Econometric Research in Finance Workshop 2020

Workshop program

18.09.2020

10:15-11:00

Session 1: Modelling Uncertainty

Author(s): Wojciech Charemza (Vistula University), Svetlana Makarova (University College London and Vistula University), Krzysztof Rybiński (Vistula University)

Lost in translation? Country-specific uncertainty, sentiments and machine learning

The paper proposes an improvement to the construction of measures of country-specific economic policy uncertainty (EPU) by using machine learning technology to analyse newspaper data and weighting the observations with sentiment weights. It is conjectured that the country-specific EPU indices that use, after translation, the same sets of words and phrases to describe economic, policy and uncertainty aspects as are used for English-language indices might not adequately reflect the nature and dynamics of the uncertainty. It is also hypothesised that the differences in language, cultural, emotional and media perception, and different styles of newspaper reporting might cause bias and fuzziness. In this context, a machine-learning approach is proposed, where the topics of newspaper articles are identified by the Latent Dirichlet Allocation method. These new indices have been computed for Russia and tested for the significance and strength of the real effect they produce in the Russian economy, leading to a statistically significant verification of the hypothesis that uncertainty shocks have an adverse impact on industrial production in Russia.

11:15-12:45

Session 2a: Asset Pricing

Author(s): Arseny Gorbenko (University of New South Wales)

Segmented short sellers and predictable market returns

Using a sample of 32 countries, I show that short interest predicts market returns in many countries globally. This predictability is stronger in countries with more segmented short sellers specializing in particular stocks. Short sales in these stocks predict both market returns and returns on other, less shorted stocks. These results indicate that while short sellers trade on their information in certain stocks, the underreaction to this information in other stocks and the whole market results in predictable returns. Overall, my findings suggest that the tendency of informed investors to segment can contribute to the persistence of predictable market returns.

Author(s): Paweł Fiedor (Central Bank of Ireland), Petros Katsoulis (Cass Business School)

Information and liquidity linkages in ETFs and underlying markets

We show that exchange-traded funds (ETFs) establish strong information links with the underlying equities but weak ones with the underlying corporate debt securities. This has several distinct effects on each asset class. First, ETFs propagate illiquidity to equities but not to debt securities. Second, ETF flows affect the underlying equities' returns to a much higher degree than debt securities' returns. Third, higher ETF ownership increases equities' volatility but decreases debt securities' volatility. The results are consistent with the view that the higher accessibility of equities facilitates the formation of close information links with ETFs through arbitrage, which makes equities' prices sensitive to ETF demand shocks and creates the potential for illiquidity contagion when this link is disrupted. In contrast, the hard-to-access nature of corporate debt securities results in weak information links with ETFs which reduces commonalities between the two markets.

Author(s): Maziar Sahakhadam (Linnaeus University), Andreas Stephan (Jönköping International Business School), Ralf Ostermark (Åbo Akademi)

Copula-based Black-Litterman Portfolio Optimization

We extend the Black-Litterman (BL) approach to incorporate tail dependency in portfolio optimization and estimate the posterior joint distribution of returns using vine copulas. Our novel copula-based BL (CBL) model leads to exibility in modelling returns symmetric and asymmetric multivariate distribution from a range of copula families. Based on a sample of 30 stocks, we evaluate the performance of the suggested CBL approach and portfolio optimization technique using out-of-sample back-testing. Our empirical analysis and robustness check indicate better performance for the CBL portfolios in terms of lower tail risk and higher risk-adjusted returns, compared to the benchmark strategies.

Session 2b: Modelling Volatility

Author(s): Jianxin Wang (University of Technology Sydney)

Volatility Persistence as a New Channel for Global Impact on Local Volatility

This study shows that global variables have strong impact on volatility persistence in individual markets. This effect represents a new channel for global impact on local volatility. Compared to the direct channel where local volatility is regressed on global variables, we find that (1) the new channel contributes more to local volatility than the direct channel; (2) global return contributes more to local volatility than global volatility; (3) global return impact comes mostly through the volatility persistence channel; (4) cross-market correlation between the two channels has changed from positive to mildly negative over time. These findings shed new light on potential mechanisms for common volatility dynamics across global markets.

Author(s): Dmitry Igorevich Malakhov (National Research University), Andrei Victorovitch Kostyrka (University of Luxembourg)

The good, the bad, and the asymmetric: Evidence from a new conditional density model

We propose a univariate conditional density model where asset returns are decomposed into a sum of copula-connected unobserved positive and negative shocks, both continuous and discrete, thus yielding up to 4 distinct shocks. The 'Bad environments, good environments' model is a special case of our model with zero-mean uncorrelated shocks, dynamic shape parameters, and without jumps. We compare our models with different marginal distributions and copulæ to 40 well-established GARCH variants (4 distributions, 10 volatility dynamics) by backtesting them on a sample of S&P500 daily data. Our models with dynamic scale parameters and without jumps perform better both in sample and out of sample compared with standard models. However, all dynamic-shape models have poor out-of-sample performance. Using the best-performing model, we reveal some hidden characteristics of returns behaviour. We show that the independence assumption for signed shocks does not hold: models with correlated shocks perform better, covariance is an important component of total variance, and it is time-dependent with a leverage-like effect. Conditional skewness behaviour reveals naïve investors' expectations. The U.S. market on average has a propensity for bull trends and a lower possibility of a bear trend during crisis times. The relation between returns and volatility is either very non-linear or insignificant. Preliminary results for models with jumps show that introduction of discrete jumps does not improve the model performance; however, negative jumps have greater sizes, and occur more frequently.

Author(s): Anna Zamojska , Magdalena Mosionek-Schweda, Anna Golab

Green bonds: Co-movement and risk premium spillover effects in selected financial markets

The aim of the research is to evaluate the dependence structure of the green bond market with selected related financial markets under conditions of structural change. We include the traditional bond market in our analysis together with the stock and oil markets. The results

obtained reveal that the green bond market is highly integrated with the corporate bond market and the equity market, but the direction of this correlation changes depending on the subperiod analysed. Additionally, the correlation between the green bond market and the oil market occurs only in the first subperiod analysed, from 2009 until the end of 2013, and has disappeared since 2014.

