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Institute of Economic Research SAS

MIER 2023

Smolenice Meeting of the Institute of Economic Research

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**Meeting of the Institute of Economic Research**  
2nd International Conference  
Institute of Economic Research SAS

15-16 November 2023  
Smolenice, Congress Centre of SAS Smolenice, Slovakia

**Conference Programme  
and Book of Abstracts**

Organized by:  
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## Foreword

Dear colleagues and participants of this international conference,

We are pleased to present to you, for the second time, a collection of papers presenting and summarizing the scientific discussions and results of a recent conference on pressing issues in contemporary scientific research. The aim of our activities was to integrate experts from different disciplines and research fields, with the primary intention of fostering synergies and identifying innovative approaches to solving current problems.

This conference serves not only as a platform for the presentation of technical papers, but also as a forum for mutual interaction and exchange of views between experts with different analytical perspectives. The topics we cover are undoubtedly important and interesting, whether they are global challenges related to crises, climate change or long-term economic and social trends.

Each contribution in this collection reflects the commitment of the individual authors to contribute to a deeper understanding of the complexity of these problems and to seek concrete solutions. This collection thus reflects the diversity of opinions and methodologies that help us to take a more complex look at the issues analyzed.

We thank all those who have contributed to the production of this volume and hope that its contents will be enriching not only for the participants of the conference but also for the wider professional community.

We look forward to welcoming you at MIER 2024 of the October 2024.

Bratislava, November 2023

**MIER 2023 Organisation Committee**



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## Conference Programme



### Programme MIER 2023

Meeting of the Institute of Economic Research – International Conference

**Tuesday 14. 11. 2023**

17:30 - 18:00 Early Registration

18:00 - 20:00 Dinner

**Wednesday 15. 11. 2023**

9:00 - 9:30 Registration

9:30 - 9:35 Conference opening (Štefánik M.) - CONGRESS HALL

9:35 - 10:30 The “Cinderella” Effect in Business Groups: Choosing which Subsidiary Firms to Support ( Hanousek J.) - CONGRESS HALL

10:30 - 11:00 Coffee Break

*Parallel Sessions*

	CONGRESS HALL	LECTURE HALL
11:00 - 12:30	<b>Credit risk models on P2P markets</b> <i>Chair: Lyócsa Štefan</i>	<b>Hybrid modelling system for regional policy evaluation: regional, industry and labour effect</b> <i>Chair: Radvanský Marek</i>
11:00 - 11:20	Macroeconomic environment and the future performance of loans: Evidence from three peer-to-peer platforms (Baumöhl E.)	The Czechoslovak monetary reform in 1953 - monetary and social aspects (Páleník V.)
11:20-11:40	Peer-to-peer loan returns: heterogeneous effects across quantiles (Lyócsa Š.)	Price dynamics in high inflation EA countries: Evidence from Slovakia and the Baltic States. (Kupkovič P.)
11:40-12:00	Threshold networks in credit risk models: an application on P2P markets (Výrost T.)	Medium-term forecast of the development of Slovak economy for 2023 - 2026 (Gogora M.)
12:00-12:20	Graph Convolutional Network-Based Approach to Default Prediction of P2P Loans (Plihal T.)	Examining Slovakia's Convergence Process: A Symptomatic or Systemic Failure After the Dual Crisis? (Radvanský M.)
12:30 - 13:30	Lunch	



*Parallel Sessions*

	CONGRESS HALL	LECTURE HALL
13:30 - 15:20	<b>Traditional and shadow banking sector</b> <i>Chair: Širaňová Mária</i>	<b>Development trends in the Slovak economy</b> <i>Chair: Hvozdková Veronika</i>
13:30 - 13:55	Bank Liquidity Creation, Monetary Policy, and Uncertainty: The U.S. Evidence (Fišera B.)	Public finance in unstable external environment (Frank K.)
13:55 - 14:20	Transition from high to low dependence on public transfers in old age (Domonkos T.)	Foreign trade balance of Slovakia: from surpluses to a huge deficit (Šikulová I.)
14:20 - 14:45	A Time Series Approach to Explainability for Neural Nets with Applications to Risk-Management and Fraud Detection (Misheva B. H.)	A New Structural and Digital Transformation (SDT) of the Economy in the Concept of Parallel Phasing (Brzica D.)
14:45 - 15:10	Calibrating Simultaneous Prediction Regions or Giving a Head Start in EUR/USD Exchange Rate Path-Forecast Prediction Band Horserace? (Ostrihoň F.)	Post-pandemic employment recovery in the Slovak Republic in the context of the outbreak of war in Ukraine (Hvozdková V.)
15:10 - 15:30	Easing of Borrower-Based Measures: Evidence from Czech Loan-Level Data (Hodula M.)	Economic development of Slovakia in 2022 (Morvay K.)
15:30 - 16:00	Coffee Break	
	<i>History Sessions</i>	
16:00 - 17:00	<b>The IER SAS is celebrating the 70th Anniversary of its foundation</b>	
18:00-22:00	Gala dinner	



