Cliodynamics: The Journal of Quantitative History and Cultural Evolution

State Crisis Theory: A Unification of Institutional, Socio-ecological, Demographic-structural, World-systems, and Revolutions Research

Tilman Hartley
University of Cologne and Utrecht University

Increasing ecological and political instability has stimulated interest in how similar problems have arisen in the past – and how they have been resolved. But this research has long been divided along different research traditions. This paper draws together five broad research strands: institutionalism, socio-ecological systems, demographic-structural theories, world-systems approaches, and revolutions research. It begins by establishing that each of these five traditions proposes to explain state crisis, in the sense of a decisive turning point from which the state might not emerge in its current form. But each of the five strands proposes a slightly different set of central hypotheses, and draws on a slightly different set of cases in support. Systematizing these hypotheses draws attention to a neglected distinction between crises that take place in different ecological-economic conditions. This is because crises that occur in conditions of worsening scarcity are hypothesized to have very different causes and trajectories to crises that occur in conditions of sufficiency. But beyond this fundamental scarcity/sufficiency distinction, there are no outright contradictions between different hypotheses. Unifying these theories of state crisis thus establishes a framework for testing these competing, but compatible, hypotheses.

Corresponding author's e-mail: ehartley@uni-koeln.de

Citation: Hartley, Tilman. 2024. "State Crisis Theory: A Unification of Institutional, Socio-ecological, Demographic-structural, World-systems, and Revolutions Research." *Cliodynamics* 15(1): Article 1, 1–60.

Introduction

Concerns over current political instability, social polarization, and environmental depletion has stimulated research across academic disciplines into states that have undergone periods of conflict, growing inequality, and resource degradation in the past. This research has long been divided along different research traditions. But more recently, several researchers have begun to note connections between these research strands. This paper systematically draws together these different strands. This helps us to see both the overlaps and the differences between existing research programs. It also provides a framework for the future testing of these theories against a large set of cases, in the first instance using the proposed 'Crisis and Recovery' dataset currently being compiled (Seshat 2024).

This paper suggests that there are no outright incompatibilities between these diverse literatures. But important differences remain over which factors different literatures emphasize. This unification thus draws attention to factors thought to be important in one literature but neglected by others, and so may help to uncover new explanations for specific crises that may otherwise have gone unnoticed. Certain factors of state crisis will of course be more important in some contexts than in others, an important question for future empirical to explore. But it is also possible that some literatures have privileged certain kinds of explanation and neglected others. The framework in this paper thus allows for a more comprehensive and multidimensional analysis of state crisis, by systematically constructing a synthesis of five broad literatures.

First, institutionalists examine the institutional trajectories of states, wherein crises are thought to arise both from systemic institutional processes and from shocks that provoke institutional change (North, Wallis and Weingast 2009; Acemoğlu and Robinson 2012; Jessop 2015; Conran and Thelen 2016; van Bavel 2016; Gerschewski 2021). Second, socio-ecological systems researchers

examine the collapse, or loss of resilience, of states in terms of a lasting breakdown of cultural and productive processes, population, and resource acquisition (Renfrew 1984; Tainter 1988; Holling and Gunderson 2002; Cumming and Peterson 2017; Scheffer et al. 2021). Third, demographic-structural theory and its variants focus particularly on changes in population and demographic structure as factors in the political instabilities which herald state crisis (Goldstone 2016; Turchin and Nefedov 2009; Turchin 2016). Fourth are world-systems approaches that examine the rise and decline of different hegemonic states within the rise and decline of broader systems of tribute and trade (Wallerstein 1974a; Modelski 1987; Abu-Lughod 1991; Gills and Frank 1993; Chew 2007; Arrighi 2010; Moore 2015). Fifth are revolutions researchers, a literature that has expanded beyond an initial focus on armed uprisings to analyze the occurrence of violent and nonviolent conflict in modern states (Tilly, Tilly and Tilly 1975; Tilly 1993; Skocpol 1979; Gurr and Goldstone 2019; Esty et al. 1998; King and Zeng 2001; Fearon and Laitin 2003; Collier and Hoeffler 2004; Stewart 2005; Goldstone et al. 2010; Cederman, Gleditsch and Buhaug 2013; Hillesund 2019; 2022; Beck et al. 2022; Beissinger 2022; Goldstone, Grinin and Korotayev 2022a).

Across each of these five literatures, the state is broadly conceived as a political apparatus with coercive power over a population within some territory (see also (Scheidel 2013)). State crises occur when that political apparatus is seriously challenged, and there is a strong chance that the state will not persist in its current form. Dramatic outcomes of state crises include breakdown and collapse. To the extent that a state loses the power to coerce the population within its territory, it also loses the very characteristics required to be defined as a state. But state crises do not inevitably imply catastrophic outcomes. Crises are still crises even when catastrophe is avoided; a 'crisis' is a decisive turning point when change might also be averted, or when change might be for the better (Flower 2010, ix). Across these five literatures, entrenchment

and reform are thus also potential outcomes of state crisis, alongside the potential for breakdown and collapse.

Generally speaking, then, theories of state crisis address two broad questions. First, why do crises take place? Second, why do crises have different outcomes? I here unify a more diverse range of literatures than has previously been done, and though I could not claim to have compiled a comprehensive list of hypotheses, this basic framework does allow for the integration of more hypotheses in the future. Fig. 1 represents this basic framework, in which I draw together hypotheses from across the five literatures. These are hypotheses about the conditions in which crises take place, and about the factors thought to influence the societal response to those crises. The figure illustrates succinctly what is set out in greater detail in the rest of this paper, where I explain how I have extracted these hypotheses from the five literatures, and why I systematize these hypotheses in the way that I do.

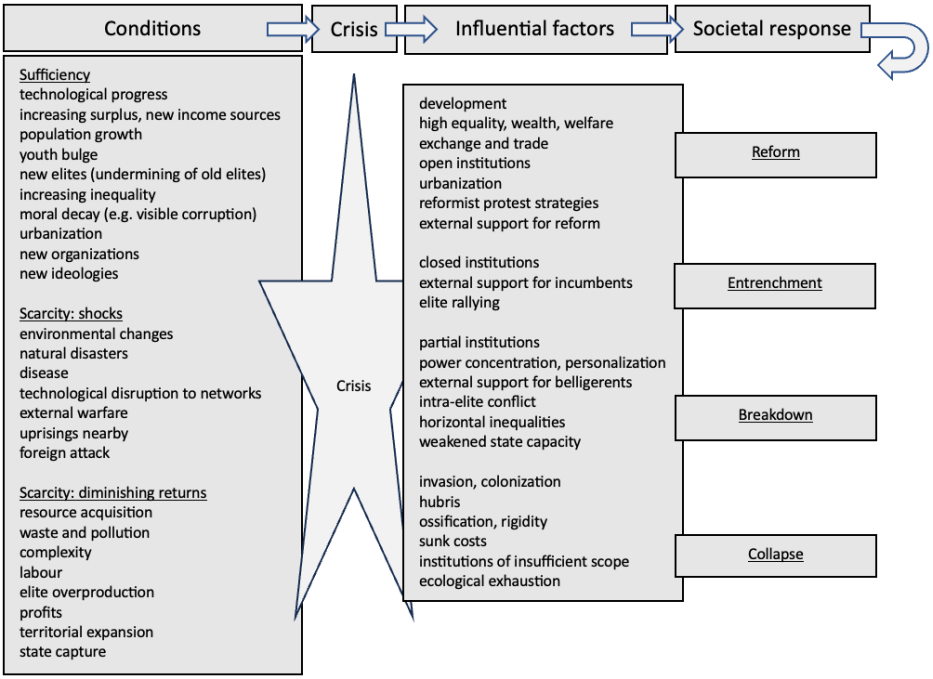

Figure 1. The State Crisis Theory framework. An illustration showing the conditions in which crises occur, and the factors that influence the societal response to crises.

My systematization of the theories centres around the fundamental distinction between two broad kinds of crises: those that occur in conditions of ecological-economic sufficiency, and those that occur in conditions of worsening scarcity. The distinction between crises in conditions of sufficiency from those in conditions of scarcity is rarely emphasized in the literature, with the notable exception of Korotayev et al. (2011: 277–79). I emphasize this relatively neglected distinction because a different set of theories is proposed to explain 'sufficiency crises' than to explain 'scarcity crises'.

I then set out the factors proposed to influence the trajectory of crises. For example, crises are thought to be strongly influenced by

whether state institutions are more democratic and open, more autocratic and closed, or somewhere in between (variously called partial, anocracratic, intermediate, or hybrid states). Other factors thought to be influential include various kinds of inequality, the dynamics between elites, factors affecting decision making, and external influences such as interventions by other states. Finally, I distinguish four societal responses to crisis. 'Reform' is where crises are resolved through relatively peaceful social or political change. 'Entrenchment' is where elites shore up state power and resist change. 'Breakdown' is where conflict becomes protracted, violent, and divisive. 'Collapse' is where there is extensive depopulation, a loss of state function, even a loss of culture. These four societal responses are often presented as binaries, with research questions often framed in terms of whether or not there is reform, whether or not there is entrenchment, whether or not there is breakdown, and whether or not there is collapse.

These binaries thus tend to bundle together outcomes that are seen as distinct in other literatures. For example, entrenchment is sometimes characterized as a successful societal response for reconstituting the state, particularly in more ancient historical examples (Schwartz and Nichols 2006; Butzer 2012). In contrast, among researchers examining more modern societies, entrenchment is often seen as a form of institutional backsliding more akin to state breakdown (van Bavel 2016; Goldstone et al. 2010). Others note that reform as well as entrenchment may result in less fundamental change than revolutionary breakdown (Dunn 1982: 20). The four categories of societal responses I outline here could, of course, be unbundled further, and for many questions further sub-division could be important (Hillesund 2022; Margolis 2012: 17). The future operationalization of these categories will more precisely define these variables in quantifiable terms. But for the purposes of my coarse-grained systematization here, these four headings represent the minimum number of categories needed to

capture the range of societal response posited by theorists across these five literatures.

There are three main contributions of this framework for state crisis research. First, crises which occur in conditions of sufficiency are fundamentally different from crises which occur in conditions of worsening scarcity, and these differences have thus given rise to two distinct bodies of theory. Second, many systemic theories of scarcity rest upon a common mechanism of diminishing returns, though differences remain regarding precisely which returns are diminishing and why. Third, once the sufficiency/scarcity distinction is taken into account, the hypotheses drawn from across the five literatures do not contradict, and can thus be considered competing but compatible. Unifying these theories establishes a framework for the future testing of these hypotheses, and for better understanding which factors may be most important given different kinds of crisis. The ultimate hope is that better understanding crises in past states may help us better navigate crises in the future.

Five literatures on state crisis

A few theorists within the five literatures I examine offer explicit definitions of 'the state' or of 'state crisis', though most more implicitly establish their objects of study through discussion and examples. In this section, I extract a few of the clearest statements (see the Appendix for references made between these five literatures and a list of the some of the shared cases they examine).

Among institutionalists, Jessop (Jessop 2015) defines 'the state' as a territory organized under a political apparatus that has powers of coercion over a particular population. Jessop notes three aspects of state crisis that follow from his definition. First, state crises manifest themselves territorially through insecure borders and occupation. Second, state crises manifest themselves in the loss of capacity or legitimacy of the political apparatus. Third, state crises manifest themselves in the population as emigration and

demographic decline. Jessop describes 'normal crises' as the kind that institutions such as the state are set up to manage. He contrasts these 'normal crises' with state crises that occur when the very institutions of crisis management are unable to go on as they have before. These deeper systemic crises "occur when a set of social relations (including their ties to the natural world) cannot be reproduced ('go on') in the old way". He lists instances of state failure, corresponding to what I call state breakdown, that include genocide and civil war. Other institutionalists offer compatible descriptions. North, Wallis, and Weingast (2009: 268–70, 21) deliberately do not offer an explicit definition or theory of the state, but describe crises due to shocks that require renegotiation amongst elites; if these renegotiations fail then "violence is likely, including civil war… ethnic violence… or coups". Van Bavel (2016: 270) identifies a phase of crisis and decline in modern market economies, evidenced by increasing "state repression, armed violence, and warfare by states".

