

# The Complexity of Government

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**Abstract** Two broad arguments are made. The first is that we are some distance away from having a good understanding of collective action, and until we do, claims about the role and scope of government will be based on crude impressions or ideologies. The second is that complexity science is well placed to make advances in in this area because social systems are inherently complex, as are many collective action problems. Indeed, most political ideologies impacting on public policy have emerged from a comparatively simple, mechanistic view of social systems. It is argued that the economic success of capitalist countries can in part be attributed to people being free to form organisations, which are collective acts, and can be seen as the other side of the coin to Adam Smith's division of labour. A discussion of what is meant by *collective action* will develop a broader than normal definition that includes social governance, defined here as all forms of institutions, the role of which is to facilitate, or enable, collective action. Governments are part of our social governance furniture, but have a monopoly over the use of force. The *libertarian challenge* concerning government will be used as the antithesis to the thesis that a primary role of government is to enable collective action, leading to a synthesis of the two. A speculation on the role governments should have in complex social systems *vis-a-vis* collective action precedes consideration of what value complexity science can add in the domain of collective action and government. This could be substantial since complexity science includes concepts and tools which can help advance our understanding. At the very least, the dispassionate science of complexity could provide a fresh perspective on what has been an historically emotive and inconclusive debate.

## 1 Introduction and Overview

Debates about the role and scope of government in social systems are often highly charged, and they seem endless. Many schools of thought exist in political philosophy, and these typically produce very different answers to these questions.

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For example, socialists advocate a substantial role for government in society, whereas extreme ‘right-libertarians’ and anarchists argue for its total abolition. More moderate voices among Conservatives argue for ‘small government’.

But in order to answer the ‘why’, ‘what’ and ‘how’ of government, we first need a deep understanding of the fundamental rationale for it. In the absence of such an understanding, claims that government should be ‘large’ or ‘small’ are ill-posed.

An important premise of this essay is that a significant role of government concerns the social process of collective action. Two broad arguments will be developed: first, we do not have a good understanding of collective action, and, until we do, claims about the role and scope of government will be based on crude impressions or ideologies; second, complexity science is well placed to make advances in this area because social systems are inherently complex, as are many collective action problems. Indeed, most political ideologies, which have a considerable effect on public policy, have emerged from a relatively simple, mechanistic view of social systems. Policy decisions based on crude ideologies could have substantial costs.

Section 2 focuses on the fundamentals of interaction and collective action. It sets out the argument that the economic success of capitalist countries can in part be attributed to people being free to form organisations, which are collective acts. This might seem paradoxical but it will be shown that collective action is the other side of the coin to Adam Smith’s division of labour.

Section 3 includes a discussion of what is meant by collective action in the literature and develops a broader definition than is normally used. It also includes a discussion of social governance, defined here as all forms of institutions, the role of which is to facilitate, or enable, collective action. Governments should be viewed as a part of our social governance furniture; however national governments have one crucial differentiating characteristic: they have a monopoly over the use of force.

Section 4 considers ‘the libertarian challenge’ concerning government. This perspective will be used as the antithesis to the thesis that a primary role of government is to enable collective action. The discussion in this section will help us form a synthesis of these two.

Section 5 speculates about what role governments should have in complex social systems *vis-à-vis* collective action. Since we emphasise in this essay that the literature dealing with social complexity is immature, these comments will be mostly speculative. The aim of this section is more to comment about research directions.

Dovetailing in to this, we consider what value the complexity sciences can add in the domain of collective action and government. This value could be substantial since social systems are complex and the complexity sciences include concepts and tools which can help advance our understanding. At the very least, the dispassionate science of complexity could provide a fresh perspective on what has been an historically emotive and inconclusive debate.

## 2 Interaction and Collective Acts

Societies are integrated networks of people in which interaction is both common and often significant. This interaction gives way to a substantial number of collective action challenges and opportunities, which range from the very simple to the highly complex.

Taking a step back, recent research in evolution studies has shown that under certain circumstances, evolution can favour groups of cooperating entities over non-cooperative groups. For example, Powers et al. [11] demonstrated how particular population structures, which can be selected for, confer the benefits of cooperation on the co-operators (rather than parasites). Such groups will have an evolutionary advantage over non-cooperative groups and also overcome the problem of the ‘invading defector’. The complexity scientist Stuart Kauffman refers to this process as self-organisation in complex biological systems.