Session 2c: Monetary Policy

Author(s): Ivan Hajdukovic (University of Barcelona)

Transmission Mechanisms of Conventional and Unconventional Monetary Policies in Open Economies

This paper provides an empirical examination on the transmission mechanisms of conventional and unconventional monetary policy shocks for two non-EMU countries, Switzerland and the United Kingdom, over the period 1990-2017. In this study, we ask whether monetary policy is operative, beside other well-known channels, via a stock price and consumer confidence channels. We estimate two distinct VAR models based on a novel identification specification. The model for the case of conventional monetary policy covers the pre-2009 period, while the model for the case of unconventional monetary policy covers the post-2009 period. We identify two monetary policy shocks: (i) the official bank policy rate (ii) the central bank's reserve assets. The empirical analysis reveals that the inclusion of a forward-looking informational variable of near-term development in economic activity and a financial variable such as the stock prices are of key importance for the monetary policy assessment. We also provide evidence for the existence of a consumer confidence channel in the transmission of conventional monetary policy. Our findings indicate that conventional and unconventional monetary policies were effective in providing temporary stimulus to the economies of Switzerland and the United Kingdom.

Author(s): Jakub Rybacki (SGH Warsaw School of Economics)

Are Central Banks' Research Teams Fragile Because of Groupthink?

In the recent years, the great majority of central banks have globally failed to realize inflation targets. We attempt to answer a question of whether such failure resulted from insufficient organization of economic research in those institutions. Our study shows a positive, but statistically weak, relationship between these issues. However, the analysis finds also a few adverse irregularities in major central banks' research organizations. The research of the European Central Bank, Bundesbank, and the Bank of England are relatively less diversified compared to the U.S. Federal Reserve. In the cases of Poland and Italy, economic departments are dominated by groups of researchers focused on narrow topics. On the other hand, the organization of research departments in France and Canada support a greater variety of topics and independence of researchers.

Author(s): Mariusz Górajski (University of Lodz), Zbigniew Kuchta (University of Lodz), Agnieszka Leszczyńska-Paczesna (University of Lodz)

Price-setting heterogeneity and robust monetary policy in a twosector DSGE model of the Polish economy

This paper presents welfare analysis in a dynamic stochastic general equilibrium model of a small open economy. The model assumes a price-setting heterogeneity between two sectors of the economy: the production of food and energy goods, and the remaining consumption goods. This model allows us to analyze the dynamics of different price indices and consider their role in monetary policy. We derive an analytical formula for a second-order approximation to the welfare of the representative consumer. Based on the estimated model for the Polish economy, we compare welfare loss distributions under alternative monetary policy regimes. We consider two types of robust monetary policy rules which minimize the maximum and mean welfare losses. We show that price-setting heterogeneity matters for the design of the robust monetary policy

Session 2d: Macro-financial links

Author(s): Michał Rubaszek (Warsaw School of Economics)

Forecasting crude oil prices with DSGE models

We run an oil prices forecasting competition among a set of structural models, including vector autoregressions and dynamic stochastic general equilibrium models. Our results highlights two principles. First, forecasts should exploit the mean reversion of the real oil price over long horizons. Second, models should not replicate the high volatility of oil prices observed in sample. Abiding by these principles, we show that a small scale DSGE model performs much better in real oil price forecasting than the random walk as well as vector autoregressions.

Author(s): Amat Adarov (Vienna Institute for International Economic Studies)

Financial Cycles in Europe: Dynamics, Synchronicity and Implications for Business Cycles and Macroeconomic Imbalances

Using dynamic factor models and state-space techniques we quantify financial cycles for twenty European countries over the period 1960Q1–2015Q4 capturing imbalances across credit, housing, bond and equity markets. The paper documents the existence of slow-moving and persistent financial cycles for all countries in the sample, many of which also exhibit high cross-country synchronicity. Spillover analysis points at the significant role the global financial cycle and a common latent region-specific factor, the European financial cycle, play in shaping national financial market dynamics. Estimations using Bayesian panel VAR models to assess interactions between external and internal macroeconomic imbalances suggest that financial cycles are an important driver of business cycles and public debt dynamics, with much stronger shock transmission observed in the euro area and systemic European economies.

Author(s): Janusz Brzeszczyński (Northumbria University), Jerzy Gajdka (University of Łódź), Tomasz Schabek (University of Łódź), Ali M. Kutan (Southern Illinois University Edwardsville)

Central Bank's Communication and Markets Reactions: Polish Evidence

Purpose:
This study contributes to the pool of knowledge about the impact of monetary policy communication of central banks on financial instruments' prices and assets' value in emerging markets.
Design/methodology/approach:

Empirical analysis is executed using the National Bank of Poland (NBP) announcements about its monetary policy covering the data from the broad financial market in its 3 main segments: stock market, foreign exchange market and bonds market. The reactions are measured relative to the changes in the NBP announcements and also with respect to investors' expectations. ARCH models with dummy variables are used as the main methodological tool.
Findings:
Bonds market and foreign exchange market are the most sensitive market segments, while interest rate and money supply are the most influential types of announcements. The changes of the revealed new macroeconomic figures had more impact on assets' prices movements than the deviations from their expectations. In addition, the economic benefit for investors was evaluated in the out–of–sample period by simulating trading strategy relying on the in–sample estimations.
Practical implications:
The findings have direct implications for investors and also for financial market regulators.
Originality/value:
The reported results provide novel evidence about how the emerging financial market responds to monetary policy announcements made by the central bank. They help understand the nature of the impact of public information on financial assets' valuation and on movements of their prices in the emerging market environment.

13:25–14:15

Session 3a: Asset pricing

Author(s): Jamilu Said Babangida (Ahmadu Bello University)

Nonlinearity in Stock Exchange Markets: The Case of Emerging Markets Indices

In this paper, we investigate the existence of nonlinearities by employing strand of nonlinearity tests for N-11 emerging economies. To this end, we use the BDS and Runs tests as first tests of nonlinearity indication. We then carry out the other sets of direct tests of nonlinearity developed by White (1989) and Terasvirta (1993); Keenan (1985) and Tsay (1986). Also, the TAR test is employed as a final test. The results concludes that the stock indices are characterised by the presence of nonlinearities and cycles in most economies which negates the efficient Market Hypothesis.

