Corvinus University of Budapest
Budapesti Corvinus Egyetem

PRMIA Hungary Chapter Research Conference, 2019

CONFERENCE PROCEEDINGS

17 October, 2019

Budapest

Central European University

Corvinus University of Budapest

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Organizers: PRMIA Hungary Chapter
Corvinus University of Budapest's Department of Finance
Central European University’s Department of Economics and Business

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Greetings

The Hungary Chapter of Professional Risk Managers' International Association (PRMIA) organizes its research conference for the fourth time in a row this year. The co-organizers of the event are two leading research institutions of Hungary: Central European University's Department of Economics and Business and Corvinus University of Budapest's Department of Finance.

We warmly welcome all participants of the conference, and would like to thank the speakers, the session chairs, our sponsors, and everybody who has contributed to the success of the event.

We trust that the topics covered by the presentations will be of interest for all of you, and we can discuss many important questions in a friendly and interactive atmosphere. We also hope that this conversation will go on, with the conference helping to both build new research connections and deepen the existing ones.

On behalf of the organizers:

Barbara Dömötör

Péter Szilágyi

PRMIA

PRMIA believes in a world in which risk management is a recognized profession and embedded core competency of the financial services industry. PRMIA's main goal is to promote, develop and share professional risk management practices globally. The PRMIA education system includes, beside the formal certification program, informal training possibilities for both professionals and others interested in the field of risk management. PRMIA is a transparent, nonprofit, independent member-focused and member-driven organization open for working with other professional associations in furtherance of the PRMIA mission.

PRMIA Hungary Chapter has been working for about 15 years, organizing 6-7 events annually including the present conference.

Program:

08:30 - 09:00	Registration
09:00 - 09:15	Opening
9:15 – 10:45	**Session I**. *Chair: Mihály Ormos, ELTE GTI*
	Keynote speech Gender-specific role of risk and time preferences in saving decisions *János Kiss Hubert (KRTK, ELTE)* Applying continuous-valued logic to model probability weighting functions in prospect theory *József Dombi, Tamás Jónás (ELTE)*
10:45 – 11:15	*Coffee break*
11:15 – 12:45	**Session II.** *Chair: István Barra (Blackrock)*
	Risk of liquidity and leverage in the Hungarian manufacturing industry *Péter Juhász (BCE)* Pure factor megatrend investments *Helena Naffa, Máté Fain (Aegon, BCE)* Performance evaluation of absolute return funds – Detecting performance manipulation *Dávid Andor Rácz (BCE)* Do ESG factors matter in emerging markets? *Máté Fain, Helena Naffa (Aegon, BCE)*
12:45 - 14:00	*Lunch*

14:00 – 15:30	**Session III.** *Chair: Norbert Hári (Morgan Stanley)*
	Cyber risk in the financial sector *Anita Tikos (MNB)* What causes bitcoin volatility? *Hans Byström, Dominika Krygier (Lund University)* Implied correlation and volatility smile *Sándor Misik (BCE)* The importance of the default fund stress test calibration in case of central clearing *Melinda Friesz, Kira Muratov-Szabó, Andrea Prepuk Kata Váradi (BCE, Keler)*
15:30 – 16:00	*Coffee break*
	Session IV. *Chair: György Walter (BCE)*
	International vs. local credit ratings for structured products *György Varga, Leonardo Alvarenga (FCE-Brasil)* Financial inclusion and debt consolidation *Edina Berlinger (BCE)* Asset price impact of commodity price shocks. Can the two oils (Palm and Brent) hedge local shock? *Péter Szilágyi (CEU), Jonathan Batten (Universiti Utara Malaysia), Harald Kinateder (University of Passau), Niklas Wagner (University of Passau)* Wrong way risk of retail loans *Edina Berlinger, Barbara Dömötör (BCE)*
17:30	**Conference closing**

János Kiss Hubert
Centre for Economic and Regional Studies, Institute of Business Economics, Eötvös Loránd University

Gender-specific role of risk and time preferences in saving decisions

There is growing evidence that 1) economic preferences (notably, risk and time preferences) affect individual financial (saving and investment) decisions; 2) there are gender differences in financial decisions; and 3) there are gender differences in preferences. In this study, we use a representative survey of the Hungarian adult population and investigate 1) if these findings hold in Hungary; and 2) whether the gender differences in financial decisions are due to gender differences in preferences.

