

*New Frontiers in Economic Research**

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Governor Mr Ahmed Munawar, Maldives Monetary Authority (MMA), Dr Mahamood Shougee, Chancellor of the Maldives National University, Mr Ahmed Imad, Deputy Governor, MMA, other senior colleagues of the MMA, distinguished presenters and panelists and participants, ladies and gentlemen, good morning to all of you.

It is an honour for me to be invited to give the keynote address at this two-day Annual Research Conference of the MMA that is aptly themed: Advancing Economic Research: Policy and Innovation for a Sustainable Future. The impressive line-up of papers to be presented in the conference will shine light on to this topical theme. In my address today, I wish to focus on some new frontiers in economic research and their relevance for policy making globally, but with a focus on the Global South.

Economic inquiry is characterised as the spirit of exploration in a continual quest to understand the invisible hand that transforms livelihoods, shapes societies, and defines humanity's aspirations. In that sense, economists have always been cartographers of unyielding trade-offs and impossible trinities in their profession of studying mankind in the ordinary business of life, as Alfred Marshall famously defined economics. The lives of economists are complicated by the fact that underneath their feet, the ground is always shifting and reshaping economic constructs, information stocks and flows, and available tools. Today, we stand on the cusp of an era being redefined

as much by the boundless possibilities of technology and innovation as the risks of climate change and deglobalisation. For the economics profession, therefore, as the Greek philosopher Heraclitus remarked, "*Change is the only constant.*"

Our research has to adapt not only to today's tectonic shifts but also to new frontiers to be traversed tomorrow. Against this backdrop and in the interest of time, I will focus on four emerging areas of research that, I believe, will redefine human behaviour and hence economic research.

I. Redefining Technology Shocks in Economic Models

The rapid spread of digitalisation has been transformative, reshaping the way we live and work, the interactions between economic agents, production processes and market structures. Digitalisation can be regarded as a long-term technology shock impacting economic growth, productivity, labour markets, older technologies and inflation. It is estimated that the global digital economy already accounts for more than 15 per cent of global GDP.¹ Generative artificial intelligence (Gen-AI) alone is projected to boost global GDP by \$7-10 trillion over the next three years.² To capture these evolving dynamics, empirical research methodologies must evolve to be able to understand and assess the underlying relationships and implications.

Despite the potential of digital technologies to drive productivity through efficiency, growth has consistently fallen short of expectations. This has given rise to antithetical scenarios of slow innovation diffusion.³ Recent studies have deepened the debate, highlighting the uncertainty around AI's impact on

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¹ United Nations. (2023). Opening Session of Global Development Initiative Digital Cooperation Forum.

² JP Morgan. (2024). *Is Generative AI a Game Changer?*

³ Brynjolfsson, E., and McAfee, A. (2014). *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. WW Norton & Company; Haldane, A. (2017). *Productivity Puzzles*. Speech at the London School of Economics; Summers, L. H. (2013). Speech at the IMF 14th Annual Research Conference in Honor of Stanley Fisher. International Monetary Fund, 8.

productivity and economic growth.⁴ This productivity puzzle could be pointing to research gaps in growth decomposition models as well as in the received wisdom in explaining sectoral productivity shifts and the distributional effects of technology shocks across regions and income groups.

Digitalisation's long-term impact on employment appears benign so far, but its disruptive effects on labour markets have drawn considerable attention.⁵ Population ageing may further accelerate adoption of digital technologies. With AI set to affect 40 per cent of global jobs, education, retraining and social safety nets will be crucial.⁶ Within central banks too, recruitment and retention of FinTech talent are becoming major challenges, with 64 per cent struggling to recruit and 68 per cent facing retention issues.⁷ The ambit of research need to expand to examine digitalisation-driven labour reallocation, job-matching efficiency, new vistas of job creation such as in data science, and digitalisation's role in boosting female workforce participation through remote-friendly jobs.

Digitalisation's impact on economic variables relevant to monetary policy requires close monitoring, particularly its effect on inflation due to differences between online and offline prices, potentially steepening the Phillips curve, and hence, warranting a reassessment of traditional inflation models.⁸ Research interest is being drawn to examining how financial innovations like digital payments, FinTech, central bank digital currencies (CBDCs) and AI can reshape monetary policy transmission and affect financial stability. Dynamic

methods and big data analytics like web-scraping, text mining, large language techniques and machine learning frameworks (e.g., tree-based models and neural networks)⁹ are becoming vital for macro-financial analysis and monetary policy tech.