Author(s): Monday Osagie Adenomon (Nasarawa State University), Ngozi G. Emenogu (Federal Polytechnic Bida)

Double-Edged sword of global financial crisis and covid-19 pandemic on crude oil futures returns

This study investigates the impact of global financial crisis and the present COVID-19 pandemic on daily and weekly Crude oil futures using four variants of ARMA-GARCH models: ARMA-sGARCH, ARMA-eGARCH, ARMA-TGARCH and ARMA- aPARCH with dummy variables We also investigated the persistence, half-life and backtesting of the models. This study therefore seeks to contribute to the body of literature on the impact of global financial crisis and the present COVID-19 pandemic on crude oil futures market. This investigation of the impact of global financial crisis and the COVID-19 on crude oil futures has not been much studied at present. We obtained and analyzed the daily and weekly crude oil futures from secondary sources. Daily crude oil futures used in this study covers the period from the 4th January 2000 to 27th April 2020 while the weekly crude oil futures covered from 2ndJanuary 2000 to 26th April 2020 . The global financial crisis period covered from 2nd July 2007 to 31st March 2009 and the current COVID-19 pandemic covered from 1st January 2020 to 27th April, 2020. The study used both student t and skewed student t innovations with AIC, goodness-of-test fit and backtesting to select the best model. Most of the estimated ARMA-GARCH models are supported by skewed student t distribution while most of the ARMA-GARCH models exhibited high persistence values in the presence of global financial crisis and the COVID-19 pandemic. In the overall, the estimated ARMA(1,0)-eGARCH(2,1) and ARMA(1,0)-eGARCH(2,2) model for daily crude oil futures and weekly crude oil futures respectively have been significantly impacted by the global financial crisis and the Present COVID-19 pandemic while the preferred estimated models also passed the goodness-of-test fit and backtesting.This study recommends shareholders and investors should think outside the box as crude oil futures tend to be affected by global financial crisis and COVID-19 pandemic while countries also that depend mostly on crude oil are encouraged to diversify their economy in other to survive and be sustained during financial and health crisis.

Author(s): Maziar Sahamkhadam (Linnaeus University)

Dynamic Copula-based Expectile Portfolios

This paper investigates EVaR as the risk measure in dynamic copula-based portfolio optimization, compared with the common variance and CVaR. To estimate dependence structure between assets' returns, the canonical vine copula augmented with the generalized additive models (GAMC-vine) is used. Applying multivariate conditional distribution from GAMC-vine model, step-ahead asset returns' forecasts are obtained and used to construct dynamic copula-based EVaR portfolios. Using the ten S%P 500 industry sectors, EVaR leads to min-risk dynamic GAMC-vine portfolio that achieves higher out-of-sample average return and risk-adjusted ratios. Furthermore, EVaR shows better portfolio ranking than that of CVaR. Finally, the copula-based variance and EVaR portfolios show higher-order stochastic dominance compared to CVaR strategies.

Session 3b: Modeling Volatility

Author(s): Luca Bagato (Catholic University of S.H, Piacenza), Alessio Gioia, Enrico Mandelli (Borsa Italiana)

Reflexivity and Interactions in Modern Financial Markets: The case of Volatility Indices

Reflexivity Theory rejects efficient market hypothsesis of equilibrium price as a result of immediate and instantaneous use of information flows to determine an equilibrium price for each asset. We have empirically investigated how to determine the presence of Reflexivity for a certain list of listed Volatility Indices. We introduce a multi-step statistical model able to recognize stressed market periods and identify breakout point and short -term trend and reversal signals. We also investigate reverse causality and the response of our model to volatility shocks. Our conclusion are oriented towards a confirmation of Reflexivity Theory in the historical time series of listed Volatility Indices.

Author(s): Marius Matei (National Bank of Romania)

Volatility During the Financial Crisis Through the Lens of High Frequency Data: A Realized GARCH Approach

We study financial volatility during the Global Financial Crisis and use the largest volatility shocks to identify major events during the crisis. Our analysis makes extensive use of high-frequency financial data to model volatility and to determine the timing within the day when the largest volatility shocks occurred. The latter helps us identify the events that may be associated with each of these shocks, and serves to illustrate the benefits of using high-frequency data. Some of the largest volatility shocks coincide, not surprisingly, with the bankruptcy of Lehman Brothers on September 15, 2008 and Congress's failure to pass the Emergency Economic Stabilization Act on September 29, 2008. Yet, the largest volatility shock was on February 27, 2007, the date when Freddie Mac announced a stricter policy for underwriting subprime loans and a date that was marked by a crash on the Chinese stock market. However, the intraday high-frequency data shows that the main culprit was a computer glitch in the trading system. The days with the largest drops in volatility can in most cases be related to interventions by governments and central banks.

Author(s): Olga Kutera (Cracow University of Economics)

Fine wine in risk minimizing portfolios

In the face of extreme market conditions, Chinese investors are turning to alternative investments in assets such as gold and fine wine.

We study the dynamics of relationship between the global, European, Chinese stock markets and fine wine market by using VAR DCC-GARCH (Engle, 2002) framework and daily closing prices of LIVX50 index (representing fine wine market), S&P500, Shanghai Stock Exchange Composite (SHC) and FTSE100 indices (reflecting changes in the global, Chinese and European markets respectively) from 2010 to 2019. Three versions of univariate GARCH

models namely standard, exponential and GJR have been used in order to build best fitted multivariate dynamic conditional correlation model. Parameters of dynamic correlation were statistically significant in all cases indicating the importance of time varying co-movements. Results of our study reveal the long-term time-varying linkages in volatility between global market and SHC index and Yuan. We found evidence of property of fine wine to be hedge to global market, Chinese market and currency. Moreover, fine wine can act as safe haven asset against S&P500 index and SHC index declines. Furthermore, there is some impact and a positive correlation between European market and fine wines market in few periods. Most important results provide empirical evidence that fine wine can be hedge to S&P500 index and GBP/USD exchange rate. Fine wine can act as safe haven asset against turmoil on global and Chinese market and declines in British currency, what can help investors minimize risks to build optimal portfolios. The slowdown of economic growth in Chinese economy cannot be risk to the fine wine market, which is opposite to what Cardebat and Jiao (2018) suggested.