Socio-ecological systems researchers also repeatedly emphasize that their object of research is the state, typically focusing on whether or not state crises result in state collapse. An influential antecedent of the socio-ecological systems literatures, Renfrew (1984: 367–68) defines collapse as "1) The collapse of central administrative organization of the state, 2) the disappearance of the traditional elite class, 3) the collapse of centralized economy, and 4) settlement shift and population decline". Similarly Yoffee (1988) and Cowgill (1988: 256) emphasize that it is the political apparatus of the state, rather than the society or civilization more generally, that collapses. Much like the institutionalist Jessop, Tainter (1988: 26–28, 55, 202, 141) explicitly defines the state in terms of a territorially organized ruling authority that claims a monopoly of force over a population. Tainter argues that crises which would be easily controllable by states with sufficient resources can prove insurmountable for states that lack such reserves. Tainter contrasts loss of power to competitor states with wider collapses where there

"is no competitor strong enough to fill the political vacuum of disintegration". Though crises can lead to war, invasion, decline, and collapse, crises may also prompt reform through "sweeping economic and political changes" to ensure "the survival of the State". More recent works continue to endorse these definitions, often explicitly (Faulseit 2016, 5; Middleton 2017: 12). Collapse involves "[s]tate fragmentation" (Butzer 2012: 3636), "wars… population migration… mercenary military forces… rebellions… the widespread dissolution of polities… [so that it is] impossible to re-establish a central authority" (Drake 2012: 1863), and "state-level institutional infrastructure weaken[ing] so irrevocably that is ceases to exist" (Storey and Storey 2017: 17).

Demographic-structural theory "seeks to explain a particularly severe kind of state crisis… *state breakdown*" (Goldstone 2016: 10, 9). Examining the General Crisis of the seventeenth century, Goldstone notes that state crises arise when the state starts to become perceived as ineffective or unjust. He notes that various outcomes are possible: "[a] state crisis may be resolved peacefully if elites shore up state power, or if reformers succeed in rectifying state injustices. Or a state crisis may be resolved with a coup d'etat... a state crisis may lead to elite revolts and sharp intra-elite conflicts. And if popular unrest is waiting in the wings, conflict between the state and elites may open the doors to popular uprisings or to mobilization of the population to support competing factions. Struggles for power among different groups may then lead to civil war".

World-systems approaches focus on the rise and decline of hegemonic states within a larger economic system. Wallerstein (1974a: 37) outlines the crisis of the feudal state in fourteenth and fifteenth century western Europe, in which "contraction following the expansion caused a 'crisis', one which was visible not only in the economic sphere but in the political sphere as well (internecine wars among the nobility and peasant revolts being the two main symptoms)". Wallerstein also examines the General Crisis of the

seventeenth century and the resulting consolidation of power by a succession of individual core states (Wallerstein 1974b: 407), and attributes state crises in the twentieth century to "a serious decline in the legitimacy of state structures" which "no doubt increase the amount of day-by-day violence in the world-system" (Wallerstein 2000: 249, 264). Other world-systems analyses build similar analyses of conflict accompanying crisis and loss of hegemony in the core states (Gills 1993: 126–32; Modelski and Thompson 1996: 51–58; Amin 2018; Chase-Dunn et al. 2010: 64, 72; Denemark 2021: 39; Modelski 2012: 67, 72–73). Like Jessop, Chew (2007: 4–5) emphasizes that crises are moments where existing natural and societal relations struggle to go on in the same way, and that these "crises are moments when system reproduction experiences obstacles and difficulties". Like Tainter, both Chew and Chase-Dunn et al. (2010: 66) distinguish changes in the relative fortunes of competitor states from more widespread crises in the world-system itself. These wider world-system crises tend to lead to longer declines and even collapse, Chew in particular strongly associating the centuries long 'dark ages' following the Bronze Age collapse and the end of antiquity with ecological exhaustion.

Among revolutions researchers, Skocpol (1979: 32, 51) describes the "[l]oss of legitimacy… when… the state fails consistently to cope with existing tasks, or proves unable to cope with new tasks" thereby provoking the risk of "social-revolutionary political crises". She quotes Lenin's characterization of such crises as moments when it becomes "impossible for the ruling classes to maintain their rule in an unchanged form". Tilly (1993: 10–11, 16) examines the "mechanisms that combine at times into ineffectual protest, at other times into civil wars, more rarely into political splits producing thorough transformations of social life". Focusing on revolutions, which he defines in terms of forcible transfers of state power, he notes that "this broad definition of revolution poses an empirical question: why do forcible transfers of state power have such amazingly varied outcomes, from deep alterations of social life to

restorations of the *status quo ante*?". King and Zeng (2001) define state failure as "the collapse of the authority of the central government to impose order, as in civil wars, revolutionary wars, genocides, politicides, and adverse or disruptive regime transitions", a definition that corresponds to the description of state breakdown in the literatures outlined above. Goldstone et al. (2010: 190–92) examine "political instability" in states from 1955 to 2003, particularly those that end in "civil wars… democratic reversals, genocides, and state collapse…". Distinct from state breakdown, they also note that "[p]eaceful transitions to democracy" and "the peacefully negotiated dissolution of a federal union" are also possible. Margolis (2012: 15–16) similarly describes state crisis in terms of state instability, focusing on the questions of whether "the crisis move[s] toward repression, coup, civil war, or something else", and on whether "the state can reform".

Theories of sufficiency crisis

I begin my systematization of theories by compiling hypotheses relating to sufficiency crises.

Why sufficiency crises occur

Van Bavel (2016: 251–53) clearly distinguishes the "social revolts and upheavals" that occur in the context of "relatively high levels of wealth and welfare" and typically including "a massive extension of cultivated area and huge population growth, and… substantial technological progress", and contrasts these with the unrest that occurs during periods of worsening scarcity. He connects sufficiency crises to the undermining of old feudal elites and the stimulation of markets for land, labour and capital. North, Wallis and Weingast (2009: 21) are less explicit in distinguishing different types of crisis but nevertheless note that, in states with less open institutional conditions, even potentially beneficial changes such as "bumper crops… [and] technological change…" can destabilize

states and make violence more likely. Relatedly, contemporary observers themselves sometimes focus on 'moral decay' in the form of declining standards, particularly in public life, that accompany state crises (Mitchell 1984; Blanton et al. 2020). Van Bavel (2016: 141–42) draws on Machiavelli's suggestion that the loss of virtue and the neglect of the public good associated with moral decay may actually be the result of an increase in personal wealth which produces individuals whose power exceeds the abilities of states to constrain them, with those individuals acting to close state institutions and thus further increasing the potential for corruption, coercion, and violence.

Fischer-Kowalski et al. (2019: 69–71) analyze the transition from agrarian to fossil fuel based energy systems and its relationship with social revolution. They emphasize the key role of "cheap combustion material" in allowing a large mass of people to live in close proximity, who are then "able to organize themselves, and to develop new visions for society". People migrating to fast growing urban centers are no longer constrained by serfdom and slavery, and are instead hired as wage laborers. The goods they make yield a surplus to manufacturers and traders, who reinvest that surplus and gradually accumulate economic and political power. This challenges the power of the traditional land owning elites. The resulting tensions "may be resolved calmly and peacefully, or lead to social revolutions".

Goldstone, Grinin and Korotayev (2022b: 38–39) propose a similar set of factors, noting that in "the modern era, in most cases revolutions have been generated by tensions which emerged as a result of rapid economic modernization… Such modernization brought an explosive growth of population, urbanization, youth bulges, new sources of income, shifts in social mobility, increases in inequality, and more visible corruption".

Korotayev et al. (2011: 277–79) emphasize the demographic aspects of urban growth, examining the Arab Spring and uprisings in other countries in similar situations throughout the twentieth

century. They find that unrest occurred despite the fact that "the quality of life for the majority of the population, as measured by such demographic indices as life expectancy, has been steadily improving". They explain that "[m]any researchers regard the rapid growth of the youth share in population as a major factor of political instability… [alongside] a rapid growth of urban population due to both natural increase and rural-urban migration… Thus, not only does the most radically inclined part of population explode numerically, it also becomes concentrated near the centers of [the] political system, presenting a serious danger for political stability". Korotayev et al. explicitly contrast sufficiency crises with the kind of scarcity crises that presaged the breakdown of the Qing Dynasty in nineteenth century China and the breakdown of Ethiopia in the twentieth century.

These theories suggest a broad consensus about the kinds of factors that might increase the likelihood of sufficiency crises. The hypothesized factors are technological progress, an increased surplus and new income sources, population growth, a youth bulge, the emergence of new elites that undermine older elites, increasing inequality, moral decay such as more visible corruption, urbanization, and the organization of people around new organizations and new ideologies (see Table 1).

Table 1. Why sufficiency crises occur

Hypothesized factor	*References*
technological progress	(North, Wallis and Weingast 2009: 21; van Bavel 2016: 251–53)
increased surplus, new income sources	(Fischer-Kowalski et al. 2019: 69–71; Goldstone, Grinin and Korotayev 2022b: 38–39)
population growth	(Korotayev et al. 2011; Goldstone, Grinin and Korotayev 2022b: 38–39)
youth bulge	(Korotayev et al. 2011; Goldstone,

	Grinin and Korotayev 2022b: 38–39)
new elites (undermining of old elites)	(van Bavel 2016: 251–53; Fischer-Kowalski et al. 2019: 69–71; Goldstone, Grinin and Korotayev 2022b: 38–39)
increasing inequality	(Goldstone, Grinin and Korotayev 2022b: 38–39)
moral decay (e.g. visible corruption)	(van Bavel 2016: 141–42; Goldstone, Grinin and Korotayev 2022b: 38–39)
urbanization	(Korotayev et al. 2011; Fischer-Kowalski et al. 2019: 69–71; Goldstone, Grinin and Korotayev 2022b: 38–39)
new organizations*	(Fischer-Kowalski et al. 2019: 69–71)
new ideologies*	(Fischer-Kowalski et al. 2019: 69–71)

* Fostered by urbanization.

What influences the societal response to sufficiency crises

Van Bavel (2016, 252) notes that even successful revolts do not invariably lead to reform, and tentatively suggests that success in weakening old elites might also be conditional upon an already fairly developed economy, functioning systems of exchange and allocation, output markets and trade networks, and relatively high levels of wealth and welfare. Though Fischer-Kowalski et al. (2019) mention that tensions may be resolved calmly or lead to revolution, their aim is not to explain why crises go one way or the other, and they advance no hypotheses in this direction. Korotayev et al. (2011: 297) similarly do not advance a hypothesis about this. They note that many more were killed during protests by low-educated Egyptian youths in the 1977 'Bread Riots' than protests by high-educated youths during the 2011 Arab Spring, comparing the former to bloody civil wars and the latter to the youth uprisings of 1968 and the 'velvet revolutions' of the 1980s. But in Egypt, both

the 1977 and 2011 uprisings resulted in entrenchment rather than significant reform. Beissinger (2022) emphasizes that as urbanization concentrates protesters in cities, protest movements have developed more effective strategies to reduce the risk of repression. In several recent crises, many of these strategies have been nonviolent, with movements seeking international support for reform, rather than attempting to seize state power directly (Beck et al. 2022: 14, 159; Beissinger 2022).

Vesco et al. (2020: 3,11) summarizes a line of argument known as the "resource curse hypothesis" often posited both by institutionalists and by revolutions researchers, especially for partial or closed states. The theory is that resource abundance can lead to entrenchment as elites have an incentive to engage in extractive behaviors and thus "widespread corruption, lack of transparency, poor rule of law, and weak institutions", and can also increase the risks of state breakdown into conflict over those resources. This is thought especially likely in the presence of non-renewable but highly profitable resources such as minerals and fossil fuels. Vesco et al. do not intend any detailed explanation of why some crises turn violent, but emphasize that "[f[urther attention needs to be devoted to the mechanisms and pathways connecting natural resource abundance/scarcity to conflict".