Thursday 16. 11. 2023

Parallel Sessions	CONGRESS HALL	LECTURE HALL
9:00 - 10:30	<b>Macroeconomic analysis and policies</b> <i>Chair: Širaňová</i>	<b>Educational and labour market decisions and trajectories</b> <i>Chair: Miklošovič Tomáš</i>
9:00 - 9:25	Real estate markets and illicit financial inflows? (Širaňová M.)	Tracked and Segregated: The Effect of Early Informal Within-School Tracking in Schools with Students with Low Socioeconomic Status or Roma Ethnicity (Bahna M.)
9:25 - 9:50	Tax Benefits and Business Expenditures on R&D in Slovakia. Evidence from Firm-Level Panel Data (Tóth P.)	The flight of talent: Unveiling Slovakia's student outflow (Martinák D.)
9:50 - 10:15	What Makes Life More Expensive for Consumers? Disentangling the Sources of recent inflation hikes in Slovakia (Hojdan D.)	Afraid of robots? Pick a training! (Košťálová Z.)
10:15 - 10:30	Capital flight and government debt sustainability in Africa: the interest rate channel (Abille. A.)	

10:30 - 11:00 **Coffee Break**

Session	CONGRESS HALL	LECTURE HALL
11:00 - 12:30	<b>Educational and labour market decisions and trajectories</b> <i>Chair: Lafférs Lukáš</i>	<b>Geopolitical influences on global markets</b> <i>Chair: Vokoun Jaroslav</i>
11:00 - 11:20	Impact Evaluation of Pregnancy Benefit on Fertility in Slovakia (Trommlerová S.)	Overcoming Barriers to Smart Grid Adoption for Economic and Environmental Progress (Vakulenko I.)
11:20 - 11:40	"The impact of unexpected inflationary shock in 2022 and 2023 on the welfare of families: The case of Slovakia " (Valachyová J. , Senaj M.)	The economic crisis impact on inclusive growth (Saher L.)
11:40 - 12:00	E-commerce Usage Modes as a Proxy for Individual Digital Skills Distribution in Slovakia (Lacová Ž.)	To What the Extent the Geopolitical Events Influenced the Crude Oil Prices during the period 2000-2019: An Application of ARDL Model (Obadi S. M.)



12:00 - 12:20 Sample selection models and high-dimensional data (Lafférs L.)

12:20 - 12:40

12:30 - 13:30 **Lunch**

Adaptation of industry to carbon neutrality (Vokoun J.)  
Sustainable urban development in the content of global challenges (Kačírková M.)



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## Book of Abstracts



## **A New Structural and Digital Transformation (SDT) of the Economy in the Concept of Parallel Phasing**

**Daneš Brzica**

The public is increasingly concerned about the negative effects of industrial activity on the environment, leading to governments adopting regulations to protect the environment. Structural/digital transformation (SDT) and the search for new business/governance models are crucial for the dynamic development of the Slovak economy. The concept of parallel phasing (Brzica, 2017) emphasizes the interconnection of physical, cyber-physical, and digital spaces, which shape economic development. SDT involves harnessing people, technologies, and data to develop new business models and digital ecosystems. Governments must find new governance models to make achieving objectives easier, less time-consuming, and cheaper. New technologies and innovative platform models are disrupting established processes and structures, and parallel phasing can mobilize actors to transform the economy.

\*This work was supported by projects no. VEGA 2/0111/21

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## **A Time Series Approach to Explainability for Neural Nets with Applications to Risk-Management and Fraud Detection**

**Branka Hadji Misheva**

Artificial intelligence is creating one of the biggest revolution across technology driven application fields. For the finance sector, it offers many opportunities for significant market innovation and yet broad adoption of AI systems heavily relies on our trust in their outputs. Trust in technology is enabled by understanding the rationale behind the predictions made. To this end, the concept of eXplainable AI emerged introducing a suite of techniques attempting to explain to users how complex models arrived at a certain decision. For cross-sectional data classical XAI approaches can lead to valuable insights about the models' inner workings, but these techniques generally cannot cope well with longitudinal data (time series) in the presence of dependence structure and non-stationarity. We here propose a novel XAI technique for deep learning methods which preserves and exploits the natural time ordering of the data.