This argument helps to explain why many species exhibit both population structures, including familial networks resulting from sexual reproduction, and cooperative behaviour. Here we can think of the intricate, cooperative behaviour of beehives and ant colonies.

For social science, this literature provides a strong argument for how human societies have evolved to be inherently structured, or networked. In a sense, interaction is inevitable because structured groups with interacting individuals have been selected for by evolution.

Game theory offers a useful approach to thinking about interaction, especially the simpler, bilateral forms like the well-known Prisoners’ Dilemma. This shows in simple terms how non-cooperative interaction lead to sub-optimal outcomes for two interacting people; and how forms of credible collective action can benefit both. In the next section we will look at which forms of collective action the economics literature has focused on; but for the remainder of this section, let us look at how collective action has underpinned the economic success of capitalism.

### 2.1 *The Networked Pin Factory*

Collective action is not only about avoiding detrimental effects like free-riding and pollution; it is also about people constructively working together, for their own benefit. Most notably, private corporations are formed by collective acts, as are all forms of organisation. This is an unusual way of thinking about private corporations, so let us look at this in more detail by re-thinking the famous example of Adam Smith’s pin factory.

Adam Smith [12] wrote that the division of labour was an important source of economic wealth and growth. He famously cited a pin factory in which ten workers had specialised jobs, which had much greater productivity than the sum of ten

uncoordinated specialists making pins independently of each other. Smith attributed this to the benefits of specialisation, which he called the *division of labour*.

When the pin factory is looked at from a network theory perspective, it can be thought of as a network of interactions between various specialists. Without some deliberate pattern of interaction, the pin factory would be ten uncoordinated specialists: this would probably be extremely inefficient.

Of course, it might seem like common sense to say that organisations, which are made up of specialists, also require patterns of interaction which define how these specialists relate to each other. This point is highlighted here to emphasise just how fundamental collective action is in today's economic systems. *Organisations are networks of people acting collectively*.

Given how fundamental collective action is in economic success, it is surprising that economists have traditionally focused on autonomous exchange and free markets. Honourable exceptions include the Nobel Laureates Elinor Ostrom and Douglass C. North.

With that in mind, one might ask why Smith's emphasis on the division of labour has received more attention historically than social networks in organisations<sup>1</sup>. In network theory terms, Smith's focus was on the nodes in the pin factory's network, not the links between the nodes. But these are two sides of the same coin.

The answer is probably that we have only had the intellectual technology to recognise and enunciate this issue in a formal sense in the past few decades. Network theory has blossomed since the 1970s and we can now understand better the value of specialised skills working in conjunction with networked interaction. Indeed, complexity scientists would say that the overall value of an organisation is an emergent (irreducible) property of the whole system: its constituent employees and the nature of their interaction. We will return to this 'new technology' point later in arguing about the value of complexity science.

In an essay concerned with government, why does all of this matter? The aim of this section is to build some of the foundations for understanding government, where: (1) relationships and interaction are inherent features of social systems; and (2) collective action is widespread in economically successful countries.

### 3 Collective Action and Social Governance

In defining collective action problems, Ostrom and Ahn [9] wrote:

Collective action problems arise whenever individuals face alternative courses of actions between short-term self-regarding choices and one that, if followed by a large enough number of individuals in a group, benefits all.

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<sup>1</sup>This is not to disregard or devalue Smith's Book *The theory of moral sentiments* which was about interaction within society more broadly.

In economics and political science, the term ‘collective action’ is associated not with organisations, as discussed above, but with problems concerning specific types of resources. These typically include public goods; commons-type resources like common land and fishing locations; externalities; and coordination problems [2].

The seminal book in this field was Mancur Olson’s [7] *The Logic of Collective Action: Public Goods and the Theory of Groups*. This book, and a lot of subsequent work, placed theories of collective action firmly in the domain of orthodox economics, including the conventional assumption of selfish optimising agents.

A classic model in this literature concerns the over-grazing of common land by rational agents, epitomised by Garrett Hardin [4] who coined the phrase the *tragedy of the commons* for such problems. This can be interpreted as a multi-agent Prisoners’ Dilemma problem. Like Olson, Elinor Ostrom argued that over-grazing (a form of free-riding) is a fundamental problem in this model but in principle it can be overcome by credible enforcement mechanisms [8]. These mechanisms constitute collective action in this literature.

