

WORLD BANK

Poverty Reduction and Economic Management Unit

Technical Assistance to the Republic of Uzbekistan



Policy Making in an Uncertain Environment:
Building Capacity for Macroeconomic
Analysis and Modelling

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DISCUSSION: MODEL TYPES AND PLATFORMS

■ Model Types:

- “Flow” models, “equilibrium” models, econometric, etc.

■ Model Applications:

- Prefabricated, customized

■ Key Elements of the Models

- Inputs, Outputs, and Platforms (**Software: XLS, GAMS, STATA, etc..**)
- DEMOS (RSMS-X, Fiscal Sustainability, CGE)



MODEL TYPE:


ACCOUNTING FRAMEWORK MODEL

- Link the accounts of the real economy to fiscal monetary and balance of payments accounts
- Provide a framework for looking at the interaction of key economic variables in a consistent manner, but usually assume that output, exports and investment are determined outside model
 - **Advantages:** transparent and ensure consistency of assumptions and economic relationships
 - **Disadvantages:** most key variables are determined outside the model



MODEL TYPE: *INPUT-OUTPUT* MODELS

- Focus on the economic structure and describe the interrelationships between the use of inputs and output produced in each sector.
- These models capture additional “indirect” effects of changes in inputs through the whole production system by using so-called “Multipliers”.
 - **Advantages:** useful for tracing the possible impact of external changes through the production system
 - **Disadvantages:** (i) do not allow for dynamic simulation through time; (ii) weak links to fiscal, balance of payments and monetary accounts; (iii) assume fixed production structure



MODEL TYPE: *COMPUTABLE GENERAL EQUILIBRIUM* MODEL

- Consists of fully articulated accounting and production framework, often driven by relative price changes. Economic theory is imposed upon the observed data.
- But they must also carry significant economic baggage, by requiring that all data complies with the same economic theory.
 - **Advantages:** Can represent complex theoretical structures and can be customized to fit the particular situation.
 - **Disadvantages:** Data-intensive, intolerant to missing data-pieces, even if they are not relevant. Excessively complex and theoretically-challenging, difficult to maintain.



MODEL TYPE: *MACRO-ECONOMETRIC* MODEL

- Combines an accounting framework, with some estimated or imposed behavioral relationships (e.g. determining investment, consumption and imports)
- May include a reduced form of an input-output system.
- Can be customized to the level of detail required or feasible given data availability
 - **Advantages:** (i) flexible and transparent; and (ii) can produce dynamic scenarios over time
 - **Disadvantages:** (i) does not include non-economic variables; and (ii) not necessarily theoretically consistent



MODEL TYPE:

INTEGRATED ASSESSMENT MODEL

- Includes two connected models:
 - ***Physical flow models*** that identify the non-monetary, physical or biological changes that occur when natural resources change as part of the natural mix.
 - ***Macro Economic models*** - selected variables from physical models are used as inputs for these models, to determine the impact upon agriculture and/or industry.
- Exogenous variables in other economic models result from the physical flow models. E.g. agricultural production may depend on climatic conditions in the physical flow model.
- Response by economic actors (investment and consumption) are derived from the physical models – in order to provide what is called an “integrated assessment” of the situation.



MODEL APPLICATIONS:

PRE-FABRICATED MODELS

- These models have been developed in a general form to be applied to many countries, with little change
- Most of the data may already exist on World Bank servers, for WB type models. Full-reprogramming or large changes may be needed in order to correctly answer the problem.
 - **Advantages:** Structured Environment, solid documentation, tested.
 - **Disadvantages:** “Generic” structure may not suit the problem, making changes is difficult or impossible.

... for example

- Fiscal Sustainability Model: computes fiscal balances in the presence of external shocks. Designed for MoF and Planning offices. Single workbook format, with multiple worksheets. Inputs are economic and fiscal variables; output is calculator of revenues and expenditures.



MODEL APPLICATIONS: CUSTOMIZED MODELS

- Adapt methods from other tools into a customized, specific spreadsheet tool designed to provide exact outputs required.
- Relationships are abstracted from economic literature, and incorporated as formulas in the Workbooks.
 - **Advantages:** Simple platform, existing software, easily adapted and disseminated. Results more relevant than with pre-packaged models. Core structure could be adapted from existing model (e.g. fiscal sustainability)
 - **Disadvantages:** Care necessary to ensure theoretical coherence.