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## **Adaptation of industry to carbon neutrality**

**Jaroslav Vokoun**

The risk of climate change, the energy crisis and high inflation have created an environment in which technology change is more efficient than in the past. It is necessary to minimize the risk of a cost disadvantage compared to companies that produce outside the EU. Institutional policies must act in the sense of a reasonable triangle setting - climate ambitions, competitiveness and the provision of

sustainable green energy sources. The decarbonization of industry will lead to a significantly higher demand for energy, because many technological processes will have to be significantly electrified in order to reduce their emission intensity. Another prerequisite for cost-effective transformation is increasing energy efficiency in all areas of life.

\*This work was supported by project no. VEGA 2/0111/21

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## Afraid of robots? Pick a training!

Zuzana Košťálová

Co-autors: Lukáš Lafférs, Miroslav Štefánik

Supporting individuals through labour market transitions presents one of the crucial pillars of the policy agenda addressing changes in the future of work. With the evermore-present impact of new technologies on the structure of occupations and demanded tasks, upskilling becomes one of the most tempting policy-making options. In this respect, training provided under the portfolio of active labour market policies (ALMPs) presents an ideal measure. We evaluate a reform of the training supplied to registered unemployed in Slovakia in 2015. Specifically, we explore six training specialisations: healthcare workers, welders, truck drivers, security guards, accountants and beauticians. We document that by being allowed to select the provider and training specialisation, the jobseekers use training to reduce their risk of automation and increase income. We use administrative data to estimate the average treatment effects of training participation under the unconfoundedness assumption by applying a machine learning-based estimation technique. In line with available empirical studies, we estimate a positive employment effect observable in the long run and a positive income effect in the short run. Additionally, our data allow us to observe that some training specialisations are used as channels to find employment abroad. In contrast, other training specialisations present a pipeline for low-skilled jobseekers to find jobs in Slovakia in occupations with a lower risk of automation.

\*This work was supported by projects no. APVV-21-0360 and VEGA 2/0150/21

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## Bank Liquidity Creation, Monetary Policy, and Uncertainty: U.S. Evidence

Boris Fisera

Co-autors: Iftekhar Hasan, Roman Horvath, Svatopluk Kapounek

We examine the effect of financial market uncertainty on bank liquidity creation using bank-level data from the United States over the years 1985 and 2016. Using a panel of almost all U.S. banks during the examined period and the local projections (LP) approach, our results suggest that financial market uncertainty undermines bank liquidity creation. We also find that while contractionary monetary policy lowers the bank liquidity creation, a positive central bank information shock has a positive effect. We also find that higher financial market uncertainty limits the transmission of monetary policy shocks to bank liquidity creation: In the presence of heightened uncertainty, the effect of both standard monetary policy shock and of the central bank information shock on bank liquidity creation

disappears. Our results thus provide some evidence for a "monetary policy channel" of uncertainty: The lower effectiveness of monetary policy in times of higher uncertainty, might exacerbate the contractionary effects of uncertainty.

\*This work was supported by project no. APVV-20-0621: Hybrid modelling system for regional policy evaluation: regional, industry and labour effects

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## Calibrating Simultaneous Prediction Regions or Giving a Head Start in EUR/USD Exchange Rate Path-Forecast Prediction Band Horserace?

Filip Ostrihoň

Co-autor: Boris Fišera

In this paper, we examine and compare the performance of two competing approaches (simultaneous prediction regions and bootstrap joint prediction regions) in constructing prediction intervals in regard to consensus path forecasts of EUR/USD exchange rate. The intervals are constructed using actual out-of-sample path-forecast errors, computed based on historical EUR/USD exchange rate data. Joint accuracy of per-period intervals is measured by the family-wise prediction error rate and the potential of improving simultaneous prediction regions is explored by the application of the calibration principle. Conditional coverages are subsequently assessed by the means of standard likelihood ratio tests for interval accuracy. The main findings do not resoundingly point to the superiority of any of the two examined approaches. However, the performance of each of the intervals varies with the time period used for their construction, which is why either of the approaches can provide satisfactory unconditional coverage for EUR/USD exchange rate path forecasts, under specific circumstances.

\*This work was supported by projects no. VEGA 1/0476/21 and APVV-20-049921

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## Capital flight and government debt sustainability in Africa: the interest rate channel

Maria Siranova

Co-autor: Adamu Braimah Abille

This paper investigates the drivers of sovereign bond spreads in Africa by focusing on the role of capital flight. According to our knowledge, this is the first study to explicitly examined this relationship in the context of African countries. We use data for 21 African countries from 1990 to 2018. Based on the Pooled Mean Group (PMG) estimator, We discuss the implications of the capital flight phenomena within the debt sustainability framework through the interest rate channel. The empirically estimated strength of the link between the capital flight and government bond spreads is then subsequently used to construct the counterfactual simulation of the government debt behavior in the absence of capital flight.

