



# **MASON AfriLand: A Regional Multi-Country Agent-Based Model with Cultural and Environmental Dynamics**

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# *Primary Research Topics*

## ◆ Conflict Propagation

- ◆ Multiple countries
- ◆ Diverse ecological zones
- ◆ Unique and overlapping societal stress

## ◆ Foreign and International Feedback

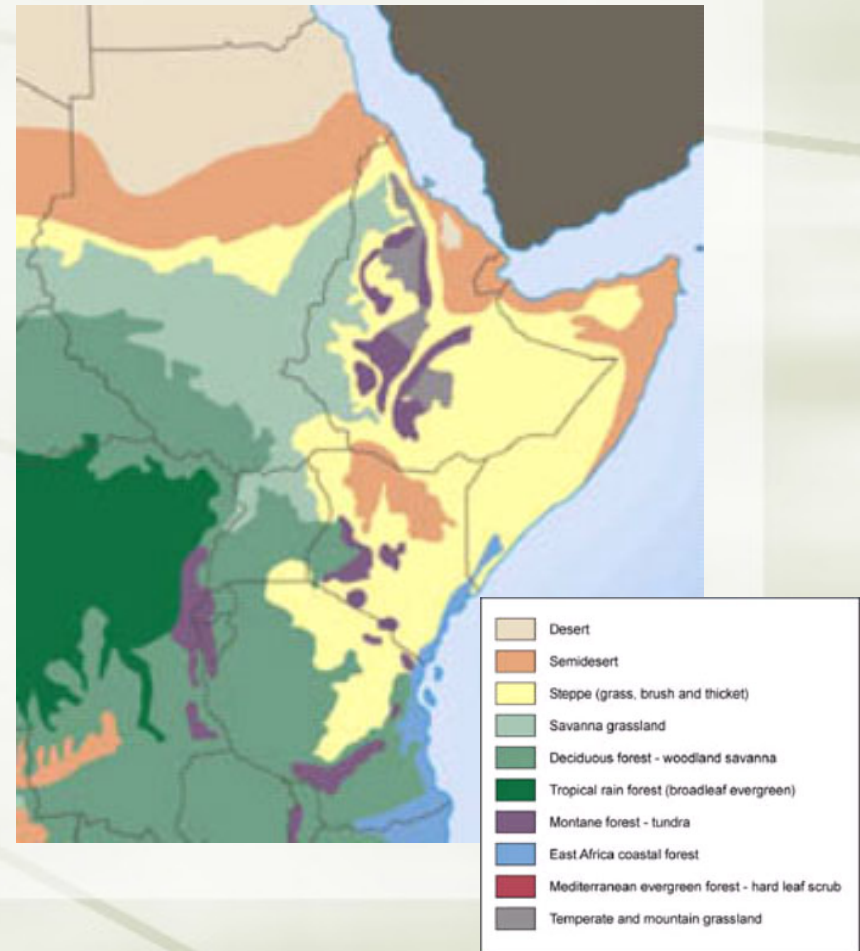
- ◆ Internal v. external dynamics
- ◆ Trans-border effects
  - ◆ Refugee crises
  - ◆ Natural disasters
  - ◆ Boundary disputes



# *Theoretical Overview*

- ◆ Ward (1992): Two Locales of Conflict
  - ◆ 1) Regions governed by non-state actors
  - ◆ 2) Regions where states have lost legitimacy
- ◆ JPR (1998): Scarce Resources
  - ◆ Government control
  - ◆ Government capacity
- ◆ Leutloff-Grandits (2005): Property
  - ◆ Social property
  - ◆ Privatization

# *Focus on East Africa*





# *Prior Modeling Efforts*

## ◆ Single Polity Models

- ◆ Iruba (Doran 2005)
- ◆ MASON RebeLand (Cioffi-Revilla & Rouleau 2009)
- ◆ Bhavnani et al. 2008
- ◆ Bennet 2009

