Research Article

State crisis theory: A systematization of institutional, socio-ecological, demographic-structural, world-systems, and revolutions research

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Today's 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. I draw together five broad research strands: neo-institutionalism, socio-ecological systems, demographic-structural theories, world-systems approaches, and revolutions research. I begin 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, I draw 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, I find no other contradictions between different hypotheses. Systematizing these theories of state crisis thus establishes a framework for testing these competing, but compatible, hypotheses.

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 2021).

This paper suggests that there are no outright incompatibilities between these diverse literatures, but important differences remain over which factors different literatures emphasize. This systematisation 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, neo-institutionalists (NIN) 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 et al., 2009; Acemoğlu and Robinson, 2012; Jessop, 2015; Thelen and Conran, 2016; Van Bavel, 2016; Gerschewski, 2021). Second, socio-ecological systems (SES) 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; Gunderson and Holling, 2002; Cumming and Peterson, 2017; Scheffer et al., 2021). Third, demographic-structural theory and its variants (DST) focus particularly on changes in population and demographic structure as factors in the political instabilities which herald state crisis (Goldstone, 2016 [1991]; Turchin and Nefedov, 2009; Turchin, 2016). Fourth are world-systems approaches (WSA) 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, 1989; Gills, 1993; Chew, 2007; Arrighi, 2010 [1994]; Moore, 2015). Fifth are revolutions researchers (REV), a literature that has expanded beyond an initial focus on armed uprisings to analyse the occurrence of violent and nonviolent conflict in modern states (Tilly et al., 1975; Tilly, 1993; Skocpol, 1979; Gurr and Goldstone, 1991; Esty et al., 1998; King and Zeng, 2001; Fearon and Laitin, 2003; Collier and Hoeffler, 2004; Stewart, 2005; Goldstone et al., 2010; Cederman et al., 2013; Hillesund, 2019, 2022; Goldstone et al., 2022).

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 from. Dramatic outcomes of state crises include breakdown and collapse. To the extent that a state loses the power to coerce the population within

 doi.org/10.32388/G2GNJR

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; dictionaries define the term 'crisis' as 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 systematize 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 (see Fig. 1).

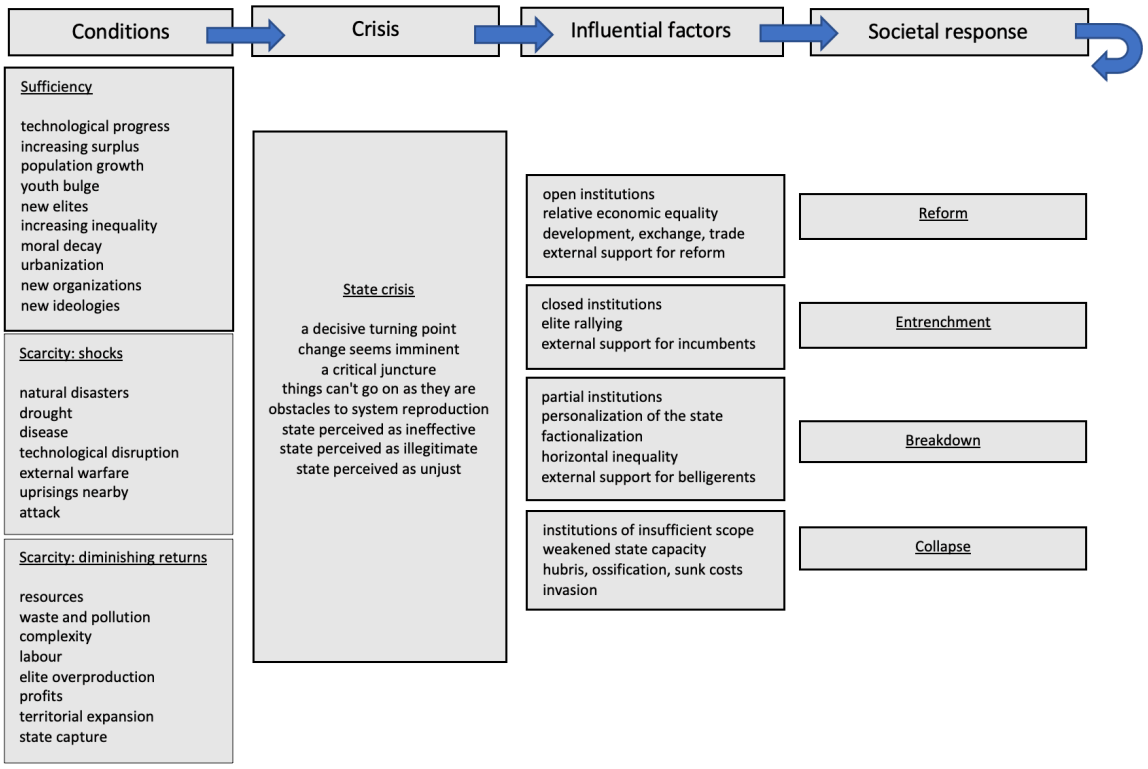

Fig. 1. A framework for systematizing the conditions in which crises occur, and the factors that influence their trajectory

I start in the next section by establishing that each of these five literatures shares a concern with state crisis. My systematisation 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 (though see Korotayev et al., 2011, pp. 277-279). I emphasize this otherwise 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 (e.g. Schwartz and Nichols, 2006; Butzer, 2012). In contrast, among researchers examining more modern

doi.org/10.32388/G2GNJR

societies, entrenchment is often seen as a form of institutional backsliding more akin to state breakdown (e.g. Goldstone et al., 2010; Van Bavel, 2016). Others note that reform as well as entrenchment may result in less fundamental change than revolutionary breakdown (Dunn, 2008, p. 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 (e.g. Margolis, 2012, p. 17; Hillesund, 2022). But for the purposes of my coarse-grained systematisation 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. Systematizing 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

For theories to be comparable, it is important to first establish that they all advance explanations for broadly the same phenomenon, namely, state crisis. A few theorists within the five literatures I examine do 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 I have found.

Definitions of 'state crisis'

Among neo-institutionalists (NIN), 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 et al. (2009, pp. 1, 268-270) 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" (2009, p. 21). Van Bavel (2016, p. 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 (SES) 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, pp. 367-8) 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, p. 15) and Cowgill (1988, p. 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, p. 26-28) 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 (p. 55). 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" (p. 202). 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" (p. 141). More recent works continue to endorse these definitions, often explicitly (Faulseit, 2016, p. 5; Middleton, 2017, p. 12). Collapse involves "[s]tate fragmentation" (Butzer, 2012, p. 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, p. 1863), and "state-level institutional infrastructure weaken[ing] so irrevocably that is ceases to exist" (Storey and Storey, 2017, p. 17).

Demographic-structural theory (DST) "seeks to explain a particularly severe kind of state crisis... *state breakdown*" (Goldstone 2016 [1991], p. 10). 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 (p. 9). 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" (p. 10).