\*This work was supported by projects no. APVV-20-0499 and No VEGA 2/0101/21.

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## Distribution of Individual Digital Skills in Slovakia : Example of E-commerce

Žaneta Lacová

Co-autors: Anna Vallušová, Peter Laco

Nowadays, to analyse the relevant supply-side characteristics on the labour market, a proper measurement of individual digital skills is necessary. Typically, the available surveys work with the self-evaluation measures proposing simple binary variables splitting the population into a technology users and non-users subgroups (having and not having the appropriate level of the digital skills). In our paper, we propose an alternative view to measure the digital abilities and benefits from a technology usage. Our concept rely on current digital divide literature, which argues that in the situation of widespread digital technologies, the users mainly differ by intensity of their use of a certain technology. The ability to benefit from digital technology is not only the result of education, but also of wider background in which an individual is living, referred to his social and cultural capital. In the paper, we demonstrate this principle using the example of e-commerce usage. We applied the method of latent class analysis to distinguish different modes of e-commerce usage. We also show that inability to fully use the benefits (or a digital privilege) of e-commerce is correlated with lower (or higher) socio-economic status. Our results motivate for providing community-level support of a technology usage in addition to individual-level (up-skilling or re-skilling) initiatives.

\*This work was supported by projects no. VEGA 1/0668/20, and KEGA 040UMB-4/2021

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## Easing of Borrower-Based Measures: Evidence from Czech Loan-Level Data

Martin Hodula

Co-autors: Lukáš Pfeifer, Ngoc Anh Ngo

We analyze how a large scale easing of borrower-based measures affect residential mortgage credit and borrower characteristics. We exploit a case of easing of the LTV limit and a complete abolishment of DTI and DSTI limits in the Czech Republic in early-2020. Loan-level data suggest that, in response to the easing, LTV, DTI, and DSTI indicators increased as well as the proportion of newly granted loans exceeding the limits in place before the easing took place. Our empirical evidence suggests that affected households increased their borrowing and purchased more expensive houses while being able to decrease the collateral value. We also document a significant increase in borrowers' debt (service) but this was soften by a concurrent growth of borrowers' income. While exploring the heterogeneity in the transmission of the regulatory easing, we find that: (i) LTV-constrained borrowers show signs of cash-retention behaviour while DTI and DSTI constrained borrowers act in line with financial accelerator motive; (ii) relaxing of the LTV limit have larger effect in poorer counties while the abolishment of DTI and DSTI limits affected mostly borrowers located in richer regions; (iii) younger borrowers are more affected by easing of LTV and DTI limits, while DSTI limits affect older borrowers; (iv) Relaxing the LTV limit affect mostly first-time borrowers while abolishing the DTI and DSTI limits help second-time borrowers to obtain higher mortgage and purchase more expensive property.

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## Examining Slovakia's Convergence Process: A Symptomatic or Systemic Failure After the Dual Crisis?

Marek Radvanský

This paper discusses to what extent and whether the convergence process in Slovakia experienced a temporary, symptomatic interruption or if there are indications of deeper systemic failures that hinder its progress. It was based on the impact assessment of recent crises on Slovakia's economic convergence with the EU. It explores whether the halt in convergence is a temporary symptom or indicative of deeper systemic issues, potentially placing Slovakia in the middle-income trap. Previous research has shown that the EU cohesion support has a rather limited effect and does not lead to unconditional convergence and has limited efficiency. Through analysis of GDP, government debt, consumption and wealth, demographics, competitiveness, and additional factors such as brain drain, it concludes that the convergence slowdown was lagging behind way before the economy suffered the consequences of two recent major crises – COVID and war in Ukraine. The provided overview suggests that the lack of convergence is rather a systemic problem and shows various symptoms related to countries imprisoned in the middle-income trap, such as systemic challenges, including innovation struggles, dependency on specific industries, regional disparities and institutional challenges, skills gap and human capital development, requiring comprehensive reforms.

This work was supported by projects no. APVV-20-0621 and VEGA 2/0150/21

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## Foreign trade balance of Slovakia: from surpluses to a huge deficit

Ivana Šikulová

Following the recovery in Slovakia's foreign trade recorded in 2021, strong dynamics on both the export and import side continued in 2022, but to a much greater extent on the import side. Thus, after more than a decade of foreign trade surpluses, Slovakia reported a negative trade balance. Imports were primarily driven by rise in the prices of natural gas, oil and electricity, while exports were dampened by persisting problems in supply chains and weaker external demand hit by inflation.