## ◆ World System Models

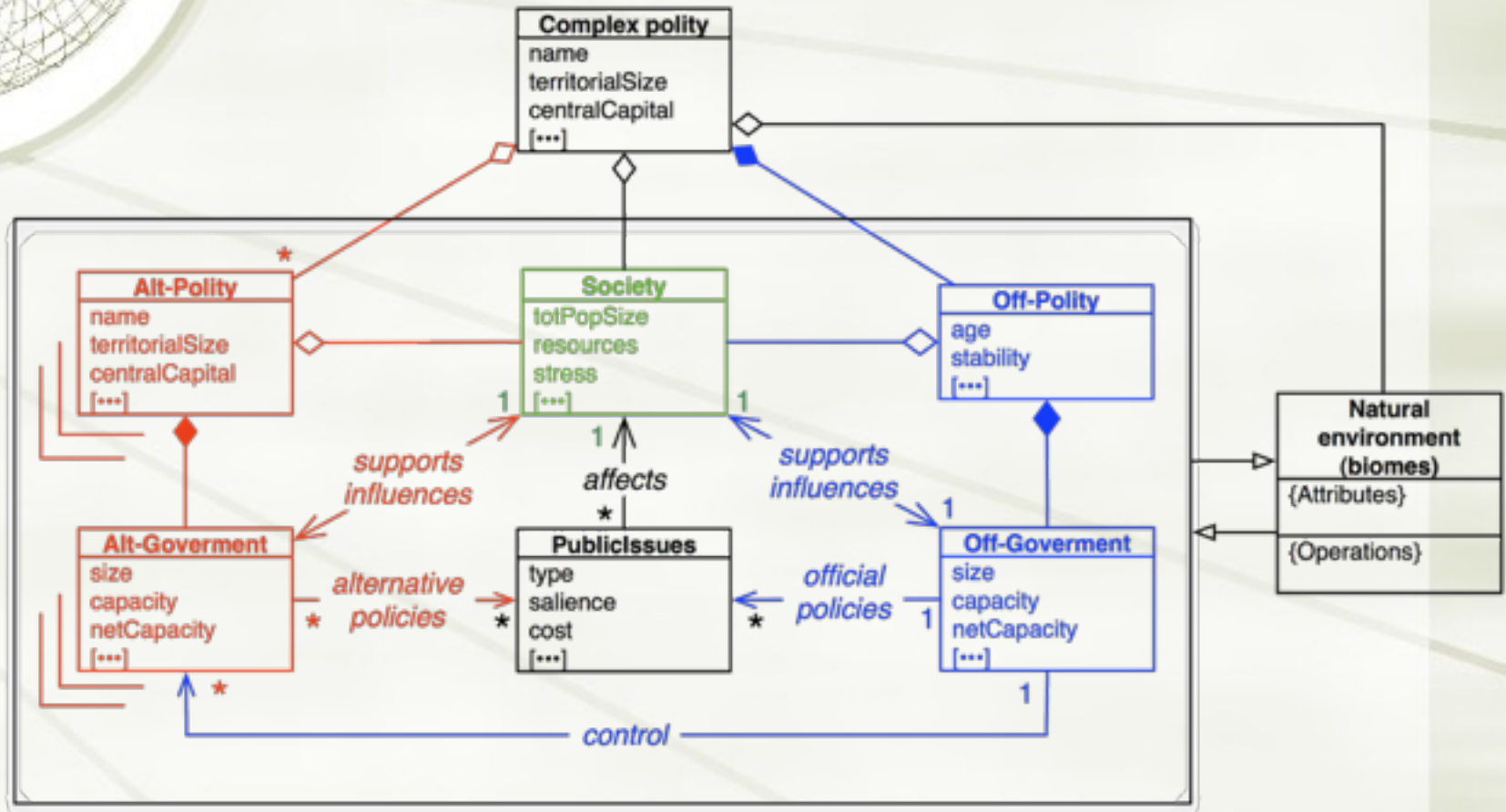
- ◆ “Chicken Wire” (Cusak & Stoll 1990)
- ◆ GeoSim (Cederman 2003; Cederman & Girardin 2007)
- ◆ MASON InterHex (Cioffi-Revilla & Balan 2006)
- ◆ AWorld System (Min et al. 2009)



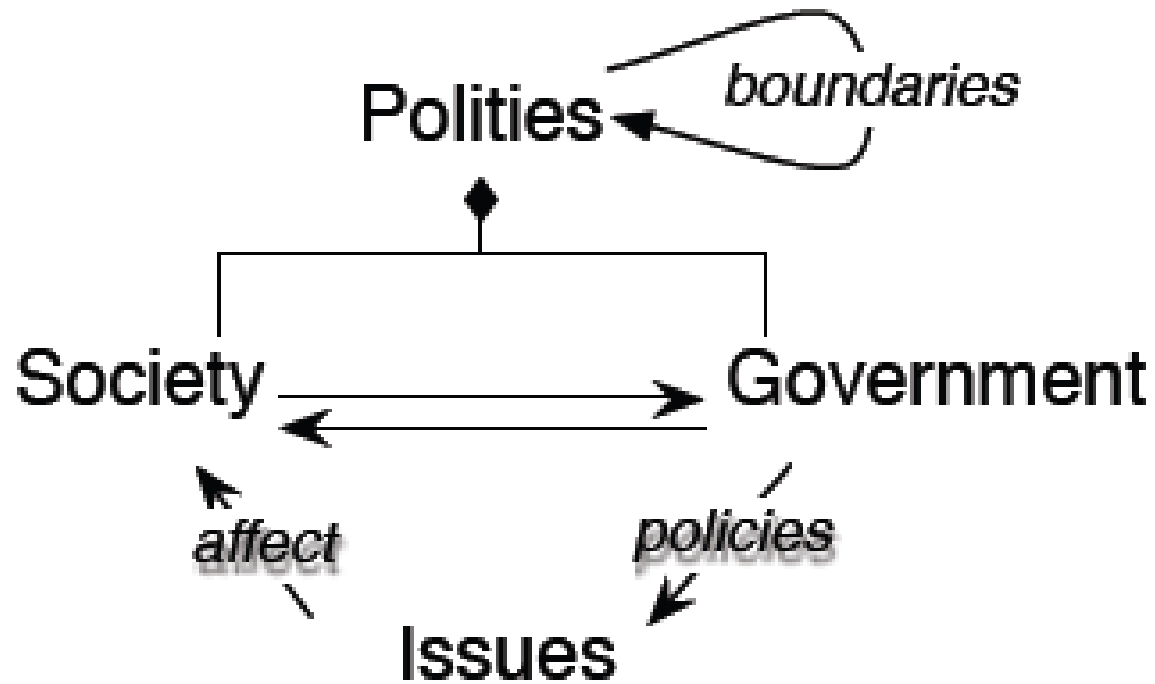
# *Model Framework*

- ◆ Spatially Situated
  - ◆ Heterogeneous ecologies
  - ◆ Border zones
- ◆ Politically-Grounded Governance
  - ◆ Real world relevance
  - ◆ Policy driven focus
- ◆ Emergent Regional Phenomena
  - ◆ “Bottom-Up” dynamics
  - ◆ No hard-wiring
- ◆ Analogue to Empirics
  - ◆ Border dynamics