A number of influential factors are not limited to sufficiency crises (and so are mentioned both here and in the discussion of scarcity crisis below). 'Personalist' states, where power has become concentrated around the incumbent leader, are more likely to lead to state breakdown, particularly when such a leader has been in office for a long period (Goldstone, Grinin and Korotayev 2022b: 46; Albrecht and Koehler 2020). In general, both open states and closed states are thought less likely to experience violent breakdown than partial states. The theory is that an open state is more likely see the enacting of timely reform in response to crisis, and a closed state more likely to see entrenchment and the enforcement of state authority. But in a partial state both reform and entrenchment are

more difficult, and hence partial states are thought to be at greater risk of breakdown (King and Zeng 2001, 651; Goldstone et al. 2010; Goldstone, Grinin and Korotayev 2022b, 46). A variation on this theme is that violence is more likely where there are severe 'horizontal inequalities' between cultural groups (Stewart 2005), since the exclusion of ethnic, religious, or linguistic groups from political processes increases factionalization and the risk of conflict (Cederman, Gleditsch and Buhaug 2013, 4–5; Bodea and Elbadawi 2007, 23–24). Tilly (1993, 237, 246–47) observes that revolutionary situations are more likely if states threaten strong collective identities or rights attached to those identities, and notes that historically the most common challengers to incumbent European rulers have been "marginalized 'parochial' identities". Similarly, Hillesund (2022, 170–72) suggests that the political exclusion of a particular cultural group motivates dissent whilst their economic exclusion limits the effectiveness of nonviolent tactics, thus making violence more likely. How other states intervene in another's internal crises can strongly affect the outcome of crises, particularly where they encourage reformers, support incumbents, or add to the pressures that increase the likelihood of state breakdown (Tilly 1993, 6; Goldstone, Grinin and Korotayev 2022b).

In summary, sufficiency crises are theorized as potentially leading to three societal responses: reform, entrenchment, or breakdown (see Table 2). Sufficiency crises are not generally supposed to lead to collapse. This is unsurprising: sufficiency crises occur precisely in conditions of population growth, improved or sustained quality of life, increased surpluses, and urbanization, in contrast to the depopulation, widespread immiseration, declining surplus, and urban abandonment associated with state collapse.

Table 2. Factors influencing the societal response to sufficiency crises.

Hypothesized factor	*Increased likelihood of*	*References*
development	reform	(van Bavel 2016: 252)
high equality, wealth, welfare	reform	(van Bavel 2016: 252)
exchange and trade	reform	(van Bavel 2016: 252)
open institutions	reform	(King and Zeng 2001: 651; Goldstone et al. 2010; Goldstone, Grinin and Korotayev 2022b: 46; Vesco et al. 2020: 3,11)
urbanization	reform	(Beissinger 2022)
reformist protest strategies	reform	(Beck et al. 2022; Beissinger 2022)
external support for reformers	reform	(Tilly 1993: 6; Beck et al. 2022; Goldstone, Grinin and Korotayev 2022b: 46–47)
closed institutions	entrenchment	(King and Zeng 2001, 651; Goldstone et al. 2010; Goldstone, Grinin and Korotayev 2022b: 46; Vesco et al. 2020: 3,11)
external support for incumbents	entrenchment	(Tilly 1993: 6)
partial institutions	breakdown	(King and Zeng 2001, 651; Goldstone et al. 2010; Goldstone, Grinin and Korotayev 2022b: 46; Vesco et al. 2020: 3,11)
power concentration, personalization	breakdown	(Goldstone, Grinin and Korotayev 2022b: 46; Albrecht and Koehler 2020).
external support for	breakdown	(Tilly 1993: 6)

belligerents		
intra-elite conflict	breakdown	(Goldstone, Grinin and Korotayev 2022b: 46)
horizontal inequalities	breakdown	(Tilly 1993: 237, 246–47; Stewart 2005; Cederman, Gleditsch and Buhaug 2013: 4–5; Hillesund 2022; Bodea and Elbadawi 2007: 23–24)

Theories of scarcity crisis

The majority of the theories I have surveyed are theories of scarcity crisis. I present these theories in two groups: shocks; and diminishing returns.

Why scarcity crises occur: shocks

Scarcity crises are often thought to be precipitated by some shock (see Table 3). These shocks are variously described as 'accidental' (Jessop 2015), 'accidental disruptions' (Middleton 2017: 27), 'adverse events' (Janssen, Kohler, and Scheffer 2003: 727), 'agents of disturbance' (Holling 2001, 394), 'hazards' (van Bavel 2019b: 62), 'major adversities', 'major stress surges' (Tainter 1988: 195–96), and 'triggers' (Butzer 2012). Shocks may also exacerbate crises occurring during periods of sufficiency, but are most closely associated with scarcity crises, typically causing a period of scarcity at least in the short term.

Table 3. Why scarcity crises occur: shocks

Hypothesized factor	*References*
environmental changes*	(Holling 2001: 394; Weiss 2017: 1–3)
natural disasters†	(Chew 2007: 4; Drake 2012: 1863; Holling 2001: 394–96)
disease	(Tainter 1988; Cumming and Peterson

	2017: 2; Middleton 2017: 11–12; Chase-Dunn and Hall 1997: 112–15; Root 2020: 258–60)
technological disruption to networks	(Armit et al. 2014: 17047)
external warfare	(Abu-Lughod 1991: 18–20: 360; Butzer 2012)
uprisings nearby	(Tilly 1993: 13–14; Goldstone, Grinin and Korotayev 2022b: 46)
foreign attack, invasion, colonization	(Butzer 2012: 3638; Middleton 2017: 26–27)

* Including drought, mega-drought, adverse weather, and climatic change.
† Including tectonic events (earthquakes, plate shifts, volcanoes), wind, fire, and insect outbreak.

Shocks are often considered to be relatively short term events and contrasted to more incremental or systemic factors. But sometimes they are actually long term changes that take place over decades or centuries, though often some particular noteworthy events stand out from within the context of a longer term change. Shocks include environmental changes such as droughts and other adverse weather events, including those that occur in the context of longer term climatic changes (Holling 2001: 394; Weiss 2017: 1–3). They also include natural disasters in the form of tectonic shifts and volcanoes (Chew 2007: 4), earthquakes (Drake 2012: 1863), wind, fire, and insect outbreak (Holling 2001: 394–96). Disease is also often considered a shock (Goldstone 2016; Butzer 2012; Holling 2001), with the increased risk and impact of epidemics themselves thought to be a consequences of increased trade and world-system expansion (Chase-Dunn and Hall 1997: 114). Whatever the cause, a drop in population is thought to be accompanied by a short term increase in the proportion of the population engaged in subsistence activities and hence a drop in trade, which in turn can lead to a loss

of political, economic, and cultural hegemony (Abu-Lughod 1991: 18–20), networks (Butzer 2012), and complexity (Diamond 2005: 3–6). Even shocks that occur elsewhere can thus cascade through networks and affect other states. Technological change is rarely thought to be the main driver of worsening scarcity, but one exception is the theory that the Late Bronze Age population collapse may have been caused by social destabilization resulting from new iron technology making long established networks redundant (Armit et al. 2014: 17047). (For hypotheses about the *lack* of technological change, see below.)

External warfare is also associated with destabilization, disruption, and decline. Even quite distant external warfare can disrupt trade and other networks (Abu-Lughod 1991: 18–20, 360; Butzer 2012). The effects of interstate war are quite similar to those caused by environmental disasters or by pathogens, and with the same caveat that a state's interdependence with the wider system can increase both the risks and the impact of these disturbances. Uprisings nearby can encourage emulation and make revolutionary expertise and ideology more readily available, as well as reduce the ability of affected states to shore up incumbents in neighboring states (Tilly 1993: 13–14). Recent revolutions research has thus placed more emphasis on seeing revolutions as part of regional or even global waves (Goldstone, Grinin and Korotayev 2022b: 46). States defeated in war with another state can lose legitimacy as well as material resources (Tilly 1993: 6).

Why scarcity crises occur: diminishing returns

It is common, particularly among institutionalists, to distinguish 'shocks' from processes that are more 'endogenous' (Gerschewski 2021; Greif and Laitin 2004), 'inherent' or 'systemic' (Jessop 2015), and the result of 'internal tensions' (Conran and Thelen 2016: 20). But when compiling these diverse 'non-shock' factors of worsening scarcity, I was struck by how many of these hypotheses ultimately derive from a theory of diminishing returns (see Table 4). So I

describe these as theories of 'diminishing returns', as a clear statement of what unites these theories, and of what distinguishes them from the 'shocks' just described.

Table 4. Why scarcity crises occur: diminishing returns

Hypothesized factor	*References*
resource acquisition	(Tainter 1988: 91, 110, 125, 194–96)
waste and pollution	(Moore 2015: 37, 269)
complexity	(Tainter 1988; Cumming and Peterson 2017: 2; Middleton 2017: 11–12; Chase-Dunn and Hall 1997: 112–15; Root 2020: 258–60)
labour	(Cumming and Peterson 2017, 7; Tilly 1993, 6; Diamond 2005: 6; Motesharrei, Rivas and Kalnay 2014)
elite overproduction*	(Goldstone 2016; Turchin and Nefedov 2009, 313; Motesharrei, Rivas, and Kalnay 2014; Alexander 2016; 2017; 2019)
profits†	(van Bavel 2016; Goldstone 2016; Turchin and Nefedov 2009; Turchin 2016; Arrighi 2010; Moore 2015: 103–4, 162, 165; Wallerstein 1974b: 414–15; 2000; Gills 1993; Modelski and Thompson 1996: 51–53; Amin 2018; Modelski 2012: 67, 72–73; Alexander 2019)
territorial expansion‡	(Tainter 1988: 148–49; Cumming and Peterson 2017: 14; Arrighi 2010: 43; Moore 2015, 167; Tilly 1993: 238; Wallerstein 1974b: 412–15; Chase-Dunn and Hall 1997: 101; Kennedy 1987)
state capture§	(van Bavel 2016: 21, 278–79; Arrighi 2010; Wallerstein 2000: 253; Gills 1993)

* Driven by elite population and consumption growth, and/or labour oversupply.

† Driven by higher resource and waste cost, rising wages, higher taxation, competition, and/or declining demand.
‡ Driven by transport costs, external resistance, costs of co-option, ecological damage, military overstretch, and/or complex organization.
§ Driven by declining profits.

In the abstract, a theory of diminishing returns (also called 'declining' or 'decreasing marginal' returns) posits that, all else equal, the return on inputs declines as more inputs are added. At a certain point, more investment of an input no longer provides any increase in return. All the theories here share this formal similarity, but differ about which inputs are subject to diminishing returns.

The diminishing returns argument is applied perhaps most fundamentally to the investment of resources in acquiring further resources. Diminishing returns occur since it is most efficient to first use resources that are easiest to acquire and, when those initial sources are exhausted, to shift to other sources that are harder to acquire. This shift results in reduced returns for the same investment (Tainter 1988: 92, 110, 125, 194–96). Often accounts focus on energy resources expressed in terms of energy return on energy invested. This is partly because all productive and reproductive processes require energy, making it a somewhat culturally independent measure of resource use than more specific agricultural goods or construction materials. But the same basic argument applies across natural resource acquisition, and also to the costs of disposing of waste in sinks: initially disposal costs are low, but over time the costs of disposing of waste and the negative effects of pollution grow ever faster (Moore 2015: 37, 269).

Tainter's influential account also emphasizes the role of social complexity in both using and acquiring energy (Tainter 1988; Cumming and Peterson 2017: 2; Middleton 2017: 11–12; Chase-Dunn and Hall 1997: 112–15; Root 2020: 258–60). Much of the investment in human societies is in the form of increasing the complexity of organizations to solve problems. But these

organizations in turn require increasing amounts of energy for their maintenance. At the point where additional complexity costs more energy than it returns, societies are no longer able to solve their problems via more complexity. Complexity becomes a less attractive strategy, and some parts of society may make efforts to break away since secession and rebellion become more attractive. As productive capacity and accumulated surpluses decline, there are fewer reserves with which to deal with any shocks that occur. Tainter (1988: 195) writes that "[o]nce a complex society enters the stage of declining marginal returns, collapse becomes a mathematical likelihood". Collapse is sometimes described as an appropriate response to such a situation, and though often appearing catastrophic for elites, may actually be beneficial for others within the population (Tainter 1988: 198).

Populations are themselves theorized to be subject to diminishing returns as their numbers grow. All else equal, population growth increases pressure on ecological resources, and diminishing returns to labour. Tilly (1993: 6) remarks that “in the absence of expanding production and increasingly effective collection of state revenues, prolonged population growth weakens the capacity of the state… a weakened state is more liable to revolution than a strong one”. Diamond (2005: 6) lists several ways in which intensification can lead to ecological degradation, including "deforestation and habitat destruction, soil problems (erosion, salinization, and soil fertility losses), water management problems, overhunting, overfishing, effects of introduced species on native species, human population growth, and increased per-capita impact of people". As resources are used up or degrade, people must work just as hard to acquire fewer returns. This decline in per capita output increasingly immiserates the population; the point at which an increase in population produces negative returns is sometimes known as the 'carrying capacity', beyond which starvation or emigration brings the population back down (Cumming and Peterson 2017: 7; Motesharrei, Rivas, and Kalnay

2014). Boserup importantly qualifies this by showing that population pressure can also prompt technological innovations that increase per capita output (Boserup 1965, 1981). Technological progress is thought to be more likely under more open institutions that are more conducive to innovation (Acemoğlu and Robinson 2012: 119–21; Modelski 2012: 73). But both institutional and technological innovation are themselves hypothesized to be subject to diminishing returns (Motesharrei, Rivas, and Kalnay 2014: 93).