We find that 1) both time and risk preferences are important to understand who has retirement saving; 2) only the first is relevant for life insurance holding; and 3) none of them predicts stock ownership. Moreover, these preferences explain only at most 3.5% of the variance in the previous decisions. Education and income have the highest predictive power.

While in some subgroups of the population we observe significant gender differences in financial asset holding, those differences vanish in a multivariate regression analysis.

We document significant gender differences in risk attitudes (even after controlling for a wide range of factors), but no such difference is found in time preferences.

We do not observe a gender-specific role of the preferences in case of retirement saving. However, in the case of life insurance holding, while time preferences are not relevant for males, they prove to have a significant effect on females' decisions. Risk does not have any effect neither for females, nor for males. Regarding stock ownership, time / risk preferences seem to matter more for females / males, though the effect is weak.

Overall, our results suggest that gender, economic preferences and their interactions are only of a limited use when predicting the holding of financial assets in Hungary.

József Dombi
Institute of Informatics, University of Szeged

Tamás Jónás
Institute of Business Economics, Eötvös Loránd University

Applying continuous-valued logic to model probability weighting functions in prospect theory

It is well-known that the probability weighting functions play an important role in prospect theory. In this study, we will present a novel method that can be used to generate parametric probability weighting functions by using a certain class of modifier operators of continuous valued logic. Namely, we will show that the Dombi modifier operator satisfies the requirements for a probability weighting function. Next, we will demonstrate that the application of this modifier operator may be viewed as a general approach to create parametric probability weighting functions including the most important ones such as the Prelec's- and the Ostaszewski, Green and Myerson (Lattimore, Baker and Witte) probability weighting function families. Furthermore, we will show how the modifier operator can be used to generate strictly convex (or concave) probability weighting functions and introduce a two-phase regression method for fitting a probability weighting function generated by the modifier operator to empirical data. Lastly, a demonstrative example of this two-phase regression method will be presented.

Péter Juhász
Corvinus University of Budapest

Risk of liquidity and leverage in the Hungarian manufacturing industry – Recent trends in dualities

The literature on national economies in Central and Eastern Europe states that foreign companies arriving in the region seem to form a separate local economy with performance and competitiveness fundamentally different to that of the locally owned firms. This paper investigates whether dualities even hit the capital structure and the liquidity of the companies. It seems that recent trends in the Hungarian manufacturing industry show an ongoing pattern of duality. Locally-owned companies and firms with lower than subindustry average wage have more extended payables and receivables turnover days while holding a similar amount of inventory. Thus, the cash conversion cycle is longer for locally-owned companies leading to not only an increase of 16-40 percent in working capital need, but also higher liquidity risk and more cash-like items required. Given that the acid test indicated higher value for locally-owned firms, it could be argued that these companies are less efficient in managing their working capital. As for leverage, locally-owned firms show a higher proportion of foreign capital in their financial reports than foreign-owned did, but even that level is far below the healthy optimum. To conclude, there is little trace of any convergence within the Hungarian manufacturing industry regarding liquidity and financing risk. During the recent eight years, differences stagnated or even increased.

Helena Naffa
Corvinus University of Budapest, Aegon Asset Management

Máté Fain
Corvinus University of Budapest

Pure factor megatrend investments

Factor investing in equity markets is rooted in the Fama and French (1996, 2015) three-factor model; several variants have since emerged that extended the number of factors in the literature. Others like Menchero (2010) and Clarke et at. (2017) enhanced the methodology to construe pure factor portfolios. In this paper, we introduce the term megatrend factors, which are a novelty in empirical financial research. The asset management industry's novice approach to thematic style investing is via identifying megatrends. These mid-to long term trends impact society, disrupt the economy and shape the environment. Some of these megatrends include the aging society, e-commerce, food scarcity, future mobility, genetics, internet of things (IoT), robotics, vanity consumption (luxury goods), and water scarcity and waste management.