# Real World Complexity

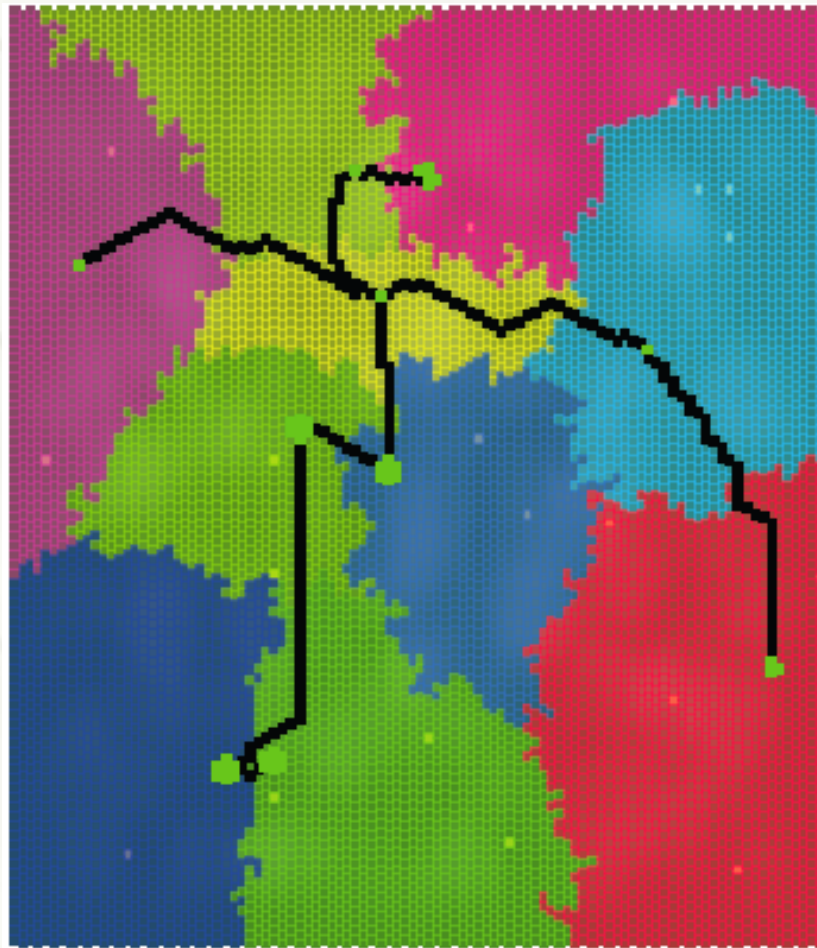


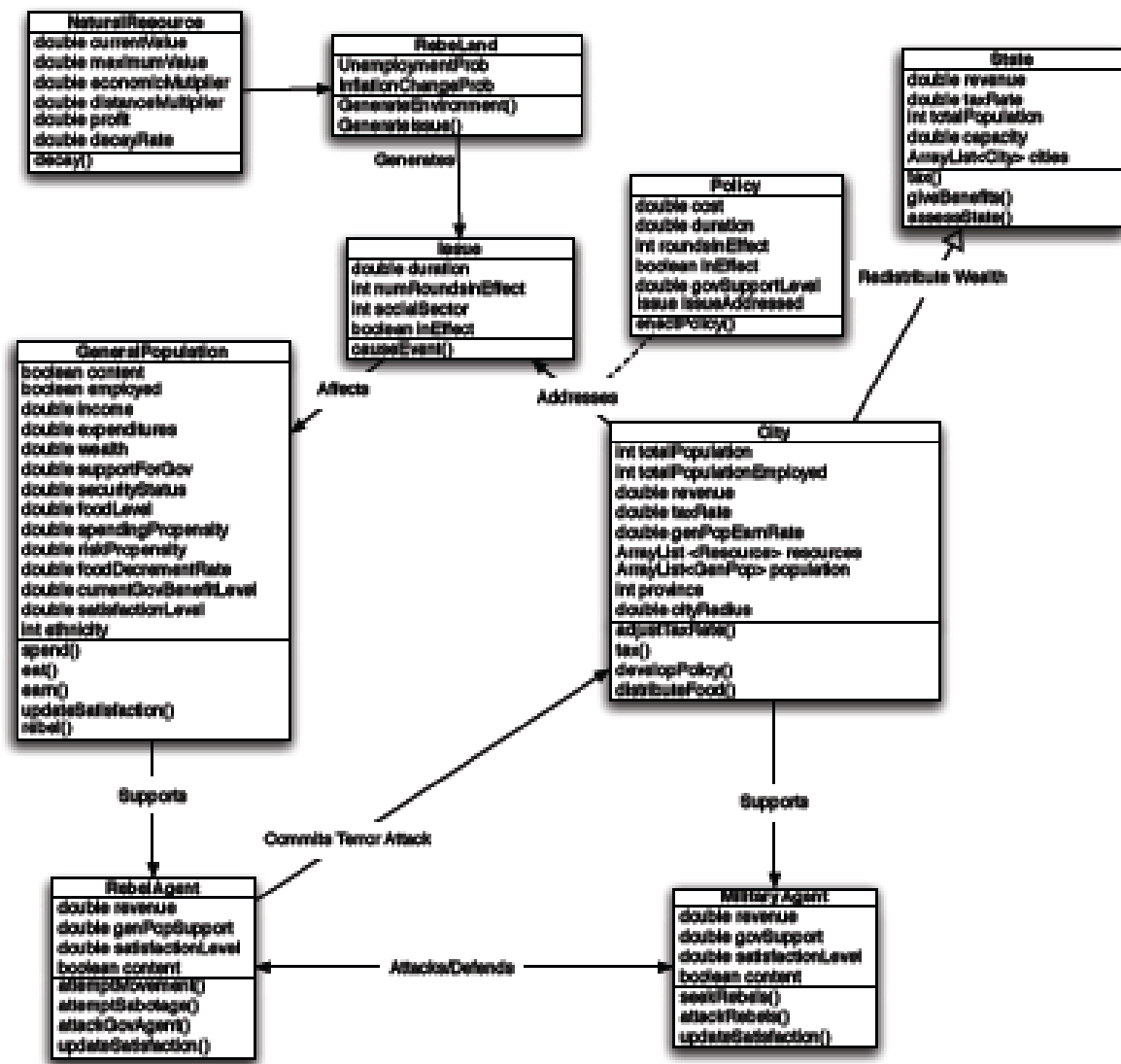
# *Model Dynamics*



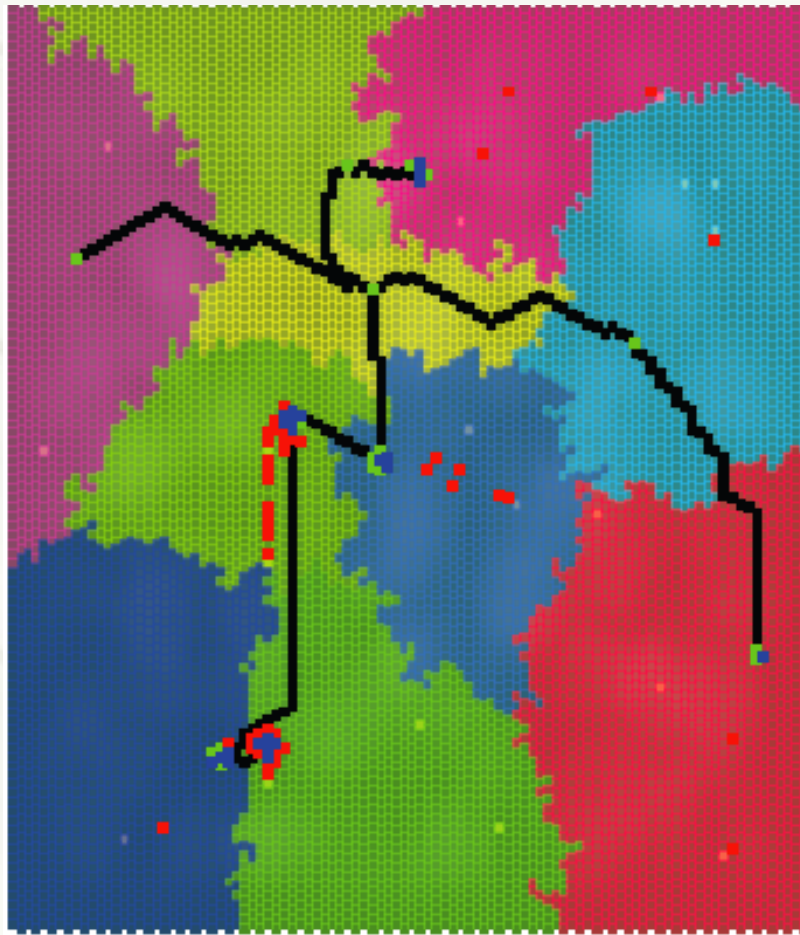