II. Climate Change and Macroeconomic Stability

Climate change is manifesting itself at an alarming scale and pace globally. It is affecting growth and price stability through supply shocks such as food and energy shortages and through a decline in productive capacity. Recurrent climate-related shocks are leading to inflation volatility, unanchoring inflation expectations. Demand shocks also arise due to the loss of wealth of firms and households on account of frequent natural disasters, with attendant financial stability risks. Physical and transition risks can affect the balance sheets of financial institutions and banks, limiting the flow of credit to the real economy. In fact, transition risks can operate through multiple channels, exacerbating traditional risks in all categories, including credit, market, liquidity, operational and reputational risks for banks and financial institutions. Mitigation and green transition policies such as carbon pricing can also affect price stability, potentially precipitating large and long-lasting movements in relative prices and shifts in trend inflation. Depreciation pressures on currencies of countries frequently affected by climate disasters can also cause financial instability, higher import costs and negative terms of trade.

The range of policy options available to mitigate climate risks require dedicated research, especially in the context of the complex, non-linear ways in which climate, the real economy, financial systems and markets interact and affect each other. Improved

⁴ Goldman Sachs. (2024). Gen AI: Too Much Spend, Too Little Benefit Report.

⁵ ECB. (2021). Digitalisation: Channels, Impacts and Implications for Monetary Policy in the Euro Area.

⁶ IMF. (2024). *Gen-AI: Artificial Intelligence and the Future of Work Report*.

⁷ 33 banks participated in the survey. Source: Central Banking Institute. (2024). Fintech Benchmarks 2024 - The Promise and Threat of AI.

⁸ Ari, M. A., Garcia-Macia, M. D., & Mishra, S. (2023). Has the Phillips Curve Become Steeper? IMF, WP/23/100.

⁹ *Tree-based methods* are flexible machine learning algorithms that can tackle a wide range of tasks. *Decision trees* group individual data points by sequentially partitioning data into finer categories according to specific characteristics of interest. *Neural networks'* main building blocks are *artificial neurons*, which take multiple input values and transform them in a non-linear way to output a single number – like logistic regressions. Source: BIS. (2024). Artificial Intelligence in Central Banking.

inter-disciplinary macroeconomic modelling is becoming crucial for understanding directions of causality and feedbacks.

III. Globalisation and the Natural Rate of Interest

Monetary policy making has evolved in line with structural changes in the economy and the financial system. Inflation targeting (IT) – the longest surviving modern monetary policy framework - is no exception. This could be attributed to the 'rule-based' principle built into the framework alongside elements of "flexibility" that have evolved in practice. It has been argued while the application of a core set of "scientific principles" has expanded significantly in practice, there remains, and will likely always remain, elements of art in the conduct of monetary policy¹⁰.

One principle followed by central banks in setting policy rates is the natural rate of interest – popularly known as R-star. It is a theoretical benchmark for monetary policy, reflecting the real interest rate that supports the economy at full employment while keeping inflation low and stable. This concept of R-star or the natural rate dates back to 1898¹¹ and currently forms an integral element of modern macroeconomic frameworks. It is argued in a seminal work that "a central bank should seek to close the gaps between actual economic conditions and the economy's potential for output and employment (y-star and u-star, respectively) as well as the gap between the actual real interest rate and the natural rate (R-star), all at the same time to obtain an optimal outcome".¹² The problem is that R-star or any of the other stars in that formulation are fundamentally unobservable. Formal efforts to estimate the value of

R-star¹³ have been refined over the years in terms of estimation approaches as well as by accounting for structural changes and country-specific features.

It is widely believed that historically, R-star has declined, especially in advanced economies, due to factors like aging populations, lower productivity growth, and excess global savings. More recently, however, the view gaining ground is that post-pandemic dynamics – in particular, overlapping shocks - have reversed some of these trends. This is observed, for instance, in the real time measure of R-star released by the New York Fed on its website¹⁴. A better understanding of the reasons behind the post-pandemic reversal and this recent disconnect from history will be useful for monetary policy setting in an uncertain future.

Global economic conditions add complexity to an accurate assessment of R-star. Advanced economies face sluggish growth amidst changing labour market dynamics, stubborn services inflation, and fiscal policy uncertainties, all of which could be imparting upsides to R-star. Emerging and developing economies may be experiencing upward pressure on their R-stars due to stronger economic activity and investment as well as productivity differentials. They, however, face challenges from geo-economic fragmentation and geopolitical uncertainty as well as global supply chain disruptions and financial market volatility. Central banks across the globe are therefore, reassessing how these global factors could be driving shifts in R-star to ensure that monetary policy remains effective in an interconnected world.

IV. Consumption Patterns and their Economic Impact

The rapid progress in information and communication technology (ICT) is contributing significantly to shortening the 'space-time flow' of

¹⁰ Mishkin, Frederic S. (2007). Will Monetary Policy Become More of a Science? *NBER Working Paper 13566*, October.

¹¹ Wicksell, K. (1936). Interest and prices. Ludwig von Mises Institute.

¹² Woodford, M. (2003). Interest and Prices: Foundations of a Theory of Monetary Policy, Princeton University Press.