World-systems approaches (WSA) focus on the rise and decline of hegemonic states within a larger economic system. Wallerstein (1974a, p. 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 (1974b, p. 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" (2000, pp. 249, 264). Other world-systems analyses build similar analyses of conflict accompanying crisis and loss of hegemony in the core states (Gill, 1993, pp. 126-132; Modelski and Thompson, 1996, pp. 51-8; Amin, 2010; Chase-Dunn et al., 2010, pp. 64, 72; Denemark, 2021, p. 39; Modelski, 2012, pp. 67, 72-73). Like Jessop, Chew (2007, p. 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 (2007, p. 6) and Chase-Dunn et al. (2010, p. 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 (REV), Skocpol (1979, pp. 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 characterisation of such crises as moments when it becomes "impossible for the ruling classes to maintain their rule in an unchanged form". Tilly (1993, p. 10-11) 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*?" (p. 16). 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, pp. 190-2) 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, pp. 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".

Theorists of state crisis that refer across literatures

Several theorists refer across literatures (see Fig. 2). 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.

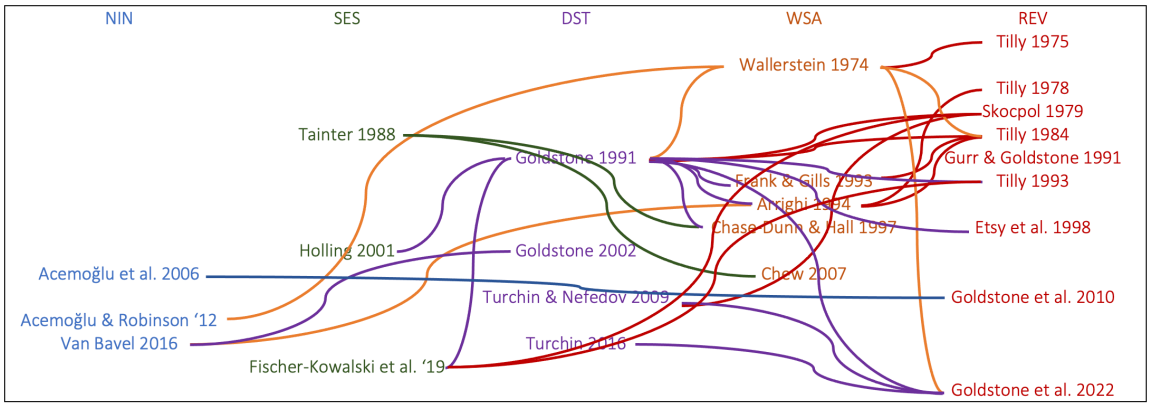

Fig. 2. Theorists from one literature that cite those from another

doi.org/10.32388/G2GNJR

Among neo-institutionalists, Van Bavel (2016, p. 275) finds similarities between his own account and Goldstone's (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 (2012, p. 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 (2001, p. 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. (2019, p. 75) explicitly draw on Goldstone's classifications of revolution and revolt, but lament that although Goldstone, Tilly (1993), and 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 (2016 [1991]: pp. 2, 13, 16-7, 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 (2016 [1991], p. 19-20) also draws heavily on Tilly, especially his (1978) work on revolution in Europe, and credits 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 (2009, pp. 5, 294) make similar observations regarding Skocpol's work, and make heavy use of the data compiled by Tilly (1993).

Among world-system analysts, Wallerstein (1974, pp. 75-6, 141) cites Tilly's work on the relationship of food supply and disorder in modern Europe (later published as Tilly 1975). Arrighi (2010 [1994], p. 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 (1993, p. 34; Gills and Frank, 1993a, p. 109) praise Tilly's (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 Gill (1993, p. 32) also suggest that Goldstone's (1991) demographic theory "could well combine with the long cycles... which we identify. Alas, we have not even investigated this possibility". Elsewhere in the same volume, Gill (1993, pp. 130-2) 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 (2010 [1994], p. 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 (1997, p. 114) build on the work of 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 (1997, pp. 112-3) 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 (2007, p. 165).

Among revolutions researchers, Tilly (1984, pp. 70-4) is sceptical about attempts at world system analysis, as discussed in the preceding paragraph. Tilly (1993, pp. 26-7) 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 (2016 [1991]) 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 (e.g. Gurr and Goldstone, 1991; Etsy et al., 1998; Goldstone et al., 2022, p. 38). Goldstone et al. (2010, p. 201) very briefly refer to the new institutionalist theories of Acemoğlu et al. (2006), 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 et al. 2022, pp. 39, 48-9; see also many of the individual chapters in the same collection).

Cases of state crisis common to different literatures

At least forty-five state crises are mentioned in two or more literatures (see Table 1). That these state crises are mentioned by researchers across different literatures, as cases to which their hypotheses might apply, further supports the idea that these researchers believe themselves to share a common object of study. I here list only those which receive a particular mention in the texts. Additionally, data about several hundred additional state crises, many of them shared across literatures, are analysed by new institutional (Cox et al. 2019), social-ecological (Fisher-Kowalski et al. 2019), demographic-structural (Korotayev et al. 2011, pp. 279-82), and revolutions researchers (Goldstone et al. 2010).

State crisis[a]	Literature
Tunisia 2010-2011 (Arab Spring)[b]	NIN: Acemoğlu and Robinson, 2012, pp. 1-7. SES: Fischer-Kowalski et al., 2019, p. 75. DST: Grinin and Korotayev, 2019. DST: Goldstone, 2016, pp. xxxii, 475-7. DST: Ortmans et al., 2017, pp. 62ff. REV: Margolis, 2012. REV: Hillesund, 2022.
Egypt 2011-2013 (Arab Spring)	NIN: Acemoğlu and Robinson, 2012, pp. 1-7. DST: Grinin and Korotayev, 2019. DST: Goldstone, 2016, p. xxxii, 475-7. DST: Ortmans et al., 2017, pp. 62ff. REV: Margolis, 2012. REV: Hillesund, 2022.
US c. 2008-	NIN: Van Bavel, 2016, pp. 243-245. NIN: Jessop, 2015. NIN: Thelen and Conran, 2016. DST: Turchin, 2016. DST: Ortmans et al., 2017. DST: Goldstone, 2016, pp. 480ff.
Europe c. 2008-	NIN: Van Bavel, 2016, pp. 245-250 (specifically northwestern Europe). NIN: Jessop, 2015. NIN: Thelen and Conran, 2016. DST: Ortmans et al., 2017 (specifically UK). WSA: Amin, 2013, pp. 96-100.
Republic of Congo 1997-1999 (civil war)	NIN: Acemoğlu and Robinson, 2012, p. 344. REV: Goldstone et al., 2010, pp. 191-2.
Democratic Republic of the Congo 1996-2003 (civil wars, Mobutu Sese Seko ousted 1997)	NIN: Acemoğlu and Robinson, 2012, p 344. DST: Goldstone, 2016, p. xxxii. REV: Goldstone et al., 2010, pp. 191-2.
Somalia and Somaliland 1991-present (civil war)	NIN: Acemoğlu and Robinson, 2012, p. 344. DST: Goldstone, 2016, p. xxxii. REV: Goldstone et al., 2010, pp. 191-2.
Yugoslavia 1991-2001 (Yugoslav or Balkan wars; Bulldozer Revolution to oust Milosevic in 2000)	NIN: North et al., 2009, p. 21. DST: Goldstone, 2016, p. xxxii. REV: Goldstone et al., 2010, pp. 191-2 REV: Tilly, 1993, ch. 6.
Rwanda 1990-1994 (civil war and genocide)	NIN: Acemoğlu and Robinson, 2012, p. 344. NIN: North et al., 2009, p. 21.