# *Model Environment*

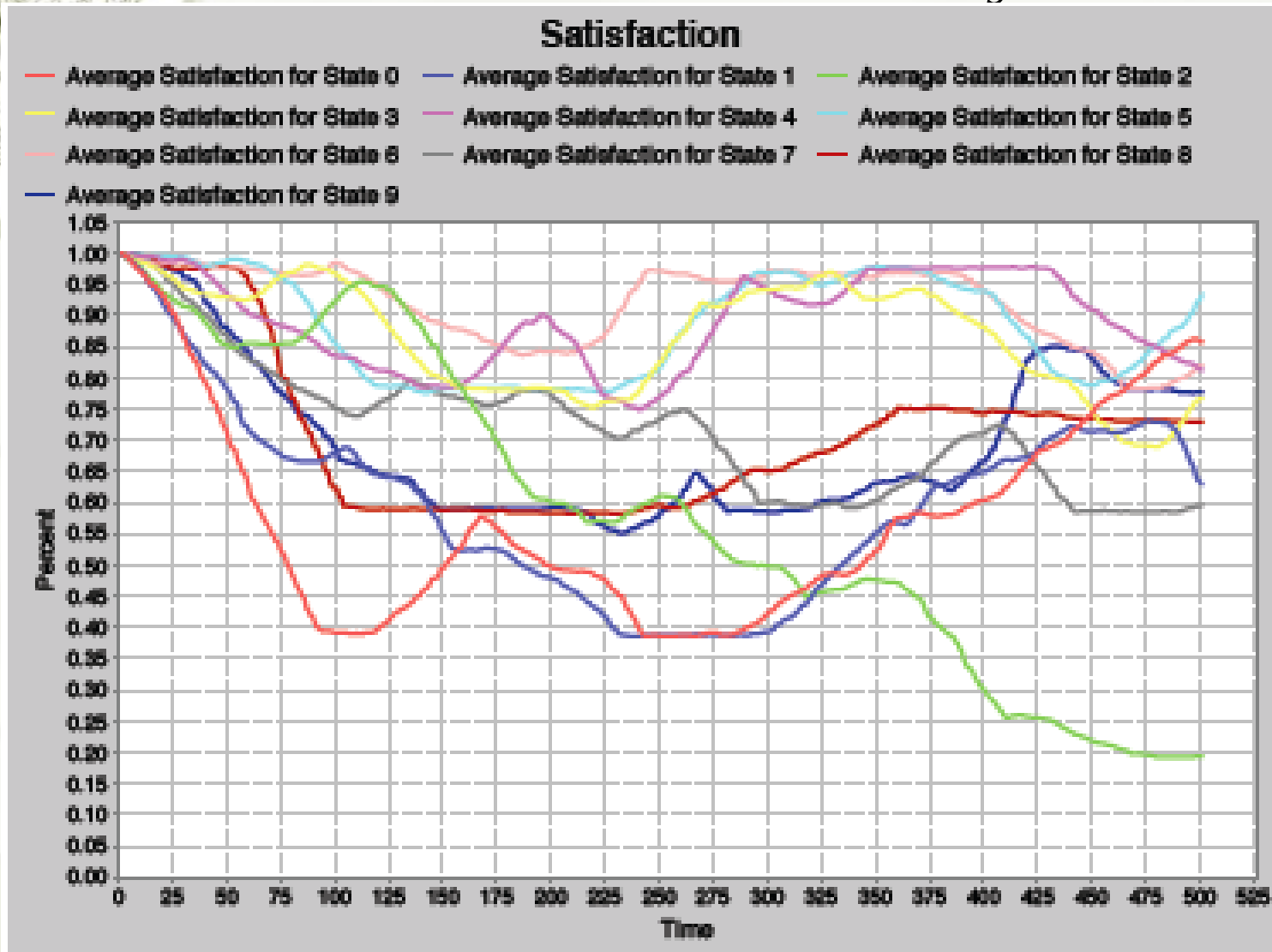




# *Simulation Results*



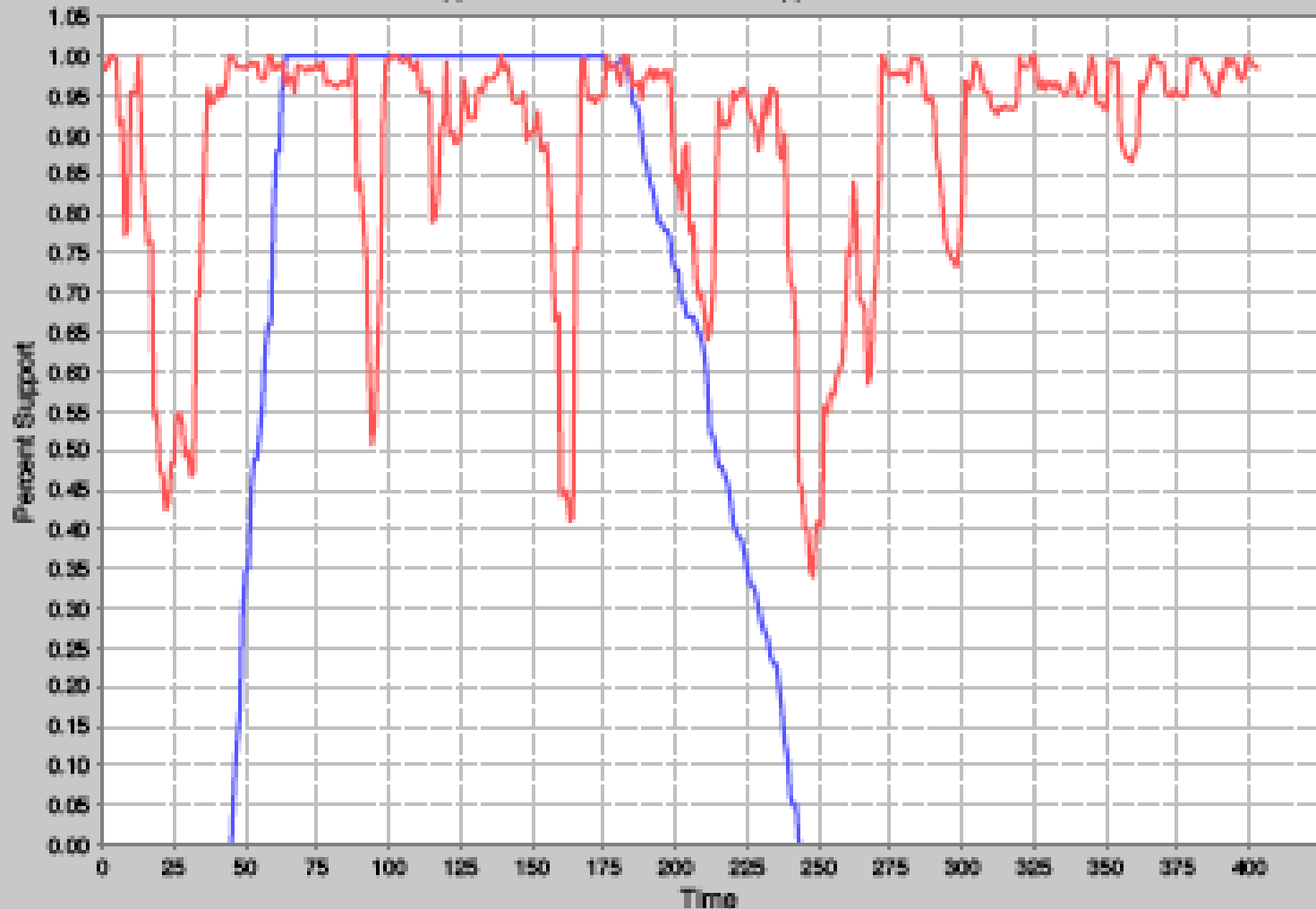
# *Stable Scenario (Satisfaction)*



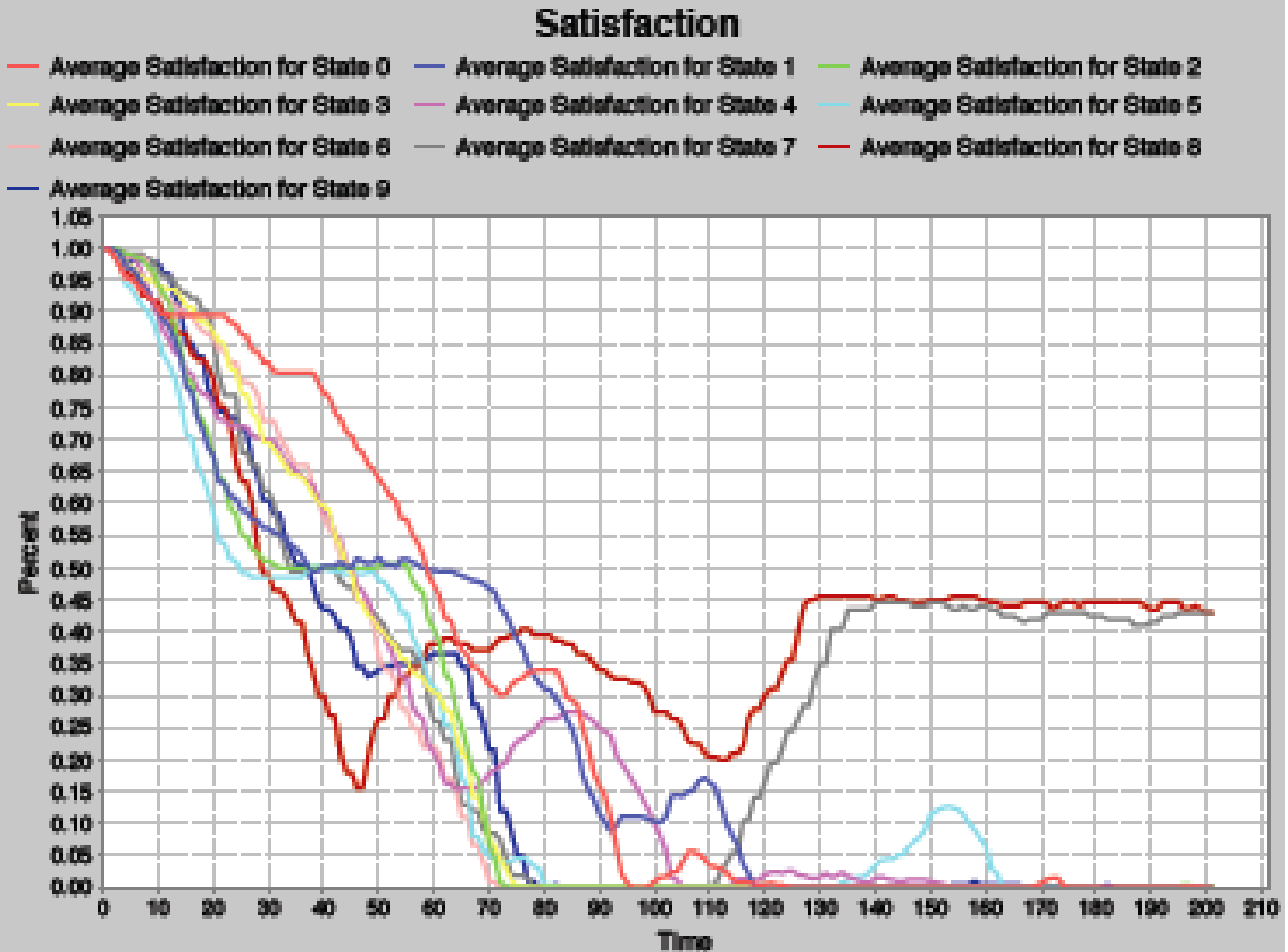