In this paper, we form pure factor megatrend investment portfolios using multivariate cross-sectional regressions to examine the profitability of megatrend investments. Do these active thematic investment strategies yield positive excess return relative to the benchmark? Our empirical research is also a test of market efficiency. We collect data from developed market thematic ETFs from 2014-2019. Our results show positive alpha for all pure factor megatrend portfolios, however results are not statistically significant for any of the megatrend factors. We also tested for traditional factors, our empirical results corroborate with findings in the literature, and show that the momentum and size factors remain relevant in generating alpha for the period examined.

Dávid Andor Rácz
Corvinus University of Budapest

Performance evaluation of absolute return funds – Detecting performance manipulation

Several aspects and measures can be used for the evaluation of actively managed investment funds. In performance measurement an important problem to overcome is possible performance manipulation which is a phenomenon that affects not only absolute return funds, but all investment funds. We present the application of the Manipulation Proof Performance Measures (MPPMs) for the first time for the evaluation of Hungarian investment funds as well as for tracing the signs of manipulation. Furthermore, we also show that the Doubt Ratio's tight overlap with other alternative return-manipulation detecting methods is unclear on the analyzed Hungarian data despite of international evidence (according to Brown et al. (2010) 80% concurrence). In summary, based on our results the Bias Ratio proved to be a better pre-filtering method for potential return-manipulation than the Doubt Ratio. We also show that the results of the Ingersoll and the Brown MPPM and doubt ratio almost completely overlap; however, the difference between them and the corresponding reasons are also indicated.

Helena Naffa
Corvinus University of Budapest, Aegon Asset Management

Máté Fain
Corvinus University of Budapest

Do ESG factors matter in emerging markets?

This paper measures the validity of ESG factor investing in emerging markets between May 2010 - May 2019 in comparison to the traditional style investments popularised by the factor investing literature. First, we construct pure factor portfolios based on cross-sectional regression models. Second, we measure their performance compared to the benchmark using time-series regression analysis. Pure factor portfolios are methodologically handy tools in filtering out secondary factor exposures. The performance of pure factors are examined in emerging markets using the investment universe of the MSCI Emerging Markets Index. Apart from the traditional factors such as size, value or momentum that are well-researched in the literature, pure ESG (environment, social and governance) factors are of our primary focus in this paper. Our empirical results prove that excess return could be achieved by investing in long positions in four traditional factors: the momentum, profitability, value and volatility factors. The most compelling strategy was buying the pure momentum factor that yielded an annual average excess return above the benchmark of 45.47% over the last 10 years. These results are statistically significant and support the literature findings. The corporate governance factor yielded higher average excess returns than the pure ESG factor, corroborating our presumption, that corporate governance matters more to emerging market investors than ESG factors combined. Our preliminary tests however, show that the results are not statistically significant. We plan to further extend the empirical tests using a wider database, to try to confirm our hypothesis.

Anita Tikos
The Central Bank of Hungary

Cyber risk in the financial sector

Cybersecurity and the cyber risk usually mentioned as a new challenge since the early 2000s. The financial sector relies heavily on technological innovations, so the sector's exposure to cyber-attacks and vulnerabilities is significant. Because of this, it is utmost important to put on the agenda the issue of cyber risk assessment and management in the financial sector and find some solution for them from operational and regulatory respective also.

I would like to present the main trends of cyber threats and vulnerabilities in the last few year (according to ENISA Threat Landscape Report and Banking & Financial Services Cyber Threat Landscape Report of Insight).

Governments, EU and sectoral institutions (for example: European Commission, European Banking Authority -EBA-, European Insurance and Occupational Pensions Authority -EIOPA-) took cyber risk on their agenda. All of the institutions tried to establish some solution to handle the cyber threats and vulnerabilities and minimize the risk by accepting studies, guidelines, terminologies, or regulation from their perspective.

I will present the main EU and national regulations, guidelines, lexicon and cooperation mechanisms that are aiming to prepare the institutions against the cyber threats and incidents, and to minimize the cyber risk for the institutions and the financial sector as well.

It is important to create a common understanding on the main elements of the terminology and to have rules and mechanisms that can be implemented in a cross-border cooperation also.

As we could see the cyber threat landscape is continuously evolving, so the cyber risk assessment and management are utmost important for the global financial stability, therefore these issues are inescapable for the institutions, authorities also.

Hans Byström
Lund University

Dominika Krygier
Lund University

What causes bitcoin volatility?

