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MACRO RESEARCH FOR DEVELOPMENT
An IMF-FCDO Collaboration

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Published Paper: Political Institutions and Output Collapses

Patrick Imam and Jonathan Temple published a paper titled "Political Institutions and Output Collapses" in the *European Journal of Political Economy*. This study examines whether major output collapses are more likely to occur under autocratic regimes. Using data from 123 developing countries over the period 1971–2016, the authors model the joint evolution of output growth and political institutions as a finite state Markov chain with a two-dimensional state space. The analysis focuses on how countries move between states.

The findings suggest that growth is more likely to be sustained under democratic regimes than under autocratic ones. Under autocracy, stagnation is more likely to lead to output collapses and output collapses are more likely to deepen. Overall, democratic countries appear to be more resilient in maintaining economic stability. The study highlights the potential benefits of democratic governance in mitigating severe economic downturns.

Working Paper: Productive Capacities, Economic Vulnerability, and Growth Volatility in Sub-Saharan Africa

In August 2024, Aminou Yaya published a paper titled "Productive Capacities, Economic Vulnerability and Growth Volatility in Sub-Saharan Africa" as part of the IMF Working Paper series. Sub-Saharan Africa (SSA) countries, like most developing nations, face significant challenges in achieving strong, sustainable, and inclusive growth. Many of these challenges stem from high levels of economic vulnerability to numerous simultaneous shocks, including the Covid-19 pandemic, climate change, and armed conflicts. This underscores the need to study policies and strategies for enhancing economic resilience to shocks.

This paper analyzes the impact of productive capacities on the volatility of economic growth in SSA under conditions of significant vulnerability. The study covers the period 2000-2018 and includes 43 SSA countries. Using the Generalized Method of Moments (GMM), the results show that economic vulnerability contributes to growth volatility in SSA. However, this effect varies depending on the performance of productive capacities. Countries with high productive capacities have greater opportunities to mitigate the impact of economic vulnerability on growth volatility. Certain dimensions of productive capacities, such as institutions and information and communication technology (ICT), appear to be more influential than others. The findings provide important recommendations for policymakers regarding these issues.

Working Paper: Mobile Technologies and Productivity among Benin Food Suppliers

The paper, titled "Can Mobile Technologies Enhance Productivity? A Structural Model and Evidence from Benin Food Suppliers", authored by Pierre Nguimkeu and Cedric Okou, examines the factors driving digital technology adoption and its impact on the productivity of small-scale businesses in Africa. Using originally collected survey data from two semi-rural markets in Benin, where grains and legumes are staple foods and one-third of the population has internet access, the authors develop a model to understand digital adoption through mobile broadband.

The findings show that younger, wealthier, more educated suppliers, and those located near other users, are more likely to adopt digital technologies. Adopters conduct 4-5 more transactions per month than non-adopters, increasing trade frequency and amounts by up to 50 percent. While most adopters are women, their productivity gains are lower than those of men. Policy simulations indicate that improving broadband quality significantly boosts both adoption rates and productivity, whereas reducing broadband cost has a moderate effect. Enhancing credit access increases adoption among credit-constrained suppliers.

Working Paper: Knowledge Diffusion Through FDI: Worldwide Firm-Level Evidence

In July 2024, JaeBin Ahn, Chan Kim, Nan Li, and Andrea Manera published a paper titled "Knowledge Diffusion Through FDI: Worldwide Firm-Level Evidence" as part of the IMF Working Paper series. This paper examines the impact of Foreign Direct Investment (FDI) on knowledge diffusion by analyzing the effect of firm-level FDI activities on cross-border patent citations. The authors construct a novel firm-level panel dataset that combines worldwide utility patent and citation data with project-level greenfield FDI and cross-border mergers and acquisitions data over the past two decades, covering firms across 60 advanced and developing countries.

Applying a new local projection difference-in-differences methodology, the authors' analysis reveals that FDI significantly enhances knowledge flows both from and to the investing firms. Citation flows between investing firms and host countries increase by approximately 11-13 percent five years after the initial investment. These effects are stronger when host countries have higher innovation capacities or are technologically more similar to the investing firms. The authors also uncover knowledge spillovers beyond targeted firms and industries in host countries, which are particularly pronounced in sectors closely connected in the technology space.

Country Application: DIGNAD Application to Tanzania in the Context of the RSF

On June 25, 2024, in the context of the Resilience and Sustainability Facility (RSF), the IMF published a Staff Country Report for Tanzania, featuring the Debt, Investment, Growth, and Natural Disaster (DIGNAD) model, an FCDO-financed product. The report includes several scenario simulations that illustrate Tanzania's vulnerabilities to climate change and the benefits of ex-ante adaptation investments on key macroeconomic variables (see Annex IV of the report for details).