State crisis[a]	Literature
	DST: Goldstone, 2016, p. xxxii.
Liberia 1989-2003 (civil war)	NIN: Acemoğlu and Robinson, 2012, pp. 344, 373. DST: Korotayev et al., 2011, pp. 279-82.
USSR 1989-1990 (collapse of communism)	NIN: Acemoğlu and Robinson, 2012, pp. 119-121. DST: Goldstone, 2016 [1991], p. 492. REV: Tilly, 1993, ch. 6.
Haiti 1984-1986 (protests oust Jean-Claude Duvalier)	NIN: Acemoğlu and Robinson, 2012, p. 373. SES: Fischer-Kowalski et al., 2019, SI p. 19 Table S3.
Iran 1979 (Iranian Revolution)	DST: Korotayev et al., 2011, pp. 279-82. DST: Goldstone, 2016 [1991], pp. 447-8, 475. REV: Gurr and Goldstone, 1991. REV: Goldstone et al., 2010, pp. 191-2.
Nicaragua 1978 (Sandanista Revolution)	SES: Fischer-Kowalski et al. 2019, SI p. 22 Table S4. REV: Gurr and Goldstone, 1991.
Angola 1975-2002 (civil war)	NIN: Acemoğlu and Robinson, 2012, p.344. SES: Fischer-Kowalski et al., 2019, p. 72, SI p. 19 Table S3.
Mozambique 1975 and 1977-1992 (war of independence then civil war)	NIN: Acemoğlu and Robinson, 2012, p. 344. SES: Fischer-Kowalski et al., 2019, SI p. 19 Table S3.
Bangladesh 1971 (war of independence and genocide)	NIN: North et al., 2009, p. 21. SES: Fischer-Kowalski et al., 2019, p. 72, SI p. 13 Fig. S3, SI p. 19 Table S3. REV: Goldstone et al., 2010, pp. 191-2.
Cambodia 1967-1976 (civil war)	SES: Fischer-Kowalski et al., 2019, SI p.19 Table S3. REV: Gurr and Goldstone, 1991.
Nigeria 1967-1970 (civil war or Biafran War)	NIN: North et al., 2009, p. 21. SES: Fischer-Kowalski et al., 2019, p. 72 and SI p. 13 Fig. S3.
Viet Nam 1975	SES: Fischer-Kowalski et al., 2019, SI p. 22 Table S4. REV: Gurr and Goldstone, 1991.
Guatemala 1944 (protests oust General Ubico in June, October Revolution ousts junta)	NIN: Acemoğlu and Robinson, 2012, pp. 349-350. SES: Fischer-Kowalski et al., 2019, SI p.19 Table S3.
Russia 1917-1921 (Socialist Revolution)	SES: Fischer-Kowalski et al., 2019, SI p.18 Table S2. REV: Skocpol, 1979, ch. 6; Tilly, 1993 ch. 6.
China 1911 (Xinhai Revolution)	SES: Fischer-Kowalski et al., 2019, pp. 74, SI p. 18 Table S2. DST: Korotayev et al., 2011, pp. 277-9. WSA: Amin, 1990. REV: Skocpol, 1979: ch. 7.
Russia 1905 (Revolution for Constitutional Monarchy)	SES: Fischer-Kowalski et al., 2019, SI p. 18 Table S2. REV: Tilly, 1993, ch. 6.

State crisis[a]	Literature
Japan 1868 (Tokugawa Crisis and Meiji Restoration)	NIN: Acemoğlu and Robinson, 2012, pp. 294-298. SES: Fischer-Kowalski et al., 2019, p. 74. DST: Goldstone, 2016 [1991], pp. 402-415. WSA: Amin, 1990.
USA 1861-1865 (American Civil War)	SES: Fischer-Kowalski et al., 2019, p. 74. DST: Turchin, 2016, ch. 7.
Austria / Habsburg Empire 1848 (March Revolution, continues into May, August, September)	SES: Fischer-Kowalski et al., 2019, SI p. 18 Table S2. DST: Goldstone, 2016 [1991], p. 475.
Germany 1848 (March Revolution)	SES: Fischer-Kowalski et al., 2019, SI p. 18 Table S2. DST: Goldstone, 2016 [1991], p. 475. REV: Tilly et al., 1975.
France 1789-1799 (French Revolution)	SES: Fischer-Kowalski et al. 2019, p. 74, SI p. 18 Table S2. DST: Goldstone, 2016 [1991], p. 475. REV: Skocpol, 1979, ch. 5. REV: Tilly, 1993, ch. 5.
England 1688 (Glorious Revolution)	NIN: North et al., 2009, pp 72, 78, 183-187. NIN: Acemoğlu and Robinson, 2012, pp. 102-13, 122, 185-197. NIN: Van Bavel, 2016, pp. 211-214, 253-4. DST: Goldstone, 2016 [1991], pp. 318-324. SES: Fischer-Kowalski et al., 2019, p. 74, SI p. 18 Table S2. REV: Tilly, 1993: ch. 4.
England 1642-1651 (civil war)	NIN: Van Bavel, 2016, p. 213. NIN: North et al. 2009, pp. 183, 243. DST: Goldstone, 2016 [1991], pp. 63-169. SES: Fischer-Kowalski et al., 2019, p. 74. SI p. 18 Table S2. REV: Tilly, 1993, ch. 4.
China 1618-1683 (Manchu conquest, Ming-Qing transition)	NIN: Acemoğlu and Robinson, 2012, pp. 231-4, 300-1. SES: Root, 2020, pp. 99-101. SES: Tainter, 1988, p. 56. DST: Goldstone, 2016 [1991], pp. 349-315. DST: Turchin and Nefedov, 2009, p. 311.
Low Countries 1550s-1560s (start of stagnation and decline in welfare; food crises 1550s-1560s; start of Eighty Years' War 1568-1648)	NIN: Van Bavel, 2016, pp. 196-7, 200-207. SES: Fischer-Kowalski et al., 2019, p. 74 SI p. 18 Table S2. DST: Goldstone, 2002. WSA: Arrighi, 2010, pp. 132-135, 138, 142-4. REV: Tilly, 1993, ch. 3.
Northern Italy 1420s-30s (Florence-Lucca war 1429-33; democratic reversal in Florence 1434; Genoa crisis)	NIN: Van Bavel, 2016, p. 132. WSA: Arrighi, 2010 [1994], pp. 105, 220. WSA: Modelski, 2012, p. 68.

