function. We apply our method empirically to a sample of 19 systemically important European banks from 12 countries between 2006 and 2021. The results show that the impact of the green factor is bigger in unstable periods: global financial crisis, public debt crisis, and COVID-19 pandemic. Also, the impact of the green factor on SRISK is bigger, the higher the fragility of a given bank is. This holds for banks from developed and emerging countries, for global and local SIFIs. We also observe a geographic variability between Western Europe and the CEE region.

## **Handling systemic risk with ESG: Evidence from the US stock market using dynamic return connectedness**

**Martin Márkus**

The implication of the ESG perspective on risk management is a hot topic nowadays however, empirical studies show mixed results. Current research further broadens the horizon of the implication of ESG in risk management, more specifically in systemic risk management. I assumed an inhomogeneous number of connections along with different levels of responsibility scores thus I applied Granger causality test using a weekly rolling window on the US stock returns between 2012 and 2020 to analyze the connectedness of top and bottom ESG performers during bullish market conditions. I found significant evidence that the best ESG performers affect the return of weak performers but the individual Environmental (E), Social (S), and Governance (G) scores based on top and bottom performers show the same pattern, moreover top performers are more interconnected than laggards. I also show that control variables like Economic Policy Uncertainty Index (EPU), VIX, and S&P500 levels are also affecting the number of dynamic connections. Results can be used for regulatory purposes as well as for risk management and portfolio diversification.

## **In Pursuit of a Level Trading Field: An Empirical Examination of IEX's Crumbling Quote Remove Fee**

**Seongkyu "Gilbert" Park, Patrik Sandas**

We examine the market quality impact of the introduction by Investors Exchange (IEX) of an additional take fee targeting brief periods when market quotes display instability. We measure the realized spreads for trades on IEX before and after the introduction of this Crumbling Quote Removal Fee. Using a control sample of trades at other platforms that is selected to be the same direction and occurring at approximately the same time and for the same size. Our difference-in-difference estimate indicate that the fee at best has a small negative effect on the realized spread, a small negative estimate of the treatment effect. Overall our results suggest that there is a small treatment effect in the effective spread and in the fraction of mid-quote executions but less clear results for the realized spread.

## Liquidity Derivatives

**Matteo Bagnara, Ruggero Jappelli**

It is well established that investors price market liquidity risk. Yet, there exists no financial claim contingent on liquidity. We propose a contract to hedge uncertainty over future transaction costs, detailing potential buyers and sellers. Introducing liquidity derivatives in Brunnermeier and Pedersen (2009) improves financial stability by mitigating liquidity spirals. We simulate liquidity option prices for a panel of NYSE stocks spanning 2000 to 2020 by fitting a stochastic process to their bid-ask spreads. These contracts reduce the exposure to liquidity factors. Their prices provide a novel illiquidity measure reflecting cross-sectional commonalities. Finally, stock returns significantly spread along simulated prices.

## Liquidity Shocks and the Real Economy

**Garo Garabedian**

Liquidity is an intuitive and widely used concept in economics. Its absence is associated with important episodes of financial stress. Potential spillovers of liquidity to the real economy are well documented. The literature, however, provides no well-defined way to identify liquidity shocks, and to distinguish these from other financial shocks. Our analysis offers a novel identification within the structural VAR literature to identify liquidity shocks through a set of sign restrictions for the US financial market. Most importantly, we use the dealer balance sheet size as an instrument. While all financial shocks are typically associated with increases in volatility, spread, and uncertainty measures, they can trigger different intermediary effects. Our analysis offers two important insights. Firstly, we find that the balance sheet variable offers a useful instrument to distinguish liquidity shocks from other financial shocks. Secondly, we uncover through the impulse response functions that liquidity shocks have different dynamics in how they affect the real economy. It is therefore important for policymakers to make this distinction. Not only do liquidity shocks require tailored responses, but they also unravel in their own specific manner.

## Margin Requirements Based on a Stochastic Correlation Model

**Dávid Zoltán Szabó, Kata Váradi**

We demonstrate that margin requirements of CCPs show a significantly different behaviour when calculated with a portfolio-wise treatment instead of taking the weighted sum of the margin requirements of the components without accounting for their correlation structure. This is shown via simulating trajectories of a joint stochastic volatility-stochastic correlation model. Results indicate that an unnecessarily large over-margin requirement is set by regulators when the applied risk measure is not calculated via a portfolio-wise treatment. Finally, accounting for the correlation structure of the assets during the margining process would not lead to an overly prudent method, neither would it cause greater procyclicality.

