MOSES Modeling Sustainable Economic Systems

- Gives economists a platform to work with environmental scientists to employ state of the art modeling and system theory approaches to formulate and test concrete economic policy and financial instruments for the green economy.

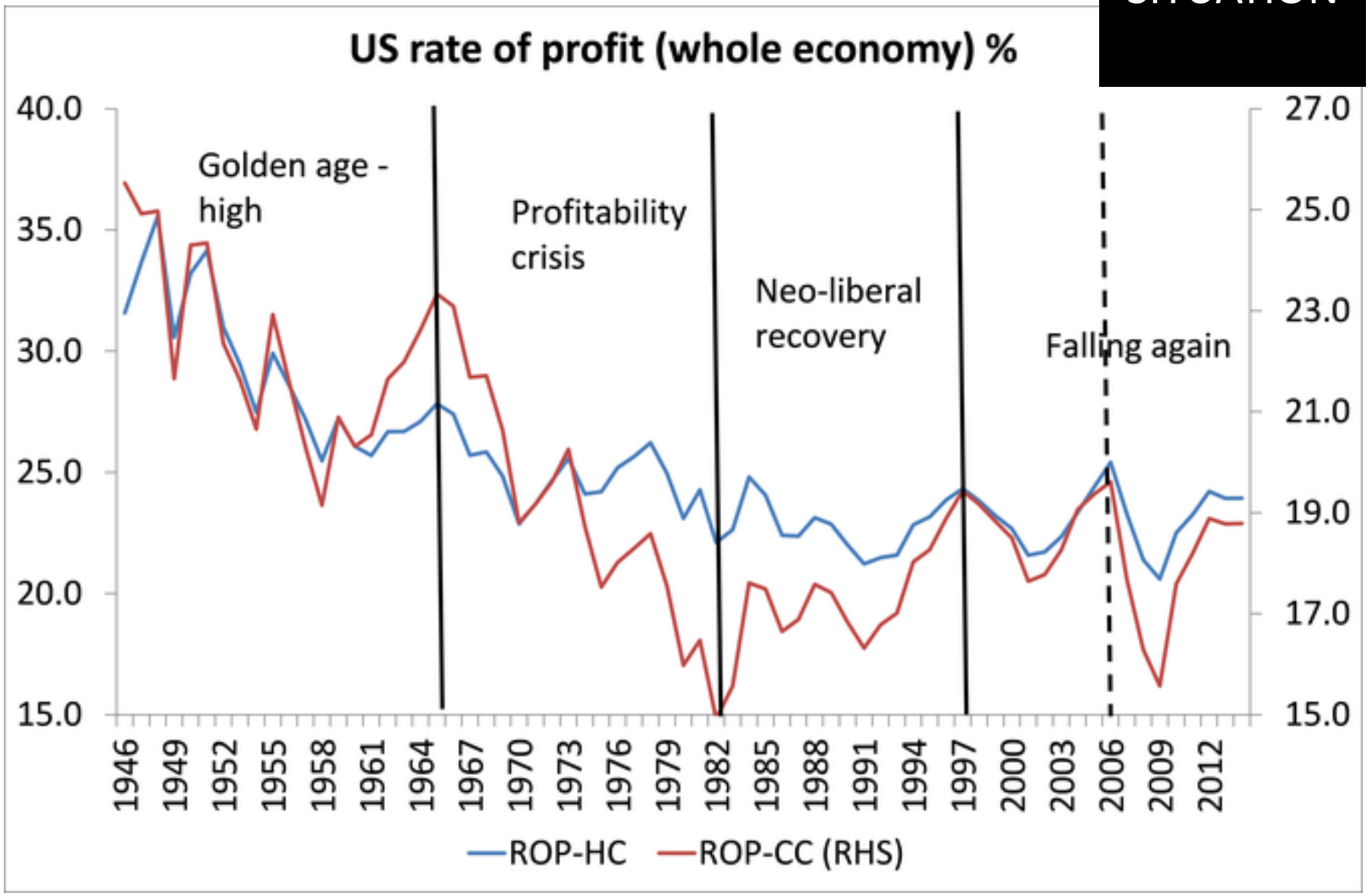
THE SWEDISH SUSTAINABLE ECONOMY FOUNDATION

TSSEF.SE

Need for model argued as

- Situation now
- Problem
- Implication
- Needs
- Possibilities
- Proposed approach
- Benefits

SITUATION


US rate of profit (whole economy) %
Golden age - high
Profitability crisis
Neo-liberal recovery
Falling again
40.0
35.0
30.0
25.0
20.0
15.0
27.0
25.0
23.0
21.0
19.0
17.0
15.0
1946
1949
1952
1955
1958
1961
1964
1967
1970
1973
1976
1979
1982
1985
1988
1991
1994
1997
2000
2003
2006
2009
2012
ROP-HC
ROP-CC (RHS)

SITUATION

- Global Financial Crisis (and its continuing aftermath in Europe) was not anticipated by mainstream economic models

PROBLEM

- The existing financial system has destabilized existing capitalism, could destabilize an ecologically sustainable society, if it is not redesigned to enhance sustainability.