The second part of the study compared the effectiveness of risk minimizing portfolios containing traditional financial instruments and two different alternative assets, namely fine wine and gold. Does fine wine have better hedging properties than gold? Which of these assets is the investor's best friend? Wine should have a larger share in two-component optimal risk minimizing portfolios than traditional financial instruments such as, for example, stocks.

Our analysis extends existing knowledge on the role of wine investments in Asian markets, especially China. In particular, employing the VAR-DCC is new to the wine literature and, importantly, allow us to capture the linear interdependencies among several time series, rather than focusing on one evolving variable (like in AR processes). Moreover, we considered daily data, while most of the prior studies limited their analyses to monthly data. As investors tend to diversify their investment across different assets, results of our analysis would be crucial input for investors in portfolio diversification and hedging their stock positions in traditional financial assets by investing in fine wines.

Session 3c: Monetary Policy and Credit Risk

Author(s): Marek Kwas (SGH), Karol Szafranek (SGH), Grzegorz Szafrański (Koźmiński University), Zuzanna Wośko (SGH Warsaw School of Economics)

Credit risk of shale companies

Author(s): Marek Bojko (Uni Cambridge), Pavel Gertler (National Bank of Slovakia)

Letting the cat out of the bag: Mining ECB's ad-hoc communication

Session 3d: Macro-financial Links

Author(s): Piotr Wdowiński (University of Łódź)

Optimal capital requirements in the Polish banking sector

Author(s): Camilla Jensen (Roskilde University)

How valid are common indicators of political risk used in IB research and practice?

Using international business research about political risk as a field experiment, the paper seeks to assess the validity of current political risk or governance indicators. Vernon's claim with the obsolescing bargaining model (OBM) that political risk plays out at the project rather than country level is investigated. Relationships are analysed among longitudinal, quarterly historical data series on: political events, expert-based political risk assessments and activity data. The aim is to show that by observing entrepreneurial investment activity at the project level we can get closer to predict political uncertainty and as it plays out via negative political events with massive material damage. Preliminary findings based on Granger causality testing combined with ordinary benchmark coefficient estimates using panel data techniques render relatively strong support for this claim. The implications could be that by observing other firms' experiences rather than relying on expert-based risk indicators alone, investors could get deeper insights into political risk, as it occurs and therefore also to some extent be able to better predict and avoid it.

14:30-15:15

Session 4: Predicting stock returns

Author(s): Zheng Tracy Ke (Harvard University), Bryan Kelly (Yale University), Dacheng Xiu (University of Chicago)

Predicting Returns with Text Data

We introduce a new text-mining methodology that extracts sentiment information from news articles to predict asset returns. Unlike more common sentiment scores used for stock return prediction (e.g., those sold by commercial vendors or built with dictionary-based methods), our supervised learning framework constructs a sentiment score that is specifically adapted to the problem of return prediction. Our method proceeds in three steps: 1) isolating a list of sentiment terms via predictive screening, 2) assigning sentiment weights to these words via topic modeling, and 3) aggregating terms into an article-level sentiment score via penalized likelihood. We derive theoretical guarantees on the accuracy of estimates from our model with minimal assumptions. In our empirical analysis, we text-mine one of the most actively monitored streams of news articles in the financial system—the Dow Jones Newswires—and show that our supervised sentiment model excels at extracting return-predictive signals in this context.

15:15-16:45

Session 5a: Return predictability

Author(s): Cleiton G. Taufemback (Universidade Federal do Rio Grande do Sul), Victor Troster (Universitat de les Illes Balears), Muhammad Shahbaz (Beijing Institute of Technology)

A Robust Test for Monotonicity in Asset Returns

This paper proposes a robust test of monotonicity in asset returns that is valid under a general setting. We develop a test that allows for dependent data and is robust to conditional heteroskedasticity or heavy-tailed distributions of return differentials. Many postulated theories in economics and finance assume monotonic relationships between expected asset returns and certain underlying characteristics of an asset. Existing tests in literature fail to control for a type I error or require that the expected return differentials are normallydistributed. Monte Carlo simulations illustrate that our test statistic has a correct empirical size under all data-generating processes together with a similar power to other tests. Conversely, alternative tests are non-conservative under conditional heteroskedasticity or heavy-tailed distributions of return differentials. We also present an empirical application on the monotonicity of returns on various portfolios sorts that highlights the usefulness of our approach.

Author(s): Jie Ying (Southern Illinois University)

Institutional Trading on Information Diffusion across Fundamentally Related Firms

I document a strong cross-predictability of stock returns driven by institutional investors' private information about firms' fundamental relations. A value-weighted arbitrage portfolio yields a monthly alpha of 1.65%. The magnitude of predicted returns increases with firm size, number of institutional shareholders, and institutional trading intensity while not changing with analyst coverage. Further evidences confirm that institutional investors strategically trade a stock in response to shocks to its peers, which subsequently causes permanent price movements. Overall, my results suggest that institutional trading propagates the diffusion of value-relevant information across firms but only gradually due to information asymmetries among investors.

Author(s): David Rakowski (University of Texas), Ehab Yamani (Chicago State University)

Revisiting the relationship between mutual fund flow and performance: An instrumental variable approach

We use an instrumental variables (IV) approach to examine the effects of dynamic endogeneity on estimating the relationship between mutual fund flow and performance. Unlike the fixed effects (FE) estimation approach (commonly used in prior research), the IV approach allows us to address reverse causation between flow and performance. Out of a long list of flow and performance determinants, we conclude that fund media coverage, risk rating, and management structure win in a horse race to evaluate exogenous instruments for fund

flow; while the fund turnover ratio and institutional share perform best as the "true" exogenous instruments for fund performance. We illustrate that endogeneity bias arises in FE coefficient estimates, as evidenced by the 'reversals' of the signs of flow and performance coefficient estimates when we switch from the FE to IV approach.