Population growth is also theorized to initially benefit elites until elites eventually exceed what the general population can support. This 'elite overproduction' makes crisis more likely (Turchin and Nefedov 2009: 313). An early version of this argument is that diminishing returns to labour drives up commodity and land prices, initially driving down wages. This increases the financial burdens on the state, but crucially also increases elite numbers and elite levels of consumption, eventually leading to ever more economic and political competition between an increasing number of elites. This occurs alongside the continuing decline in wellbeing of the general population, whom competing elites try to recruit and mobilize against other elite factions (Goldstone 2016). The particular focus on the behavior and motivations of elites makes this a lagged second-order theory of diminishing returns, in which the number and appetites of elites initially increases but soon outpaces the carrying capacity of what can be extracted from the general population. This leads to increasing social polarization, more coercive extraction, and elite infighting over a dwindling income base (Turchin and Nefedov 2009: 313). For a second-order model of these dynamics, see (Motesharrei, Rivas and Kalnay 2014).

Some recent variations of demographic-structural theory de-emphasize the demographic elements of the account. In effect, they dispense with the 'diminishing returns to labour' part of the argument, that is, the first-order argument that wages decline as population pressure on resources increases. Turchin's structural-demographic account instead proposes that labour supply

outpacing demand drives down wages (Turchin 2016), whilst Alexander's non-demographic account suggests that low wages are more to do with changes in institutional culture and policies to suppress wages (Alexander 2016; 2017; 2019). In other words, in these more recent variations the 'first-order' dynamics of declining wages are not necessarily driven by diminishing returns to population growth – but the 'second-order' part of the argument, whereby elites experience diminishing returns, is nevertheless retained. Initially, low wages allows elites to increase, but eventually elite numbers and their expanding consumption exceeds what the general population can sustain. Elite investment, whether into production or into coercion, no longer produces the returns that it once did, increasing competition and conflict among elites, and increasing the likelihood of crisis.

Diminishing returns to investment are also important in other theories of crisis. Where productive investments are concerned, such returns are often called 'profits'. Whether and why the profit rate tends to decline is a topic of lengthy debates, particularly among theorists of capitalist crisis (Mandel 1981; Hodgson 1991; Harvey 2016). But the key hypotheses all relate to a theory of diminishing returns, several of which are based on mechanisms already discussed above. Natural resource inputs become increasingly more costly, as does disposing of waste (Moore 2015: 103–4, 162, 165; Wallerstein 2000: 260). Profits are squeezed if wages rise (Turchin 2016; Wallerstein 2000: 258–59), by the higher taxation levied by the state in the face of price rises (Goldstone 2016; Wallerstein 2000: 261), by population growth, and by popular demands for education, health, pension, and social insurance (Wallerstein 2000: 261). Competition in general erodes profits, particularly as the diffusion of technological innovations erodes the competitive advantage of early adopters (Modelski and Thompson 1996: 51–53; Modelski 2012: 67, 72–73). One theory of falling profits that is not directly related to previously mentioned diminishing returns links overaccumulation to declining demand:

since goods cost more than wage earners are paid to produce them, wage earners eventually become unable to afford the goods that are produced (Wallerstein 1974b: 414–15; Amin 2018). Declining profits may in turn motivate a shift from investment to finance (van Bavel 2016; Arrighi 2010), attempts at wage suppression (Alexander 2019) and direct coercion (Turchin and Nefedov 2009; Gills 1993), and can motivate territorial expansion in search of more resources, cheaper labor, and new markets (Moore 2015; Wallerstein 1974b: 414–15; Amin 2018).

But territorial expansion is itself thought to have diminishing returns. Transport and communication costs increase (Tainter 1988: 148–49). Expansion often meets increasingly organized resistance abroad, and tax rises to cover military costs can provoke revolt at home (Arrighi 2010, 43; Moore 2015: 167). Excessive military commitments can erode a state's economic base (Kennedy (1987) drawing on Wallerstein and on Modelski). And a state's ability to coerce can be diminished by defeat in war, revolt, defection, and the financial drain of war (Tilly 1993: 238). Co-opting oppositional groups creates further incentives for other groups to resist, making co-option ever more expensive and ever less worthwhile (Wallerstein 1974b: 412–15). The scale of ecological damage increases, and the maintenance and regulation of a larger and more diversified system requires more complex organization (Cumming and Peterson 2017: 14; Chase-Dunn and Hall 1997: 101). Organizational complexity is, of course, itself thought to be subject to diminishing returns.

Hypotheses of state capture posit that dominant groups in society increasingly use their wealth to acquire political power, and thereby the state's means of coercion (van Bavel 2016: 21). This diverts resources away from productive investment and leads to economic stagnation or decline, as well as driving the closure of economic and political institutions, wage suppression and the distortion of markets, and increasing coercion which increasingly engenders resistance (van Bavel 2016; Gills 1993). Some

hypothesize that the decision of the wealthy to shift investment from production and trade to finance and coercion are motivated by declining profits in the more productive sectors of the economy (van Bavel 2016: 278–79; Arrighi 2010; Wallerstein 2000: 253). On this hypothesis, then, state capture is itself thought to be a consequence of the factors driving declining profits discussed above.

What influences the societal response to scarcity crises

As with sufficiency crises, the openness of institutions is often hypothesized to influence the societal response to scarcity crises. In theory, reform is thought more likely in open societies, and more open institutions are thought to be better able to offer buffering feedback that aids stability, particularly if reforms promote economic and political equality, develop effective hazard management institutions, and limit elite infighting (Butzer 2012: 3637; Motesharrei, Rivas, and Kalnay 2014: 98; Middleton 2017: 340–41; van Bavel 2019a: 62; Witoszek and Midttun 2018).

In contrast, the lack of openness in partial and closed states is thought to increase the risk and severity of shocks. Partial or closed institutions decrease the likelihood of adaptation since wealthier and more powerful individuals are motivated to uphold existing arrangements to protect their own interests (Butzer 2012: 3636; van Bavel 2019b: 62; van Bavel, Curtis and Soens 2018), and may even employ emergency powers that tend to further concentrate power (Kemp 2021). Even where some adaptation does take place, the actions taken in partial and closed institutional arrangements often tend to focus on increasing the overall capacity of the economic system to recover from shocks. In the terms of my framework, we might describe this as an attempt to turn conditions of worsening ecological-economic scarcity into conditions of sufficiency. But without institutional reforms that increase equality, such attempts can actually result in reducing the economic and political openness of the system even further (van Bavel 2019b: 63).

Since the wealthy and powerful are more insulated from shocks, and the poorer and weaker more susceptible to them, the deleterious effects of poorly managed crises can become a cascading feedback loop bringing ever more economic and social polarization upon each iteration (van Bavel 2019b; van Bavel, Curtis and Soens 2018).

Across literatures, the unity of elites is thought to increase the likelihood of entrenchment, and to decrease the likelihood of breakdown. When elites rally they are more likely to avoid the infighting characteristic of state breakdown, even if they are rallying in support of a military or authoritarian leader (Butzer 2012). As Turchin and Nefedov put it, "as long as the elites remain unified, peasant insurrections, slave rebellions, or worker uprisings have little chance of success" (Turchin and Nefedov 2009: 314). But if elites are divided, and particularly if they undermine existing claims to legitimacy and mobilize the population against each other, then the chances of crises occurring, and particularly, of degenerating into breakdown increase (Butzer 2012; Turchin and Nefedov 2009; Arrighi 2010: 43; Turchin 2016; Goldstone, Grinin and Korotayev 2022b).

Tilly (1993: 237) observes that revolutionary situations appear more frequently when states demand more from their best-organized citizens than the state can actually induce them to deliver, and when the power of rulers visibly diminishes in the face of strong competitors. The risk is perhaps particularly high in partial states where rival factions have the capacity for violence but are systematically excluded from the state apparatus (Bodea and Elbadawi 2007: 23; Stewart 2005; Goldstone et al. 2010; Hillesund 2019, 2022). In partial and closed states, the misperception of rival elites' capabilities can also play a role in increasing the likelihood of breakdown into violence (North, Wallis and Weingast 2009: 21). As states breakdown, a cascading feedback loop may arise, with ever more infighting between rival elites over the spoils they extract, ever more coercive extraction from the general population, and

ever declining productive investment. Fighting can enrich combatant elites whilst further impoverishing the poorest, with increasing economic and political polarization further undermining the legitimacy of the state. Within the state itself, concentrations of power, institutional closure, and increasing extraction fuels resentment and increases the likelihood of social unrest (Gills 1993: 126; van Bavel 2016).

World-system analyses emphasize that the concentration of wealth, the decline of productive profits, the shift to financialization, and increasing conflict within states is also inherently connected with the conflict between core states and their peripheries. This is thought to take the form of forced and violent globalization, anti-colonial and counter-hegemonic mobilization, and growing competition and conflict between declining core powers and emerging rivals (Amin 2018; Chase-Dunn et al. 2010: 81; Denemark 2021: 39; Amin 2013: 8–9). As hegemons decline, they increasingly attempt to use military power as a substitute for their waning economic power. This increases counter-hegemonic conflict with those who perceive this power to be exercised illegitimately. Sometimes the previous legitimizing discourses used by hegemonic cores are themselves deployed by those who resist, both within states and from the peripheries, in an attempt to protect themselves from and to mobilize against exploitation and domination (Arrighi 2010: 23; Chase-Dunn et al. 2010: 81). As ever, how other states intervene in another's internal crises can strongly affect the outcome of those crises (Tilly 1993: 6; Goldstone, Grinin and Korotayev 2022b: 46–47). And the effects of foreign attacks and invasions can range from disruptive to catastrophic, with colonization in particular emphasized as a shock that can trigger full-blown demographic, political, and cultural collapse (Butzer 2012: 3638; Middleton 2017: 26–27).

The strength of global leadership and the relative strength of rivals are also factors influencing the course of global wars, where misperception of rivals capacities and intentions is again thought to

play a role in precipitating war (Sarkees and Wayman 2010). Global wars tend to continue until a new hegemon establishes a period of relative peace and stability (Denemark 2021: 39; Modelski and Thompson 1996: 51–53; Modelski 2012: 67, 72–73).

Within states, a cascading feedback loop is proposed to occur as the delegitimization of the state weakens state capacity, making it harder to deliver services to the population, harder to protect the quasi-monopolies that deliver profits to businesses, and harder to guarantee security. The more individuals take on responsibility for their own security, the more the state is delegitimized, with the individualization of personal security particularly likely to form a "negative spiral" of cascading feedbacks of further delegitimization and a breakdown into violence (Wallerstein 2000: 246, 264). Violence itself, as well as its potential to drive emigration and to disrupt food supplies, further increases tensions and resentments, and further undermines trust and the practices and institutions that formerly bound people together (Scheffer et al. 2021: 4–5).

Other mechanisms are proposed to explain the failure to adapt to changing ecological-economic circumstances, including the hubristic refusal to admit that change is necessarily (Johnson 2016) and the accumulated rigidities or ossification of state structures that hinder necessary adaptation (Holling 2001: 394–96; Root 2020: 87). Similarly, a 'sunk-cost account' suggests that a society in which people have heavily invested in expensive infrastructure are less likely to abandon these investments. Instead, they will try to rigidly maintain their previously successful strategies even in changing ecological-economic circumstances, thus making local depletion and collapse, when it does finally occur, appear all the more dramatic (Janssen, Kohler and Scheffer 2003).

Many of the more deleterious effects of diminishing returns could, in theory at least, be avoided by instituting governance to protect natural resources or to regulate population growth (Chase-Dunn et al. 2010: 72). Ecological-economic systems that expand faster than governance and regulation become misaligned. In the

absence of institutions of sufficient scope to prevent systemic disfunction, this increases the potential for collapse (Cumming and Peterson 2017: 14). Ecological exhaustion is itself strongly associated with systemic collapse (Chew 2007: 6). All these hypothesized influences on the societal response to crises are listed in Table 5.