## **Media attention to environmental issues and ESG investing**

**Balázs J. Csillag, Marcell P. Granát, Gábor Neszveda**

We analyse how ESG scores effect on future returns when environmental issues receive higher media coverage. Investors might take environmental aspects into account if they are confronted with the issues of global warming more frequently in the press. We assess the prevalence of environmental issues in media with machine learning based Structural Topic Modelling (STM) methodology, using news archive published in the US. Running Fama-MacBeth regressions we find that in periods, when media actively reports on environmental issues ESG scores have significant impact on future returns, whereas, in months when fewer such articles are published investors do not take sustainability measures into account, and ESG scores have no explanatory power.

## **Mind the Gap: Is there a Trading Break Equity Premium?**

**Patrizia Perras, Niklas Wagner**

This paper investigates the intertemporal relation between expected aggregate stock market returns and conditional variance considering periodic trading breaks. We propose a modified version of Merton's intertemporal asset pricing model that merges two different processes driving asset prices, (i) a continuous process modeling diffusive risk during the trading day and, (ii) a discontinuous process modeling overnight price changes of random magnitude. Relying on high-frequency data, we estimate distinct premia for diffusive trading volatility and volatility induced by overnight jumps. While diffusive trading volatility plays a minor role in explaining the expected market risk premium, overnight jumps carry a significant risk premium and establish a positive risk-return trade-off. Our study thereby contributes to the ongoing debate on the sign of the intertemporal risk-return relation.

## **Momentum in the new era of funding liquidity**

**Boldizsár Plesz, Milán Badics**

We examine the two well-known momentumbased trading strategies in the futures market, and their connection to funding liquidity and the "flight to quality" effect, and we show how they depend on funding conditions. We find that bear market mean returns are much higher after 2001 than before. We explain these phenomena by funding liquidity which has effect only after 2001 too. We show that the "flight to quality" affects strongly the loser momentum portfolio, and these loser assets behave similarly as Brunnermeier & Pedersen (2009) show when margins are destabilizing. With this, we propose a completely new explanation for strong momentum performance in bad times, and it is consistent with Cujean & Hasler (2017), that show another channel starting with uncertainty. We also show that rebound market mean returns are low. Butt & Virk (2020) explain it by positive market liquidity shocks. We find the same, moreover, we show that the source is the increase in funding liquidity, which affects loser momentum portfolios through the Brunnermeier & Pedersen (2009) margin channel, as a consequence of "flight to quality". All of our results stand for both cross-sectional and time series momentum and are robust for numerous alternative lookback period parameters.

## **Monetary momentum: a worldwide phenomenon**

**Milán Cs. Badics, Pálma B. Szilárd**

We analysed the movements of asset prices surrounding the scheduled announcements of the Federal Open Market Committee. Using daily returns between 1994 and 2019, 55 instruments from four asset classes resembled a significant return drift that is conditional on expansionary and contractionary monetary policy surprises. To understand this phenomenon, referred to as ‘monetary momentum’ in the literature, we investigated factors with panel regression that could affect the return drift. Concluding that uncertainty about the future path of monetary policy weakens the transmission of policy shocks to financial markets and so does a period of severe economic downturn. Meanwhile, general market uncertainty seems to increase returns around policy decisions. We also intended to provide an explanation for significant asset price movements that begin before the Committee’s decision. By analysing the predictability of policy shocks, macroeconomic forecasts are shown to be good leading indicators that outperform standard forecasting methods. The results are robust to different measures of monetary policy surprises and subsamples.

## **New insights into liquidity resiliency**

**Conall O’Sullivan, Vassilios G. Papavassiliou, Ronald Wekesa Wafula**

This paper adds to the limited literature on resiliency liquidity which is a neglected dimension of market liquidity. We focus on the European sovereign bond markets and offer new insights on market resiliency using a unique and detailed high-frequency dataset from the MTS markets. We use two different approaches to estimate resiliency: (a) an OLS-based approach where we define resiliency as the rate of mean reversion in spread-based and depth-based liquidity, and (b) the least absolute shrinkage and selection operator (LASSO) machine learning approach. We find that resiliency provides valuable information that is not captured by the tightness and depth liquidity dimensions. We also find evidence of commonality in resiliency across core and periphery euro-area countries.

