DESA macroeconomic modelling tool and simulations for SDGs

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Outline

1. Modeling tool and methodology

2. Simulations for Lao PDR

3. Modelling capacity building for Lao PDR
Modelling tool and methodology

• Expanded World Economic Forecasting Model (WEFM-e)

• Assess impact of BRI on economic development of selected countries

• Simulate impact of investments in Infrastructure on income growth, labor market, fiscal sustainability, poverty reduction and so on
World Economic Forecasting Model

- Started linking country models in 1970s (LINK).
- Since 2005, integrated modelling tool covering 176 countries.

- Multi-country forecasting model
- Error-correction principle
- Supply, Demand, Monetary sides
UN World Economic Forecasting Model

- Potential output
- Labor supply
- Exogenous total factor productivity
- Export growth
- Labor participation
- Population
- Output
- Government consumption
- Investment
- Personal consumption
- Output gap
- Inflation
- Exchange rate against USD
- US inflation
- Shares on output
- Output per capita
- Interest rates
- Exports and imports
WEFM - production side

- Potential output growth depends on Trend growth of the Total Factor Productivity (TFP), change in the labor supply (labor force projection) and growth of exports

\[ \Delta YFT_t = \alpha [\Delta LFN_t + \Delta TFP_t] + (1 - \alpha) \Delta XTR_t \]

- Trend growth of TFP depends on TFP growth itself with an error term guarantying that labor productivity does not systematically deviates from the trend growth of TFP

\[ \Delta TFP_t = \psi \Delta TFP_{t-1} + (1 - \psi) \Delta TFP_t + (1 - \psi) \left[ \frac{1}{3} \left( \frac{YER_{t-1}}{LNN_{t-1}} \right) - \Delta TFP_{t-1} \right] \]

- TFP growth is kept constant at 2%, 3% or 4% depending on the level of country development
Changes in WEFM-e

• Create simplified (reduced-form) version of complex non-linear relationships for
  • infrastructure investment and education level in production
  • labor participation based on GDP per capita and education level
  • Poverty reduction
  • Consumption and investment behavior in relation to expected growth and the real interest rate
  • Government debt accumulation and its impact on the country risk premium, real interest rate and the exchange rate with the back loop in private consumption and investment
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Simulations for Lao PDR

• Historical trend of Gov investment – 8% of GDP (2000-2015)

• BRI investment – after MOU with China, committed investment plan (2017-2021), above 8%

• After 2021, back to historical trend

• Medium period projection until 2023
BRI related investment (SDG 9, 11) ...

- Increases in labor force participation and jobs (SDG 8)
- Decreases the gender gap (SDG 5, 8)
- Boosts the productivity growth (SDG 4, 8, 17)
- Leads to a faster output growth (SDG 8)
- Reduces poverty level (SDG 1, 10)
- Has measured impacts of partnerships and debt sustainability (SDG 17)
Future work on WEFM-e

• Environment and other areas

• Data

• Calibrations

• Region-integrated simulations

+ Qualitative studies
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Planned project activities relevant for Lao PDR

• Online access to simulation scenarios at www.brisdgs.org

• Interim report (mid 2019), and final report (mid 2020)

• Regional workshops –Bangkok (Sep 2019), China (early 2020)

• National workshops in other countries - Cambodia, Thailand, Myanmar, Bangladesh, Sri Lanka, and so on (2019-20).

• In-depth training course on modelling tools including WEFM-e (early 2020, Vientiane)
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www.brisdgs.org