Session 5b: Machine learning

Author(s): Piotr Zegadło (Kozminski University)

Predictive modelling of the log range volatility estimator for an exchange rate

Volatility prediction in the financial markets is one of the issues carefully followed both by academics and market participants. Many frameworks have been applied in this context, but modern machine learning techniques are still relatively under-represented. This paper proposes the use of a state-of-the-art decision tree boosting algorithm for predicting the values of an efficient volatility estimator – the daily log range. Although the out-of-sample accuracy of the machine learning algorithm and a Vector Error Correction Model are similar, their forecast combination significantly beats separate approaches. Machine learning models may potentially enhance the performance of more traditional volatility prediction frameworks.

Author(s): Andrea Flori (Politecnico di Milano), Daniele Regoli (Intesa Sanpaolo)

Revealing Pairs-Trading Opportunities with Long Short-Term Memory Networks

We refer to the reversal effect, consisting in the fact that temporarily market deviations are likely to correct and finally converge again, to generate valuable pairs trading opportunities based on the application of Long Short-Term Memory Networks (LSTMs). We employ such approach to create an outcome for the probability of a stock having an increasing performance in the near future compared to its cointegrated peers. We show that strategies relying on such predictions can improve portfolio performances providing predictive signals whose information content goes above and beyond the one embedded in both prices and returns gaps.

Author(s): Jiří Kukačka (UTIA AV CR)

Machine learning extension of the simulated method of moments for estimation of agent-based models

The paper introduces innovative machine learning techniques to agent-based econometrics and expands the estimation methodology for agent-based models. The setup of the simulated method of moments (SMM) for estimation of financial models is extended with an automated machine learning selection of the optimal set of moments. To briefly demonstrate the importance of the issue, Franke and Westerhoff (2012) employ a rich set of nine moments while for a similar type of a financial agent-based model Chen and Lux (2018) only use four moments. It is clear that an insufficient set of moments will likely ignore some important dynamic properties of the model while overfilling of the moment set will likely lead to estimation inefficiencies and problems with identification of parameters. Algorithmic subset selection methods (Hastie et al., 2009) generally developed for model construction are thus

utilized. The methods evaluate subsets of features, moments in our case, in terms of their suitability for a given purpose and retain only the optimal ones.

Session 5c: Monetary policy

Author(s): Mercédesz Mészáros (University of Szeged), Dóra Sallai (University of Szeged), Gábor Dávid Kiss (University of Szeged)

Can market making of last resort calm the European stock markets? The result of quantile regressions on a sample of six European countries

Stock market indices are the benchmark of valuation uncertainty. Funding conditions can have an impact on the discounting process, so time-premium, country-specific premia or (un)conventional monetary policy should be considered in case of studying market volatility. The aim of our research is to identify the effects of the unconventional monetary policy of European central banks on stock markets and to explore specific aspects of the relationship between domestic quantitative easing and the influence of the ECB, through the pattern of small, open economies in Europe. This paper employed quantile panel regression to compare the 25% (calming) and 75% (stressed) scenarios of quarterly averaged conditional variance, and compared them with an ordinary linear panel regression.

Author(s): Paweł Baranowski (University of Lodz), Wirginia Doryń (University of Lodz), Tomasz Łyziak (Narodowy Bank Polski), Ewa Stanisławska (Narodowy Bank Polski)

Words and deeds in managing expectations: empirical evidence on an inflation targeting economy

The conduct of monetary policy nowadays involves not only interest rate decisions but also central bank communication, aimed at managing the expectations of the private sector. In this paper, we apply epidemiological model to private-sector experts' forecasts regarding interest rates and inflation in Poland—an economy with over 20 years of inflation targeting history. We show that both of these factors affect interest rates and inflation expectations. Our study contributes to the literature by including a wide set of factors affecting expectations with a special focus on central bank decisions, projections and the tone of official documents.

In general, the textual content of monetary policy minutes affects experts' expectations more at the shortest horizons (nowcasts and one quarter ahead), while GDP and inflation projections released by the central bank play a larger role for slightly longer horizons (two quarters ahead or longer). As far as monetary policy actions are concerned, a positive interest rate surprise produces an upward shift in the whole path of interest rate expectations and leads to a decrease in one-year-ahead inflation expectations.

Author(s): Marfatia Hardik (Northeastern Illinois University)

Is the future really observable? A practical approach to model monetary policy rules

We take a practical approach to model the forward-looking monetary policy rule. Unlike existing studies, we recognize that the forward-looking components - future inflation and output growth - are intrinsically unobserved at the time policy formulation. Using the unobserved components framework, we extract the latent components of the policy rule from the short-term and long-term Greenbook forecasts, both individually and in combination, and jointly estimate the policy parameters. We also consider correlations between different components and combine the forecasts from the survey of professional forecasters and the inflation index bonds market. Evidence suggests that the Federal Reserve follows an inflation-tilted policy rule and the long-term state of economy gets a higher weight than the short-term. Also, the policy reaction is more aggressive when interconnections between different components of the policy rule are considered. The simulated policy rate from the model also provides an alternative measure of monetary policy stance, particularly in a zero lower bound environment.

Session 5d: Systemic Risk

Author(s): Axel Hedström (Linkoping University), Md Lutfur Rahman (Newcastle Business School), Gazi Salah Uddin (Linkoping University), Victor Troster (Universitat de les Illes Balears)

Systemic risk network in the European banking sector

This paper examines systemic risk in the European banking sector using the tail-event driven network (TENET) approach. Our data comprise of twenty European banks from the core, Nordic, and peripheral countries, and we explore the connectedness within and between these groups. We find evidence of higher connectedness during the Eurozone crisis and of increased uncertainties associated with the Brexit. Nevertheless, we find no support for increased connectedness between European banks during the global financial crisis. Nordic and Core banks are more systemically significant, but a few Peripheral banks also display systemic properties. Overall, the Core banks are strong receivers of tail risk while the Nordic banks are strong emitters of tail risk, and risk spillover is stronger within the groups than across the groups. Our results have important implications for assessing systemic risk and devising macroprudential supervision policies in the European banking area.