We look at the link between the volatility in the Bitcoin market and the volatility in other related traditional markets, i.e. the gold, currency and stock market. We also try to answer if the volatility in the Bitcoin market can be explained by retail investor-driven internet search volumes or, perhaps, by the general level of risk in the financial system, as measured by two market-wide risk indicators. We use daily, weekly as well as monthly data covering the period 2011 to 2017. Correlations and regressions reveal a weak but positive contemporaneous link between changes in the Bitcoin volatility and changes in the volatility of the trade weighted USD currency index. A stronger positive link is found between Bitcoin volatility and search pressures on Bitcoin-related words on Google, particularly for the word "bitcoin". To further assess what drives Bitcoin volatility we turn to a VAR-analysis and impulse response functions which point at Google searches for the word "bitcoin", and to some extent the USD currency index volatility, being the only determinants of future Bitcoin volatility. We then use our findings to make improved predictions of Bitcoin volatility based on Google search activity. Interestingly, the significant link that we find between Google search volumes and market volatility points at retail investors, rather than large institutions, being the most important drivers of Bitcoin volatility. We believe that we contribute to the literature in several ways and that our results could be of significant practical importance if the Bitcoin market continues to grow at the current speed.

Sándor Misik
Corvinus University of Budapest

Implied correlation and volatility smile

Inconsistency between constant volatility of Black-Scholes formulae and volatility smile or surface is a well-known and deeply investigated phenomenon in finance literature. Based on the triple determination of currency pairs implied correlation can be derived by implied volatilities observed in quotations of currency options. So far not many studies went further to apply volatility skew or smile for correlation forecasting. Correlation is a particularly important input for financial investment and risk management decisions: one of the key determinants the risk of a given portfolio, ie the expected volatility and / or the VaR measure can be estimated with the help of a “correct” correlation matrix. By default, the implied correlation formulae contains the ATMF (At the Money Forward) implied volatilities which ensures no arbitrage not only on spot but at forward maturities, and at the same time ensures the consistency of market expectations. The aim of the study is to loosen the constraint of consistent market expectations in a sense that any implied volatility on the volatility smile could be used as an expectation of later realized volatility for the given FX rate, allowing inconsistent expectations among different FX rates. Based on 5 years of daily close prices of spot rate from MAY 2013 to MAY 2018, 10-25-delta call/put implied volatility and ATMF volatilities of USD/EUR, JPY/EUR and JPY/USD the best predictor for implied correlation was the 10-25D Call for JPY/USD and JPY/EUR and 25D Put and ATMF for USD/EUR.

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Melinda Friesz
Corvinus University of Budapest, KELER CCP Ltd.

Kira Muratov-Szabó
Corvinus University of Budapest

Andrea Prepuk
Corvinus University of Budapest

Kata Váradi
Corvinus University of Budapest, KELER CCP Ltd.

The importance of the default fund stress test calibration in case of central clearing[1]

The central counterparty is a market infrastructure, which becomes a "central" party between traders, becoming a buyer to the seller, and a seller to the buyer. This process is called novation. The two parties are, therefore, no longer exposed to each other, but only to the CCP, which provides insurance against bilateral default risk. Researchers have shown concerns due to their growing importance for becoming too-interconnected-to-fail. The risk management toolkit of CCPs is a multi-level guarantee system, a so-called default waterfall, which provides the framework for proper operation and guarantees performance against the defaulting party in case of default.

CCPs operate a cross-guarantee system, so cross-correlation between markets and customers is significant to them, and the diversification of exposures is as high as possible. The value of margins provided by the partners depends on their current open positions but is limited. The second layer of the default waterfall is de default fund. The value of the default fund posted by members should be sufficient to cover the losses in case of extreme, but a plausible condition. The third layer of the default waterfall system is the CCPs own capital, the so-called skin-in-the-game.

Our paper focuses on the second layer of the guarantee system. We propose a simulation of a hypothetical financial system and market players, representing a simplified reality.

From this discussion, we draw the following conclusions: our model shows that if a CCP's goal is to maximize the value of the guarantees, may choose to handle default funds separately, but if it wants to increase the risk-sharing between clearing members, the CCP should use merged guarantee system of different markets. This depends on the margining methodology and the volume of the trades on the different markets.

