

# Collapse. Institutional Decline and Breakdown, Its Endogeneity and Its Asymmetry Vis-à-Vis Emergence: A Theoretical Frame

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***Collapse.***  
***Institutional Decline and Breakdown, Its Endogeneity and Its***  
***Asymmetry Vis-à-Vis Emergence: A Theoretical Frame***

***Wolfram Elsner***

**Abstract:** Collapse is considered a breakup of institutions and entire socio-economies. Collapse has accompanied socio-economic history, but seems to have become more topical again in recent decades. We even face the danger of extinction of the human species, due to anthropogenic climate change, not the least based on failure of institutional arrangements. Uprooting migration and “failing states” have become topical as well. Mainstream economics seems to have no clue about all that, advising ever more good old “market-economy institutions.” Evolutionary and institutional economics has focused on institutional emergence, evolution, and persistent structures, but still not so much on decline and collapse. I develop an endogenous explanation of institutional decline and collapse implied by the previous success of institutionalized cooperation and increasing (over-)complexity, which exceeds individual cognitive capacities. Institutional adaptability and problem-solving capacity then decline. Uneven distribution of cooperation gains will further cause social conflict and institutional ceremonialization, decline, and collapse. Collapse will not just be a symmetric reverse of emergence. Being subject to sunk costs during emergence, to habituation and normativation, institutions tend to display some hysteresis. The article adopts an evolutionary-institutional perspective, in order to conceptualize future modeling.

**Keywords:** collapse, evolution of cooperation, global commons, institutional decline and breakdown, institutional hysteresis

**JEL Classification Codes:** B52, D02, O15, O17, O43

Decline and collapse of institutional structures and, with this, of entire socio-economies and often their natural ecologies as well, have occurred over thousands of years of human history (e.g., Tainter 2003; Turchin 2003; Diamond 2005).<sup>1</sup> We know of famous ancient cases of such collapse and even complete extinction in the interaction of institutions (namely ceremonially warranted ones) and *natural environment*, such as the Easter Island. More recently, we saw the decline and partial collapse of former state-socialist countries of Eurasia in the 1990s (with their large and long-term socio-economic impacts in terms of GDP decline or persistent brain

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<sup>1</sup> On the global economic history as “a sequence of rises and falls” (e.g., White 2018).

and labor emigration), and a number of entirely failing states and manifold humanitarian disasters in Africa and greater Middle East since then. So far, this all was spatially limited, even if on increasing scales.

### ***Topicality and Theoretical Significance of Decline and Collapse—and its Negligence in Economics So Far***

But the recent increasing fragility and hazard of the entire *global system*, from the decline of global trade to the decline of the global ecological system as we have known it, and the very limited collective-action capacity of the leading groups of powers (G7, G20, WTO, UNO),<sup>2</sup> when it comes to the protection of the endangered *global commons* (e.g., Block 2000; Padoan 2001; Rasmus 2016), have now become topical and dramatic,<sup>3</sup> and apparently to the surprise of many of our fellow-humans, and apparently even of top political decision-makers.<sup>4</sup>

But also below the global level of decline and sneaking collapse, there are ample symptoms of institutional decline and collapse at national and local levels, with subsequent economic downgrades, excessive and cumulating income and wealth inequalities, social disintegration and conflict, spatial fragmentation, humanitarian crises as to food, health,

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<sup>2</sup> So no wonder that there is much consideration nowadays of “de-globalization” and “post-globalization” (e.g., Latham 2016). And de-globalization has become even more topical under the Western strategy of “de-coupling” (D. Trump) and under the Covid-19 pandemic.

<sup>3</sup> The most general model simulations available, beyond earth-centered IPCC-based climate-change research, have been made at a comparative “exo-planetary” scale (i.e., on potential earlier energy-hungry civilizations with no planetary-collective rationality) just like the human species. Using current knowledge of astrophysics (namely of histories of known exo-planets), population biology, and complexity sciences, they elaborated Lotka-Volterra-type predator-prey models of populations and their environments (e.g., Frank 2016, 2018). They brought about a generalization of the “anthropocenic” pattern of planetary development, which in a wide range of settings led to planetary collapse and entire extinction. Reactive changes to low-impact (regenerative) energy sources usually came too late, as the planetary mechanisms were already so distorted that they eventually reached a tipping point of full extinction (a “delayed collapse”). So the planetary situation on earth may be far more serious than suggested even by IPCC-forecasts, with a good chance for the human species “to be consigned to the scrap heap of civilizations too shortsighted to take care of their own planet” (Frank 2018, 5). The old sarcasm suddenly appears tangible: Two planets meet again in universe. One says to the other: “What happened to you? You’re looking terrible!” The other: “Yes, it’s a horror. I have homo sapiens!” “Ooooh,” says the first, “that’s horrible indeed. I once had that too. But there’s hope: at some point, it usually ends by itself quite suddenly.”