Author(s): Federico Daniel Forte (BBVA Research Argentina)

Network Topology of the Argentine Interbank Money Market

This paper provides the first empirical network analysis of the Argentine interbank money market, commonly known as call market, based on data from the Central Bank of Argentina (BCRA). Its main topological features are described applying graph theory, focusing on the unsecured overnight loans settled from 2003 to 2017. The network, where banks are the nodes and the operations between them represent the links, exhibits low density, as is usual in financial networks, and a higher reciprocity than comparable random graphs. It displays a short average distance and its clustering coefficient remains above that of a random network of equal size. Both indicators are in line with those reported for other interbank networks around the world. Furthermore, the network is prominently disassortative. Different node centrality measures are computed. It is found that a higher centrality enables a node to settle more convenient bilateral interest rates compared with the average market rate, identifying a statistical and economically significant effect by means of a regression analysis. The degree distributions fit better to a Lognormal distribution than to a Poisson or a Power Law. These results constitute a relevant input for systemic risk assessment and provide solid empirical foundations for future theoretical modelling and shock simulations.

Author(s): Sylvain Benoit, (Paris Dauphine University), Ophélie Couperier (ENSAE-CREST), Jérémy Leymarie (University of Vienna), Olivier Scaillet (University of Geneva)

Comparing and Evaluating Systemic Risk Models

In point forecasting, a loss function is said to be consistent for a given statistical functional (e.g., the mean, median, quantile, etc.), if the expected loss is minimized when the given functional is used as the forecast. This article identifies the first and general class of loss function that is consistent with the marginal expected shortfall (MES) and related systemic-risk measures, including SRISK and SES. Our loss function opens the way to the possibility of statistically comparing systemic-risk models, which are generally used by academics and policy makers, to rank the so-called Systemically Important Financial Institutions (SIFIs) whose failure might trigger a crisis in the entire financial system.

17:00-19:00

Session 6a: Asset pricing

Author(s): Torben G. Andersen (Northwestern University), Martin Thyrsgaard (Northwestern University), Viktor Todorov (Northwestern University)

Recalcitrant Betas: Intraday Variation in the Cross-Sectional Dispersion of Systematic Risk and Expected Returns

We study the temporal behavior of the cross-sectional distribution of assets' market exposure, or betas, using a large panel of high-frequency returns. The asymptotic setup has the sampling frequency of returns increasing to infinity, while the time span of the data remains fixed, and the cross-sectional dimension of the panel is either fixed or increasing. We derive functional limit results for the cross-sectional distribution of betas evolving over time. We demonstrate, for constituents of the S\&P 500 market index, that the dispersion in betas is elevated at the market open and gradually declines over the trading day. We rationalize this pattern with a more diverse reaction of stocks to aggregate cash-flow news relative to other shocks to the market portfolio, combined with a decline in the average intensity of cash-flow news across the trading day. Importantly, we find that this intraday variation in betas is reflected in expected asset returns.

Author(s): Bartosz Gębka (Newcastle University), Sze-Nie Ung (Newcastle University), Robert D. J. Anderson (Newcastle University)

Bad Beta and Good Beta Revisited: Rational and Irrational Expectations

Campbell, Polk and Vuolteenaho (2010) determine the source of systematic risks in asset prices by assuming that the cash flow news is driven by fundamentals whereas discount rate news is sentiment driven. This study empirically evaluates their assumptions by constructing a four-beta model that disentangles the cash flow and discount rate betas of Campbell and Vuolteenaho (2004) into rational and irrational components. The empirical results do not support their assumptions in that the stock returns respond significantly to the shocks in the irrationally expected cash flow and rational discount rate. Comparing the asset pricing performance of our four-beta model against alternative asset pricing models reveals that our model has a better model fit with lower pricing error. The documented negative (positive) risk premia of irrational (rational) betas implies that investors are willing to pay a price (require a risk premium) for stocks that are sensitive to the irrational risk factors (rational risk factors).

Author(s): Rajeev R. Bhattacharya (Johns Hopkins University)

Market Efficiency, Short Sales Costs & Constraints, and Trading Volume

I use eight metrics as separate negative measures for market efficiency. I develop a theory of trading volume as a function of short sales costs and market efficiency as a function of trading volume. I identify instruments for the endogenous variables and for those measured with error. I use 3SLS and EIV to estimate this two-equation structural model and test the one-tailed hypotheses, separately for Nasdaq and non-Nasdaq U.S. stocks. Accounting for Fama-French factors and institutional ownership, I find that the impact on market efficiency of short sales costs & constraints is not negative and that of trading volume is not positive.

Author(s): Gregory Connor (Maynooth University), Robert A Korajczyk (Northwestern University)

Semi-strong factors in asset returns

We refine the approximate factor model of asset returns by distinguishing between natural rate factors, whose sum of squared factor betas grow at the same rate as the number of assets, and semi-strong factors, whose sum of squared factor betas grow to infinity, but at a slower rate. We characterize the cross-sectional mean and mean-square of semi-strong factor betas, and differentiate them from natural rate factors. We apply the methodology to daily equity returns to characterize some pre-specified factors as natural rate or semi-strong.

Session 6b: Modeling volatility

Author(s): Arpita Mukherjee (Rutgers University)

How Relevant is Volatility Density Forecasting? Evidence from Empirical Finance

In this paper, we provide new empirical evidence of the relative usefulness of interval (density)and point forecasts of asset-return volatility, in the context of financial risk management. In our evaluation we use both statistical criteria, i.e. accuracy of directional volatility predictions and economic criteria i.e. profitability of trading strategies based on said predictions. We construct interval forecasts using nonparametric kernel estimators, while point forecasts are based on "linear" heterogeneous autoregressive models as well as "nonlinear" deep-learning recurrent neural network models. Additionally, we utilize a novel trading strategy that builds on the contemporaneous return-volatility relationship and leads to new insights related to linkages between economic and statistical methods of forecast evaluation. Our empirical findings based on high-frequency data suggest that, interval forecasts can improve upon point forecasts in terms of trading profitability (as measured using Sharpe and Sortino Ratios), regardless of the "linear" or "nonlinear" nature of the point-forecasting model. Moreover, linear (nonlinear) model-based point forecasts perform worse (marginally better) than interval forecasts when it comes to directional predictive accuracy. These findings are consistent with hypotheses concerning both nonlinear volatility dynamics and the ability of interval forecasts to accurately estimate "large price jump "induced future volatility movements. A follow-up series of Monte Carlo experiments is motivated by our finding that for translation of statistical improvements into economic gains, the choice of volatility estimation technique is crucial. Our experiments reveal that the inability of certain volatility estimators to accurately predict "pseudo true" volatility density for specific magnitudes of "price jumps" or "microstructure noise" in the price process, can explain why these same estimators are less profitable when used in our empirical trading strategies.