IMPLICATION

NEED

- Among others, the United Nations Environment Programme (UNEP) is calling for a new *Green Economy* that results in improved human wellbeing and social equity, while significantly reducing environmental risks and ecological scarcities.

Why a model is needed

- Current modelling suffers from
  - derived primarily from attempting to replicate the structure of the economy in a set of differential equations
  - Each theory and approach creates its own modelling program. “M&S crisis”: Too many islands of knowledge
  - DSGE (“Dynamic Stochastic General Equilibrium”) modeling ignores exogenous shocks
- A model can test things that cannot easily be tested in real life
  - Market mechanisms adaption to ecological stimuli
  - Speed at which these adaptations occur

NEED

Modelica

- Object based
- Modules
- W3 already available
- W3 is verified

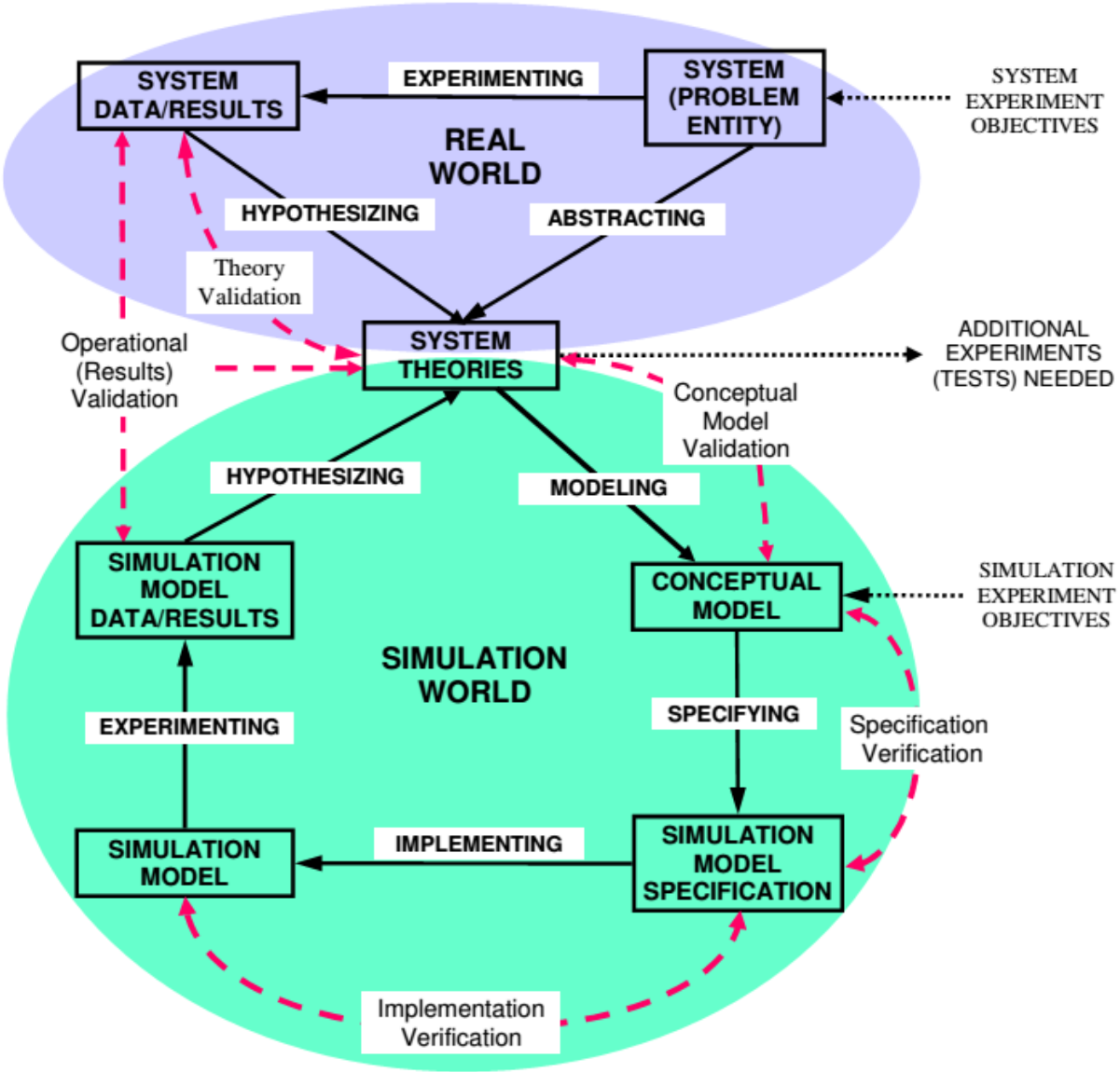
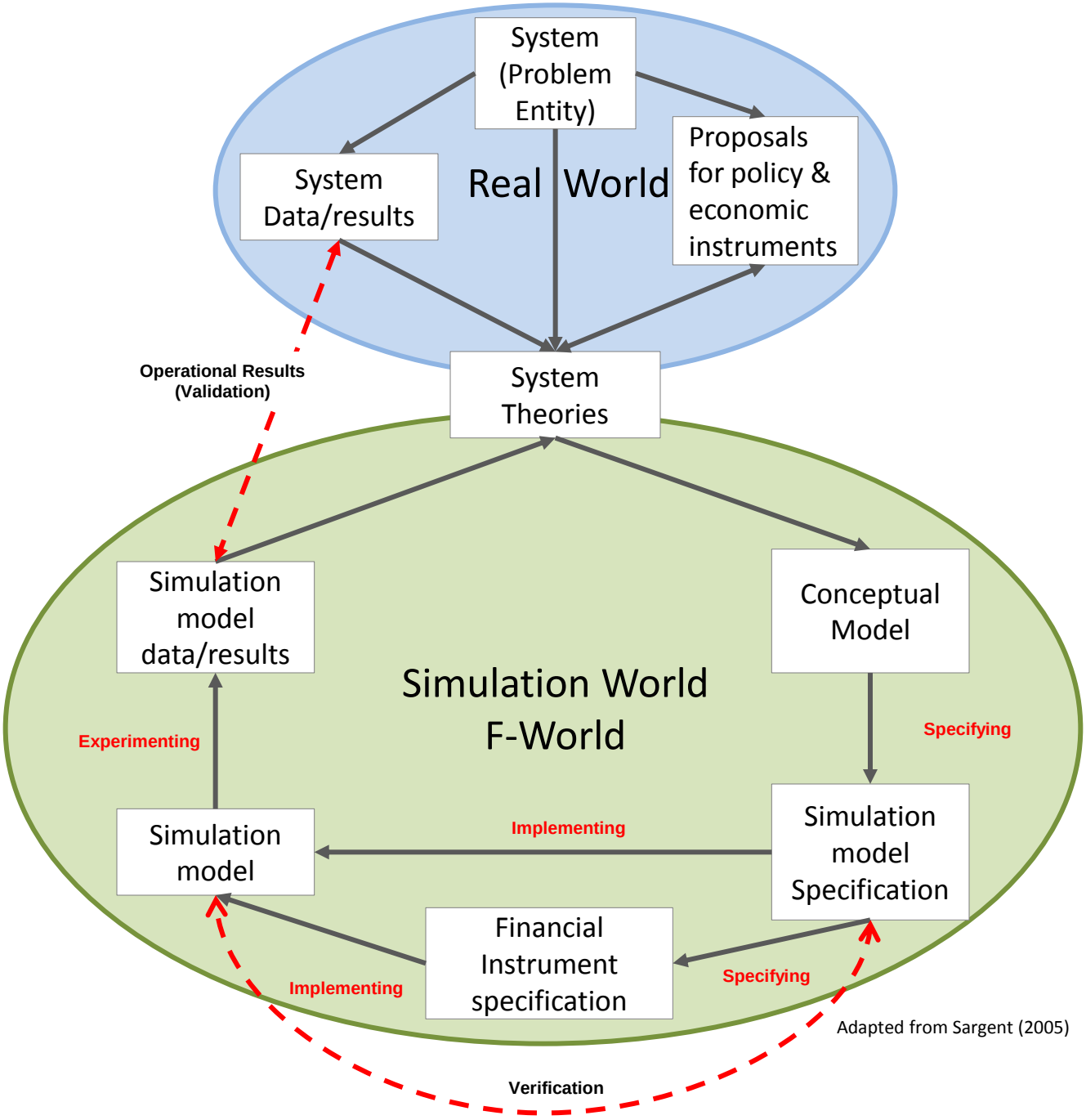


Figure 3: Real World and Simulation World Relationships with Verification and Validation



Adapted from Sargent (2005)

Proposal Feature	Benefit
Model of economy and Resources	Fills gap in academic and policy toolbox Means rigorus testing otherwise difficult
Modelica language Modelica is modular	Covers many applications Specific modules can be made for various functions
Based on W3	Specified and verified, verifiable
Models financial and policy instruments with resources	Fills gap with current models
Based on Sargent	Scientific rigour