State crisis[a]	Literature
Europe 14th-15th centuries (Crisis of the Late Middle Ages)	DST: Goldstone, 2016 [1991], p. 353. DST: Turchin and Nefedov, 2009 (esp. in France, and War of the Roses in England). WSA: Wallerstein, 1974a, p. 37.
China 1368 (Ming rebellion, Yuan-Ming transition)	WSA: Abu-Lughod, 1993, p. 284. SES: Root, 2020, pp. 101, 109, 160. DST: Goldstone, 2016 [1991], p. 353. DST: Turchin and Nefedov, 2009, p. 311.
Northern Italy 1360s-70s (rebellions in Lucca in 1369, Perugia in 1370–5, Siena in 1371, and Florence in 1378).	NIN: Van Bavel, 2016, p. 130. WSA: Arrighi, 2010, p. 103.
China 1271-1279 (Song decline, Song-Yuan transition)	NIN: Van Bavel, 2016, pp. 33, 35. WSA: Modelski and Thompson, 1996. DST: Turchin and Nefedov, 2009, p. 311.
Byzantium 977-1071 (civil wars, decline)	SES: Tainter, 1988, pp. 70, 86, 203. WSA: Gills and Frank, 1993b, p. 174.
Iraq 10th century (start of crisis and decline)	NIN: Acemoğlu and Robinson, 2012, p. 147. WSA: Abu-Lughod, 1989, p. 192. WSA: Gills and Frank, 1993b, p. 176. SES: Butzer 2012, p. 3635.
Lowland Classic Maya c.810- (collapse)	NIN: Acemoğlu and Robinson, 2012, p. 147. SES: Tainter, 1988, pp. 152-177 and passim.
Byzantium 6th century (crisis and decline)	DST: Baker, 2011. WSA: Chew, 2007, p. 156.
Roman Empire 235-284 (Crisis of the Third Century or Imperial Crisis)	NIN: Acemoğlu and Robinson, 2012, pp. 158, 172-175. NIN: Van Bavel, 2016, pp. 32, 35. SES: Tainter, 1988, pp. 128-151 and passim. DST: Turchin and Nefedov, 2009, pp. 233-239. WSA: Chew, 2007, pp. 112, 139-165 and passim. WSA: Gills and Frank, 1993a, p. 91.
China 180-220 (Han crisis and decline)	NIN: Van Bavel, 2016, p. 33. DST: Turchin and Nefedov, 2009, p. 311. WSA: Gills and Frank, 1993a, p. 91.
Rome 133 BC (the Gracchan Crisis; start of the Crisis of the Late Republic)	NIN: Acemoğlu and Robinson, 2012, pp. 158-172. SES: Tainter, 1988, pp. 69, 77, 129, 150, 202, 214. DST: Turchin and Nefedov, 2009, pp. 201-207.

Table 1. Specific state crises discussed in two or more different literatures

[a] *Note that in general, I often 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.*

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

In summary: across these five literatures, there is a shared focus on the state, broadly defined as a political apparatus with coercive power over a population within some territory. Across literatures, a state crisis is a decisive turning point 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.

Systematizing Theories Of State Crisis

Within these five literatures, I have found none that integrate all these different factors and possible responses into a single systematic framework. But within the five literatures I do find several frameworks (sometimes called 'conceptual models' or 'pathways' or 'classificatory schemes') which I have drawn on when constructing my own.

From Van Bavel et al. (2018; see Fig. 3) I have incorporated into my own framework the idea that the societal response to adverse events can be influenced by institutional openness, and that entrenchment as well as reform are possible outcomes. Though not strictly speaking limited to state crisis, their model does illuminate the effects of state capture on the institutions that govern environmental hazards. They link together how egalitarianism enhances the chances of governance institutions adjusting to circumstances, derived from a more specific analysis of the governance of high water hazards to prevent flood disasters. They describe how a buffering feedback loop can occur in which measures are taken to increase economic and political equality. These in turn increase the information and motivation necessary to improve hazard management, which helps to prevent disasters. But a cascading feedback loop can also arise when elites entrench and engage in state capture, increasing inequality and making management improvements less likely, thus increasing the risk of further disasters which in turn increase inequality, and so on.

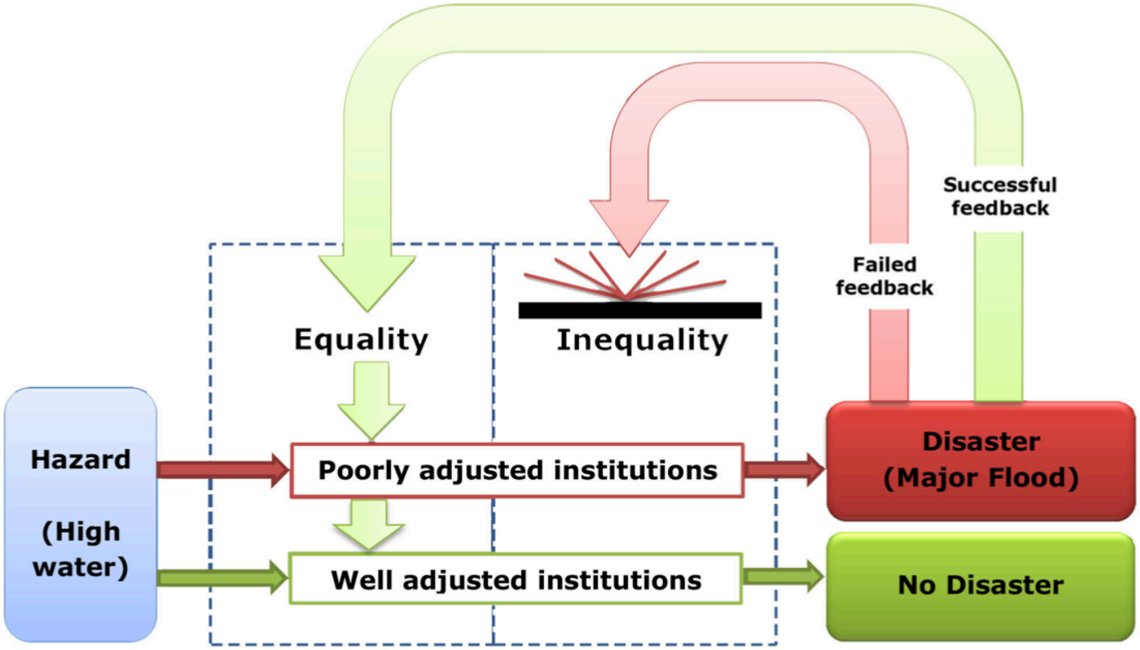

Fig. 3. Van Bavel et al.'s (2018) model linking the hazard of high water to flood disasters focuses on how institutions of relative economic and political equality increase the chance that institutions will adjust and preventing future disasters

Synthesizing theories drawn from across the socio-ecological systems (SES) literature, Butzer (2012, p. 3636; see Fig. 4) presents a conceptual model for historical collapse and resilience. In societies with a high level of resilience, buffering feedbacks mean that elites are able to rally and reconstitute the state.

But in societies with low resilience, cascading feedbacks lead to breakdown and then to collapse, including elite polarization, urban decline, a fracture of social order, civil wars, and state fragmentation. This corresponds very closely to the scarcity crises in my framework, and I have drawn a great deal from its nuanced analysis. Butzer's conceptual model does not consider sufficiency crises, and does not really consider the possibility for reform: although social transformation and new ideologies are mentioned, these are in the context of elites rallying around authoritarian military leaders and mobilizing support for elite entrenchment.

