

The Skeptical Economist: Complex Systems and Social Incentives

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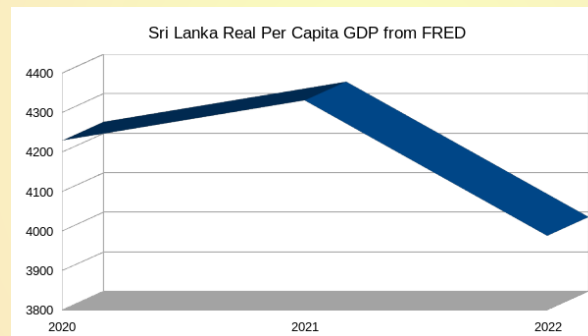
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Simple vs. Complex Systems

- a simple system has few controls
- a complex one has many
- car: gas pedal, brake and steering wheel
- unlike us Max Verstappen knows exactly how to coordinate the gas pedal with the steering wheel
- with many many controls and only a general idea how to adjust them a large adjustment is likely to cause an overshoot and make a mess
- a smaller adjustment is safer and may result in a mild improvement
- in the face of ignorance interventions into a complex and poorly understood system should be small
- best of all: to understand how complex systems work and make the right adjustment

An Astounding Blunder

- prior to 2021 Sri Lanka had a thriving agricultural sector
- provided food for Sri Lankans and money from exports
- Sri Lankan agriculture relied heavily on chemical fertilizers
- in April of 2021 President Gotabaya Rajapaksa banned them



- food production dropped catastrophically
- a small adjustment - phasing out chemical fertilizers over a long period of time - would have moved the system in the right direction without overshooting the target and causing an economic collapse
- better still: understand how the system works

Understanding Complex Systems

- to evaluate policies we need to simulate complex human systems
- we need artificial agents that behave like human beings
- I came to Royal Holloway as part of a Leverhulme project bringing together economists, psychologists led by Ryan McKay and computer scientists led by Kostas Stathis and a wonderful team of affiliated faculty, postdoctoral fellows and PhD students
- many people made this project happen, especially: Ken Badcock, Matthew Humphreys, Dan Anderberg, Michael Mandler, Catharina Tilmans
- this project is a first step: to build artificial agents that behave like human beings in the laboratory
- historically “agent based models” have studied simple agents in complex environments, but humans are complex agents
- the goal of the project is to study complex “human-like” agents in simple environments

Where the Action Is

- we know a lot about the individual pursuit of personal objectives
- but what about social objectives?
- we have a lot of data on human behavior with respect to social preferences and norms
- currently the knowledge that can be incorporated into artificial agents is limited
- one of the priorities in this project is to better understand how social preferences, incentives and norms can be incorporated into artificial agents
- in the rest of this lecture I am going to discuss some of the research on models of social preferences and norms that led up to this project and explain how this is of practical importance in policy design

Incentives for Public Goods

- everyone wants a green environment but most people want someone else to pay: how we get people to act green?
- economic incentives: taxes, subsidies
- social incentives: peer pressure
- self-organizing groups are good at getting peer pressure right
- important: economic incentives can substitute for social incentives
- depends on the type of economic incentives
- unexpected consequences



Subsidies vs Social Incentives

- subsidies and social incentives are substitutes
- subsidies may cause social incentives to collapse: it may be easier just to rely on the subsidies
- this can result in less output of a public good or greater output of a public bad



Masooda Bano in Pakistan

- public goods including from welfare, health care, education, and the defense of political rights were provided through voluntary efforts with socially provided incentives for contribution
- volunteers provided public goods in response to a system of social incentives based on monitoring
- those who were thought not to pull their weight received less respect and were less likely to be invited to social events, for example, to be honored guests at weddings



NGOs

- donor organizations attempted to increase public good provision through subsidies in the form of salaries to contributors
- Bano's case studies shows how this led to the unraveling of social incentives and to **decreased** provision of the public good
- in each case there was a reduction in public good provision because monitoring and social incentives were abandoned in response to formal incentives
- in the absence of social incentives volunteers dried up



Two Kinds of Subsidies

Pigouvian subsidy: paying the salary of group members who provide effort

output multiplier: equipment and training that increases the effectiveness of effort provided by group members

- a Pigouvian subsidy is a substitute for social norms: even without subsidies the public good will be provided
- an output multiplier is a complement for social norms: if there is no social pressure for service then there will be no public good

give them ambulances: they are not a substitute for social incentives

classical example: the Afghan army did not fight **BECAUSE** we paid their salaries and the Ukrainian army does fight because we do not pay their salaries

Climate Change

- foreign aid doesn't solve the problem of poverty
- electric cars don't solve the problem of climate change
- economists don't solve the problem of climate change
- we generally recommend that governments charge a Pigouvian tax – the carbon tax
- the skeptical economist disagrees



How to Spend It?