Table 5. Factors influencing the societal response to scarcity crises

Hypothesized factor	*Increased likelihood of*	*References*
high economic equality	reform	(Butzer 2012: 3637; Motesharrei, Rivas and Kalnay 2014: 98; Middleton 2017: 340–41; Witoszek and Midttun 2018; van Bavel 2019b: 62)
open institutions	reform	(Butzer 2012: 3637; Motesharrei, Rivas and Kalnay 2014: 98; Middleton 2017: 340–41; van Bavel 2019a: 62; Witoszek and Midttun 2018)
external support for reformers	reform	(Tilly 1993: 6; Goldstone, Grinin and Korotayev 2022b:46–47)
elite rallying	entrenchment	(Butzer 2012; Turchin and Nefedov 2009; Arrighi 2010: 43; Turchin 2016; Goldstone, Grinin and Korotayev 2022b: 46)
closed institutions	entrenchment	(Butzer 2012: 3636; van Bavel 2019b: 62; van Bavel, Curtis and Soens 2018; Gills

		1993: 126)
external support for incumbents	entrenchment	(Tilly 1993: 6; Goldstone, Grinin and Korotayev 2022b: 46–47)
partial institutions	breakdown	(Butzer 2012: 3637; Motesharrei, Rivas and Kalnay 2014: 98; Middleton 2017: 340–41; Witoszek and Midttun 2018; van Bavel 2019b: 62)
external support for belligerents	breakdown	(Tilly 1993: 6; Goldstone, Grinin and Korotayev 2022b: 46–47)
horizontal inequalities	breakdown	(Stewart 2005; Goldstone et al. 2010; Hillesund 2019; 2022; Bodea and Elbadawi 2007)8/29/2024 10:52:00 PM
intra-elite conflict*	breakdown	(Butzer 2012; Turchin and Nefedov 2009; Arrighi 2010: 43; Turchin 2016; Bodea and Elbadawi 2007: 23; Stewart 2005; Goldstone et al. 2010; Hillesund 2019; 2022; Goldstone, Grinin and Korotayev 2022b: 46)
weakened state capacity	breakdown	(Wallerstein 2000: 246, 264; Scheffer et al. 2021: 4–5)
invasion, colonization	collapse	(Butzer 2012: 3638; Middleton 2017: 26–27).
hubris	collapse	(Johnson 2016)
ossification, rigidity	collapse	(Holling 2001: 394–96; Root 2020: 87)

sunk costs	collapse	(Janssen, Kohler and Scheffer 2003)
institutions of insufficient scope	collapse	(Chase-Dunn et al. 2010: 72; Cumming and Peterson 2017: 14)
ecological exhaustion	collapse	(Chew 2007: 6)

* Which may be driven by elite overproduction.

Conclusion

I have unified these theories of state crisis by integrating five broad literatures surrounding two questions: Why do crises occur? And what factors influence societal responses to state crisis? This paper contributes to answers in three ways.

First, I have distinguished two fundamentally different varieties of state crisis: those that occur in ecological-economic conditions of sufficiency, and those that occur in conditions of worsening scarcity. Emphasizing this important but neglected distinction allows us to be sure that we are comparing theories that are indeed comparable, and to avoid attempting comparison between theories intended to apply to substantially different kinds of state crisis.

Second, many theories of worsening scarcity rest on a common mechanism: diminishing returns. Though differences remain as to what is diminishing and why, it may prove fruitful to further investigate this commonality and to see if there are further interrelationships between the various theories of diminishing returns.

Third, the unification I here propose allows us to clearly distinguish the different factors that are hypothesized to contribute to state crisis. I have identified the factors hypothesized to increase the likelihood of a sufficiency crisis (Table 1) and the factors hypothesized to influence the societal response to sufficiency crises

(Table 2). Similarly, I have identified the kinds of shock (Table 3) and the varieties of diminishing returns thought to make a scarcity crisis more likely (Table 4), as well as the factors hypothesized to influence the societal response to scarcity crises (Table 5). Different theories give different importance to different hypothesized factors. But beyond the fundamental distinction drawn between scarcity crises and sufficiency crises, there are no obvious contradictions between posited hypotheses. This unification thus establishes a framework for testing these competing but compatible hypotheses.

Examining five hundred years of European history Tilly noted that, faced with the sheer amount of information, an individual scholar can at best "take up a small piece of the problem, or dare a provisional synthesis". He nevertheless hoped that "some day a single polymath, research team or computer may pack all the critical evidence into a connected bundle" (Tilly 1993: 18–19). The aspiration to construct a more general theory of state crisis persists (Scheidel 2013; Goldstone, Grinin and Korotayev 2022b). Research groups continue to collate data on an ever growing number of cases, to test hypotheses, and to generate new theories. Having systematically connected five major traditions in this ongoing body of work, the provisional synthesis presented here provides a framework upon which to weave together these theories and data into an ever more complete understanding of state crisis.

Appendix

For theories to be comparable, it is important to establish that they all advance explanations for broadly the same phenomenon. The section 'Five literatures on state crisis' in the main text of this paper shows that each of the five literatures provides compatible definitions of the 'state' and of 'state crisis'. The purpose of this Appendix is to provide two additional lines of evidence showing these five literatures examine the same phenomenon: state crisis. First, some theorists refer across literatures and consider

themselves as investigating the same phenomenon as other literatures. Second, at least 45 specific cases of state crisis are examined across two or more literatures, indicating that these researchers believe themselves to share a common object of study: state crisis.

Theorists of state crisis refer across literatures

Several theorists refer across literatures (see Figure A1). Most notably, theorists from all five literatures engage with Goldstone's demographic-structural theory. This strongly suggests that they consider themselves as sharing Goldstone's object of study: state crisis.

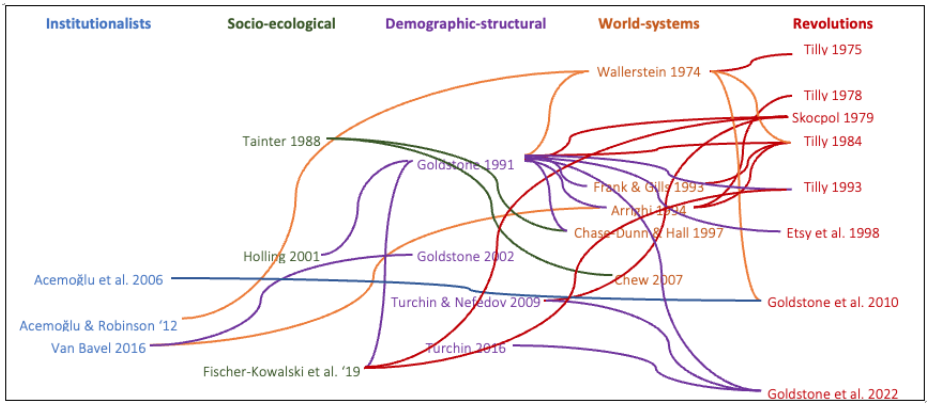

Figure A1. Theorists from one literature that cite those from another: See text for who says what about whom.

Among institutionalists, Van Bavel (van Bavel 2016: 275) finds similarities between his own account and Goldstone's (Goldstone 2002), writing that "[t]he economies he discusses… each experienced a pulsation of economic growth and growing complexity, often later characterized as a 'golden age', but then declined again, in his view as a result of population pressure, social unrest, and crisis". Van Bavel notes even closer similarities with

world-system analysis, writing that "[m]ost akin to the present book, however, is perhaps Giovanni Arrighi's investigation of how capital accumulation, financial markets, public debts, and state formation interact… [but] Arrighi only deals with one phase in this cycle—a final phase". Acemoğlu and Robinson (Acemoğlu and Robinson 2012: 274) also very briefly note some similarities between their own work and world-system analysis in explaining differences in economic conditions in different countries, writing that "[t]he notion that the development of the rich countries of the West is the mirror image of the underdevelopment of the rest of the world was originally developed by Wallerstein (1974–2011), though he emphasizes very different mechanisms than we do".

Among social-ecological systems theorists, Holling (Holling 2001: 399) approvingly writes that Goldstone "hypothesized that political breakdown occurs when there are simultaneous crises at several different organizational levels in society. In other words, adaptive cycles at different levels in a panarchy become aligned at the same phase of vulnerability". Fischer-Kowalski et al. (Fischer-Kowalski et al. 2019: 75) explicitly draw on Goldstone's classifications of revolution and revolt, but lament that although Goldstone, Tilly (Tilly 1993), and Skocpol (Skocpol 1979) all examine resource conflicts in industrializing economies, none of them refer "to coal, or more generally energy, as a critical resource".

Among demographic-structural theorists, Goldstone (Goldstone 2016: 2, 13, 16–17, 19, 42, 69–70, 77–84, 87, 117, 121, 146, 157, 360) frequently cites world-system analyst Wallerstein's explanation of the general crisis of the seventeenth century, though largely to note what Goldstone sees as limitations in Wallerstein's account. Goldstone (Goldstone 2016: 19–20) also draws heavily on Tilly, especially his work on revolution in Europe (Tilly 1993), and credits Skocpol (Skocpol 1979) with three influential observations that he integrates into his own analysis: that revolutions arise from a conjunction of factors affecting the state, elites, and the general population; that states are not only objects but also actors during

crises; and that uprisings are also the product of international forces that impact upon states and their institutions. Turchin and Nefedov (Turchin and Nefedov 2009: 5, 294) make similar observations regarding Skocpol's work (Skocpol 1979), and make heavy use of the data compiled by Tilly (Tilly 1993).

Among world-system analysts, Wallerstein (Wallerstein 1974: 75–76, 141) cites Tilly's work on the relationship of food supply and disorder in modern Europe (later published as (Tilly 1975)). Arrighi (Arrighi 2010, xiii) draws on Tilly's work but disagrees with Tilly's recommendation to focus on smaller and more manageable units of analysis than world systems, with Arrighi ultimately undertaking precisely the kind of world system history that Tilly warns against. Frank and Gills (Gills and Frank 1993a: 91; Frank and Gills 1993: 34) praise Tilly's (Tilly 1984) work connecting people's participation in revolutionary movements with international structures of power, but like Arrighi disregard Tilly's warnings against attempting world system history. Frank and Gills (Frank and Gills 1993: 32) also suggest that Goldstone's demographic theory (Goldstone 2016), first published in 1991, "could well combine with the long cycles… which we identify. Alas, we have not even investigated this possibility". Elsewhere in the same volume, Gills (Gills 1993: 130–32) notes that "Goldstone (1991) has recently argued that cycles of social rebellion... are essentially demographically driven... But there does seem to be a general historical correlation between concentration of accumulation and social rebellion… and also to possible disintegration, war, invasion, or collapse". Arrighi (Arrighi 2010: 43) also proposes an alternative to Goldstone's theory, writing that "[i]t is plausible to suppose that this disruption and diversion of trade flows contributed far more decisively than demographic and climatic factors to the sudden worsening problem of vagrancy and to the 'subsistence crisis' which constitute the social and economic backdrop of the general crisis of legitimacy of the seventeenth century (cf. …Goldstone 1991)". In contrast, Chase-Dunn and Hall

(Chase-Dunn and Hall 1997: 114) build on the work of Turchin (Turchin 2003) and consider that "Goldstone's demographic analysis of revolutions fits nicely with our explanation of world-system evolution. Indeed, his explanation can be interpreted as a special case of the same processes analyzed in closer detail". Chase-Dunn and Hall (Chase-Dunn and Hall 1997: 112–13) also approvingly cite socio-ecological systems theorist Tainter, writing that "in periods of contraction, and especially when contraction is rapid and deep – the phenomenon of collapse investigated by Tainter (1988) – the still-present demographic, ecological, and circumscription factors reemerge". Tainter is also briefly cited by Chew (Chew 2007: 165).