The results demonstrate that investing in adaptation infrastructure can improve Tanzania's economic resilience against natural disaster shocks, limiting post-disaster economic losses, recovery costs, and increases in public debt. Additionally, reforms that enhance public investment efficiency and domestic resource mobilization can further amplify the benefits of adaptation investments and strengthen long-term debt sustainability.

Workshop: Modelling Climate Risks and Policies

From July 22 to 26, 2024, a workshop on Modelling Climate Risks and Policies was held in Johannesburg, South Africa, featuring training on climate-related tools, including the Debt, Investment, Growth, and Natural Disaster (DIGNAD) model, an FCDO-financed product. The event was organized in collaboration with the IMF's Institute for Capacity Development (ICD), the Research Department (RES), and the Fiscal Affairs Department (FAD). The workshop, requested and hosted by the South African Reserve Bank, provided hands-on training with Excel-based tools and models to integrate and assess climate considerations in policy formulation.

Nearly 40 participants attended, including 24 from the Regional Capacity Development Center for Southern Africa (AFRITAC South – AFS) countries, which include low-income countries such as Comoros, Lesotho, Madagascar, Mozambique, Zambia, and Zimbabwe. Participants greatly appreciated the lectures and hands-on practice sessions, with many expressing interest in applying the tools, particularly the DIGNAD model, in their climate policy work.

Workshop: Macro-Climate Modelling with DIGNAD

The Debt, Investment, Growth, and Natural Disaster (DIGNAD) model and toolkit were taught during a virtual workshop at the University Network at SOAS (School of Oriental and African Studies, University of London) from July 29 to 31, 2024. The event aimed to enhance the technical skills of academics and officials in macroeconomic modeling through country cases and hands-on training sessions. Prof. Johannes Pfeifer from the University of the Bundeswehr Munich provided a review of dynamic (stochastic) general equilibrium models as an introduction to the toolkit, focusing on practical applications using MATLAB/Octave. On the following days, Dr. Azar Sultanov from the IMF Research Department and Dr. Vimal Thakoor from the IMF Institute for Capacity Development/Africa Training Institute led sessions on the DIGNAD toolkit, covering its main components, country use cases, model calibration, incorporation of natural disasters, and evaluation of adaptation investments.

The workshop was attended by 35 participants, primarily from academia, but also included policymakers from Zambia, Ethiopia, Tanzania, Nigeria, Uganda, Rwanda, Ghana, South Africa, Kenya, and Jamaica.

Course: Compilation of Macro-Relevant Environment and Climate Change Statistics

From August 19 to 30, 2024, the IMF's Statistics Department (STA) and the Institute for Capacity Development (ICD) jointly organized a course on the Compilation of Macro-Relevant Environment and Climate Change Statistics. A session on the Debt, Investment, Growth, and Natural Disaster (DIGNAD) toolkit, which focused on assessing the macro-fiscal effects of natural disasters and adaptation infrastructure, was a key component of the course.

Attended by 35 participants from 30 countries, including several low-income countries, the course aimed to enhance participants' ability to support climate-relevant discussions and policy decisions by using IMF tools and resources. It covered methods, frameworks, and tools for compiling macro-relevant climate indicators and their application in policy formulation, emphasizing the need for an institutional framework for the climate data ecosystem and the importance of collaboration between agencies at both the national and international levels to ensure the availability of accurate data for climate-related macroeconomic analysis.

FCDO-Supported Research at Peer-to-Peer Workshop for Central Bank Practitioners in CCAMM

The 9th peer-to-peer workshop for central bank practitioners from the Caucasus, Central Asia, Moldova, and Mongolia (CCAMM) was held in Vienna on June 18-19, 2024. The workshop was organized by the International Monetary Fund (IMF), the Swiss National Bank (SNB), the Joint Vienna Institute (JVI), and, for the first time, the IMF's Capacity Development Center for the Caucasus, Central Asia, and Mongolia (CCAMTAC). The event was attended by 27 senior central bank officials from all ten countries of the region, including low-income countries, the Kyrgyz Republic and Moldova, and featured presentations by staff from the IMF, the JVI, and the SNB, as well as contributions from country participants and several external speakers from the Austrian National Bank (OeNB), the Bank for International Settlements (BIS), the European Bank for Reconstruction and Development (EBRD), the European Central Bank (ECB), the National Bank of North Macedonia, and the University of Virginia.