A number of researchers in this field refer to Olson and Hardin’s work as the ‘first generation’ of the collective action literature [9]. In the past two decades or so, a second generation has emerged, building on new research in behavioural economics and evolutionary game theory. Advances in our understanding of human cognition (notably bounded rationality) and the evolving nature of social systems are included in this new generation.

As will be discussed in Sect. 4, Ostrom and Ahn’s definition of collective action problems (and, by implication, collective action) is somewhat narrow. It is typical of reductionist approaches to social systems where the value of the whole is seen as an aggregation of the value of the parts. Recall the pin factory where greater productivity was an emergent property and not the same as the sum of the parts.

For the remainder of this essay, we will use a broader definition of collective action, that it is about the coordinated actions of people where such actions are expected to achieve some aim. This definition is more general than the collective action of Ostrom and Ahn, which can be viewed as a subset, since it also incorporates the type of networked collective action seen in organisations.

### ***3.1 First and Second-Order Collective Action***

The literature in this field makes an important distinction between *first-order* and *second-order collective action problems*. This distinction is important here because it will help to move analytically toward an appreciation of the role of government *vis-à-vis* collective action.

First order problems are those which are immediate and localised. For example, Ostrom [8] discussed fishing rights of fishermen off the coast of Bodrum in Turkey. This was a specific, localised problem. Ostrom [8] also described a substantial number of other specific problems, all of them first-order.

Second order problems concern the setting up of institutions, or codified rules, which resolve first-order problems. In the case of fishing rights in Bodrum, if the fishermen were to self-organise, they would draw up agreements about who has the right to fish, when and where. This is a meta-problem, which is also a collective action problem because it requires people to agree the institutions of agreement. Put another way, any form of organisation which helps to resolve some collective action problem is itself a public good.

A second strand of literature relevant to this essay is that concerned with institutions. A thorough evaluation of this literature is beyond the scope of this essay but it is worth noting two points. First, this literature distinguishes between informal and formal institutions, and, second, it differentiates between emergent and deliberate institutional formation.

*Informal institutions* are typically associated with social norms, including concepts such as etiquette and conventions. In this essay I will use a broad definition and include ideas such as morality: general 'ought' principles which influence what we do. *Formal institutions* involve the codification of rules e.g. the drafting of laws and regulations. This literature includes a discussion of the process of formalising informal institutions, e.g. when moral principles like prohibition of murder are codified in to law.

Informal institutions are broadly synonymous with emergent institutions: those arising spontaneously within a population, in an unplanned way. Similarly, formal institutions are generally associated with *deliberate institutional formation*: the conscious planning of rules and regulations. Note, however, that deliberate institutions can also be informal in nature, e.g., when a group agrees to some systematic process like a weekly meeting.

### 3.2 *Social Governance*

Before we develop a discussion of what the role of government might look like in this context, it will be helpful first to define the term *social governance*. This will help us differentiate between institutions in general and government.

Here we will define *social governance* as any form of organisation, institution or rules that enables first-order collective action. Put another way, it is about higher orders of collective action. To understand this in more detail, let us look at a number of examples of what would constitute social governance given this definition.

Referring back to our discussion of organisations, many corporations have boards of directors, which have ultimate responsibility for running companies, including their overall corporate strategies. These boards are normally viewed as forms of governance: in the context of this chapter, these can be included in our collection of social governance.

One potential criticism of this point is that organisations, while made up of people, are singular so it makes no sense to talk about collective action within a single entity. The key point here is that this is a reification: the unit of analysis we

are concerned with is the individual person, not the individual firm, which is an abstract concept.

Similarly, charities have boards of trustees that perform a similar role to boards of directors. In addition, a substantial amount of collective action occurs among civil society groups and this forms an essential part of the collective action architecture of modern civilised societies.

Other examples of social governance in the UK include:

- Associations like the Football Association, which coordinates the activities of the football leagues and agrees the rules of the sport;
- Professional bodies like the Institute for Chartered Accountants in England and Wales (ICAEW), which coordinates accounting conventions;
- Trades unions;
- The Driver and Vehicle Licensing Agency (DVLA), which ensures that cars and drivers on the roads are roadworthy; and
- The National Air Traffic Services (NATS), which is responsible for air traffic control in the UK.

It is noteworthy that the examples above range from fully private (corporations) to fully public (government departments). For example, the Football Association is independent of government whereas the DVLA is a government body. By contrast, NATS is a public-private partnership.