# *Stable Scenario (Support)*

Government Support v. Rebel Support

— Support for Government — Support for Rebels



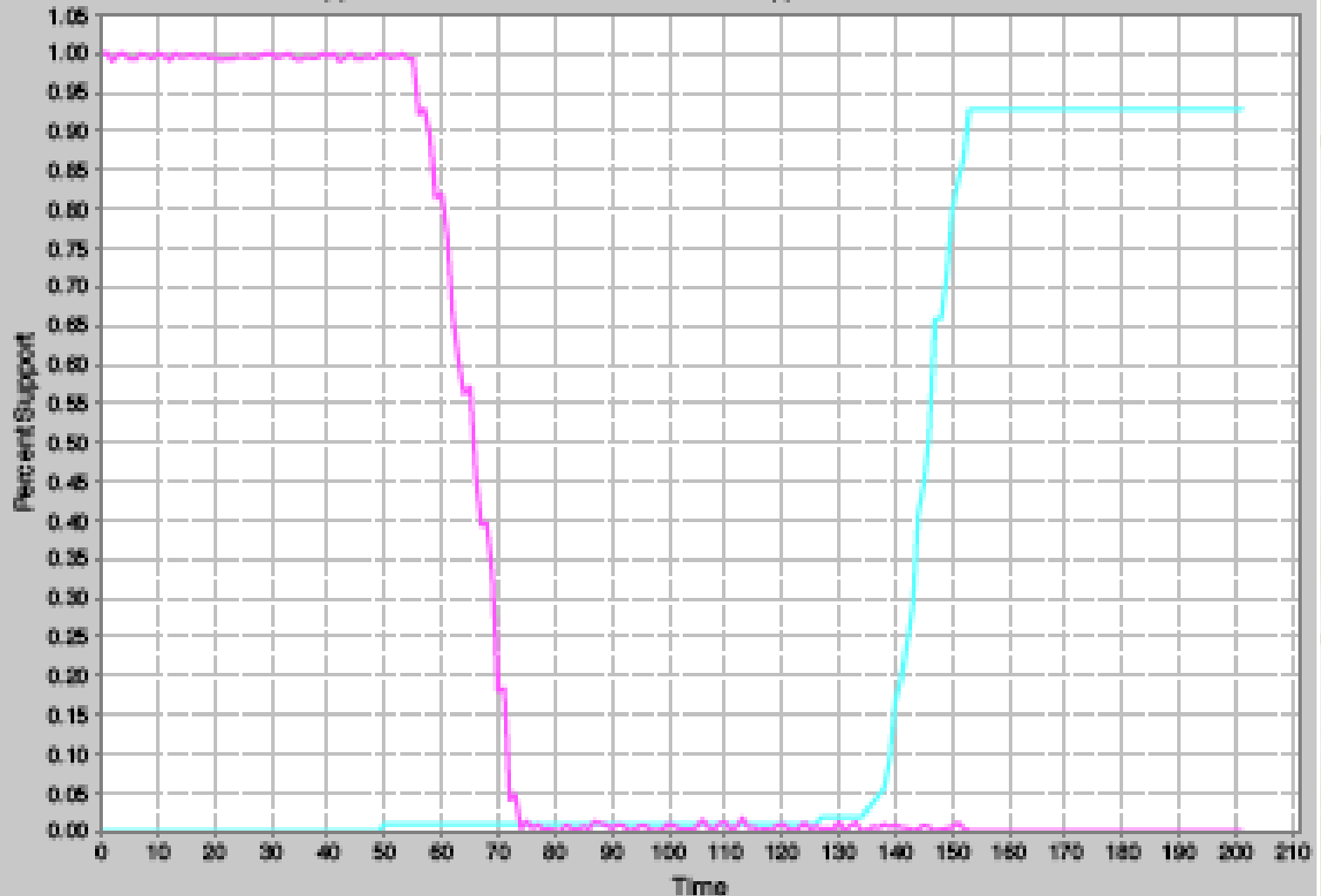
# *Unstable Scenario (Satisfaction)*