Among revolutions researchers, Tilly (Tilly 1984: 70–74) is skeptical about attempts at world system analysis, as discussed in the preceding paragraph. Tilly (Tilly 1993: 26–27) cites Goldstone's demographic theory, with Tilly's analysis of the emergence of rival elite blocs, a mobilized population, and diminished state capacity echoing much of Goldstone's analytical framework. There is in general a strong connection between the revolutions literature and demographic-structural theory, not least since Goldstone's (Goldstone 2016) established the demographic-structural strand whilst much of his subsequent work is positioned firmly within the 'fourth wave' of revolutions research focusing on modern states (Goldstone, Grinin and Korotayev 2022b: 38; Gurr and Goldstone 2019; Esty et al. 1998). Goldstone et al. (Goldstone et al. 2010: 201) very briefly refer to the new institutionalist theories of Acemoğlu et al. (Acemoğlu, Johnson and Robinson 2005), but only to note that Goldstone and his colleagues did not find inequality to be a significant driver of state breakdown in the cases they examine. One of the most recent comparative studies of revolution explicitly combines revolutions research with both world-system and demographic-structural analyses (Goldstone, Grinin and Korotayev 2022b: 39, 48–49) (and also many of the individual chapters in that collection).

Many cases of state crisis are common to different literatures

At least 45 state crises are mentioned in two or more literatures (Table A1). This again shows that these researchers believe themselves to share a common object of study. The list focuses on the state crises which receive more detailed discussion in the texts. Data about several hundred additional state crises, many shared across literatures, are analyzed in works by institutional (Cox, North and Weingast 2019), social-ecological (Fischer-Kowalski et al. 2019), demographic-structural (Korotayev et al. 2011: 279–82), and revolutions researchers (Goldstone et al. 2010).

Table A1. Specific state crises discussed in two or more different literatures

State crisis[*]	*References*
Tunisia 2010-2011 (Arab Spring)[†]	Institutionalists (Acemoğlu and Robinson 2012: 1–7) Socio-ecological systems (Fischer-Kowalski et al. 2019: 75) Demographic-structuralists (Goldstone 2016: xxxii, 475–77; Grinin and Korotayev 2019; Ortmans et al. 2017: 62) Revolutions (Hillesund 2022; Margolis 2012; Beck et al. 2022)
Egypt 2011-2013 (Arab Spring)	Institutionalists (Acemoğlu and Robinson 2012: 1–7) Demographic-structuralists (Goldstone 2016, xxxii, 475–77; Grinin and Korotayev 2019; Ortmans et al. 2017: 62) Revolutions (Hillesund 2022; Margolis 2012; Beck et al. 2022)

US c. 2008-	Institutionalists (van Bavel 2016: 243–45; Jessop 2015; Conran and Thelen 2016) Demographic-structuralists (Turchin 2016; Goldstone 2016: 480; Ortmans et al. 2017)
Europe c. 2008- (sometimes specifically NW Europe, EU, or UK)	Institutionalists (van Bavel 2016: 245–50; Jessop 2015; Conran and Thelen 2016) Demographic-structuralists (Ortmans et al. 2017) World-systems (Amin 2013: 96–100) Revolutions (Beck et al. 2022)
Republic of Congo 1996/7-1999 (civil war)	Institutionalists (Acemoğlu and Robinson 2012: 344) Revolutions (Goldstone et al. 2010: 191–92; Beissinger 2022: Appendix 2)
Democratic Republic of the Congo 1996-2003 (civil wars, Mobutu Sese Seko ousted 1997)	Institutionalists (Acemoğlu and Robinson 2012: 344) Demographic-structuralists (Goldstone 2016, xxxii) Revolutions (Goldstone et al. 2010: 191–92)
Somalia and Somaliland 1991-present (civil war)	Institutionalists (Acemoğlu and Robinson 2012: 344) Demographic-structuralists (Goldstone 2016, xxxii) Revolutions (Goldstone et al. 2010: 191–92)
Yugoslavia 1990/1-2001 (Yugoslav or Balkan wars;	Institutionalists (North, Wallis, and Weingast 2009: 21)

Kosovo War for Independence; Bulldozer Revolution to oust Milosevic in 2000)	Demographic-structuralists (Goldstone 2016, xxxii) Revolutions (Tilly 1993, Chapter 3; Goldstone et al. 2010: 191–92)
Rwanda 1990-1994 (civil war and genocide)	Institutionalists (North, Wallis and Weingast 2009: 21; Acemoğlu and Robinson 2012: 344) Demographic-structuralists (Goldstone 2016, xxxii) Revolutions (Beissinger 2022: Appendix 2)
Liberia 1989-2003 (civil war)	Institutionalists (Acemoğlu and Robinson 2012, 344, 373) Demographic-structuralists (Korotayev et al. 2011, 279–82). Revolutions (Beissinger 2022: Appendix 2)
USSR 1989-1990 (collapse of communism)	Institutionalists (Acemoğlu and Robinson 2012, 119–21) Demographic-structuralists (Goldstone 2016, 492) Revolutions: (Tilly 1993, Chapter 6; Beck et al. 2022; Beissinger 2022: Appendix 2)
Haiti 1984/5-1986 (protests oust Jean-Claude Duvalier)	Institutionalists (Acemoğlu and Robinson 2012, 373) Socio-ecological systems (Fischer-Kowalski et al. 2019, SI:19 Table S3) Revolutions (Beck et al. 2022; Beissinger 2022: Appendix 2)
Iran 1979 (Iranian Revolution)	Demographic-structuralists (Goldstone 2016: 447–48, 475;

	Korotayev et al. 2011: 279–82) Revolutions (Goldstone et al. 2010: 191–92; Gurr and Goldstone 2019; Beck et al. 2022: 114–17; Beissinger 2022: Appendix 2)
Nicaragua 1978 (Sandanista Revolution)	Socio-ecological systems (Fischer-Kowalski et al. 2019, SI p. 22 Table S4) Revolutions (Gurr and Goldstone 2019; Beissinger 2022: Appendix 2)
Angola 1975-2002 (civil war)	Institutionalists: (Acemoğlu and Robinson 2012, 344) Socio-ecological systems (Fischer-Kowalski et al. 2019, 72, SI p. 19 Table S3) Revolutions (Beissinger 2022: Appendix 2)
Mozambique 1975 and 1977-1992 (war of independence then civil war)	Institutionalists (Acemoğlu and Robinson 2012, 344) Socio-ecological systems (Fischer-Kowalski et al. 2019, SI p.19 Table S3)
Viet Nam 1975	Socio-ecological systems (Fischer-Kowalski et al. 2019, SI p.22 Table 4) Revolutions (Gurr and Goldstone 2019)
Bangladesh 1971 (war of independence and genocide)	Institutionalists (North, Wallis, and Weingast 2009, 21) Socio-ecological systems (Fischer-Kowalski et al. 2019, 72, SI p.13 Fig. S3, SI p.19 Table S3) Revolutions (Goldstone et al. 2010,

	191–92)
Cambodia 1967-1976 (civil war)	Socio-ecological systems (Fischer-Kowalski et al. 2019, SI p.19 Table S3) Revolutions (Gurr and Goldstone 2019; Beck et al. 2022; Beissinger 2022)
Nigeria 1967-1970 (civil war or Biafran War)	Institutionalists (North, Wallis, and Weingast 2009, 21) Socio-ecological systems (Fischer-Kowalski et al. 2019, 72, SI p.13 Fig. S3) Revolutions (Beissinger 2022)
Guatemala 1944 (protests oust General Ubico in June, October Revolution ousts junta)	Institutionalists (Acemoğlu and Robinson 2012, 349–50) Socio-ecological systems (Fischer-Kowalski et al. 2019, SI p.18 Table S2) Revolutions (Beissinger 2022)
Russia 1917-1921 (Socialist Revolution, civil war)	Socio-ecological systems (Fischer-Kowalski et al. 2019, SI p.18 Table S2) Revolutions (Tilly 1993, Chapter 6; Skocpol 1979, Chapter 6; Beck et al. 2022; Beissinger 2022)
China 1911 (Xinhai Revolution)	Socio-ecological systems (Fischer-Kowalski et al. 2019: 74, SI p.18 Table S2) Demographic-structuralists (Korotayev et al. 2011: 277–79) World-systems (Amin 1990) Revolutions (Skocpol 1979, Chapter 7; Beissinger 2022)

Russia 1905 (Revolution for Constitutional Monarchy)	Socio-ecological systems (Fischer-Kowalski et al. 2019: SI p.18 Table S2) Revolutions (Tilly 1993; Beck et al. 2022: 142–43; Beissinger 2022)
Japan 1868 (Tokugawa Crisis and Meiji Restoration)	Institutionalists (Acemoğlu and Robinson 2012: 294–98) Socio-ecological systems (Fischer-Kowalski et al. 2019: 74) Demographic-structuralists: (Goldstone 2016: 402–15) World-systems (Amin 1990)
USA 1861-1865 (American Civil War)	Socio-ecological systems (Fischer-Kowalski et al. 2019: 74) Demographic-structuralists (Turchin 2016: Chapter 7)
Austria/Habsburg Empire 1848 (March Revolution, continues into May, August, September)	Socio-ecological systems (Fischer-Kowalski et al. 2019, SI p.18 Table S2) Demographic-structuralists (Goldstone 2016: 475)
Germany 1848 (March Revolution)	Socio-ecological systems (Fischer-Kowalski et al. 2019: SI p.18 Table S2) Demographic-structuralists (Goldstone 2016: 475) Revolutions (Tilly 1975)
France 1789-1799 (French Revolution)	Socio-ecological systems (Fischer-Kowalski et al. 2019: 74, SI p.18 table S2) Demographic-structuralists (Goldstone 2016: 475) Revolutions (Tilly 1993: Chapter 5;

	Skocpol 1979: Chapter 5; Beck et al. 2022)
England 1688 (Glorious Revolution)	Institutionalists (North, Wallis, and Weingast 2009: 72, 78, 183–87; van Bavel 2016: 211–14, 253–54; Acemoğlu and Robinson 2012: 102–3, 122, 185–97) Demographic-structuralists (Goldstone 2016: 318–24) Socio-ecological systems (Fischer-Kowalski et al. 2019: 74, SI p.18 Table S2) Revolutions (Tilly 1993: Chapter 4)
England 1642-1651 (civil war)	Institutionalists (North, Wallis, and Weingast 2009: 183, 243; van Bavel 2016, 213) Demographic-structuralists (Goldstone 2016: 63–169) Socio-ecological systems (Fischer-Kowalski et al. 2019: 74, SI p.18 Table S2) Revolutions (Tilly 1993: Chapter 4)
China 1618-1683 (Manchu conquest, Ming-Qing transition)	Institutionalists (Acemoğlu and Robinson 2012: 231–34, 300–301) Socio-ecological systems (Root 2020: 99–101; Tainter 1988: 56) Demographic-structuralists (Turchin and Nefedov 2009: 311; Goldstone 2016: 349)
Low Countries 1550s-1560s (start of stagnation and decline in welfare; food crises 1550s-1560s; start of Eighty	Institutionalists (van Bavel 2016: 196–97, 200–207) Socio-ecological systems (Fischer-Kowalski et al. 2019: 74, SI p.18

Years' War 1568-1648)	Table S2) Demographic-structuralists (Goldstone 2002) World-systems (Arrighi 2010: 132–35, 138, 142–44) Revolutions (Tilly 1993: Chapter 3)
Northern Italy 1420s-30s (Florence-Lucca war 1429-33; democratic reversal in Florence 1434; Genoa crisis)	Institutionalists (van Bavel 2016: 132) World-systems (Arrighi 2010: 105, 220; Modelski 2012: 68)
Europe 14th-15th centuries (Crisis of the Late Middle Ages, esp. France and War of the Roses in England)	Demographic-structuralists (Turchin and Nefedov 2009; Goldstone 2016: 353) World-systems (Wallerstein 1974: 37)
China 1368 (Ming rebellion, Yuan-Ming transition)	World-systems (Abu-Lughod 1991: 284) Socio-ecological systems (Root 2020: 101, 109, 160) Demographic-structuralists (Turchin and Nefedov 2009: 311; Goldstone 2016: 353)
Northern Italy 1360s-70s (rebellions in Lucca in 1369, Perugia in 1370–5, Siena in 1371, and Florence in 1378).	Institutionalists (van Bavel 2016: 130) World-systems (Arrighi 2010: 103)
China 1271-1279 (Song decline, Song-Yuan transition)	Institutionalists (van Bavel 2016, 33–35) World-systems (Modelski and Thompson 1996) Demographic-structuralists (Turchin and Nefedov 2009: 311)
Byzantium 977-1071 (civil	Socio-ecological systems (Tainter

wars, decline)	1988: 70, 86, 203) World-systems (Gills and Frank 1993b: 174)
Iraq 10th century (start of crisis and decline)	Institutionalists (van Bavel 2016: 78–94) World-systems (Abu-Lughod 1991: 192; Gills and Frank 1993b) Socio-ecological systems (Butzer 2012: 3635)
Lowland Classic Maya c.810- (collapse)	Institutionalists (Acemoğlu and Robinson 2012: 147) Socio-ecological systems (Tainter 1988: 152–77, passim)
Byzantium 6th century (crisis and decline)	Demographic-structuralists (Gills and Frank 1993b: 174) World-systems (Chew 2007: 156)
Roman Empire 235-284 (Crisis of the Third Century or Imperial Crisis)	Institutionalists (van Bavel 2016: 32, 25; Acemoğlu and Robinson 2012: 158, 172–75) Socio-ecological systems (Tainter 1988: 128–51, passim) Demographic-structuralists (Turchin and Nefedov 2009: 233–39) World-systems (Chew 2007: 112, 139–65, passim; Gills and Frank 1993a: 91) Revolutions (Beck et al. 2022)
China 180-220 (Han crisis and decline)	Institutionalists (van Bavel 2016: 33) Demographic-structuralists (Turchin and Nefedov 2009: 311) World-systems (Gills and Frank

	1993a: 91)
Rome 133 BC (the Gracchan Crisis; start of the Crisis of the Late Republic)	Institutionalists (Acemoğlu and Robinson 2012: 158–72) Socio-ecological systems (Tainter 1988: 69, 77, 129, 150, 202, 214) Demographic-structuralists (Turchin and Nefedov 2009: 201–7)

* Note that in general, I tend to name a crisis after its most obvious consequence, such as an ensuing civil war. Contriving to name the preceding crisis itself, though technically correct, would be cumbersome and usually less informative.