One special form of governance which is excluded from the above list but which plays a critical role in all civilised societies, is the judiciary. The institutions of the judiciary have a central role in enabling individuals (people and / or legal entities) to act collectively through enforcing private agreements. Importantly, a substantial amount of collective action in devolved, capitalist economies is bilateral and private in nature: the judiciary is used to enforce such contracts when necessary. Because it enables collective action, the judiciary can be included in our social governance architecture.

We could think of many more examples of social governance. The important point is that such bodies or processes enable first-order, real world collective action.

### ***3.3 Higher-Order Governance***

In thinking about collective action and forms of governance, it is helpful once more to refer to Ostrom's discussion of orders of collective action.

Ostrom [8, p. 52] mentioned that first-order collective action problems are resolved through operational rules (or norms) being realised on the ground. Such problems fail to be resolved when appropriate rules are not devised (the second-order problem again) or when they are not effectively enforced. Indeed, Ostrom noted how fishermen around Bodrum in Turkey were able to form and abide by credible agreements whereas, in the Bay of Izmir, fishermen did not, which resulted in a depleted resource. This is an important point: collective action is not guaranteed.

The second-order problem concerns what Ostrom called collective choice rules, which indirectly affect operational rules:

'[Collective choice rules] are the rules that are used by appropriators, their officials, or external authorities in making policies—operational rules—about how [the resource] should be managed.' [8, p. 52].

Note, however, that an organisation might be formed with the responsibility and discretionary power to change the operational rules. This same organisation might also be involved in monitoring and enforcement. In the case of Bodrum's fishermen, this might simply be a monthly meeting of selected fishermen, with responsibility to make enforcement decisions, and to decide whether operational rules should be adjusted.

Note that the decisions about rules or organisations (or both) to resolve the second-order problem will be context-dependent. In predictable circumstance, rules might be sufficient; whereas in changing (unpredictable) environments, discretionary decision-making might be preferable.

Ostrom takes this thinking a level yet further, defining a third order of governance, with constitutional choice rules that:

affect operational activities and results through their effects in determining who is eligible and determining the specific rules to be used in crafting the set of collective-choice rules that in turn affect the set of operational rules.

In the fisheries example, a constitution might be written which constrains the fishermen who make up the committee that meets monthly.

These references to higher orders of governance in Ostrom's work are important here because they show that hierarchies of governance are possible and often necessary (the counterpart risks of excessive bureaucracy and exploitation will be discussed in Sect. 4). To that end, we often see boards of directors in private corporations delegate the implementation of corporate strategies to the executive directors. Individual executives might then further devolve tactical implementation, and so on, until things are actually done. We see governance hierarchies in many other parts of social governance.

The last point to make in this section is that governments could be viewed as merely manifestations of many institutions in a society's social governance portfolio. As mentioned in the introduction, national governments have one characteristic which other social governance institutions do not have: a legal monopoly over the use of force within national boundaries. This characteristic means national governments have a special place within social governance, but it does not tell us in detail what that role should be. Before we speculate about this, let us first deal with 'the libertarian's challenge' because it raises some important questions.



## 4 The Libertarian Challenge

In this section we will focus on two critiques of government, which are best expressed through libertarian philosophy. This philosophy goes well beyond these two critiques but for our purposes these two critiques are useful.

### 4.1 *First Critique of Libertarianism*

The first critique of libertarians is that collective action is not necessary and, therefore, governance and government is not necessary. From this perspective, society can be viewed as merely a collection of individuals who can choose to interact or not. We can think of this as an extreme reductionist interpretation of social systems since the ‘whole’ of such a society would be viewed as the sum of its parts. Margaret Thatcher’s famous quotation comes to mind here: ‘There is no such thing as society. There are individual men and women, and there are families.’ [5].

To be fair to libertarians, very few of them actually believe in this extreme opinion, so it is something of a ‘straw man’ (this perspective would also be more closely associated with anarchism). E.g., in his *Constitution of Liberty*, Friedrich Von Hayek (seen by many as the quintessential libertarian) made a powerful argument for freedom and against top-down statism; but he also included references to the need for people to self-organise, which looked a lot like collective action.

It follows from the above sections that this first critique is rejected here. It was argued in Sect. 2 that evolution appears to have selected for structured (networked) populations, which are able to cooperate (act collectively). This means interaction is inevitable, and this gives rise to certain problems. In addition, Sect. 2 also argued that corporations have had a central role in the economic success of capitalist economies, and these are forms of collective action.