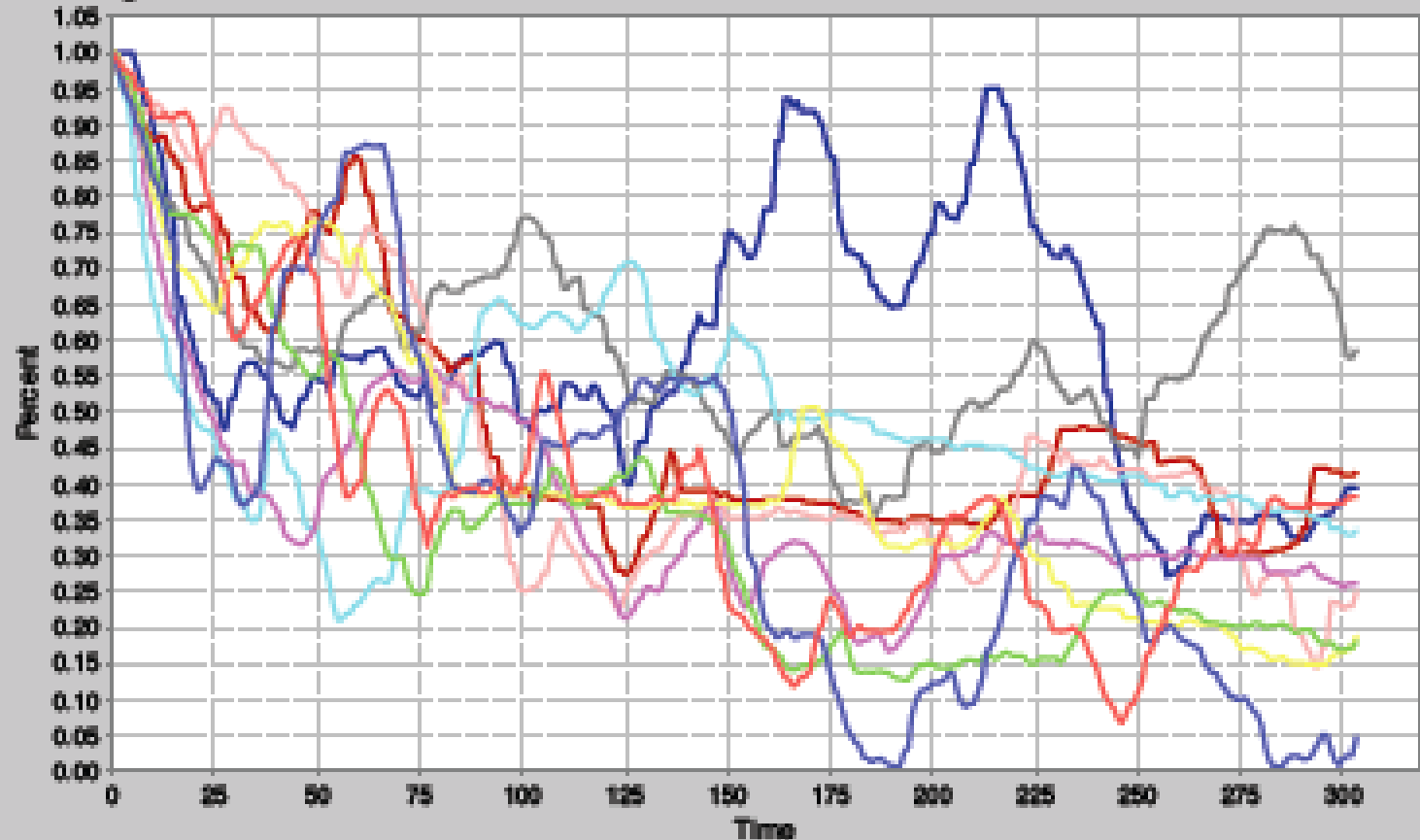
# *Unstable Scenario (Support)*

## Government Support v. Rebel Support

— Support for Government in State 2    — Support for Rebels in State 2