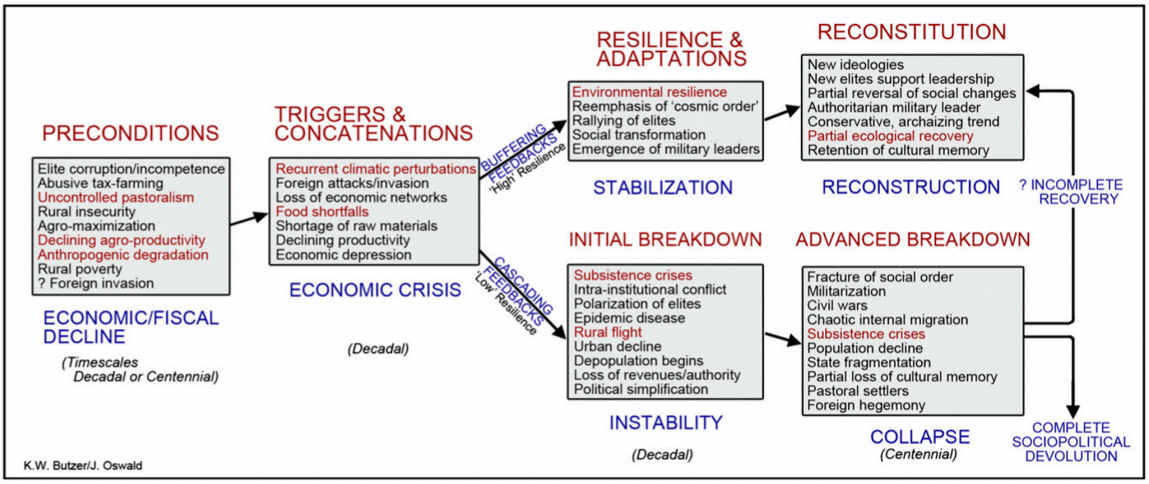

Fig. 4. Butzer's (2012) conceptual model for crises in historical societies which may stabilize and reconstitute, or may breakdown and collapse

Within the world-system (WSA) literature, Chase-Dunn et al. (2010, p. 73 revised from Chase-Dunn and Hall 1997, p. 102; see Fig. 5) draw on Turchin (2003) as well as on the work of anthropologists Marvin Harris, Robert Carneiro, and Allen Johnson and Timothy Earle. In their model, scarcity crises occur when population growth and intensification leads to environmental degradation, in turn leading to increased conflict; this downswing corresponds to conditions in which scarcity crises occur in my own framework. During the upsweeps in their model, conflict sets the stage for rapidly expansionist states and increasing urbanization, trade, and technology; but they do not discuss the 'sufficiency crises' that may occur during this phase of the cycle. Their upswing ends when population growth once again leads to intensification and degradation, and thus once more to decline.

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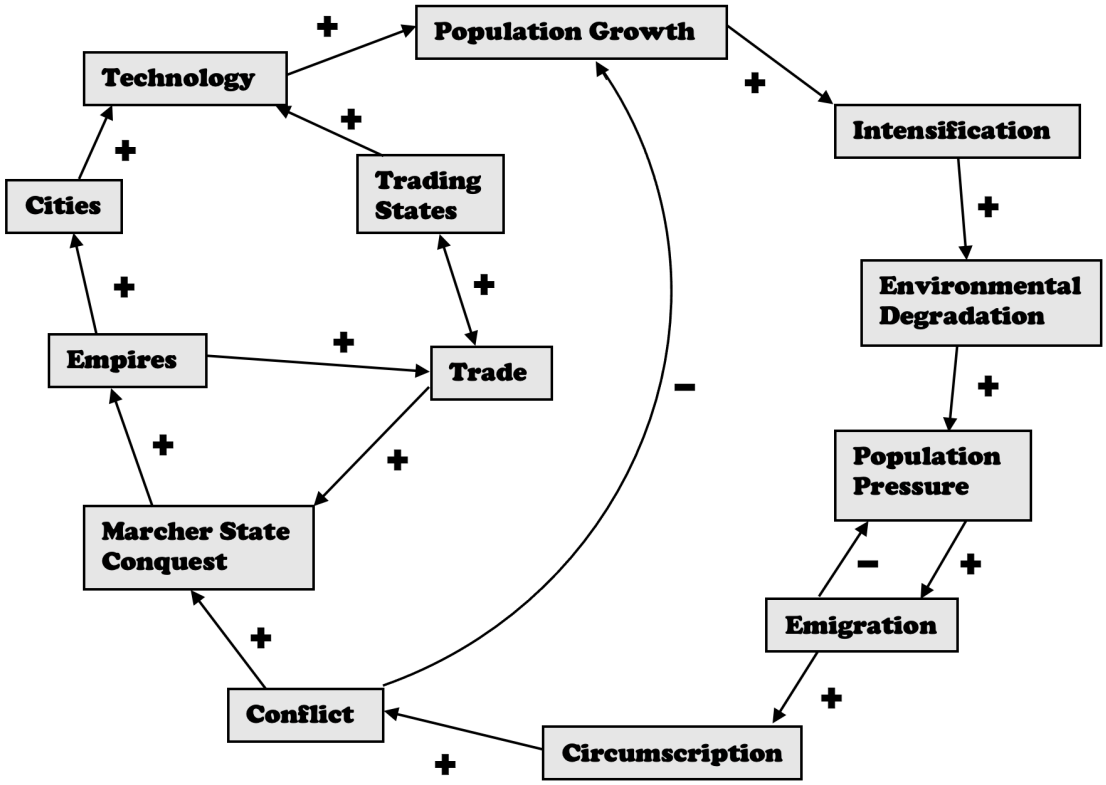

Fig. 5. Chase-Dunn et al.'s (2010) model of population growth inducing the 'nasty right side' decline into environmental degradation and conflict, followed by upsweeps of cities, empires, technology, and trade on the left (redrawn after the original)

Among demographic-structural theories (DST) and its variants, Turchin and Nefedov (2009, pp. 19-21) verbally set out a secular cycle with a disintegrative phase when the population tends to decline, elites are divided, the state is weak, and there is instability and disorder including civil war. This corresponds to scarcity crisis within my framework. This seems particularly the case in partial and closed societies where elite division is thought to be pivotal in whether the societal response to a crisis is entrenchment or breakdown. They also set out an integrative phase of the cycle which occurs in conditions of sufficiency when the population increases, elites are unified, and there is a strong and stable state (though often there are expansionary wars of conquest). Turchin and Nefedov do not much discuss sufficiency crises. But elsewhere both Goldstone (2016 [1991]) and Korotayev et al. (2011) emphasize that crises associated with 'youth bulges' occur in conditions of sufficiency; both also note that though they may inspire hope for reform, such crises actually often result in entrenchment or breakdown.