### 4.2 *Second Critique of Libertarianism*

The second critique of libertarians recognises that, while collective action can have benefits, for example in the provision of public goods, governance and government concentrate power, and this will be abused. Put another way, collective action can have value but we are not very good at it.

This second critique is important because it highlights a possible downside of collective action: the exploitation of power. So far this essay has taken a functionalist stance toward collective action: this second critique offers one counter-argument.

Exploitation of power within this process of collective action can arise in two broad ways: (1) *ex ante*, power might be exercised when rules or organisations are

formed, resulting in institutions which benefit those who have power already; and (2) *ex post*, the exploitation of any discretionary power built into an institution. This second form is *ex post* because it is the agreement to concentrate discretionary decision-making which concentrates power.

These are valid risks but this second libertarian critique assumes that the exploitation of power is inevitable. Is this correct? We will argue that while power exploitation is a possibility, it is not inevitable: it depends heavily on the informal institutions (ethics, morals, norms) existing among the people concerned. Power exploitation is only inevitable if the people involved are rational egoists: the selfish utility maximisers of orthodox economics.

In terms of (1), the *ex ante* exercise of power, it should be clear that collective action is not responsible for any power dynamics prior to some collective act. In many circumstances, people can choose whether to act collectively or not. For example, if the richest fisherman gets most of the fishing rights in Bodrum, it still might be in the interests of other fishermen to agree to act collectively because it protects the stock of fish. If credibly enforced, such an agreement might be pareto efficient despite pre-existing inequity. Else it might be possible for the less powerful to veto the agreement if it worsens their position.

Of course, there may be circumstance where less powerful individuals will be forced into agreements which lessen their power and makes them worse off. It is impossible to generalise about this point because circumstances differ. In any case, it is far from clear that collective acts will necessarily worsen power relationships in these types of situation.

With regard to (2), the *ex post* exercise of power, this is a more difficult subject, and a detailed evaluation of all relevant arguments is beyond the scope of this essay. Nonetheless, there are a number of points worth emphasising.

First, there is an argument that it is a role of higher forms of governance to monitor lower forms, and to sanction when power is being abused. This means that the possibility of power exploitation could itself be an argument for (higher order) collective action.

Clearly, however, there is a limit to levels of oversight: we have to draw a line somewhere, and the people at the highest level might abuse their power in some way e.g. by taking bribes from the people they are monitoring. Furthermore, there is information asymmetry to consider: higher orders of governance will know less than lower orders about their environment and behaviour. This is the well-known *Principal-Agent Problem*, which implies there is a limit to the value of higher orders of governance.

Second, the second libertarian critique presumes rational egoists. Importantly, the second-generation of collective action literature, and also the literature concerned with informal institutions, have both gone well beyond this assumption. Not everybody is a rational egoist.

Ferguson [2] described how behavioural economists have moved from rational egoists to *instrumental reciprocity* where agents cooperate with others but on a contingent basis. This was described by Samuel Bowles [1] as ‘hidden selfishness’ because people were still viewed as essentially self-interested.

Moving beyond instrumental rationality, behavioural economics refers to *intrinsic reciprocity*, which is when agents' internal models include other agent-regarding preferences. Put another way, this is when people genuinely care about others' well-being. More broadly, behavioural economists now talk about social preferences, which Ferguson [2] described as being about other-regarding preferences, process-regarding preferences (such as preferring to earn £100 over stealing £100), and inequality concerns.

So we see there is now a deep literature in economics concerned with new forms of rationality, where cognition is not merely about selfish utility maximisation. This literature undermines the assertion in the second libertarian critique that power exploitation in institutions and government is inevitable.

As previously mentioned, there is a deep literature concerned with informal institutions. These are the moral values and norms of behaviour which we inherit from (and perpetuate within) our societies. It is clear that these have an important influence on how we frame circumstances and also the choices we make. Note also the connection to formal institutions, which is the subject of this essay: certain moral values can be viewed as types of institution because they help overcome collective action problems; but they are informal, so to speak. For example, if moral values against murder and assault are pervasive then it means people do not have to take measures to mitigate the risk of murder or assault. In the UK I do not have to carry weapons or travel among armed groups for protection.