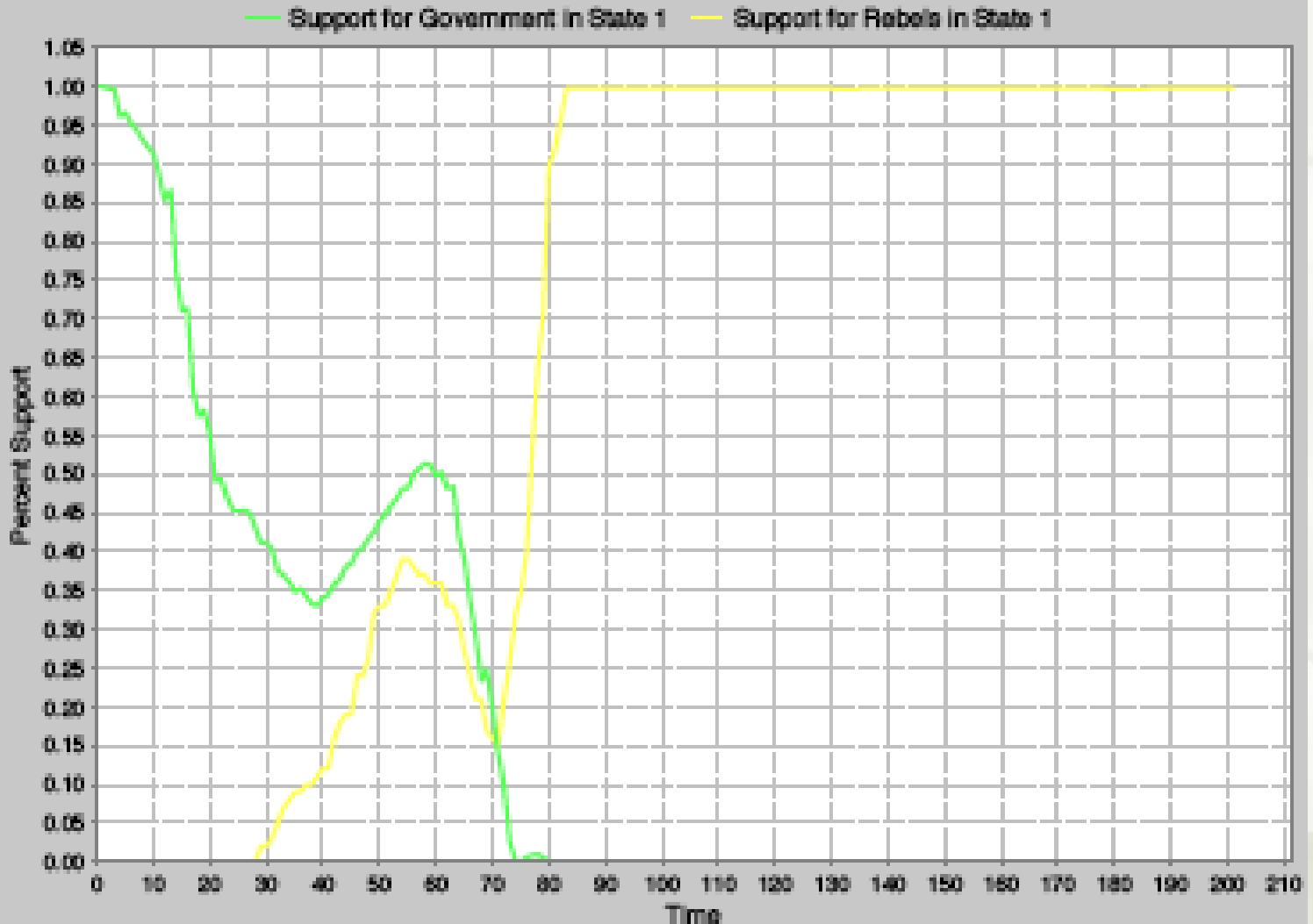
# Conflict Scenario (Satisfaction)






# Conflict Scenario (Support)

## Government Support v. Rebel Support





# *Conclusion*

- ◆ Platform for Regional Studies
  - ◆ Multiple Countries
  - ◆ Multiple Ecologies
- ◆ Foreign and Domestic Interplay
  - ◆ Refugee Crises
  - ◆ Natural Disasters
  - ◆ Cross-border Crime
  - ◆ Border conflicts
- ◆ East Africa Focus