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[1] **ACKNOWLEDGEMENT**

EFOP-3.6.3.-VEKOP-16-2017-00007 számú "Tehetségből fiatal kutató" – A kutatói életpályát támogató tevékenységek. ("Talented young researcher" – Supporting activities of researcher career)

György Varga
FCE-Brasil

Leonardo Alvarenga
FCE-Brasil

International vs. local credit ratings for structured products

This article describes and models the ratings announced by rating agencies to Brazilian ABS (FIDC) and address the important issue of agencies incentives to mismanage the rating they provide. We show that the debt provisions and the total assets of the FIDC are the main variables that explain the ratings issued by the agencies. On this basis we show that overall, the ratings are inflated when it comes to large funds and that there is little difference between the explanatory variables of the rating used by national and international agencies.

Edina Berlinger
Corvinus University of Budapest

Financial inclusion and debt consolidation

The aim of the research is to design and implement new innovative financial products and services to help the social and economic integration of disadvantaged people in disadvantaged regions in Hungary. According to interviews and surveys, non-performing loans are a fundamental factor to impede legal employment and formal banking in this segment. Debtors do not feel motivated to take a legal employment on the job market because 33% (or even 50%) of their income would immediately be taken away for debt repayment. Due to their non-performing loan, they do not even think to open a bank account because banks would be allowed to take their money away. Feeling shame, anger, and regret, they are decided to avoid all kinds of connections to formal banking. We investigate the size of these problems, the optimal debt consolidation program, the role of the state, and the potential effects of such a program.

Péter Szilágyi
Central European University

Jonathan Batten
Universiti Utara Malaysia

Harald Kinateder
University of Passau

Niklas Wagner
University of Passau

Asset price impacts of commodity price shocks: Can the two oils (Palm and Brent) hedge local stocks?

This paper links in with the financial market development debate (e.g. access to finance, technology and financial inclusion) and extends recent work on stock-oil hedging to consider the macroeconomic price effects of commodities. We consider how hedging two key oils (Brent and palm oil) can be used as a macro hedge on two countries, Indonesia and Malaysia, which are the world's largest palm oil producers.

Within the Asia-Pacific region, most economies are smaller open economies with floating exchange rates. Their commodities exports are priced in USD and international trade is also invoiced in USD. The overall economic impact is that many Asia-Pacific corporations (including Indonesia and Malaysia) are subject to both commodity price, as well as foreign exchange price fluctuations. These risks are especially important for agriculturally based small and medium enterprises (SMEs), whose products are ultimately destined for export markets.

In this paper we show that adverse Indonesian and Malaysian stock price movements can be reduced by macro hedges using palm oil, Brent oil as well as exchange rates hedges. We first determine the sensitivity of one asset to another within a capital asset pricing framework. Then, we identify strategies to minimize the two oil and exchange rate risks and establish the most appropriate strategy using a hedging effectiveness statistic. The results have important policy implications. Risk management is rarely mentioned in the development literature, although we show clear economic benefits from engaging in some form of macro hedging. Policy suggestions may include the centralized collection and sale of agricultural products to facilitate hedging, as well as the sale of option-like products to SMEs – although financial literacy, in addition to financial inclusion, is a key impediment in most developing nations.

Edina Berlinger
Corvinus University of Budapest

Barbara Dömötör
Corvinus University of Budapest

Wrong way risk of retail loans

Financial regulation aims to capture all risk factors financial institutions are exposed to, however, capital requirements are prescribed to be calculated separately for market, credit and operational risk. The interaction of market risk and credit risk is built in the second pillar of the new Basel framework by requiring banks to identify, measure, monitor, and control interest rate risk in the banking book. This concept decomposes the interest rate elements and investigates the distinct effects of the changes of the market liquidity spread and general market credit spread on the present value of the assets in the banking book. On the other hand, the relationship of the idiosyncratic credit spread to the market risk components – that is a general wrong way risk – are monitored only for counterparty credit risk, the credit risk of settlement of mainly derivative transactions.

This paper presents the market risk of retail mortgage loans with short term interest periods, and the effect of a potential increase of interest rates on the default probability of individual borrowers. Using scenario analysis and stress testing, we suggest a methodology for commercial banks to analyze their loan portfolios and to calculate the minimum capital needs of the wrong way risk of them.

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