

# **A LOW DIMENSIONAL APPROACH TO THE DYNAMIC ANALYSIS OF GEO-POLITICAL RISK**

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## Existing geo-political analysis

- Poor record of prediction even over short-time scales:
  - Philip E Tetlock, *Expert Political Judgement: How Good Is It? How Can We Know?*, Princeton Univ Press, 2006
  - Paul K Davies: Uncertainty-Sensitive Planning in Stuart E Johnson et al: *New Challenges: New Tools for Defence Decision Making* (Rand 2003)
- often presented to policy or decision makers as a “black box”, which can neither be examined nor integrated into the decision making process

# A low dimensional dynamic approach: Cognitive Maps (1)

- *Complementary* to the high dimensional approach of RAHS
- Complex outcomes from the dynamic feedbacks of the system
- Even models with very few factors can give rise to system properties which require non-trivial analysis to understand
- But sufficiently low dimensional models *can* be analysed and understood completely

# A low dimensional dynamic approach: Cognitive Maps (2)

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- We are in a world of scarce resources
- Which parts of the problem should we devote scarce skilled resources to:
- improve/monitor closely
- build in (much) more detail?

## A low dimensional dynamic approach: Cognitive Maps (3)

- Identifies stability of system with respect to ‘weak signals’ i.e. potential shocks
- Do not have to specify what the shocks are: key point is where they impact the system
- In general, such systems will have a mixture of stability and instability
- So we can identify the potentially unstable parts and concentrate our efforts there i.e. try to identify the parts which are most vulnerable to weak signals

# A low dimensional dynamic approach: Cognitive Maps (3)

- *Not* a panacea
- Captures explicitly the knowledge held within government, companies and the expert community
- these techniques are dynamic, incorporating the complex feedback loops of the real world
- they are *transparent*; assumptions made by experts are explicit
- Above all, they are capable of simple graphical representation which makes them candidates for presentation to policy makers

## An illustration

- P Ormerod and S Riordan, *Diplomacy and Statecraft*, December 2004
- Prospects of political stability in China
- Maps try to capture the *key* features of a situation