## **Option Market Manipulation**

**Guido Baltussen, Julian Terstegge, Paul Whelan**

We document a striking pattern in the underlying price around expiration of am-settled options (e.g. spx options): The price of the underlying futures contract drifts up significantly overnight, spikes at the time of option expiration and reverts immediately afterwards. There is no corresponding pattern for pm-settled options. We fail to explain this pattern with any common greek hedging story. Instead, we provide suggestive evidence that some market participants use the relatively illiquid overnight market to influence the underlying price and thus manipulate option payoffs. The associated economic magnitudes are large in dollar terms. Our results suggest that am option expiration invites manipulation and leads to less efficient capital markets.

## **Parsimony and Liquidity Ratio Effects on Capital Markets: Evidence from South Africa**

**Mahlatshe Mabeba**

From a sample period of 30 years, the study shows that a parsimonious model helps explain the effect of the liquidity ratio on the equities and bonds indices in South Africa. The multivariate econometrics modelling is applied. The study finds that as market participants improve their ability to pay off their short-term debts, as measured by liquidity ratio, they tend to decrease raising capital in the equity market and increase borrowing from the bond market. These findings are consistent with a simple model to a multivariate model that exhibits parsimony. Based on the findings, the liquidity ratio is significantly inversely associated with the equity index and positively associated with the bond index. These are lessons learned from a long-run horizon in the South African capital markets.

## **Put-call parity for Bitcoin options traded at Binance**

**Balázs Králik, Nóra Szűcs, Kata Váradi**

The idea of testing the Black-Scholes model and parity is not a recent one, however, no publication is testing how put-call parity holds in cryptomarkets. Since the publishing of the Black-Scholes-Merton model an important volume of research has been dedicated to testing the model. At the first sight, the results of testing the put-call parity seem to be contradictionary. When focusing only on option spreads, a significant number of deviations is detected. But if we control for transaction costs, dividends (or any other cash flows related to the underlying product before the exercise date) and match the prices in time most of the deviation disappears. The more recent direction within the literature is to build an explanatory model to define why option prices differ from the arbitrage-free value. Usually, the moneyness, the time to expiry, the difference in time between the trade of the put, call and the underlying or the time within the day are reported to be significant. Authors often use a Tobit regression in their research. We examine vanilla European BTC options traded on BINANCE since the inception of these products with a 480 minutes time resolution, as well as subsecond trade and book data over the most recent months. We include trading costs, bid-ask spread, moneyness, time to expiration, as well as the assumed risk-free rate to build a model to predict an asymmetry of expectations. The recent extreme volatility in the crypto markets provides insight into the change in the direction of the parity violation and subsequent changes in the price of the underlying, potentially uncovering trading opportunities.

## **Spillover between Investor Sentiment and Volatility: The Role of Social Media**

**Adrian Fernandez-Perez, Ivan Indriawan, Ni Yang**

This study examines the attributes of informational spillover across different asset volatilities and social media sentiments. Specifically, we uncover the spillover effect between investor sentiment and market implied volatility among stock, bond, foreign exchange and commodity markets. We find that sentiments and volatilities are weakly connected. There is a stronger spillover from the market-specific volatility to the sentiment of the same market, but a marginal effect the other way round. Second, the informational spillover is mainly from market volatilities to market sentiments, and the most significant net transmitter is the VIX. Third, the connectedness of market sentiment and volatility increases in turbulent economic periods. Lastly, the role of sentiments can switch from net receiver to net transmitter at turmoil times.

## **Surviving the “Great Lockdown” scenario: Macroprudential policy and liquidity risk supervision for the UK banking sector during Covid-19.**

**Stavros Pantos**

This quantitative empirical legal research captures the critical examination of the effectiveness of macroprudential policy responses by the PRA and the BoE, based on empirical evidence from the UK banks’ financial disclosures (liquidity measurements). Specifically, the focus is placed on how macroprudential policies regarding liquidity risk management are designed, how they work and are applied to UK banks, contributing to the relevant legal theory in banking law and financial regulation. This paper critically analyses the BoE/PRA’s supervisory practices for liquidity and funding risks during the coronavirus pandemic for UK banks. The attention is placed on liquidity risk management practiced during Covid-19, capturing the evolution of the prudential buffers and the macroprudential liquidity requirements. The SREP during Covid-19 is analysed, presenting proposals in extending the risk assessment analysis towards the ILAAP practices and macroprudential stress tests addressing liquidity risk vulnerabilities. Recommendations for the design and development of liquidity stress tests are included. Overall, this research examines the regulatory practices for the effective supervision of liquidity risks for UK banks during Covid-19, describing their evolution, differing characteristics with proposals for future developments to ensure their sound prudential risk management.