<sup>4</sup> There is no need (and no space) to go into details here, as the media have had it as their front-page stories for years. A remark on the mega-disaster of the Australian bush fires is due, though, as it already indicates a closer connection between institutional degeneration and decline and ecological collapse that I will deal with in the present article. Namely, it would appear as no surprise that one of the most neoliberal and de-regulated countries in the world, with its long-term “business model” of unlimited depletion of its resources and nature, beginning with its colonial predation by the Europeans, not only had not installed the slightest precautions against the foreseeable disaster, warned of by both international and Australian scientists for many years. It also appears that the collective action capacity of the state, in terms of manpower, water, or organizational provisions against the actual fires, have been run down and now are close to zero. So there are obvious manpower, water, and organizational shortages all over; a disaster of its own that made the natural disaster grow into this mega tragedy the world has been forced to experience. Firefighting still is on a purely voluntary basis, exploiting the firefighters to their limits. Water supply for firefighting has not been cared for, and in fact all water privatized. On the personal level, it fits to the picture that the current prime minister, a neoliberal fundamentalist and climate-disaster denier, for many weeks simply seemed not to care at all about what is now known to have become one of the largest natural disasters for humankind. Its secondary and tertiary impacts are currently unpredictable, but will certainly be drastic and at least for the rest of the century. For a recent analysis of the Australian case, see Chester 2020. While the bush fires have been reemerging in the Australian summer 2020/2021, other mega-fires, directly or indirectly man-made, tend to become permanent as well: the Brazilian rain forest fires, the Californian wildfires and the Siberian Arctic tundra fires. As a final observation, the Covid-19 pandemic seems to have caused some fundamental systemic crisis for some of the leading nations. In all, the years 2020/2021 seem to demonstrate some major global turn of the tide.

It needs to be added that the (Australian-based) Murdoch global-media mega-corp. is a spearhead of climate-change deniers, recently rooting against “climate alarmism.” They present themselves to be “positive” and “optimists”—optimists, apparently, just as those jumping down a building from the twentieth story and at the fifth saying, “What are these people always talking about? So far nothing has happened!” What was a groaner for decades, now seems to receive serious topicality.

water, land, or shelter access, to violence and wars, and subsequent enforced, uprooting and disembedding migration.

There is of course no absolute empirical measure or value threshold to exactly define, when a social institution, socio-economic, political, or natural system really has “collapsed,” after some decline, when an institution no longer is socially “valid” or an economy is “broken down.” GDP will not go to zero throughout, the planet and the global natural system will continue to exist in some way, and even when humankind would become extinct, nature may not have been completely “collapsed.” You cannot tell the day, not even the decade, perhaps the century, when the Roman Empire completely ceased to exist along Hadrian’s Wall. On the other hand, the Roman Empire definitely collapsed, as it does not exist anymore. But the state of collapse is a relative state of systems. Pragmatically, therefore, I consider collapse a discernible vanishing point at the end of some process of decline and of an increasing inappropriateness and decreasing efficacy of institutional decision-making of a population, after a particular phase of accelerated decline. I expect to get reasonably far with such theorizing of critical institutional deterioration processes.

The focus of evolutionary and institutional perspectives in economics has been so far on emergence and further evolution rather than decline and collapse of informal social institutions and their related socio-economies, populations, or nations. Explicit considerations of decline and collapse have been considerably fewer, and if so, only relatively recent (e.g., Acemoglu and Robinson 2012). The issue was largely left to other social sciences, particularly historiography, ethnography, anthropology, and social geography (in addition to the above-mentioned: e.g., Weiss and Bradley 2001; Tainter 2006; Brooks 2012; Meija 2018), and partly to law and business (e.g., Richman 2016). Most of these accounts, however, have considered the reasons for collapse as mainly exogenous and discretionary: through the failure and collapse of a formal, hierarchical political system, an apparent “mismanagement” by the elites, and often just through climatic changes and ecological disasters. In some cases in Joseph Tainter (2003) and Jared Diamond (2005), exogenous climate change works in conjunction with a systemic failure to adapt to that change, but most significance has been given to just those exogenous events. And only few scholars have explicitly taken institutional aspects into account, such as a biased collective decision-making in the presence of sunk costs of institutions (e.g., for anthropology: Janssen, Kohler, Scheffer 2003).

