C3A Brazil Online model session (1)

Financial Sector Mitigation and Adaptation Tool (FSMAT)

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Financing needs for the low-carbon transition
THERE IS STILL A HUGE GAP TO REACH NET ZERO EMISSIONS

**Ambition gap:** Though countries have increased their mitigation ambition since the signing of the Paris Agreement in 2015, current NDCs would reduce global GHG emissions by just 11%.

**Policy gap:** In a business-as-usual scenario with no new mitigation policies, global GHG emissions are projected to increase by 4% to 51.5 billion tons in 2030—a rate that would exhaust the carbon budget for 1.5°C by 2035.
THE URGENT NEED TO RAMP UP CLIMATE FINANCE

Financing gap: despite the recent progress in climate finance, we are still falling short of 6.5 trillion USD yearly to make all the required investments consistent with NZE.

Closing the climate finance gap will involve developing a complete battery of financial sector initiatives.

Green Financial Sector Interventions (GFSI)
Some examples of Green Financial Sector Interventions (GFSIs)

Green regulatory policies (GRP)
- Green supporting factor
- Dirty penalizing factor

Green monetary policies (GMP)
- Green collateral framework
- Green QE

Public co-funding of green investments
- Soft loans
- Credit guarantees

Labelling
- Blue and Green Bonds and Loans

Debt for climate/nature swaps
Climate-resilient debt clauses

Ecuador's 'Galapagos Bond' (debt-for-nature swap)
PBoC's green monetary policies
The low-carbon transition entails challenges for EMDEs

- Green investments will bring benefits and costs.
- Even when the net benefits are positive, the costs can generate specific vulnerabilities (i.e., an increase in debt).
- To prevent these vulnerabilities, policy makers could be tempted to delay the transition.

What is FSMAT aiming to?

FSMAT is a tool to evaluate Green Financial Sector Interventions.

What are the dynamic macro-financial implications of GFSI?

How effective GFSI are to help reduce GHG emissions and cushion the effects of climate-related shocks?
GFSI as enablers of the low-carbon transition

Ex: Promoting green loans through a National Development Bank will foster the low-carbon transition, increase output and create new job opportunities.
But GFSI can be self-defeating if not adequately designed and implemented.

However, higher output leads to trade deficit, especially in EMDEs where the low-carbon transition is import intensive. Balance of payments deficits, in turn, might lead to more volatile financial inflows.
Key vulnerabilities and transmission channels captured by FSMAT
Key vulnerabilities and transmission channels captured by FSMAT (fiscal and debt side)

Transmission Channels

- Investments in Mitigation
- Investments in Adaptation and expenditures on reparations

Transmission Channel
Lower fiscal sustainability can constrain access to financing, potentially jeopardizing the required investments.

- Deficit
- Financing needs
- Debt
- Fiscal sustainability
- Country risk
- Interest payments
- Revenue loss
- Environmental Sustainability
Modelling Pillars of FSMAT
Modelling pillars of FSMAT

Stock-Flow Consistency
- Flows affect stocks, which dynamically feed back into the flows.
- Quadruple entry bookkeeping
- Fulfilment of budget constraints.

Real and Financial spheres interdependencies
- The monetary and financial spheres are not just a mirror of the real side of the economy.
- The financial sector is autonomous and produces direct effects on the real side.

Disequilibrium approach
- Disequilibria in real and financial markets.
- Simultaneous price and quantity adjustment, but at different speeds.
- Continuous time modeling

Structuralism
- A country’s economic structure conditions its macroeconomic performance.
- Need to account for these structural features.
- Alternative closures.

FSMAT builds upon a series of preexisting modeling approaches quickly gaining momentum.

Empirical SFC Models
US, Greece, Denmark, France, Argentina, England, Italy, Vietnam

GEMMES Approach
Tunisia, Morocco, Brazil, Colombia, Vietnam, Mexico, India

FSMT 1
Excel static tool for >100 countries
Model Features

- **Disequilibrium approach**
  - Markets, real and financial, simultaneously adjust via price and quantities, but at different speeds.

- **Full integration of the System of National Accounts**
  - The whole sequence from generation of income to the financial account are explicitly incorporated in the model's accounting structure.
  - This allows for the fulfilment of institutional agents' budget constraints.

- **Fully empirical models**
  - Country models are anchored on data, allowing for country-specific structural and institutional parameters, as well as vulnerability measures.
  - Dynamic calibration methods (CMA-ES).

- **Detailed financial sphere**
  - Broad range of financial instruments (at an aggregate level), representing the complexity of contemporary economies' financial dimension.

- **Pragmatic approach to behavioral equation specification**
  - Prioritize the model’s capacity to replicate actual economic dynamics.
  - Importance of equations providing accurate descriptions of agents' decision-making processes.

- **Initially, single-sector economy** (with some sectoral flavor in the different blocks)
FSMAT – End-user experience

**Data inputs**
- Required low-carbon transition investments
- Import propensities
- Total financing needs

**User defines**
- Speed and intensity of the low-carbon transition
- Combination of financing instruments

**Dynamic Macroeconomic stock-flow Consistent Model**

**Output**
- GHG emissions reduction
- Macro-financial performance

Policy decision
FSMAT - Output

Radar charts
Summarize the impact on all variables for a specific point in time

Line plots
Describe the dynamic trajectory of each variable

Global coverage and stock-flow consistent

(Quasi) global coverage: FSMAT 1.0 will cover around 100 EMDEs

Integrated assessment approach with stock-flow consistency

User friendly: easily usable interface to design, analyze and compare different GFSIs
FSMAT Databank
The multidimensional nature of FSMAT requires compiling macroeconomic data from several international databases.

- **WBG World Development Indicators**
  - GDP and components
  - Price indexes

- **IMF Government Finance Statistics**
  - Taxes on income, profits and capital gains

- **UN Data**
  - Inst. sector data

- **ILOSTAT**
  - Employment
  - Income distribution

- **IMF International Financial Statistics**
  - Domestic financial assets and liabilities
  - Interest rates

- **IMF Balance of Payments**
  - External assets and liabilities
  - External transactions

- **IMF Investment and Capital Stock Statistics**
  - Capital stock by institutional sector

- **UNCTAD World of Debt Report**
  - Public debt interest payments
### Tax Information (Firms)

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### Monetary Policy

- **FSMAT data coverage:** an in-depth analysis
Thank you!

Corresponding contacts on FSMAT

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