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## Graph Convolutional Network-Based Approach to Default Prediction of P2P Loans

Tomáš Plíhal

Co-autor: Oleg Deev

This paper proposes a Graph Convolutional Network (GCN) model for predicting bankruptcies in P2P lending market. Unlike traditional machine learning models that focus solely on individual attributes like credit history, our approach also incorporates high-order relational structures among borrowers. The GCN effectively captures both localized node features and edge connections, enriching risk assessment. We validate the model's performance against traditional classifiers, revealing its



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advantages in understanding both borrower-specific and network-level risk factors. This work offers new perspectives for enhancing decision-making in P2P lending and integrating graph theories in financial risk modeling.

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## How susceptible are rents in local real estate markets to the illicit financial inflows?

Maria Siranova

Co-autors: Jarko Fidrmuc; Zuzana Kostalova

The real estate market has been reported to be particularly vulnerable to money laundering schemes (Ferber and Unger, 2013), as land and house purchases require large sums of money while being subject to fewer regulatory and reporting requirements, providing an easy route to move funds (Naheem, 2017). To date, only a few country-specific studies have discussed the link between the impact of illicit financial flows and property prices, such as van Duyn and Soudijn (2009) for the Netherlands, Cheung et al. (2017) for the Hong Kong housing market, or Johannesen et al. (2022) for the UK housing market. This study aims to shed some light on the empirical link between illicit financial flows and real estate rents using unique city-level data in Europe collected through the web portal Numbeo.com (dataset similar to Reichle et al., 2023). City-level data from the online survey are provided for city centre and suburban areas, as well as for the size of dwellings. Given the richness of the data, we use a triple interaction term that declares a specific type of dwelling (e.g., luxury dwellings in the city centre) as the treated subset among the all dwellings. In addition, we add a set of conditioning variables that characterise cities that are hypothesised to attract higher volumes of illicit financial flows.

\*This work was supported by projects no. APVV-20-0499 and No VEGA 2/0101/21.

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## Impact Evaluation of Pregnancy Benefit on Fertility in Slovakia

Sofia Trommlerová

Co-autor: Libertad González

This research evaluates the impact of a new type of family policy - pregnancy benefit - on fertility behavior using population-wide administrative microdata on births and abortions and a difference-in-discontinuities model. The benefit was introduced in Slovakia in early 2021, with monthly payments of 27-42% of average net monthly earnings being paid to working women starting from the 13th week of pregnancy. Unlike typical family policies, this one is unique as it takes place in prenatal period.

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## Macro-financial stability and systematic shocks

Juraj Sipko

Over the last three to four years, the world economy has faced three systematic shocks — COVID-19, the Russian invasion in Ukraine and climate change. In addition, there have been unprecedented downside risks, mainly related to growing public debt and high inflation. Climate change is an existential threat for future generations. Therefore, a comprehensive approach would be needed. In this context, empirical and data analysis related to the impact of climate change on macroeconomic

and financial stability, including the real economy would be essential. The main goal is to describe the factors that will strongly influence macro-financial stability and the real economy and analyse them in terms of their impacts on the resilience and durability of sustainable economic growth within the EU member countries, as well as in Slovakia.

\*This work was supported by projects no. VEGA 2/0111/21

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## Medium-term forecast of the development of Slovak economy for 2023 – 2026

Matej Gogora

Co-autors: Branislav Kučerík, Tomáš Miklošovič

This analytical commentary updates the forecasting model for the Slovak economy for 2023-2026, which uses ECM methodology. Attention will be paid to the key indicators, including inflation, economic sentiment and industrial output, their recent development and outlook for the following years. For 2023, we forecast a correction in economic growth, mainly in the consumption, caused partly by record inflation in the first half of the year and decline in investments considering rising interest rates. For 2024-2026, we forecast a recovery of the economy and return to a dynamic growth.

This work was supported by project no. VEGA 2/0150/21

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## Overcoming Barriers to Smart Grid Adoption for Economic and Environmental Progress

Ihor Vakulenko

Energy significantly influences the economic landscape, and smart grids represent a pivotal facet of modernizing energy systems. Various economic, social, and organizational obstacles hinder the widespread adoption of smart grids. Surmounting these impediments is critical to foster economic growth and ecological sustainability. Stakeholders necessitate pragmatic tools for executing smart grid initiatives to tackle the intricate systemic hurdles associated with the incremental energy transition.