Author(s): Viktor Todorov (Northwestern University), Yang Zhang (The Options Clearing Corporation, Chicago)

Information Gains from using Short-Dated Options for Volatility Measurement, Forecasting and Management

We study empirically the gains from using short-dated options for the purposes of volatility measurement, forecasting and management. Options contain important information about the volatility of the underlying asset but the link option - spot volatility is rather complicated because of the time-variation in volatility and the presence of jumps in asset prices. By forming suitable portfolios of short-dated options, however, one can nonparametrically estimate spot volatility under weak assumptions for the underlying asset dynamics. This volatility estimator complements existing ones constructed from high-frequency returns. We show empirically, using recent data on the S&P 500 index and stocks in the Dow 30 index, that combining optimally return and option data can lead to nontrivial gains both in the measurement of volatility as well as for its forecasting over horizons ranging from one day to one month. These gains are due to the ``diversification'' of the measurement error in the two volatility proxies. Measures of jump variation from options can provide in certain cases only small additional gains for the purposes of volatility forecasting. The volatility forecasting improvements from using options lead to efficiency gains when constructing minimum variance portfolios.

Author(s): Marcin Fałdziński (Nicolaus Copernicus University), Piotr Fiszeder, (Nicolaus Copernicus University) Peter Molnár (University of Stavanger)

Improving volatility forecasts: Evidence from Range-Based models

Volatility models based on daily high-low range have become increasingly popular because high and low prices are easily available, yet range contains very useful information about volatility. It has been established in the literature that range-based volatility models outperform standard volatility models based on closing prices. However, little is known about which range-based model performs the best. We therefore evaluate two range-based volatility models i.e. CARR and Range-GARCH with the standard GARCH model based on Monte Carlo experiments and wide sample of currencies and stock indices. For simulated series the range-based models outperform the standard GARCH model, and the performance of the Range-GARCH model and the CARR model is similar. However, for real financial time series (six currency pairs and nine stock indices) the Range-GARCH model outperforms both the standard GARCH and CARR models, while ranking of the standard GARCH and CARR models is ambiguous. We therefore consider Range-GARCH as the best from these three models.

Author(s): Piotr Dybka (Warsaw School of Economics)

One model or many? Exchange rates determinants and their predictive capabilities

The goal of this paper is to establish which macroeconomic variables play the most important role in shaping exchange rate movements and then to test their predictive capabilities in the case of nominal exchange rates of selected developed economies. First, Dynamic Bayesian Model Averaging (DMA) is used to establish whether different variables determine exchange rate movements among the developed and emerging economies and to check if there are differences in the inclusion probabilities and coefficients in time. Second, the results from the DMA are tested in a forecasting competition for 8 currencies, that include EUR, CHF, GBP, CAD, JPY (nominal exchange rate against the US dollar). They are compared against a simple random walk model, AR(4) model, calibrated PPP mean reverting benchmark and

static BMA model in three scenarios: direct forecast, forecast based on naïve forecasts of the explanatory variables (i.e. random walk forecast of the macroeconomic fundamentals) and forecast based on perfect forecast of the explanatory variables. The results show that in the case of the direct forecasts the random walk or calibrated PPP model performs the best, which indicates that macroeconomic fundamentals cannot be treated as leading indicators of the exchange rate movements. Nevertheless, it is possible to beat the random walk or simple calibrated models with the static and dynamic model averaging, however it requires additional forecasts of the explanatory variables that need to be better than naïve forecasts. Even though we can observe some variability in the posterior inclusion probabilities and coefficients of the macroeconomic variables affecting exchange rates, the obtained results show that the key macroeconomic fundamentals affecting exchange rate movements include the PPP rate, Terms of Trade (TOT) and output per worker along with the lagged exchange rate variable. To conclude, the contribution of this paper includes identification of the key determinants of the nominal exchange rates and the conditions necessary for the successful application in the forecasting.

Session 6c: Microeconomic analyses

Author(s): Oleksandr Faryna (National Bank of Ukraine), Tho Pham (University of Reading), Oleksandr Talavera (University of Birmingham), Andriy Tsapin (National Bank of Ukraine)

Wage Setting and Unemployment: Evidence from Online Job Vacancy Data

This paper examines the relationship between labour market conditions and wage dynamics by exploiting a unique dataset of 0.8 million online job vacancies. We find a weak trade-off between aggregated national-level wage inflation and unemployment. This link becomes more evident when wage inflation is disaggregated at sectoral and occupational levels. Using exogenous variations in local market unemployment as the main identification strategy, a negative correlation between vacancy-level wage and unemployment is also established. The correlation magnitude, however, is different across regions and skill segments. Our findings suggest the importance of micro data's unique dimensions in examining wage setting – unemployment relationship.

Author(s): Bruce Carlin (Rice University), Tarik Umar (Rice University), Hanyi Yi (Rice University)

Deputizing Wall Street to Fight Elder Abuse

U.S. regulators recently deputized financial professionals to help fight financial abuse of the elderly, without providing any incentives. Exploiting a staggered rollout of the authority to halt suspicious disbursements, we show deputization led to a 4%-6% decrease in suspected cases and a 7% drop in personal bankruptcies. Women, minorities, and unmarried people benefited more. Community connectedness and deeper relationships appeared to matter for effectiveness. Egoistic incentives, legal concerns, interest in publicity, and moral imperatives

were less important. Our results suggest that regulators can rely on social networks to solve tough problems.

Author(s): Nora Marija Laurinaityte (Bank of Lithuania)

Understanding Differences in Stock Market Participation: Networks Matter

This paper exploits the geographic heterogeneity in stock market participation (SMP) rates across the US counties, and the role information sharing through social network plays in explaining this heterogeneity. Using Facebook county-level connectivity data, the US Census Bureau, and the Internal Revenue Services (IRS) information, I find that the traditional determinants of SMP explain the observed cross-county heterogeneity rather well, on average. However, traditional determinants fail to explain SMP heterogeneity across the income distribution. Explanatory power of the empirical model with only the traditional determinants of SMP is particularly low for the income rich households. An empirical model that accounts for county´s network, namely when the average SMP rates across the income distribution in the connected counties is included as determinants of SMP, outperforms the traditional framework. SMP rate in the county´s network is particularly important covariate of SMP for the high income level households. This finding highlights the importance of social connectivity in household´s investment decisions, and improves our understanding of non-participation among wealthy households.