## **Systemic Illiquidity Noise-Based Measure – An Alternative Approach to Systemic Liquidity**

**Ewa Dziwok, Marta A. Karaś, Michał Stachura, Witold Szczepaniak**

The paper presents an alternative approach to measuring systemic illiquidity applicable to countries with frontier and emerging financial markets, where other existing methods are not applicable. We develop a novel Systemic Illiquidity Noise (SIN)-based measure, using the Nelson–Siegel–Svensson methodology in which we utilize the curve-fitting error as an indicator of financial system illiquidity. We empirically apply our method to a set of 10 divergent Central and Eastern Europe countries—Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, and Slovakia—in the period of 2006–2020. The results show three periods of increased risk in the sample period: the global financial crisis, the European public debt crisis, and the COVID-19 pandemic. They also allow us to identify three divergent sets of countries with different systemic liquidity risk characteristics. The analysis also illustrates the impact of the introduction of the euro on systemic illiquidity risk. The proposed methodology may be of consequence for financial system regulators and macroprudential bodies: it allows for contemporaneous monitoring of discussed risk at a minimal cost using well-known models and easily accessible data.

## **TERM STRUCTURE FITTING AND THE EXPECTATION HYPOTHESES: A STUDY FOR BRAZIL**

**Gyorgy Varga**

This is the first Expectation Hypothesis Theory (EHT) study to address the problem of term structure fitting. Three different fitting models are used: flat forward, Nelson Siegel and Cubic Spline. The overall results regarding EHT do not differ from other studies, but we do find differences in the EHT tests for long term rate.

## **The 2020s, the Decade of ESG Crises: Is ESG rating disagreement associated with firm's financial performance?**

**Fanni Dudás, Helena Naffa**

Sustainability considerations have become an increasingly important part of today's financial decision-making. The best-known sustainability indicators are the Environmental, Social, and Governance indicators, collectively ESG indicators, which quantify the sustainability performance of companies. However, these metrics are not standardized; therefore, companies can get significantly disagreeing performance assessments from the different rating agencies, called ESG rating disagreement in the literature. Using ESG ratings from four different data providers for a sample of firms in the MSCI All Country Index between 2018 and 2021, we studied the relationship between ESG rating disagreement and companies' financial performance before and during the Covid-19 crisis. We applied panel regression in our empirical study. Our findings may provide evidence to better understand the ESG performance of companies and the relationship between ESG performance and financial performance.



## **The Cost of ESG Portfolio Construction Strategies with Heterogenous ESG Ratings**

**Gergely Janos Czupy, Helena Naffa**

In this study, we examine how constructing equity portfolios based on ESG strategies results in different risk exposure and risk adjusted performance of index portfolios. We identify three popular ESG portfolio construction strategies: thematic net-zero carbon investing portfolio, best-in-class ESG ratings-based, and overall ESG integration. We define the rules for ESG alignment in relation to the MSCI All Country Index, and construct factor portfolios that aim at ESG tilt according to the respective ESG strategy, while maintaining minimal exposure to various style factors, as well as neutral industry and geographic exposure in relation to the benchmark index. Our findings compare the risk-adjusted performance as well as the absolute risk level of the resulting ESG portfolios to the benchmark. A unique database has been constructed for the analysis with more than 3000 MSCI All Country Index members and their ESG attributes combining data from the largest ESG rating providers: MSCI, Refinitiv and Sustainalytics.

## **The Intersectionality of High-Frequency Trading (HFT) and Market Fragmentation, and their Impact on Liquidity: New Evidence**

**Shahadat Hossain**

We address two important recent trends in equity markets---high-frequency trading (HFT) and trade fragmentation in this paper, and join the ongoing debate regarding their social benefits. We take the European equity market as a laboratory as it has been confronting the issue since its adoption of Market in Financial Instruments and Directives (MiFID) in 2007. We employ a unique extraordinarily large millisecond time-stamped trades and quotes dataset enriched with the data from London Stock Exchange (LSE) and three multilateral trading facilities (MTFs)---CHIX, Bats and Turquoise. We evaluate the joint impact of HFT and fragmentation on market liquidity. We provide new evidence at the intersectionality of HFT and Fragmentation that there is an interlinkage between HFT and trade fragmentation, and it determines, at least partially, the size of their individual effect on liquidity. Generally, higher HFT is beneficial for market liquidity, however trade fragmentation is liquidity damaging. HFT reduces both realized spreads and adverse selection costs. HFT's liquidity benefits are greater for large stocks, and small stocks take the more harms from fragmentation. The effect of HFT is time variant, even so it provides market liquidity in the period of crisis. Both HFT and fragmentation decrease market depths at the best bid and ask prices.