\*This work was supported by SASPRO 2 project financed under the EU program for research and innovation Horizon 2020 Marie Curie Skłodowska COFUND (Project registration number: 1263/02/03)

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## Peer-to-peer loan returns: heterogeneous effects across quantiles

Štefan Lyócsa

Co-autors: Petra Vašaničová, Oleg Deev

In this study, we examine how loan and borrowers' characteristics have a different impact on profitable and non-performing loans. Using a quantile regression profit-scoring model estimated with 472,106 loans from the U.S. P2P lending platform Lending Club, we show that higher loan amounts,



loan term, interest rate and lower income are associated with lower returns for less creditworthy borrowers, i.e., for under-performed loans. Conversely, for performing loans, higher loan amounts, loan term, interest rates and lower income are associated with higher returns. We also find that borrowers' credit (debt-to-income and FICO score) matters mostly for the tails of the return distribution, to mitigate losses for non-performing loans and improve profits for highest-performing loans. The results have broader implications for the design of credit risk models.

This work was supported by project no. APVV-22-0472

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## Post-pandemic employment recovery in the Slovak Republic in the context of the demographic transition and the outbreak of war in Ukraine

Veronika Hvozdíková

The paper attempts to explain unusually weak depth of the employment slump during the pandemic and highlights the sectoral specificities of the pandemic's impact. It shows that the subsequent employment recovery was largely driven by those aged over 45, which is not surprising in the context of changes in the labour force age structure. In addition, almost half of the overall employment recovery was due to an increase in the number of foreign workers. Available statistics show a clear impact of the outbreak of war in Ukraine, with implications e.g. for the gender composition of labour migrants, their composition by a citizenship, registered form of employment, or implications for job vacancies by occupational structure. Based on signs of a cooling labour market, we outline the near-term outlook.

\*This work was supported by projects no. VEGA 2/0042/23 and VEGA 2/0150/21

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## Price dynamics in high inflation EA countries: Evidence from Slovakia and the Baltic States.

Patrik Kupkovič

The main building block of price modules in current macroeconomic models is the Phillips curve. The general form of the Phillips curve decomposes inflation into two components: a slow-moving component called the inflation attractor or trend, and a second cyclical component called the inflation gap. In this paper, we decompose the inflation dynamics in the high-inflation EA countries (Slovakia, Estonia, Latvia, Lithuania) into two components using the unobserved component model. The results show that inflation in Slovakia is more volatile than in the Baltic countries in terms of trend inflation and inflation gap. The current high inflation environment in Slovakia is driven not only by a significant increase in the inflation gap, which is similar to that in the Baltic countries but also by an increase in the inflation trend, which started to rise well before the current shocks. The main contribution of the paper is the new empirical evidence on inflation dynamics in high inflation EA countries.

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## Public finance in unstable external environment

Karol Frank

Similarly, to the previous year, 2022 was an extraordinary challenge for the public finances of the Slovak Republic. Despite the expected fall of the economy into recession due to the Russian aggression in Ukraine and its secondary effects, there were positive developments, and the deficit was significantly lower than expected. However, this is only a temporary phenomenon, and the Slovak public finances are still at high risk of unsustainability if the necessary consolidation measures are not taken in the coming years. We have also devoted a significant part of the chapter to the EU funds, as the end of the programming period is approaching and a similar or even worse situation with their absorption than in the previous programming period is recurring. Reform of the system of their management is a necessity, so that the delayed new programming period 2021-2027 does not lead to the same situation, and the resources that could have been used for the development of the Slovak economy will not be used.

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## Sample selection models and high-dimensional data

Lukáš Lafférs

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This paper considers the evaluation of discretely distributed treatments when outcomes are only observed for a subpopulation due to sample selection or outcome attrition. For identification, we combine a selection-on-observables assumption for treatment assignment with either selection-on-observables or instrumental variable assumptions concerning the outcome attrition/sample selection process. We also consider dynamic confounding, meaning that covariates that jointly affect sample selection and the outcome may (at least partly) be influenced by the treatment. To control in a data-driven way for a potentially high dimensional set of pre- and/or post-treatment covariates, we adapt the double machine learning framework for treatment evaluation to sample selection problems. We make use of (a) Neyman-orthogonal, doubly robust, and efficient score functions, which imply the robustness of treatment effect estimation to moderate regularization biases in the machine learning-based estimation of the outcome, treatment, or sample selection models and (b) sample splitting (or cross-fitting) to prevent overfitting bias. We demonstrate that the proposed estimators are asymptotically normal and root-n consistent under specific regularity conditions concerning the machine learners and investigate their finite sample properties in a simulation study. We also apply our proposed methodology to the Job Corps data for evaluating the effect of training on hourly wages which are only observed conditional on employment. The estimator is available in the causalweight package for the statistical software R.