- even Donald Trump couldn't increase carbon emissions in the US
- a very fine group of Swedish economists is fighting climate change: they think Sweden's net zero is a waste of money
- regulation vs a social movement and the threat of regulation: we don't need to ban coal fired power plants, no private investor in a Western country is going to invest their money in a coal fired power plant
- social movements are important: can tip the balance in close investment decisions
- the problem scenarios involve increased carbon emissions from developing countries such as Bangladesh

Bangladesh

- one of countries most at risk from climate change
- hot and close to sea level

also very poor

- per capita GDP **UK 2022:** **28,648**
- per capita GDP **Bangladesh 2022:** **4,322**
- per capita GDP **China 2002:** **2,557**
- per capita GDP **China 2022:** **11,560**

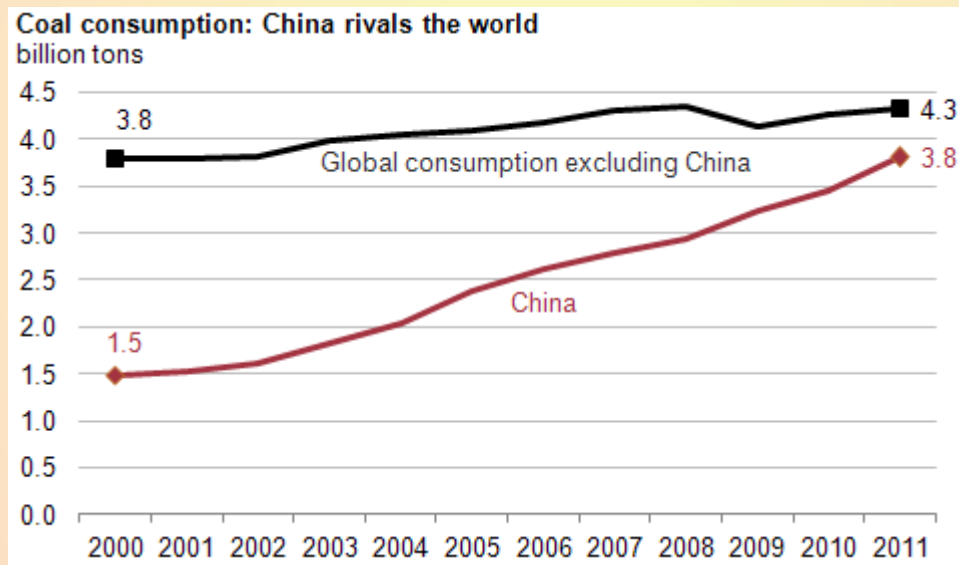
in 2010 USD from FRED

by far the greatest reduction in poverty and hunger in all of human history took place in China in the last 50 years

the role of foreign aid was....NONE

How the Chinese did It

- there is a lot of coal very close to the surface
- it is cheap energy and attractive to developing countries
- how China grew so fast (18% world population)



US Energy Information Administration

Cost Effectiveness

- spend money and resources on electric cars for us?
- or on solar power plants for Bangladesh?

Bangladesh and similar countries have the most to lose from global warming

and the most to gain through economic growth driven by cheap energy
– and **that is the big global warming threat**

- if Bangladesh and other poor countries follow the Chinese model we are in big trouble



Wise Use of Foreign Aid

- foreign aid doesn't work: how about spending it subsidizing green power plants for developing nations instead?
- remember Afghanistan: don't buy power plants: subsidize them

Bangladesh gdp: **460 billion USD** (world bank)

UK foreign aid + charity + net zero expenditure: **50 billion USD**

(UK official government statistics, cafonline.org, UK OBR)



Complex Systems Again

- the human systems producing global warming are complex
- individual incentives, social movements, political systems
- we see bad things and think simple cures
 - people are hungry: give them food
 - diesel cars contribute to global warming: ban them
- these are proven failures
- our Leverhulme project will build tools to better analyze complex human systems
- meanwhile: we know a lot from decades of research in the laboratory, in the field, and studying economic data
- this can serve as an effective guide in the immediate future

Thank You