What the economics and informal institutions literatures emphasise is that the likelihood of power exploitation depends on the society under consideration. Most importantly, do informal institutions help to counter information asymmetries and the possible rewards of power abuse? In some societies it seems possible to create and maintain formal institutions where power abuse is mitigated by informal institutions such as moral principles, or emotional considerations like loyalty and patriotism. In others, it is not possible e.g. where corruption and nepotism are widespread. The crucial point here is that the ideal nature and scale of a government of some population is contingent on the informal institutions of that population.

In conclusion, the second libertarian critique discussed here is particularly important in our analysis of collective action and government. The exploitation of power by those involved in institutions with discretionary decision-making power is a risk. But it is not inevitable. Indeed, this issue helps point to the significance of informal institutions in helping to regulate and mitigate such behaviour.

## 5 The Complexity of Government

Given the plethora of social governance architecture in many countries, we are left asking the question: what, if any, should the role of government be? This section uses the material above to suggest a few tentative ideas. It also articulates the case for a complexity science approach to collective action, institutions, and government.

## 5.1 *Tentative Ideas*

Here we discuss eight points concerning national governments and collective action (in no particular order).

- *Doing it Versus Enabling it.*

The foregoing discussion shows that governments do not necessarily have to do first-order collective action: they can just enable it. This might sound obvious from the above discussions but these two can be easily conflated.

Moreover, the term ‘enabling’ can cover a number of things, depending on the context, e.g. setting up a new institution to tackle a collective action problem, funding, making changes to legislation, etc.

Put another way, a government could play the role of second or third-order governance, or even higher orders if that were appropriate (and not bureaucratically cumbersome).

The most obvious area where national governments should take an enabling role rather than an executive role is in regional and local government. These ‘levels’ will have their own idiosyncratic collective action problems: national governments will not be as well informed as those ‘closer to the action’ so it would be inappropriate for national governments to be executives.

Another example of enabling collective action is the law concerning organisational forms. There are many organisational forms allowed by law in the UK, e.g. companies limited by guarantee, public companies, charities, community interest companies, etc., and the British government has a role in designing suitable legislation. Fisher and Ormerod [3] argued that the economy is constantly changing so what organisational types are suitable is also changing. Moreover, these pieces of legislation (like the Companies Act) have an important influence on the ability of people to form organisations i.e. to act collectively.

- *Doing National Collective Action*

National governments can be involved in first-order collective action but this should apply to national collective action problems. Examples will include well-known public goods like national defence and national infrastructure planning. But more complex collective action problems like recessions and banking crises might also be considered national, requiring a national response.

- *Involvement in Inter-National Collective Action*

With the internationalisation of societies across the globe, more collective action problems straddle national boundaries (and these phenomena might increase). Importantly, this does not mean an international government is necessary but it does mean that forums for interaction are required to help coordinate international collective action. Obvious examples include certain environmental problems (like Ozone depletion), international banking crises and international recessions.

- *Getting Out of the Way*

Collective action across society is not only about national governments and the public sector. Most collective action is bottom-up, bilateral and private.

One aim for all governments ought to be not disrupting socially constructive forms of collective action.

Indeed, Ostrom [8] included eight “Design Principles for Enduring Common Pool Resource Problems’ Institutions”. The seventh Principle was:

‘7. Minimal recognition of rights to organize.  
The rights of appropriators to devise their own institutions are not challenged by external government authorities.’ [8, p. 90]

These eight principles were abstracted by Ostrom from a substantial amount of empirical work concerned with common pool resource problems. This seventh principle can be thought of as an important lesson from that empirical work.

- *Disrupting Damaging Collective Action*

Cartels and racketeering are examples of collective action which is disruptive to society as a whole. One aim of national government should be to either disrupt (directly) such behaviour; or to enable the disruption of it. In British society, many of these types of behaviour are illegal and the police are tasked with preventing it.

- *A Unique Role Concerning Enforcement*

As mentioned above, one characteristic of national governments is that they have a monopoly over the use of force within national boundaries.

Force is an essential component for the credibility of many institutions because without the ultimate threat of being forced to adhere to an agreement or rules, or to adhere to sanctions for renegeing on agreements or breaking rules, then institutions will lack credibility. In many instances, sanctions will fall short of physical force, e.g. paying a fine for a motoring offence; however, physical force often results if a series of sanctions are evaded. If I refuse to pay a fine then a magistrate might order my bank to pay the money from my account. If I close my bank account beforehand then a magistrate might order my employer to pay it directly from my wages. If I am self-employed, I might be able to avoid this, etc. Ultimately, a judge might order that I am imprisoned by force but, *ex ante*, knowing this is likely to make me pay the original fine.