Featuring research supported by the FCDO, staff from the IMF's Development Macro Division discussed geopolitical and economic fragmentation (GEF) and its macroeconomic implications at the global level and specifically for CCAMM. Representatives from Armenia, the Kyrgyz Republic, and Moldova shared their experiences with GEF to date, as well as the policies they are implementing to ensure domestic resilience against heightened geopolitical uncertainty and shifting global linkages.

FCDO-Supported Research Featured at Conference on Globalization and Fragmentation

On July 2nd, 2024, the conference "Rethinking Globalization and Fragmentation: From Regional to Global Linkages" took place in Manila, Philippines, organized by the Asian Development Bank. The event brought together academics, policymakers, and representatives from international organizations with three main objectives: (i) to assess current trends in global and regional integration using the latest measurement frameworks; (ii) to address emerging narratives of geoeconomic fragmentation and discuss the economic implications for Asia and the Pacific; and (iii) to highlight policies for strengthening global and regional integration in response to an increasingly polarized global economy.

Policymakers and experts shared their insights through research presentations and in-depth panel discussions. Featuring FCDO-supported research, staff from the IMF's Development Macro Division discussed the changing global linkages and their implications for Asia and the Pacific region, including LICs.

External Presentation: Regime-Switching Factor Models and Nowcasting with Big Data

On June 25th, 2024, Omer F. Akbal presented the working paper "Regime-Switching Factor Models and Nowcasting with Big Data" at the 2024 Annual Conference of the International Association for Applied Econometrics (IAAE) in Thessaloniki, Greece. This paper contributes to the literature by proposing an estimation methodology that can be applied to various policy-oriented studies. A key aspect of the project is the simultaneous estimation of recession probabilities and real production estimates – factors of particular relevance to developing and low-income countries, where timely economic insights are crucial for informed decision-making.

While existing literature has recognized the improved performance of nowcasting models under regime-switching, this paper demonstrates that nowcasting performance particularly improves when key economic indicators are released. The initial application of this methodology uses U.S. data due to its broad representativeness, but the toolkit is sufficiently adaptable to be applied to low-income and developing economies. Future applications to these economies will be reported as they develop. This innovative approach could assist economists and policymakers with more accurate and timely evaluations of overall macroeconomic conditions.

External Presentation: Capital Inflows and Technology Diffusion

On June 17th 2024, Gabriela Cugat presented the paper "Do Capital Inflows Spur Technology Diffusion? Evidence from a New Technology Adoption Index" at the Barcelona School of Economics Summer Forum on International Finance and Macroeconomics. This paper, co-authored with Andrea Manera, introduces a novel measure of technology adoption: the Embodied Technology Imports Indicator (ETI), which is available for 181 countries over the period 1970-2020. The ETI measures the technological intensity of imports for each country by utilizing patent data from PATSTAT and product-level trade data from COMTRADE. This index is particularly relevant for developing countries, including low-income countries (LICs), that typically import capital goods.

The paper uses the ETI to assess the relationship between capital flows and the diffusion of new technologies across emerging economies and LICs. Using a local projection difference-in-difference approach, it finds that changes in statutory capital flow regulations lead to a 7-9 percentage point increase in technological intensity over 5 to 10 years. This increase is accompanied by a significant 28-33 percentage point rise in the volume of gross capital inflows, primarily driven by foreign direct investment (FDI), and a 9-12 percentage points increase in the level of real GDP per capita in purchasing power parity (PPP) terms. The evidence presented in the paper highlights capital flow regulations, particularly those concerning FDI, as a crucial factor in promoting technology adoption in developing countries.

Internal Presentation: Upcoming Paper on Foreign Aid and Natural Disasters

On May 28th, 2024, Rabah Arezki and Patrick Imam presented an upcoming paper titled "Foreign Aid and (Big) Shocks: Evidence from Natural Disasters" at a departmental seminar of the Institute for Capacity Development (ICD) of the IMF.

The paper examines the effect of (big) shocks on the allocation of (bilateral) aid, using natural disasters as natural experiments. It finds that aid commitments increase following natural disasters, with humanitarian aid preceding structural aid. However, the effect is quantitatively small, and the poorest countries, or countries experiencing the most severe natural disasters, do not necessarily receive the most aid. The paper finds no evidence that foreign aid commitments are disbursed more rapidly following natural disasters. Further explorations into the factors influencing aid distribution in disaster-affected countries point to the importance of political alignment with (major) donors in recipient countries with low state capacity.