¹³ Laubach, T. and Williams, John C. (2003). Measuring the Natural Rate of Interest. *Review of Economics and Statistics*, November, Vol. 85, No. 4, pp. 1063-1070.

¹⁴ <https://www.newyorkfed.org/research/policy/rstar>

circulation of capital – allowing it to move faster and grow larger.¹⁵ The growing usage of digital financial platforms and tools is also shaping the behaviour of households in multifarious ways.

First, with the proliferation of digital products and social media platforms, there has been a marked shift from in-person shopping to online shopping. E-commerce is growing rapidly, with online sales accounting for a significant portion of retail sales in many countries. The pandemic gave a distinct push to online shopping, which has sustained its growth momentum even in the post-pandemic period. In 2023, e-commerce accounted for over 19 per cent of retail sales worldwide. Forecasts indicate that by 2027, the online segment will make up close to a quarter of total global retail sales.¹⁶ The global annual retail e-commerce sales growth is projected to reach 9 per cent in 2024 from 6 per cent in 2022.¹⁷ This rise of e-commerce has also led to a shift in favour of digital goods and services.¹⁸ To illustrate, the global number of users of video streaming services has increased from 0.6 billion in 2017 to 1.4 billion in 2024, with a similar uptrend seen for music streaming and digital news services.¹⁹

Secondly, the proliferation of digital consumption has also been accompanied by a shift in saving and investment decisions such as online brokerage accounts, robo-advisors, investment apps and the like, as they are easier, faster and more informed. Digitalisation has also influenced borrowing patterns of households, with greater and easier access to fintech companies for digital loans, and by reducing information asymmetries through a wide range

of sources, including tax returns, electronic toll collection, and bill payments.²⁰

At the same time, these newer technologies pose challenges for monetary and regulatory policy formulation. First, the shift from traditional modes of savings can affect the transmission of monetary policy impulses to the real economy.²¹ Second, central banks need to be vigilant about the possibilities of debt escalation and risk build-up at the household level.²²

Third, there is evidence to suggest that the buy-now-pay-later and credit card-based spending can facilitate immediate consumption, especially for younger generations and lower their savings.²³ Fourth, there can be concerns of mis-selling of financial services to households due to poor digital financial literacy.²⁴

These shifts in consumer behaviour may require central banks and policymakers to transition from traditional macroeconomic models to agent-based modelling, integration of behavioural economics, nowcasting, policy simulations and advanced liquidity stress tests. They also need to equip themselves with cutting-edge computational tools like machine learning and big data analytics to examine the real-time, high-frequency data received from digital platforms.

V. Conclusion

As we journey towards new frontiers of economic research, I am reminded of the words of

¹⁵ Digital financial system allows more and larger transactions to be completed in a shorter period. Paraná, Edemilson. 2018. *Digitalized Finance: Financial Capitalism and Informational Revolution*. Leiden and Boston: Brill.

¹⁶ eMarketer; Statista.

¹⁷ eMarketer; Statista.

¹⁸ International Monetary Fund (IMF). 2020. *World Economic Outlook: A Long and Difficult Ascent*. October 2020.

¹⁹ Statista Market Insights.

²⁰ International Monetary Fund (IMF). 2020. *Global Financial Stability Report*. October.

²¹ Beck, T., Cecchetti, S. G., Grothe, M., Kemp, M., Pelizzon, L., & Serrano, A. S. 2022. Will video kill the radio star? Digitalisation and the future of banking. European Systemic Risk Board.

²² Pengpeng, Y., Korkmaz, A., Zhichao, A. and Haigang Z. 2022. The rise of digital finance: Financial inclusion or debt trap? *Finance Research Letters*. 47(Part A).

²³ Cornelli, G., Gambacorta, L. and Pancotta, L. 2023. Buy now, pay later: A cross country analysis. *BIS Quarterly Review*, December 4, 2023.

²⁴ Morgan, P., Huang, B. and Trinh, Long. 2019. The need to promote digital financial literacy for the digital age. Policy Brief under T20 Japan Task Force 7. March 31, 2019.

John Maynard Keynes: *"The difficulty lies not so much in developing new ideas as in escaping from old ones"*.

Economic research is like exploring a dense forest: each new finding clears a path, but also reveals deeper mysteries. As we prepare, like the starship Enterprise, in the famous sci-fi television series Star Trek, to boldly go where no man has gone before, I am reminded of the words of T.S. Eliot: 'Only those who will risk going too far can possibly find out how

far one can go'. In recent years, economic research is increasingly being equipped with multi-disciplinary frameworks, forward-looking and computationally intensive analytical tools, and high dimensional data. So let us venture into the unknown with a commitment to redefine what is possible, to make the complex comprehensible, and to transform our understanding of the forces that shape human experience.

Thank you.