† These discussions also include mentions of the Arab Spring in Libya, Syria, and Yemen, not listed separately in this table.

Conclusion to the Appendix

In summary: across these five literatures, the state is broadly defined as a political apparatus with coercive power over a population within some territory. Across literatures, a state crisis is a turning point in which the capacity or legitimacy of the state to exercise this power is challenged, where it is possible that the state might not continue in its current form. Across literatures, crises may result in violent breakdown or collapse as well as entrenchment or reform. Across literatures, there is an overlap in cases of state crisis that theorists seek to explain. Essentially, what unites these literatures is the motivation to better understand why state crises occur and why some state crises result in collapse, some in breakdown, others in entrenchment, and still others in reform.

Acknowledgements

This paper has benefited from comments from Emily Alexander, Sam Bliss, Katalin Botos, Josh Busby, Philip G Cerny, Mark Cresswell, Selin Dilli, Mladen Domazet, Marina Fischer-Kowalski, Philip Giurlando, Dan Hoyer, Janne I. Hukkinen, Luke Kemp, Gorgi Krlev,

Alla Mostepaniuk, Rocío Ruenes Morales, Victor Petrenko, Robin Philips, Flavia Poinsot, Auke Rijpma, Raymond A. Rogers, Robert Schaeffer, Marten Scheffer, Peter Turchin, Bas van Bavel, Bram van Besouw, Sytze Van Herck, Antonio Velasco, Ronny J. Viales-Hurtado, and seminar participants at the Economic and Social History group and at the Centre for Complex Systems Study, both at Utrecht University. This research was partly funded by the Spinoza Prize and partly by the Ministry for Culture and Science of the State of North Rhine-Westfalen.

References

Abu-Lughod, Janet L. 1991. *Before European Hegemony: The World System AD 1250-1350*. Oxford University Press, USA.

Acemoğlu, Daron, and James A. Robinson. 2012. *Why Nations Fail: The Origins of Power, Prosperity and Poverty*. London, England: Profile.

Acemoğlu, Daron, Simon Johnson, and James A. Robinson. 2005. "Institutions as a Fundamental Cause of Long-Run Growth." In *Handbook of Economic Growth*, edited by Philippe Aghion and Steven Durlauf, 385-472. Amsterdam, Netherlands: Elsevier.

Albrecht, Holger, and Kevin Koehler. 2020. "Revolutionary Mass Uprisings in Authoritarian Regimes." *International Area Studies Review* 23 (2): 135–59.

Alexander, Michael Allen. 2016. "Application of Mathematical Models to English Secular Cycles." *Cliodynamics* 7 (1): 76-108.

———. 2017. "Involvement of a Capitalist Crisis in the 1900-30 Inequality Trend Reversal." *Cliodynamics* 8 (1): 18-47.

———. 2019. "A Cultural Evolution Model for Trend Changes in the American Secular Cycle." *Cliodynamics* 10 (1): 1-30.

Amin, Samir. 1990. "The 1911 Revolution in World Historical Perspective: A Comparison with the Meiji Restoration and the Revolutions of Mexico, Turkey and Egypt." *Patrimoine Numerique Africain*.

http://patrimoinenumeriqueafricain.com:8080/jspui/bitstream/123456789/2687/1/The%201911%20revolution%20in%20world%20historical%20perspective-converti.pdf.

———. 2013. *The Implosion of Contemporary Capitalism*. New York, NY: New York University Press.

———. 2018. *Modern Imperialism, Monopoly Finance Capital, and Marx's Law of Value: Monopoly Capital and Marx's Law of Value*. New York, NY: New York University Press.

Armit, Ian, Graeme T. Swindles, Katharina Becker, Gill Plunkett, and Maarten Blaauw. 2014. "Rapid Climate Change Did Not Cause Population Collapse at the End of the European Bronze Age." *Proceedings of the National Academy of Sciences* 111 (48): 17045–49. https://doi.org/10.1073/pnas.1408028111.

Arrighi, Giovanni. 2010. *The Long Twentieth Century: Money, Power, and the Origins of Our Times*. London : New York, NY: Verso.

Bavel, Bas van, Daniel R. Curtis, and Tim Soens. 2018. "Economic Inequality and Institutional Adaptation in Response to Flood Hazards: A Historical Analysis." *Ecology and Society* 23 (4): art30. https://doi.org/10.5751/ES-10491-230430.

Bavel, Bas van. 2016. *The Invisible Hand? How Market Economies Have Emerged and Declined since AD 500*. New York ; Oxford: Oxford University Press.

———. 2019a. "Open Societies before Market Economies: Historical Analysis." *Socio-Economic Review* 18 (3): 795–815. https://doi.org/10.1093/soceco/mwz007.

———. 2019b. *Power Concentration and State Capture: Insights from History on Consequences of Market Dominance for Inequality and Environmental Calamities*. UN Human Development Report 2019, 60.

Beck, Colin J., Mlada Bukovansky, Erica Chenoweth, George Lawson, Sharon Erickson Nepstad, and Daniel P. Ritter. 2022. *On Revolutions: Unruly Politics in the Contemporary World*. 1st ed. Oxford University Press. https://doi.org/10.1093/oso/9780197638354.001.0001.

Beissinger, Mark R. 2022. *The Revolutionary City: Urbanization and the Global Transformation of Rebellion*. Princeton, New Jersey Oxford: Princeton University Press.

Blanton, Richard E., Gary M. Feinman, Stephen A. Kowalewski, and Lane F. Fargher. 2020. "Moral Collapse and State Failure: A View From the Past." *Frontiers in Political Science* 2 (October): 568704. https://doi.org/10.3389/fpos.2020.568704.

Bodea, Cristina, and Ibrahim A. Elbadawi. 2007. *Riots, Coups And Civil War : Revisiting The Greed And Grievance Debate*. Policy Research Working Papers. The World Bank. https://doi.org/10.1596/1813-9450-4397.

Boserup, Ester. 1965. *The Conditions of Agricultural Growth: The Economics of Agrarian Change under Population Pressure*. London, England: George Allen and Unwin Ltd.

———. 1981. *Population and Technological Change: A Study of Long-Term Trends*. Vol. 255. Chicago, IL: University of Chicago Press.

Butzer, Karl W. 2012. "Collapse, Environment, and Society." *Proceedings of the National Academy of Sciences* 109 (10): 3632–39. https://doi.org/10.1073/pnas.1114845109.

Cederman, Lars-Erik, Kristian Skrede Gleditsch, and Halvard Buhaug. 2013. *Inequality, Grievances, and Civil War*. Cambridge University Press.

Chase-Dunn, Christopher, and Thomas D. Hall. 1997. *Rise and Demise: Comparing World Systems*. Boulder, CO: Westview Press.

Chase-Dunn, Christopher, Richard Niemeyer, Alexis Alvarez, Hiroko Inoue, Kirk Lawrence, and James Love. 2010. "Cycles of Rise and Fall, Upsweeps and Collapses: Changes in the Scale of Settlements and Polities Since the Bronze Age." In *History & Mathematics: Processes and Models of Global Dynamics*, edited by Leonid Grinin, Peter Herrmann, Andrey Korotayev, and Arno Tausch, 64-91. Uchitel.

Chew, Sing C. 2007. *The Recurring Dark Ages: Ecological Stress, Climate Changes, and System Transformation. Trilogy on World Ecological Degradation.* Lanham: Altamira Press.

Collier, Paul, and Anke Hoeffler. 2004. "Greed and Grievance in Civil War." *Oxford Economic Papers* 56 (4): 563–95.

Conran, James, and Kathleen Thelen. 2016. "Institutional Change." In *The Oxford Handbook of Historical Institutionalism*, edited by Tulia G. Falleti and Adam Sheingate Orfeo Fioretos, 51-70. Oxford, U.K: Oxford University Press.

Cowgill, George L. 1988. "Onward and Upward with Collapse." In *The Collapse of Ancient States and Civilizations*, edited by Norman Yoffee and George L. Cowgill, 244-76. Tucson, AZ: University of Arizona Press.

Cox, Gary W., Douglass C. North, and Barry R. Weingast. 2019. "The Violence Trap: A Political-Economic Approach to the Problems of Development." *Journal of Public Finance and Public Choice* 34 (1): 3–19.

Cumming, Graeme S., and Garry D. Peterson. 2017. "Unifying Research on Social–Ecological Resilience and Collapse." *Trends in Ecology & Evolution* 32 (9): 695–713.

Denemark, Robert A. 2021. "World-Systems Analysis: Past Trajectories and Future Prospects." In *Routledge Handbook of Historical International Relations*, edited by Benjamin De Carvalho, Julia C. Lopez and Halvard Leira, 37-46. London, England: Routledge.

Diamond, Jared. 2005. *Collapse: How Societies Chose to Fail or Succeed*. London, England: Penguin Books.

Drake, Brandon L. 2012. "The Influence of Climatic Change on the Late Bronze Age Collapse and the Greek Dark Ages." *Journal of Archaeological Science* 39 (6): 1862–70. https://doi.org/10.1016/j.jas.2012.01.029.

Dunn, John. 1982. "Understanding Revolutions." *Ethics* 92 (2): 299–315. https://doi.org/10.1086/292328.

Esty, Daniel C., Jack A. Goldstone, Ted Robert Gurr, Barbara Harff, Pamela T. Surko, Alan N. Unger, and Robert Chen. 1998. "The State Failure Project: Early Warning Research for US Foreign Policy Planning." In *Preventive Measures: Building Risk Assessments and Crisis Early Warning Systems*, edited by John L Davies and Ted Robert Gurr. Rowman & Littlefield.

Faulseit, Ronald K., ed. 2016. *Beyond Collapse: Archaeological Perspectives on Resilience, Revitalization, and Transformation in Complex Societies*. Visiting Scholar Conference Volumes, no. 42. Carbondale, Illinois: Southern Illinois University Press.

Fearon, James D., and David D. Laitin. 2003. "Ethnicity, Insurgency, and Civil War." *American Political Science Review* 97 (1): 75–90.

Fischer-Kowalski, Marina, Elena Rovenskaya, Fridolin Krausmann, Irene Pallua, and John R. Mc Neill. 2019. "Energy Transitions and Social Revolutions." *Technological Forecasting and Social Change* 138 (January): 69–77. https://doi.org/10.1016/j.techfore.2018.08.010.

Flower, Harriet I. 2010. *Roman Republics*. Princeton: Princeton University Press.

Frank, Andre Gunder, and Barry K. Gills. 1993. "The 5,000 Year World System: An Interdisciplinary Introduction." In *The World System: Five Hundred Years or Five Thousand*, edited by Andre Gunder Frank and Barry Gills, 3-58. London, England ; New York, NY: Routledge.