Within revolutions research (REV), Vesco et al. (2020, p. 2; see Fig. 6) set out some main pathways connecting natural resources to conflict risk. Like my distinction between scarcity and sufficiency, Vesco et al. distinguish abundance from scarcity, noting that abundance can lead to higher opportunities for looting, corruption, and slow economic growth, whilst worsening scarcity can lead to loss of economic activity, food crisis, livelihood deterioration, and outmigration. Both can lead to political crisis, economic instability, and societal fragmentation by lowering the cost of fighting whilst increasing the motivation to fight. Their focus is on violent breakdown rather than the possibility for reform, entrenchment, or collapse, as well as on partial or closed rather than more open societies. In terms of my framework, Vesco et al.'s pathways correspond to the way that both sufficiency and worsening scarcity can lead to breakdown, particularly under partial or closed institutional settings.

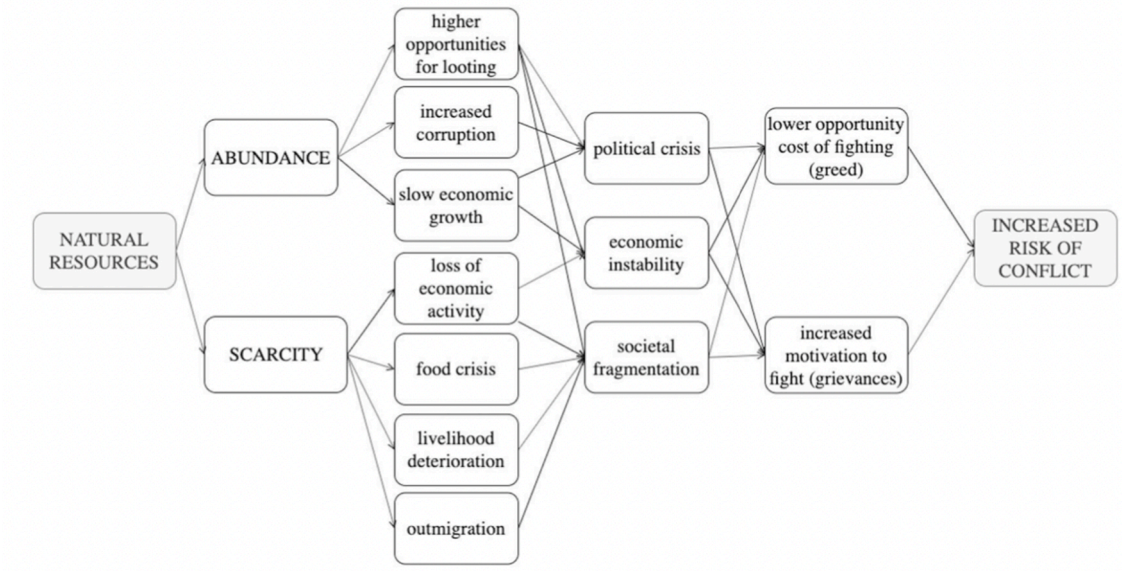

Fig. 6. Vesco et al.'s (2020) main pathways connecting both resource scarcity and resource abundance to conflict. Reprinted from *Ecological Economics* 172 'Natural resources and conflict: A meta-analysis of the empirical literature' p. 106633, copyright (2022), with permission from Elsevier

Theories of Sufficiency Crises

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

Why sufficiency crises occur

Van Bavel (2016, pp. 251-3) 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 et al. (2009, p. 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, p. 141-2) 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, p. 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 et al. (2022, pp. 38-9) 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) 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 that 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" (p. 277). 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. (2011, pp. 277-279) explicitly contrast sufficiency crises with the kind of scarcity crises that presaged the breakdown of the Qing Dynasty i“ 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, p. technological progress, an increased surplus, population growth, a youth bulge, the emergence of new elites that undermine older elites, urbanization, and the organization of people around new ideologies (see Table 2).

Hypothesized Factor	References
technological progress	Van Bavel, 2016, p. 251-3; North et al., 2009, p. 21.
increased surplus, new income sources	Fischer-Kowalski et al., 2019, p. 69-71; Goldstone et al., 2022, p. 38-9.
population growth	Goldstone et al., 2022, p. 38-9; Korotayev et al., 2011.
youth bulge	Goldstone et al., 2022, p. 38-9; Korotayev et al., 2011.
new elites (undermining of old elites)	Van Bavel, 2016, p. 251-3; Fischer-Kowalski et al., 2019, p. 69-71; Goldstone et al., 2022, p. 38-9.
increasing inequality	Goldstone et al., 2022, p. 38.
moral decay (visible corruption)	Van Bavel, 2016, p. 141-2; Blanton et al., 2020; Goldstone et al., 2022, p. 38-9.
urbanization	Fischer-Kowalski et al., 2019, p. 69-71; Goldstone et al., 2022, p. 38-9; Korotayev et al., 2011.
new organizations (fostered by urbanization)	Fischer-Kowalski et al., 2019, p. 69-71.
new ideologies (fostered by urbanization)	Fischer-Kowalski et al., 2019, p. 69-71.

Table 2. Why sufficiency crises occur

What influences the societal response to sufficiency crises

Van Bavel (2016, p. 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) similarly do not advance a hypothesis about this. They note (p. 297) 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.

Vesco et al. (2020, pp. 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 (see also Blair et al., 2020). Vesco et al. (2020, p. 12) 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 (Albrecht and Koehler, 2020, Goldstone et al., 2022, p. 46). 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, p. 651; Goldstone et al. 2010; Goldstone et al. 2022, p. 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 (Bodea and Elbadawi, 2007, pp. 23-24; Cederman et al., 2013, pp. 4-5). Tilly (1993, pp. 237, 246-7) 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, pp. 170-2) 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, p. 6; Goldstone et al., 2022).

In summary, sufficiency crises are theorized as potentially leading to three societal responses: reform, entrenchment, or breakdown (see Table 3). 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.

Hypothesized Factor	Increased Likelihood Of	References
development	reform	Van Bavel, 2016, p. 252.
fairly high economic equality, wealth, and welfare	reform	Van Bavel, 2016, p. 252.
exchange and trade	reform	Van Bavel, 2016, p. 252.
open institutions	reform	Vesco et al., 2020, p. 3, 11; King and Zeng, 2001, p. 651; Goldstone et al., 2010; Goldstone et al., 2022, p. 46.
external support for reformers	reform	Tilly, 1993, p. 6; Goldstone et al., 2022, p. 46-7.
closed institutions	entrenchment	Vesco et al., 2020, p. 3, 11; King and Zeng, 2001, p. 651; Goldstone et al., 2010; Goldstone et al., 2022, p. 46.
external support for incumbents	entrenchment	Tilly, 1993, p. 6.
partial institutions	breakdown	Vesco et al., 2020, p. 3, 11; King and Zeng, 2001, p. 651; Goldstone et al., 2010; Goldstone et al., 2022, p. 46.
external support for belligerents	breakdown	Tilly, 1993, p. 6.
horizontal inequalities	breakdown	Tilly, 1993, p. 237, 246-7; Stewart, 2005; Bodea and Elbadawi, 2007, p. 23-24; Cederman et al., 2013, p. 4-5; Hillesund, 2022.
factionalization / elite fragmentation	breakdown	Goldstone et al., 2022, p. 46.