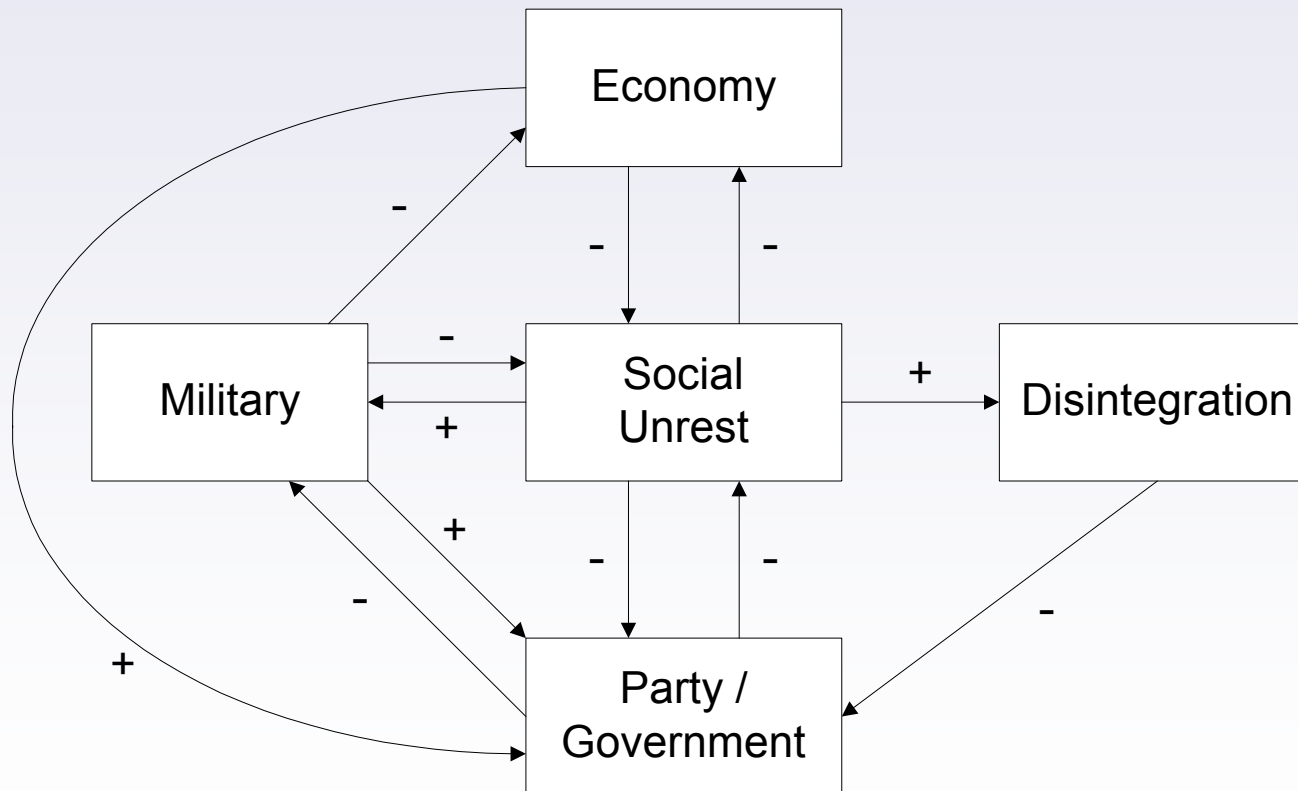
## Four main drivers

- the economy
- the military
- the Party
- social unrest

# The assumptions

- weakness in the economy increases social unrest, and that social unrest weakens the economy;
- decline in party/government unity increases social unrest, and increased social unrest undermines the party/government;
- a strong party/government reduces the importance of the military, but that a strengthened military reinforces the party/government;
- a strong and influential military, by strengthening the position of the conservatives, weakens the economy;
- increased social unrest increases the prospects for disintegration, which in turn undermines the party/government

# Illustrative Cognitive Map of Potential Political Disintegration in China

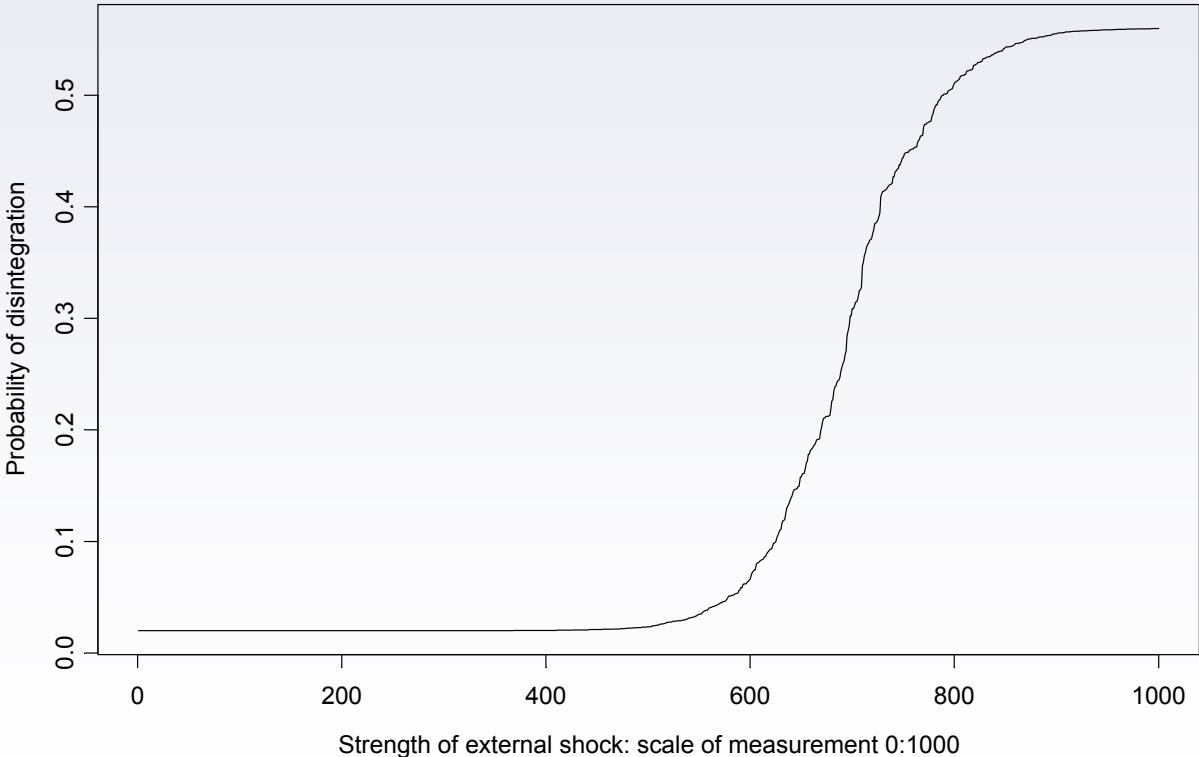


## Properties of the map

- Like many things in maths, this graphical representation has an algebraic equivalent which enables us to analyse it
- despite the small number of variables and the small number of parameters (links), the dynamics of the system are highly complex
- but *because of* the small number of variables and the small number of parameters (links), the dynamics of the system can be understood
- the system is stable with respect to certain types of shock and unstable with respect to others
- the properties even of this system would be impossible to discover by purely verbal analysis

# Probability of disintegration in China and strength of external shock

Probability of disintegration in China and strength of external shock



## Discussion

- This approach does not pretend to spurious objectivity
- But it makes transparent the judgements of experts
- We can identify the most sensitive links and their strengths
- A way of coping with complexity
- A high level approach to deciding where to invest scarce resources in building a more detailed model