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## Sustainable Urban Development In The Content Of Global Challenges

Mária Kačírková

Global challenges, especially climate change, increasing urbanization rates, population trends and increasing pressure on ecosystems and the environment, have a huge impact on global development. One of the key strategic aspects in the future development of the urban environment is the aspect of sustainability - to find a systemic interplay between environmental, economic, social and cultural factors.

Climate change and environmental threats are reflected in the scenarios of the future of cities, presented by the 2030 Agenda for Sustainable Development. Due to the different regional environment scenarios have a different character. The paper aims to briefly point out the challenge associated with urbanization and to outline possible scenarios of urban development in the future.

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## Tax Benefits and Business Expenditures on R&D in Slovakia. Evidence from Firm-Level Panel Data

Peter Tóth

We estimate the effect of corporate tax benefits on business expenditures on research and development using Slovak firm-level panel data from 2010-2021. Using an exact matching estimator we find that on average, a unit of tax benefit stimulated somewhat less than a unit of R&D expenditures. In an international comparison, this suggests a relatively low efficiency of the Slovak scheme, which is based on superdeductions of R&D expenditures from the tax base. We study the heterogeneity of results by different superdeduction rates enacted, by firm size and by types of R&D expenditures.

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## The Czechoslovak monetary reform in 1953 - monetary and social aspects

Viliam Páleník

We describe the historical context of the Czechoslovak currency reform in 1953, its connection with the currency reform in 1945, as well as the reactions of the population before and after the announcement of the 1953 reform. We analyze the essence of this reform: recalculation of cash, bank deposits and quasi-money in the ratio of 1:5 to 1:30 and 1:50 to 1:0; establishing a new currency: 1 CZK = 0.12 g of gold, 1 ruble = 1.8 CZK; abolition of the tied market (ticket system) and its connection with the free market; new regulated prices. The monetary reform of 1953 was also accompanied by changes in wages, their taxation, the introduction of an advance for the payment of wages, child allowances, etc. The monetary reform of 1953 was also accompanied by changes in wages, their taxation, the introduction of an advance for the payment of wages, child allowances, etc. Deposits,

insurance policies, state securities, which were bound by the reform in 1945, were canceled, as well as state bonds from the period between the 1945-1953 reforms (except for foreign holders). The work contains a quantification of the effects of the monetary reform of 1953 on the population, the economy, the state budget and monetary aggregates.

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## The economic crisis impact on inclusive growth

Liudmyla Saher

Studying economic crises in the context of inclusive growth objectives is paramount. Knowing crises is essential to formulating effective strategies for fostering inclusivity. By dissecting the dynamics between crises and inclusive growth, we can identify vulnerabilities and implement measures to mitigate the adverse impact of downturns on vulnerable populations. These insights are indispensable for policymakers and organizations to advance a more equitable and sustainable economic landscape.

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## The flight of talent: Unveiling Slovakia's student outflow

Dávid Martinák

Co-autor: Samo Varsik

Slovakia faces an unprecedented outflow of students to foreign higher education institutions, mainly in Czechia. The loss of highly skilled human capital can negatively impact Slovakia through foregone student expenditures in the short term and adverse effects on productivity and economic growth in the long term. Little evidence is available on who these students are and whether they are already carriers of advanced skills after graduation from upper secondary schools. This study deploys multilevel multinomial logistic regression on a rich administrative dataset to describe the population of graduates in 2018 pursuing higher education studies abroad relative to those studying at home and not studying. The selection to foreign higher education institutions is strongly influenced by academic outcomes, and cultural and economic capital of upper secondary graduates, even after controlling for a range of individual- and school-level factors. Furthermore, the results of our model indicate that the relationship between academic performance and the probability of studying abroad is not uniform. Instead, it varies significantly depending on an individual's economic and cultural capital endowment.

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## The impact of unexpected inflationary shock in 2022 and 2023 on the welfare of families: The case of Slovakia

Matúš Senaj

Co-autor: Jana Valachyová

We analyse the impact of an unexpected and steep increase in price level on the purchasing power of Slovak families in 2022 and 2023. This is the first and the only paper that looks at distributional impacts of an inflationary shock in Slovakia. We combine a microsimulation model SIMTASK with the data on expenditure from the Household Budget Survey to quantify the net effect of an inflationary shock together with the cushioning effects of government measures and economic adjustments in the form of inflation-induced wage growth and an additional valorisation of social benefits. We show that in 2022, the government measures were well targeted and succeeded in offsetting a significant part of a purchasing power drop for low-income families. For high-income families, economic adjustments were the crucial component offsetting a significant part of their purchasing power drop. However, the overall net effect on purchasing power was negative (6 % for an average family) and it holds true for each income decile and family type. The story is different in 2023. It turns out that despite the high inflation, the macroeconomic adjustment hand in hand with adopted government measures, including a generous price cap on energy prices, more than compensate for the effects of unexpected inflation (3 % increase for an average family). This holds true for all analysed income categories, except for the lowest income decile. When looking at family types, the best off are families without children, often consisting of pensioners.