This ultimate sanction of physical force is necessary in many agreements and it can even be used in private, bilateral contracts e.g. bailiffs are given permission by a state official (usually a judge) to use reasonable force to remove property but, importantly, they do not have discretionary power. If national governments have a monopoly over the use of force then they must play the ultimate role in the enforcement of institutions, rules, agreements, etc., across the whole of society. More often than not, such physical force is delegated to the judiciary to decide over and for the police to execute.

- *Government Scope and Informal Institutions*

It is tempting to frame these discussions as if the role and scope of government ought to be the same in every country. However, the discussion of informal institutions above tells us this need not be true.

We saw that informal institutions can help to mitigate the various risks of power abuse which might arise in formal institutions. This means that in countries

with generally strong moral values, e.g. concerning abuses of power such as corruption or nepotism, the ideal scope of government could be broader than in countries with weaker moral values. In fact, we might say that the closer we get to people being extreme rational egoists, the closer the ideal scope of government gets to libertarian philosophy.

Clearly, of course, the weaker a society's moral values are, the more it is likely a government will try to expand its power since this increases the scope of officials to expropriate value from society. So the idea of small government in such countries might be infeasible. But what should be clear from this is that countries with strong informal institutional foundations ought not to be constrained by the assumption of rational egoists.

- *Power and Governmental Processes*

Power exploitation is not the only risk for governments. Another is the exercise of power to shape collective action, including public policy. This has traditionally come in two forms: the funding of political parties and lobbying for particular outcomes.

This is clearly not new. It is mentioned here to emphasise the point about power dynamics and the need for governments to mitigate these. A notorious (but certainly not the only) example of financial power influencing policy is the US Congress, where Congressmen have to raise millions of dollars to fight election campaigns and where corporate donations are allowed. This sets up a positive feedback loop for power: the financially more powerful in a society influence the institutions to give them more power.

## 5.2 Complexity Science

An important premise of this essay is that one of the major roles of government concerns collective action. This includes directly executing types of collective action and also enabling it when government takes on higher-order roles. This process of overcoming collective action problems also includes institutional formation. These might include rules, laws, regulations, and organisations with discretionary decision-making power.

It is useful at this point to highlight what two leading thinkers in collective action and institutions have written about their fields.

'until we gain a better conception of the individual actor within [policy] settings, which is likely to be a much more complex theory of the individual, we cannot move ahead as rapidly as we need to. The entire theoretical structure is likely to be one of complexity starting with complex models of individual behavior through complex models of structural interaction.' [10].

'The study of the process of economic change must begin by exploring the ubiquitous efforts of human beings to deal with and confront uncertainty in a non-ergodic world.' [6]

Ostrom's quotation explicitly refers to the need to develop better complex foundations for understanding collective action, whereas North's quotation is about dealing with uncertainty. His reference to non-ergodic systems is about systems that exhibit unpredictable and novel features, which means the future is not a perfect reflection of the past. This sits extremely well with complexity science because it studies such systems.

The key point to be made here is that complexity science offers a valuable way of reframing collective action and institutions, and from this better theories of government could emerge.

The study of collective action has to date been mostly non-complex. This was noticeable in the definition of collective action problems in Sect. 3: the definition implied that people make their decisions independently of each other, and that the value of collective action is the sum of all individuals' value gained from it. This is a reductionist framing.

Complexity science tell us that aggregated behaviour should not be our only concern: we must also consider *networked behaviour*. We saw this in Sect. 2 where Smith's pin factory included a social network of structured interactions which helped it achieve its aim. Complexity scientists would say that organisations are not merely an aggregation of individuals; rather we might think of them as a form of networked collective action. The value of the organisation will be an emergent property of the parts and their interaction. But this does not fit Ostrom and Ahn's definition.

Collective action is about *interaction* and *adaptation* by individuals; the *emergence* of institutions (the system organising itself), which is about *patterns*—or *networks*—of interaction; and it is about the *evolution* of this structured interaction over time, which features *uncertainty* and *far from equilibrium conditions*. The various italicised words in the last sentence are all concepts or subjects of study in the complexity sciences.

Reductionist strategies can only go so far to understand systems which exhibit these complex features. This includes social systems. If we are to develop better theories of government it will be important to first reframe the field of collective action, and then explore the role of government within complex social systems.

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