In the present article, I will consider exactly high sunk fixed costs of the complex process of emergence, of interactively learning and converging on informal institutions, and therefore the relatively low decision-making costs, or “transaction costs,” of established, “old” institutions. Low transaction costs apply even to “petrified” and outmoded institutions. This implies relatively high expected transaction costs under institutional breakdown of the old and the emergence of a new institution, under a general assumption of a major change of the factor constellation. So, even if such major institutional change, considered here an exchange of two different institutions, would be most appropriate and warranted in terms of factor constellations, the outmoded institution would have a transaction-cost advantage, at least in the short run. (In the long run, the new institution would presumably become relatively cheaper, when sufficiently applied already, while the outmoded one may even face increasing transaction costs from some point on.) This results in institutional endurance and *hysteresis*,<sup>5</sup> which will entail an increasing inappropriateness of decision-making and

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<sup>5</sup> On economic hysteresis in general (e.g., Setterfield 1996).

of institutional coordination based on that obsolete institution, and eventually increasing overall transaction costs and other damage in the socio-economy at large.

Such institutional inertia, which makes an established institution exist on some “borrowed time,” reflected in the dominance of a *short-run rationality* of decision-making and as a ceremonial race to differential power and status, may also be considered as based on inequality and unequal power structures, short-run gains for the superior, and identity provision for the inferiors (more below), corresponding apologetic belief and value systems, and even related pleasurable emotional aspects on all sides, superiors and inferiors, as is known in social sciences, institutionalism, and even management literature (e.g., Weik 2019).

Thorstein Veblen and Clarence Ayres’ ideas of a ceremonially warranted value base of institutions already referred to a psychological dimension, a mental and emotional constellation, that contents itself with conformity with “enabling myths,” with “sufficient reason” or “ceremonial adequacy” (Veblen 1899). A modern theory of human decision-making, as informed also by neuroscience and anthropology, includes both emotion-based and reason-based dimensions (e.g., Rolls 2019). This is nothing else than to say that humans as complex entities of cognitive and affective dimensions will have to be holistically considered. More below.

At a systemic level, as in many historical instances, decline and collapse may conceptually be mirrored by a complex society that develops into a less complex one, where the degree of complexity<sup>6</sup> and adaptability (including institutional adaptability) falls below a degree required for the maintenance of the commons under changing conditions (e.g., Tainter 2003; Turchin et al. 2013; Horiuchi 2015). Although institutionalization is meant to reduce the complexity of the individual’s decision situation, institutional inertia may make the complexity and adaptability of the socio-economy fall below an appropriate level. Such socio-economies, then, have always been candidates of collapse.

Such too little complex, and thus too little adaptive, societies, in relation to changing circumstances and requirements to adapt, due to “old,” “sclerotized” and ceremonially dominated institutions, may indeed have had considerable earlier coordination *success* and thus may have grown their socio-economies into considerable sizes. But exactly this success then may have rendered overall transaction costs in the socio-economy too high. In some adaptive “countermovement” this may cause fragmentation of populations into small groups.<sup>7</sup> If this happens without some proper higher-level cooperation, reducing higher-level collective-decision capacity, communication and cooperation in favor of the higher-level commons may be overly constrained, and in this way eventually lead to collapse, as Javier Meija (2018) has elaborated. What in this respect happened in history at some regional dimension, sounds like what we have managed today to elevate to the global planetary dimension . . .

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<sup>6</sup> Note that more complex systems basically have the property of being able to assume more system states, in reaction to changes of their environment, than less complex ones, and therefore may be more resilient throughout. This requires adequate levels of within-population diversity (e.g., Heinrich 2016; Elsner 2017).