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## Threshold networks in credit risk models: an application on P2P markets

Tomáš Výrost

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P2P lending markets offer risky investment opportunities where accurate credit risk models are in high demand. Publicly available loan books might offer a broad spectrum of loan and borrowers' characteristics that lead to high-dimensional systems that make the usage of traditional credit scoring models challenging. The purpose is to explore whether complex relationships between risky assets (loans) can be identified via threshold feature-based networks. More specifically, adjacency matrices are created using heterogeneous distance measures, and networks are built with the  $\alpha$  threshold approach. Topological properties are extracted as loan-based features to augment credit risk models. A statistical comparison uncovers the most promising network-based features for improving credit risk models.

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## To What the Extent the Geopolitical Events Influenced the Crude Oil Prices during the period 2000-2019: An Application of ARDL Model

Saleh Mothana Obadi

Co-autor: Matej Korček

This paper aims to explore the short-run and long-run relationship between geopolitical events and crude oil prices for the period 2000–2019. In addition to geopolitical events, we included the market factors whose data were available in the right part of the equation. To investigate long-run cointegration, this paper used quarterly data and employed the Autoregressive distributed lagged (ARDL) bounds testing approach. Study findings from the ARDL bound testing approach confirm the existence of a long-run and short-run association between geopolitical events and crude oil prices. Furthermore, the findings from the ARDL model revealed that world crude oil production; OECD's crude oil stocks, and Chinese GDP growth have a significant effect on the dependent variable (crude oil prices) both in the long run and short run. The unexpected results of the model denote an insignificant effect of OECD economic growth (but explainable) and Indian economic growth on the movement of world crude oil prices.

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## Tracked and Segregated: The Effect of Early Informal Within-School Tracking in Schools with Students with Low Socioeconomic Status or Roma Ethnicity

Miloslav Bahna

Co-autor: Terézia Tomášchová

While between-school tracking has been a well-explored topic especially with countries tracking their educational systems as early as at the age of 10, within-school ability grouping has received comparatively less analytical attention. This paper explores effects of within-school informal tracking practices at socioeconomically and ethnically mixed elementary schools. In Slovakia, where these practices were previously described as linked to segregation of Roma students, they result in academically, socioeconomically and ethnically distinct separate classes in a school. We try to identify the early tracking practices of schools by exploring if two or more classes included in the TIMSS 2019 assessment in a particular school display extreme differences with regard to ethnic (Slovak vs. Roma) or socioeconomic (defined by parental education levels or occupation) composition. We employ a series of hierarchical linear models to assess the impact of early within-school informal tracking on mathematics and science test results of students from low-track classes. We check the robustness of our findings in a parallel propensity scores approach. Our results confirm that class-level segregation seems to have a very significant connection to academic performance of students from low-track classes. When compared to identical students from non-tracked classes, students from low-track classes have more than 15% lower test scores in mathematics and science. This points to the need to further explore early informal within-school tracking practices which have so far escaped analytical attention. While not a topic of cross-national assessment programs per se, this can be done using data from major international assessments.

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## What Makes Life More Expensive for Consumers? Disentangling the Sources of recent inflation hikes in Slovakia

Dávid Hojdan

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Contrary to the pre-Covid-19 and post-Great Recession periods, where a significant part of mainly advanced economies had experienced low growth and low inflation macroeconomic landscape, there has been a dramatic shift in the Covid-19 period that has brought a remarkable hikes in inflation rate while economic growth has remained largely sluggish. In this work, we estimate the causes of recent inflation spikes and quantify the contributions of individual factors of production, imported consumption and profits to CPI inflation in Slovakia. This is done using the methodology of Dhingra (2023). The results seem to suggest that firm's excessive profit, input prices and imported inflation seem to be the most profound explanation for overall rising inflation during the recent period.

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## ...and the Winner Is: Consumption

Karol Morvay

The parameters of consumption and investment in Slovakia have been moving in a significant mismatch in the last decade. Investment dynamics have moderated to such an extent that it disputes the prospects for further real convergence. At the same time, household consumption has expanded, even in turbulent moments. Economic policy has fared better in maintaining household consumption levels than in promoting investment. This setting raises concerns about long-term growth and competitiveness.

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