## **The Post-ECB Announcement Drift**

**Alexander Valentin**

This paper documents a drift in equity prices in the days following monetary policy announcements of the European Central Bank (ECB). Using intraday data from European equities and yields between 2002 and 2020, I construct monetary policy shocks and analyze the long run response of European equities to these shocks. I find a prolonged drift in equity prices for up to 20 days. This drift is particularly strong in response to information shocks amounting to 160 (-114) basis points for positive (negative) shocks. To rationalize the drift I investigate the role of investor disagreement on ECB announcement days. My findings suggest that higher levels of disagreement are associated with a stronger price drift in the days following the monetary policy event

## **The Price Impact of Tweets: A High-Frequency Study**

**Adrian Fernandez-Perez, Ivan Indriawan, Ni Yang**

Using 2.18 million tweets, we examine the mechanism by which social media sentiment affects stock prices. Specifically, we assess the impact of Twitter feeds on stock returns at the intraday level. We find that an increase in buyer-initiated trades has a significantly positive price impact. The impact is stronger with an increase in the number of tweets and sentiment, and persists even after controlling for volatility, liquidity shock, and limit-order activity. Both bullish and bearish tweets amplify the impact of trades on returns. The impact of Twitter sentiment on prices causes a permanent price movement, indicating that Twitter sentiment contains information.

## **The Public Availability of Retail Order Flow Data and Market Quality**

**Vinh Duc Anh Hua, Harminder Singh, Xiangkang Yin**

This paper examines how the public availability of retail order flow information affects market quality. Using the shutdown of public access to the Robinhood users' holdings data as a quasi-natural experiment, we find mixed results. The shutdown improves stock liquidity and reduces intraday volatility on the one hand but diminishes informational efficiency on the other hand. These effects are more pronounced for stocks with greater Robinhood activities. Moreover, these seemingly contrasting effects can be well explained by algorithmic trading activities of institutional investors and back-runners who are unable to access to the data after the shutdown.

## **The optimal loan paying rule of adjustable-rate mortgages**

**Attila A. Vég**

Adjustable-rate mortgages are risky because rising interest rates lead to an increase in monthly payments. In the current banking practice, monthly payments of adjustable rate mortgages are calculated in a heuristic way, which assumes that the current interest rate remains until maturity. In this paper we suggest that the expected path of interest rates should be taken into account when calculating monthly payments. As a result of our theoretical model, we arrive at a financially reasonable formula to calculate monthly payments. The default risk of adjustable rate mortgages is reduced significantly due to this new loan paying rule.

## **Welfare Improvement in Incomplete Market with Binding Collateral Constraints**

**Shahabeddin Gharaati**

This paper examines the welfare effect of taxation in the general equilibrium model, with default and collateral constraints. The paper considers removing tax incentives to purchase a durable good in the first period and redistributing the tax revenue as a lump-sum government transfer in the second period. The income effect dominates the substitution effect in the first period. Thus, removing tax incentives limits agents' borrowing who sold promises in the first period to purchase a durable good. As a consequence, borrowers purchase less of the durable goods that serves as collateral. The lower demand for the durable good has a negative income effect, which is compensated by the government transfer in the second period. Hence, the expected utility of borrowers does not change. Lenders purchase more durable goods due to the substitution effect in the first period. Therefore, their consumption in the second period rises due to the income effect in this period. The new equilibrium, Pareto dominates the old equilibrium allocation. Prices of the promise and the durable good decrease because lenders' marginal rates of the substitutions decline.

## **Who creates and who bears flow externalities in mutual funds?**

**Daniel Fricke, Stephan Jank, Hannes Wilke**

Using a unique dataset on the sectoral ownership structure of euro area equity mutual funds, we study how different investor groups contribute to the negative performance externality from large outflows. Investment funds, as holders of mutual funds, are the main contributors to this externality. Insurers and households, in particular less financially-sophisticated ones, are the main receivers. These differences are due to investment funds reacting more strongly on past performance and displaying a more procyclical investment behavior compared to households and insurers. Our results raise consumer protection and financial stability concerns due to the trading activity of short-term oriented investors.

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