<sup>7</sup> There is a well-known literature tradition in social science on the disadvantages of (over-)size and the advantages of “smallness,” in political and economic structures. Over-size of communities, for instance certain large nations, had been contrasted by Leopold Kohr with “human scale” and related even to the breakdown of nations (e.g., Kohr [1957] 2001). Later, Ernst F. Schumacher popularized the idea as smallness being “beautiful” (Schumacher 1973). On “over-size,” “over-complexity” and collapse more recently (e.g., Benjamin Gussen 2019). For an overview of the theoretical issues of the size dimension of economies, see Wolfram Elsner, Torsten Heinrich and Henning Schwardt 2015, 419–447 “The Size Dimension of Complex Economies.” In the present article I will deal not only with absolute size but with the internal structuration of human social entities of any size, or its network structure—and of course also not only with size and network structure alone.

My use of the conception of complexity therefore is based on these propositions, briefly stated: *Systems* (economies, societies, populations) are “complex” entities, composed of different “*meso*”-entities (subsystems, spatial and social neighborhoods, emerged local cultures) and *micro*-entities that both are numerous, heterogeneous, and interdependent in different ways (different coordination and commons/dilemma problems).<sup>8</sup> With these properties, systems display evolutionary dynamics, by which they generate emerging systemic (“macro”) properties that cannot be traced back to the properties of the components, both meso and micro. Distinct from that, and independent of the degree of complexity of the system, agents may *perceive* the complexity of their individual decision situation (number and heterogeneity of other agents involved, differentiation of the interdependence/decision structures), as overly complex, compared to their *cognitive* (memorizing, analytical, computational) capacities, which are relatively limited. Socio-economies thus basically generate all kinds of heuristics (i.e., social institutions) to solve complex interdependence problems, not the least by reducing systemic complexity. If institutional arrangements are not sufficiently reducing systemic complexity, the system’s complexity may remain “too high” for society to effectively take decisions for economic and social progress (i.e., for increasing its own complexity through metabolism with the natural environment). Complexity-reducing institutions, however, may also concur with the spontaneous emergence of uneven centrality and power structures in their basic networks and with resulting hierarchies and then, ideally, degenerate into ceremonially dominated, “sclerotic” institutions that mainly serve the reproduction and reinforcement of differential status and power. Such institutions, and subsequently the systems, then, will display not just reduced complexity but, at some point in fact too little complexity and drop below required minimum adaptability (resilience). These systems, then, obviously, are prone to institutional, and then economic, societal, and ecological decline and finally collapse, as to be qualified in the present article.

In this article, I will consider how institutional hysteresis relates to some *earlier cooperation success*, as well as its usual adverse distributional effects, usually entailing perceived over-complexity. In a co-evolutionary process, and through subjective reactions, systemic complexity may eventually be overly reduced through hierarchical and ceremonial structures, while required institutional change (or exchange of institutions, appropriate against outmoded) will be postponed. Thus socio-economic performance will deteriorate, causing socio-economic decline and eventually rather sudden socio-economic and institutional collapse.

With this, the present article should contribute to the collapse literature of different other disciplines, with still few contributions from economics, namely evolutionary-institutional economics (while mainstream economics has very little to say here at all). I will develop two key hypotheses:

First, institutional and socio-economic decline and collapse are not necessarily tied to exogenous events but may well occur because of endogenous dynamics. This is consistent with the idea, well-known in social-dilemma theory, of “improving oneself into extinction” (Elster 1983, 54) through a short-run hyper-rationality (and resulting general individualist “defection”), resulting in a complete lack of some collective, planetary long-run rationality. In an evolutionary process, this may also apply, when institutional decision-making and its

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<sup>8</sup> Note that the conceptualization of systems with their “macro” (systemic), “meso” (subsystem and also culturally emergent) and “micro” (agents and their interrelations) levels require, and mirror, an appropriate ontology. Thanks to one of the reviewers for this important hint. Two references on the ontology of complex socio-economies may suffice here: Dopfer, Foster, Potts 2004; Gräbner, Kapeller 2015.

adaptability are no longer appropriate to the growing size and complexity of the population and its socio-economy, due to its own (i) growth success and distributional impacts, and (ii) its very conditions of emergence. The institution then no longer matches endogenous or exogenous changes of the socio-economic and natural commons (again: Tainter 2006; Horiuchi 2015; on a general commons economics, also Ostrom 2009).<sup>9</sup>

