

PROCEEDINGS OF THE
INTERNATIONAL WORKSHOP ON

SOCIAL SECURITY REFORM

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SOCIAL SECURITY REFORM

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Chapter 2:

A Way to Formalization

Model-based problem analysis: methods, pitfalls and tools^{*}

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All the presentations delivered during the workshop clearly show that the social security reform (SSR) in Poland and elsewhere can remarkably profit from model-based analysis of various problems that will have to be analyzed in order to implement the reform in a best possible way.

Models would serve various purposes and would be built by different teams composed of experts in related fields. However, there is a lot of experience in model building and analysis, and a number of well tested modular software tools, both in Poland and at IIASA, that can be used for the needs of the SSR.

Methodology of model analysis for decision support has been developed in the last decades based upon experiences from applications in various areas.

Obviously, the models applied to various case studies were different, and the same will apply to models that will be developed to meet various needs of the SSR.

However, there are several guidelines that are common to most of models built for policy analysis and that are easy to be observed during a model specification and that allow for a more complete model analysis.

It is not possible to go into details in such a short contribution therefore I mention only key issues here. A rational model analysis should involve two groups of methods of a model analysis: simulation and optimization.

^{*} Intervention at Panel Discussion.

Social Security Reform: A way to formalization

Both groups of methods should include important extensions developed recently, such as soft simulation, inverse simulation, multicriteria model analysis, soft constraints, etc.

A model developed for such a comprehensive analysis should be composed of the so-called core model (sometimes called substantive model) which should include only logical and physical relations.

The preferential structure of a model user should not be included into the core model (this is one of common pitfalls which typically results in a large set of solutions that is left beyond analysis, typically without any warning for a user). User's preferences should be driving elements of various methods of model analysis.

Modern methods of model analysis aim not at finding a recommended solution (which is a typical pitfall of a traditional, optimization based, decision support approach) but rather at helping a user to learn as much as possible about the problem being modeled and to explore and compare various solutions. Such solutions can be suggested by a user (if he/she is using one of the methods for which inputs are decisions and outputs are consequences).

Multicriteria model analysis offers complementary approach, in which a user specifies goals (in the form of aspiration and reservation levels for each criterion he/she wants to consider) and the software computes decisions which will result in a solution that is as close as possible to specified goals (or uniformly better, if specified goals are attainable).

A combination of various methods from these two groups (sometimes called alternative focused or goal-oriented) provides much better understanding of the problem, offers possibility of exploring and identifying solutions that correspond to various preferences (that are typically remarkably modified during a model analysis) than any of the traditional (simulation or optimization based) model analysis method.

The organizers have asked participants to end-up contributions with "some kind of conclusion".

An outsider like myself should refrain from any sort of recommendations.

My only suggestion for the competent teams who provide expertise for decision makers in Poland is to consider the above mentioned thoughts while new models will be developed.

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