Table 3. Factors influencing the societal response to sufficiency crises

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 4). These shocks are variously described as 'accidental' (Jessop, 2015), 'adverse events' (Janssen et al., 2003, p. 727), 'accidental disruptions' (Middleton, 2017, p. 27), 'agents of disturbance' (Holling, 2001, pp. 394-396), 'hazards' (Van Bavel, 2019, p. 62), 'major stress surges', 'major adversities' (Tainter, 1988, pp. 195-6), and 'triggers' (Butzer,2012). Shocks may also

exacerbate crises occurring during periods of sufficiency, but are most closely associated with scarcity crises, typical causing a period of scarcity at least in the short term.

Hypothesized Factor	References
environmental changes[a]	Holling, 2001, p. 394; Weiss, 2017, pp. 1-3.
natural disasters[b]	Chew, 2007, p. 4; Drake, 2012, p. 1863; Holling, 2001, pp. 394-396.
disease	Chase-Dunn and Hall, 1997, p. 114; Holling, 2001; Butzer, 2012; Goldstone, 2016 [1996]; Abu-Lughod, 1991, pp. 18-20; Diamond, 2005, p. 3-6.
technological disruption to networks	Armit et al., 2014, p. 17047.
external warfare	Abu-Lughod, 1991, pp. 18-20, 360; Butzer, 2012.
uprisings nearby	Tilly, 1993, pp. 13-4; Goldstone et al., 2022, p. 46.
foreign attack, invasion, colonization	Butzer, 2012, p. 3638; Middleton, 2017, pp. 26-27.

Table 4. Why scarcity crises occur: shocks

[a] *Including drought, mega-drought, adverse weather, and climatic change.*

[b] *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, p. 394; Weiss, 2017, pp. 1-3). They also include natural disasters in the form of tectonic shifts and volcanoes (Chew, 2007, p. 4), earthquakes (Drake, 2012, p. 1863), wind, fire, and insect outbreak (Holling, 2001, p. 394-396). Disease is also often considered a shock (Holling, 2001; Butzer, 2012; Goldstone, 2016 [1996]), 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, p. 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, pp. 18-20), networks (Butzer, 2012), and complexity (Diamond, 2005, p. 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, p. 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, pp. 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, pp. 13-4). Recent revolutions research has thus placed more emphasis on seeing revolutions as part of regional or even global waves (Goldstone et al., 2022, p. 46). States defeated in war with another state can lose legitimacy as well as material resources (Tilly, 1993, p. 6). 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, p. 3638; Middleton 2017, p. 26-27).

Why scarcity crises occur: diminishing returns

It is common, particularly among neo-institutionalists, to distinguish 'shocks' from processes that are more 'endogenous' (Greif and Laitin, 2004; Gerschewski, 2021), 'inherent' or 'systemic' (Jessop, 2015), and the result of 'internal tensions' (Thelen and Conran, 2016, p. 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 5). 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' I've just described.

Hypothesized Factor	References
resource acquisition, especially energy	Tainter, 1988, pp. 92, 110, 125, 194-6.
waste and pollution	Moore, 2015, pp. 37, 269.
complexity	Tainter, 1988; Chase-Dunn and Hall, 1997, pp. 112-5; Cumming and Petersen, 2017, p. 2; Middleton, 2017, p. 11-12; Root, 2020, p. 258-260.
labour	Tilly, 1993, p. 6; Diamond 2005, p. 6; Motesharrai et al., 2016; Cumming and Petersen 2017, p. 7.
elite overproduction[a]	Goldstone, 2016 [1991]; Turchin and Nefedov, 2009, p. 313; Motesharrei et al., 2016; Alexander, 2016, 2017, 2019.
profits[b]	Wallerstein, 1974b, pp. 414-415, 2000; Moore, 2015, pp. 103-4, 162, 165; Turchin, 2016; Goldstone, 2016 [1991]; Modelski and Thompson, 1996, pp. 51-3; Modelski, 2012, pp. 67, 72-73; Arrighi, 2010 [1994]; Van Bavel, 2016; Alexander, 2019; Gill, 1993; Turchin and Nefedov, 2009; Amin, 2010; Moore, 2015.
territorial expansion[c]	Tainter, 1988, pp. 148-149; Arrighi, 2010 [1994], p. 43; Moore, 2015, p. 167; Kennedy, 1987; Tilly, 1993, p. 238; Wallerstein, 1974b, pp. 412-3, 415; Chase-Dunn and Hall, 1997, p. 101; Cumming and Petersen, 2017, p. 14.
state capture (driven by declining profits)	Van Bavel, 2016, pp. 21, 278-9; Gill, 1993; Wallerstein, 2000, p. 253; Arrighi 2010 [1994].

Table 5. Why scarcity crises occur: diminishing returns

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

[b] *Driven by higher resource and waste cost, rising wages, higher taxation, competition, and/or declining demand.*

[c] *Driven by transport costs, external resistance, costs of co-option, ecological damage, military overstretch, and/or complex organization.*

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 (e.g. Tainter, 1988, pp. 92, 110, 125, 194-6). Often accounts focus on energy resources expressed in terms of energy return on energy invested, 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, pp. 37, 269).

Tainter's influential account also emphasizes the role of social complexity in both using and acquiring energy (Tainter, 1988; Chase-Dunn and Hall, 1997, pp. 112-5; Cumming and Petersen, 2017, p. 2; Middleton, 2017, pp. 11-12; Root, 2020, pp. 258-260). 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, p. 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 a situation, and though often appearing catastrophic for elites, may actually be beneficial for others within the population (Tainter,1988, p. 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, p. 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, p. 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 (Motesharrai et al., 2016; Cumming and Petersen, 2017, p. 7). 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, pp. 119-121; Modelski, 2012, p. 73). But both institutional and technological innovation are themselves hypothesized to be subject to diminishing returns (Motesharrai et al., 2016, p. 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, p. 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 the 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 [1991]). 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, p. 313; Motesharrei et al., 2016 construct a second-order model of these dynamics).

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 (2016) instead proposes that labour supply outpacing demand drives down wages, whilst Alexander's non-demographic account (2016, 2017, 2019) suggests that low wages are more to do with changes in institutional culture and policies to suppress wages. 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 (e.g. Mandel, 1981; Hodgson, 1991; Harvey, 2015). 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 (Wallerstein, 2000, p. 260; Moore, 2015, pp. 103-4, 162, 165). Profits are squeezed if wages rise (Wallerstein, 2000, p. 258-259; Turchin, 2016), by the higher taxation levied by the state in the face price rises (Wallerstein, 2000, p. 261; Goldstone, 2016 [1991]), by population growth, and by popular demands for education, health, pension, and social insurance (Wallerstein, 2000, p. 261). Competition in general erodes profits, particularly as the diffusion of technological innovations erodes the competitive advantage of early adopters (Modelski and Thompson, 1996, p. 51-53; Modelski, 2012, pp. 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, pp. 414-415; Amin, 2010). Declining profits may in turn motivate a shift from investment to finance (Arrighi, 2010 [1994]; Van Bavel, 2016), attempts at wage suppression (Alexander, 2019) and direct coercion (Gill, 1993; Turchin and Nefedov, 2009), and can motivate territorial expansion in search of more resources, cheaper labour, and new markets (Wallerstein, 1974b, p. 414-415; Amin, 2010; Moore, 2015).