Gerschewski, Johannes. 2021. "Explanations of Institutional Change: Reflecting on a 'Missing Diagonal'." *American Political Science Review* 115 (1): 218–33.

Gills, Barry K. 1993. "Hegemonic Transitions in the World System." In *The World System: Five Hundred Years or Five Thousand*, by Andre Gunder Frank and Barry K. Gills, 115–42. London, England: Routledge.

Gills, Barry K., and Andre Gunder Frank. 1993a. "The Cumulation of Accumulation." In *The World System: Five Hundred Years or Five*

Thousand, edited by Andre Gunder Frank and Barry Gills, 81-114. London, England ; New York, NY: Routledge.

———. 1993b. "World System Cycles, Crises, and Hegemonic Shifts, 1700 BC to 1700 AD." In *The World System: Five Hundred Years or Five Thousand*, edited by Andre Gunder Frank and Barry Gills, 143-99. London, England ; New York, NY: Routledge.

Goldstone, Jack A., Leonid Grinin, and Andrey Korotayev. 2022a. "Conclusion. How Many Revolutions Will We See in the Twenty-First Century?" In *Handbook of Revolutions in the 21st Century*, edited by Jack A. Goldstone, Leonid Grinin, and Andrey Korotayev, 1037–61. Societies and Political Orders in Transition. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-86468-2_41.

———. 2022b. "The Phenomenon and Theories of Revolutions." In *Handbook of Revolutions in the 21st Century: The New Waves of Revolutions, and the Causes and Effects of Disruptive Political Change*, edited by Jack A. Goldstone, Leonid Grinin, and Andrey Korotayev. Societies and Political Orders in Transition. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-86468-2.

Goldstone, Jack A. 2002. "Efflorescences and Economic Growth in World History: Rethinking the" Rise of the West" and the Industrial Revolution". *Journal of World History*: 323–89.

———. 2016. *Revolution and Rebellion in the Early Modern World: Population Change and State Breakdown in England, France, Turkey, and China, 1600-1850. 25th anniversary edition*. New York: Routledge,Taylor & Francis Group, an Informa business.

Goldstone, Jack A., Robert H. Bates, David L. Epstein, Ted Robert Gurr, Michael B. Lustik, Monty G. Marshall, Jay Ulfelder, and Mark Woodward. 2010. "A Global Model for Forecasting Political Instability." *American Journal of Political Science* 54 (1): 190–208. https://doi.org/10.1111/j.1540-5907.2009.00426.x.

Greif, Avner, and David D Laitin. 2004. "A Theory of Endogenous Institutional Change." *American Political Science Review* 98 (4).

Grinin, Leonid, and Andrey Korotayev. 2019. "Arab Spring, Revolutions, and the Democratic Values." In *Islamism, Arab Spring, and the Future of Democracy*, edited by Leonid Grinin, Andrey Korotayev and Arno Tausch, 157–214. Perspectives on Development in the Middle East and North Africa (MENA) Region. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-91077-2_5.

Gurr, Ted Robert, and Jack Goldstone. 2019. "Comparisons and Policy Implications." In *Revolutions Of The Late Twentieth Century*, edited by Jack Goldstone, Ted Robert Gurr, and Farrokh Moshiri, 2nd ed. Abingdon, UK ; New York, NY: Routledge.

Harvey, David. 2016. "Crisis Theory and the Falling Rate of Profit." In *The Great Financial Meltdown: Systemic, Conjunctural or Policy Created*, edited by Turan Subasat and John Weeks, 37–54. Cheltenham, England: Edward Elgar.

Hillesund, Solveig. 2019. "Choosing Whom to Target: Horizontal Inequality and the Risk of Civil and Communal Violence." *Journal of Conflict Resolution* 63 (2): 528–54.

———. 2022. "To Fight or Demonstrate? Micro Foundations of Inequality and Conflict." *Conflict Management and Peace Science* 39 (2): 166–90. https://doi.org/10.1177/07388942211017881.

Hodgson, Geoffrey M. 1991. *After Marx and Sraffa: Essays in Political Economy*. New York, NY: St. Martin's Press.

Holling, Crawford Stanley, and Lance H. Gunderson. 2002. *Panarchy: Understanding Transformations in Human and Natural Systems*. Washington, DC: Island Press.

Holling, Crawford Stanley. 2001. "Understanding the Complexity of Economic, Ecological, and Social Systems." *Ecosystems* 4 (5): 390–405.

Janssen, Marco A., Timothy A. Kohler, and Marten Scheffer. 2003. "Sunk-Cost Effects and Vulnerability to Collapse in Ancient

Societies." *Current Anthropology* 44 (5): 722–28. https://doi.org/10.1086/379261.

Jessop, B. 2015. "Challenges to the State, Economic and Political Crises, and State Restructuring." *Policy & Politics* 43 (4): 475–92.

Johnson, Scott AJ. 2016. *Why Did Ancient Civilizations Fail?* New York, NY: Routledge.

Kemp, Luke. 2021. The 'Stomp Reflex': When Governments Abuse Emergency Powers. BBC Future. 2021. Accessed February 21, 2024. https://www.bbc.com/future/article/20210427-the-stomp-reflex-when-governments-abuse-emergency-powers.

Kennedy, Paul. 1987. *The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000*. New York, NY: Random House.

King, Gary, and Langche Zeng. 2001. "Improving Forecasts of State Failure." *World Politics* 53 (4): 623–58.

Korotayev, Andrey, Julia Zinkina, Svetlana Kobzeva, Justislav Bozhevolnov, Daria Khaltourina, Artemy Malkov, and Sergey Malkov. 2011. "A Trap At The Escape From The Trap? Demographic-Structural Factors of Political Instability in Modern Africa and West Asia." *Cliodynamics: The Journal of Quantitative History and Cultural Evolution* 2 (2). https://doi.org/10.21237/C7CLIO22217.

Mandel, Ernest. 1981. "Introduction." In *Capital*, by Karl Marx, translated by David Fernbach. Vol. 3. London: Penguin.

Margolis, Eli J. 2012. "Estimating State Instability." *Studies in Intelligence* 56 (1): 13–24.

Middleton, Guy D. 2017. *Understanding Collapse: Ancient History and Modern Myths.* 1st ed. Cambridge University Press. https://doi.org/10.1017/9781316584941.

Mitchell, Thomas N. 1984. "Cicero on the Moral Crisis of the Late Republic." *Hermathena*, 136: 21–41.

Modelski, George, and William R. Thompson. 1996. *Leading Sectors and World Powers: The Coevolution of Global Politics and Economics*. Univeristy of South Carolina Press.

Modelski, George. 1987. *Long Cycles in World Politics*. Springer.

———. 2012. "Kondratieff (K-) Waves in the Modern World System." In *Kondratieff Waves: Dimensions and Prospects at the Dawn of the 21st Century*, edited by Leonid Grinin, Tessaleno Devezas and Andrey Korotayev, 65–76. Volgograd, Russia: Uchitel.

Moore, Jason W. 2015. *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*. London, UK: Verso.

Motesharrei, Safa, Jorge Rivas, and Eugenia Kalnay. 2014. "Human and Nature Dynamics (HANDY): Modeling Inequality and Use of Resources in the Collapse or Sustainability of Societies." *Ecological Economics* 101 (May): 90–102. https://doi.org/10.1016/j.ecolecon.2014.02.014.

North, Douglass Cecil, John Joseph Wallis and Barry R Weingast. 2009. *Violence and Social Orders*. Cambridge, England: Cambridge University Press.

Ortmans, Oscar, Elisabetta Mazzeo, Kira Meshcherina, and Andrey Korotayev. 2017. "Modeling Social Pressures Toward Political Instability in the United Kingdom after 1960: A Demographic Structural Analysis." *Cliodynamics: The Journal of Quantitative History and Cultural Evolution* 8 (2). https://doi.org/10.21237/C7CLIO8237313.

Renfrew, Colin. 1984. *Approaches to Social Archaeology*. Cambridge, MA: Harvard University Press.

Root, Hilton L. 2020. *Network Origins of the Global Economy: East vs. West in a Complex Systems Perspective*. Cambridge, England: Cambridge University Press.

Sarkees, Meredith Reid, and Frank Whelon Wayman. 2010. *Resort to War: A Data Guide to Inter-State, Extra-State, Intra-State, and Non-State Wars, 1816 - 2007*. Correlates of War Series. Washington, DC: CQ Press.

Scheffer, Marten, Egbert H. van Nes, Darcy Bird, R. Kyle Bocinsky, and Timothy A. Kohler. 2021. "Loss of Resilience Preceded Transformations of Pre-Hispanic Pueblo Societies." *Proceedings of the National Academy of Sciences* 118 (18): e2024397118. https://doi.org/10.1073/pnas.2024397118.

Scheidel, Walter. 2013. Studying the State. Pages In Bang, Peter F. and Walter Scheidel (eds). *The Oxford Handbook of the State in the Ancient Near East and Mediterranean*. New York, NY: Oxford University Press.

Schwartz, Glenn M., and John Jackson Nichols, eds. 2006. *After Collapse: The Regeneration of Complex Societies*. Tucson, Ariz: The University of Arizona Press.

Seshat. 2024. "Global History Databank. n.d. Crisis and Recovery Database." Accessed February 21, 2024. https://seshatdatabank.info/seshat-projects/crisis-and-recovery-database.

Skocpol, Theda. 1979. *States and Social Revolutions: A Comparative Analysis of France, Russia, and China. 36th ed*. Cambridge: Cambridge University Press.

Stewart, Frances. 2005. "Horizontal Inequalities: A Neglected Dimension of Development." In *Wider Perspectives on Global Development*, edited by Anthony B. Atkinson, Kaushik Basu, Jagdish N. Bhagwati, Douglass C. North, Dani Rodrik, Frances Stewart, Joseph E. Stiglitz, and Jeffrey G. Williamson, 101–35. London, UK: Palgrave Macmillan. https://doi.org/10.1057/9780230501850_5.

Storey, Rebecca, and Glenn R. Storey. 2017. *Rome and the Classic Maya: Comparing the Slow Collapse of Civilizations*. Routledge.

Tainter, Joseph. 1988. *The Collapse of Complex Societies*. Cambridge, England: Cambridge University Press.

Tilly, Charles, Louise Tilly, and Richard H. Tilly. 1975. *The Rebellious Century, 1830-1930*. Cambridge: Harvard University Press.

Tilly, Charles. 1975. "Food Supply and Public Order in Modem Europe." In *The Formation of National States in Western Europe*,

edited by Charles Tilly. Princeton, N.J: Princeton University Press.

———. 1984. *Big Structures, Large Processes, Huge Comparisons*. New York, NY: Russell Sage Foundation.

———. 1993. *European Revolutions, 1492-1992*. Oxford, UK ; Cambridge, MA.

Turchin, Peter, and S. A. Nefedov. 2009. *Secular Cycles*. Princeton, N.J: Princeton University Press.

Turchin, Peter. 2003. *Historical Dynamics: Why States Rise and Fall*. Vol. 26. Princeton, N.J: Princeton University Press.

———. 2016. *Ages of Discord: A Structural-Demographic Analysis of American History*. Chaplin CT: Beresta Books.

Vesco, Paola, Shouro Dasgupta, Enrica De Cian, and Carlo Carraro. 2020. "Natural Resources and Conflict: A Meta-Analysis of the Empirical Literature." *Ecological Economics* 172 (June): 106633. https://doi.org/10.1016/j.ecolecon.2020.106633.

Wallerstein, Immanuel. 1974a. *Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century*. New York: Academic Press.

———. 1974b. "The Rise and Future Demise of the World Capitalist System." *Comparative Studies in Society and History*, 387–415.

———. 2000. "Globalization or the Age of Transition?: A Long-Term View of the Trajectory of the World-System." *International Sociology* 15 (2): 249–65. https://doi.org/10.1177/0268580900015002007.

Weiss, Harvey, ed. 2017. *Megadrought and Collapse: From Early Agriculture to Angkor.* New York, NY, United States of America: Oxford University Press.

Witoszek, Nina, and Atle Midttun, eds. 2018. *Sustainable Modernity: The Nordic Model and Beyond. Routledge Studies in Sustainability*. London: Routledge.

Yoffee, Norman. 1988. "Orienting Collapse." In *The Collapse of Ancient States and Civilizations*, by Norman Yoffee and George L. Cowgill, 1–19. Tucson, AZ: University of Arizona Press.