Author(s): Maher Kooli, Ivan Stetsyuk (University of Quebec in Montreal)

Are Hedge Fund Managers Skilled?

The purpose of this study is to measure the skill of hedge fund (HF) managers by calculating the value added that they extract from capital markets. We find that HF managers are skilled and the magnitude of the value added depends on the benchmark. Compared to Vanguard S&P 500 Index Fund and a set of eight Vanguard index funds, HF managers add on average $3.24 million per year and $2.88 million per year, respectively. Furthermore, we show that value is added with managerial skill as opposed to mere chance. Applying bootstrap to control for luck, we find that top performing managers are skilled. We also show that while the value added is particularly high before the financial crisis of 2007-2008, it decreases during post-crisis period. Finally, we find no evidence that HF managers share the value added produced by their skill with their investors.

Session 6d: Macro-financial links

Author(s): Carlos Madeira (Central Bank of Chile)

The impact of the Social Explosion of 2019 and the Covid 2020 pandemic on firms and households in Chile

This work studies the impact of the Social Explosion and Covid crises on the business and household sectors in Chile. The Chilean Social Explosion crisis in October of 2019 represented a mass protest, many times the size of similar events in other countries such as the Yellow Jackets in France. Using delinquency models calibrated with survey data we show that household and business debt risk increased substantially after both crises. The highest risk industries are Mining, Construction and Transports, while the poorer households are the most affected by unemployment and indebtedness. Public policies implemented after the Covid crisis reduce the increase in delinquency risk, especially for Micro firms and Manufacturing. The most effective policies are direct tax and income support, while deferral of loan payments is of limited impact for both households and firms, except for a few highly indebted agents. However, these measures may lose effect with a worsening unemployment crisis, implying that public support may require scaling up in the future. Risks rise substantially with a joint credit market and unemployment shock.

Author(s): Sylwester Kozak, (Warsaw University of Life Sciences), Agata Wierzbowska (Kobe University)

Banking market concertation and bank efficiency. Evidence from the South, East and Central Europe

The importance of the concentration-efficiency relationship comes from the fact that bank efficiency influences its ability to extend loans and financial stability of the banking sector. The paper aims to study this relationship in the banking sector of the SECE countries. The research covers 150 banks operating in 11 member and 8 non-member EU countries in 2005-2019. The value of profit inefficiency was assessed with the stochastic frontier approach (SFA), and next regressed with the banking market concentration and range of explanatory bank specific and macroeconomic variables. The results indicate that concentration nonlinearly, positively (in the EU countries) and negatively (in non-EU countries) impacts bank efficiency. Similarly, bank size helps to improve bank efficiency in EU and lowers it in non-EU countries. Thus, banks in the EU countries seem to follow the efficient structure hypothesis while banks in non-EU countries the quiet life hypothesis. Product diversification of income improves efficiency of banks in both groups of countries.

Author(s): Maximillian Littlejohn (University of California, Irvine)

Effects of Sector-Specific Credit Supply Shocks on the U.S. Economy

This paper investigates the implications of sector-specific credit supply shocks on real economic activity in the United States from 1952-2018. These sectors include private households, non-financial corporations, and banks. Within a structural vector autoregression (SVAR) framework, I employ a novel sign-restriction strategy to identify one monetary policy shock, two aggregate macroeconomic shocks, and three sector-specific credit supply shocks. I find evidence that credit supply shocks not only vary by the sectors in which they arise, but also by their consequences for business cycle dynamics. Credit shocks originating in the banking sector can explain up to 25% of output fluctuations while those arising in the household and corporate sectors can explain up to 15%. In addition, household and bank credit shocks may hold long-run consequences for inflation explaining up to 15% of its fluctuations. Within a historical context, the model identifies several periods where credit supply has been a significant driver of GDP. With respect to the recent financial crisis, I find a smaller role for credit shocks relative to aggregate supply shocks than is typically found in the literature. This supports recent empirical evidence suggesting that the early stages of the crisis were more reminiscent of an oil price shock recession.

Author(s): Michał Rubaszek (Warsaw School of Economics) Karol Szafranek (Warsaw School of Economics), Gazi Salah Uddin (Linköping University)

The dynamics and elasticities on the U.S. natural gas market. A Bayesian Structural VAR analysis

Natural gas is an important source of energy in the global economy, hence understanding the drivers of its prices is of significant interest for economic agents. This paper investigates the role of structural shocks for the dynamics of the U.S. natural gas market within the Bayesian Structural Vector Autoregression framework applied by Baumeister and Hamilton (2019, AER) for the crude oil market. This approach provides clear intuition for the identification strategy and allows deriving posterior with sound economic interpretation. We show that the short-term price elasticity of natural gas supply is low, whereas the demand price elasticity is

higher than the consensus estimate in the literature. Next, we argue that demand shocks specific to the U.S. natural gas market explain a large fraction of real natural gas prices variability, while the overall small contribution of supply and inventory shocks rises occasionally during specific market events. Finally, we illustrate how changes in supply in the era of shale gas revolution contributed to the dynamics of natural gas prices.

Session 7: Modelling stock returns

Authors: Shumiao Ouyang (Princeton University), Jiaheng Yu (MIT Sloan), Ravi Jagannathan (Northwestern University)

Life Cycle Cash Flows of Ventures

We estimate the collective return to all investors in ventures in our sample over their life cycle. The net present value per dollar invested in the first round of funding (NPV) is significantly positive on average before 1999, and about zero afterwards. The structural break follows the passage of the National Securities Markets Improvement Act (NSMIA). We develop a model to understand the effects of increased supply of capital due to NSMIA. Consistent with the models predictions, after NSMIA, ventures have lower NPVs, founders give up a smaller fraction of ownership, but more experienced VCs continue to add value.