But territorial expansion is itself thought to have diminishing returns. Transport and communication costs increase (Tainter, 1988, pp. 148-149). Expansion often meets increasingly organized resistance abroad, and tax rises to cover military costs can provoke revolt at home (Arrighi, 2010 [1994], p. 43; Moore, 2015, p. 167). Excessive military commitments can erode a state's economic base (see 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, p. 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, pp. 412-3, 415). The scale of ecological damage increases, and the maintenance and regulation of a larger and more diversified system requires more complex organization (Chase-Dunn and Hall, 1997, p. 101; Cumming and Petersen, 2017, p. 14). Such 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, p. 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 (Gill, 1993; Van Bavel, 2016). 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 (Wallerstein, 2000, p. 253; Arrighi, 2010 [1994]; Van Bavel, 2016, pp. 278-9). 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 aid stability, particularly if reforms promote economic and political equality, develop effective hazard management institutions, and limit elite infighting (Butzer, 2012, p. 3637; Motesharrai et al., 2014, p. 98; Middleton 2017, pp. 340-341; Witoszek and Midtun, 2018; Van Bavel, 2019, p. 62).

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, p. 3636; Van Bavel et al., 2018; Van Bavel, 2019, p. 62), 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, 2019, p. 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 et al., 2018; Van Bavel, 2019, p. 62 Fig. S1.1.2).

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 (2009, p. 314) put it, "as long as the elites remain unified, peasant insurrections, slave rebellions, or worker uprisings have little chance of success". 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 degenerating into breakdown increase (Arrighi, 2010 [1994], p. 43; Turchin and Nefedov, 2009; Butzer, 2012; Turchin, 2016; Goldstone et al., 2022, p. 46). The mechanism of 'elite overproduction' is thus an important hypothesized mechanism influencing whether elites entrench or whether they breakdown into infighting (Turchin and Nefedov, 2009; Turchin 2016).

Tilly (1993, p. 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, p. 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 et al., 2009, p. 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 (Gill, 1993, p. 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. from is thought to take fromform of forced and violent globalization, anti-colonial and counter-hegemonic mobilization, and growing competition and conflict between declining core powers and emerging rivals (Amin, 2010 [1994], 2013, p. 8-9; Chase-Dunn et al., 2010, p. 81; Denemark, 2021, p. 39). 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 exercized 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 [1994], p. 23; Chase-Dunn et al. 2010, p. 81). As ever, how other states intervene in another's internal crises can strongly affect the outcome of those crises (Tilly, 1993, p. 6; Goldstone et al., 2022, pp. 46-7).

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 (Modelski and Thompson, 1996, pp. 51-53; Modelski, 2012, pp. 67, 72-73; Denemark, 2021, p. 39).

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, pp. 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, p. 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, 2017) and the accumulated rigidities or ossification of state structures that hinder necessary adaptation (Holling, 2001, pp. 394-396; Root, 2020, p. 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 et al., 2003).

Some theorists note that 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, p. 72). Ecological-economic systems that expand faster than governance and regulation become misaligned and, in the absence of institutions of sufficient scope to prevent systemic disfunction, this increases the potential for collapse (Cumming and Petersen, 2017, p. 14). All these hypothesized influences on the societal response to crises are listed in Table 6.

Hypothesized Factor	Increased Likelihood Of	References
relative economic equality	reform	Butzer, 2012, p. 3637; Motesharrai et al., 2014, p. 98; Middleton 2017, p. 340-341; Witoszek and Midtun, 2018; Van Bavel 2019, p. 62.
open institutions	reform	Butzer 2012, p. 3637; Motesharrai et al. 2014, p. 98; Middleton 2017, p. 340-341; Witoszek and Midtun 2018; Van Bavel 2019, p. 62.
external support for reformers	reform	Tilly 1993, p. 6; Goldstone et al. 2022, pp. 46-7.
elite rallying	entrenchment	Arrighi 2010, [1994], p. 43; Turchin and Nefedov, 2009; Butzer, 2012; Turchin, 2016; Goldstone et al., 2022, p. 46.
closed institutions	entrenchment	Butzer, 2012, p. 3636; Van Bavel et al., 2018; Van Bavel 2019, p. 62; Gill, 1993, p. 126.
external support for incumbents	entrenchment	Tilly, 1993, p. 6; Goldstone et al., 2022, pp. 46-7.
partial institutions	breakdown	Butzer, 2012, p. 3637; Motesharrai et al., 2014, p. 98; Middleton, 2017, p. 340-341; Witoszek and Midtun, 2018; Van Bavel, 2019, p. 62.
external support for belligerents	breakdown	Tilly, 1993, p. 6; Goldstone et al., 2022, pp. 46-7.
horizontal inequality	breakdown	Bodea and Elbadawi, 2007, pp. 23-3; Stewart 2005; Goldstone et al., 2010; Hillesund 2019, 2022.
factionalization / elite fragmentation	breakdown	Arrighi, 2010 [1994], p. 43; Turchin and Nefedov, 2009; Butzer, 2012; Turchin, 2016; Goldstone et al., 2022, p. 46.
elite overproduction	breakdown	Turchin and Nefedov, 2009; Turchin, 2016.
weakened state capacity	breakdown	Wallerstein, 2000, pp. 246, 264; Scheffer et al., 2021, pp. 4-5.
hubris	collapse	Johnson, 2017.
ossification, rigidity	collapse	Holling, 2001, p. 394-396; Root, 2020, p. 87.
sunk costs	collapse	Janssen et al., 2003.
institutions of insufficient scope	collapse	Chase-Dunn et al., 2010, p. 72; Cumming and Petersen, 2017, p. 14.
ecological exhaustion	collapse	Chew, 2007, p. 6.

Table 6. Factors influencing the societal response to scarcity crises

Conclusion

I have systematized these theories of state crisis by integrating five broad literatures that each advance hypotheses regarding two questions: Why do crises occur? And what factors influence societal responses to state crisis? This paper contributes to attempts to answer these questions 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 underappreciated 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 systematisation I here propose allows us to clearly distinguish the different factors that are hypothesized to contribute to state crisis. I have identified ten broad factors hypothesized to increase the likelihood of a sufficiency crisis (Table 2) and eleven broad factors hypothesized to influence the societal response to sufficiency crises (Table 3). Similarly, I have identified seven kinds of shock (Table 4) and eight varieties of diminishing returns thought to make a scarcity crisis more likely (Tables 5), and seventeen factors hypothesized to influence the societal response to scarcity crises (Table 6). 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 systematisation thus establishes a framework for testing these competing but compatible hypotheses.

Examining five hundred years of European history Tilly (1993, p. 18-9) 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". The aspiration to construct a more general theory of state crisis persists (Scheidel, 2013; Goldstone et al., 2022). 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 of the 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.

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Declarations

Funding: The Spinoza Prize

Potential competing interests: No potential competing interests to declare.