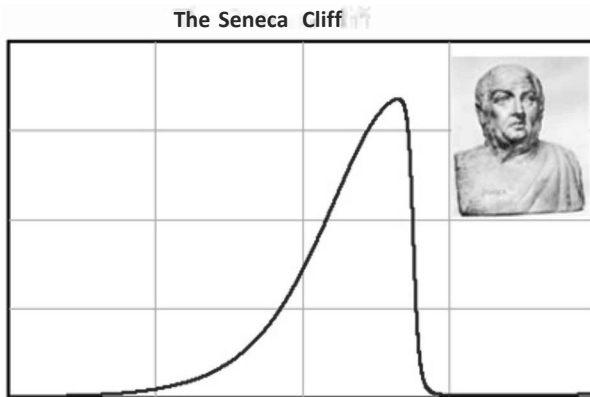
Second, and related to that endogeneity thesis, institutional collapse of cooperation also is not typically merely a logical and symmetric reversal of its emergence. Otherwise, its theoretical comprehension would be a simple derivative of the work on emergence. Rather, as the various disciplinary perspectives already mentioned indicate, collapse follows different rules than emergence. Due to its endogenous hysteretic character, it also is *asymmetric* both to emergence and to endogenous and exogenous changes of factors, and therefore has to be subject to an investigation in its own right.

In the first section, I will contrast a well-known asymmetry hypothesis that I call the *Seneca-asymmetry*, contending slow building up and fast breaking down, with a contrary evolutionary-institutional asymmetry hypothesis, inertial and hysteretic asymmetry. I will further develop an asymmetry argument in the second section, and will combine hysteretic asymmetry with the endogeneity hypothesis in the third section. In the fourth section, I will sort and condense things in a set of propositions. The final section will conclude.

### ***“Seneca-Asymmetry” vs. Institutional Hysteresis***

There is a widespread understanding in the literature and in many general comprehensions that building up structures will take time, while collapse will happen quickly. According to the much-cited saying of ancient Roman Stoic Philosopher Lucius Annaeus Seneca: “Fortune is of sluggish growth, but ruin is rapid.” This relates to some everyday experiences of relatively quick and radical collapse of things. The phenomenon has become known recently as the “Seneca effect,” assuming mechanisms that entail rapid decline and collapse, as analyzed and popularized mainly by Ugo Bardi (2017). For a simple illustration, see Figure 1.

**Figure 1. The Asymmetric “Seneca” Curve**



Source: <https://www.businessinsider.com.au/the-seneca-effect-why-decline-is-faster-than-growth-2011-8>

Quick decline and collapse of some structures and dynamics of systems, and their replacement by new ones, are well-known in complex systems, in complexity theory and in



computational simulations, and can be seen as discontinuities, so-called phase transitions, and particularly “catastrophes” as theorized in catastrophe theory. Large and sudden changes of the behavior of a system then occur, formerly stable (or turbulent) areas of the dynamic system change, and established knowledge and information flows, basic to social institutions, may get devaluated and completely lost (e.g., Heinrich 2018). Bardi applied the Seneca-asymmetry hypothesis of sudden collapse to several fields from the Roman Empire to nowadays’ peak oil and to the global environmental system.

However, complex systems are also known to display not only idiosyncratic dynamics with quick and fundamental regime shift upon marginal parameter change, but also *hysteresis* or *resilient* stasis, at so-called attractors, in spite of major parameter changes (e.g., Sugiarto et al. 2015; Elsner 2017). So, sudden collapse apparently highly depends.

And socio-economic instances brought forward in favor of the “Seneca” hypothesis, such as slow growth of imperial armies in history and their quick shrinking and collapse as part of an imperial breakdown, and namely the “mother of all collapses,” as put forward by Bardi (i.e., the fall of Rome) as measured by the manpower of the Roman military, indeed suggest that the Seneca asymmetry mainly applies to formal institutions and related hierarchical organizations, such as the state, its armies, police, and other state agencies. It may also apply to firms that sometimes may collapse quickly (e.g., at some legal threshold) for a formal declaration of bankruptcy.

And there is substantial indication for a contrary consideration, namely that for non-formal, non-hierarchical structures, informal institutions and cultures that had a different, more complex and more evolutionary emergence history, that had to be learned, internalized, habituated, generalized, and thus be “enculturated,” there are mechanisms at work that may make them more inert and enduring, and somehow resilient. The result then may be a quite different asymmetry over time, contrary to “Seneca,” namely one of persistence beyond a certain critical point, where the institution should collapse, an existence on borrowed time that then may lead to deterioration and collapse later, then even suddenly as well—an *asymmetry hypothesis*, I contend, fitting better to explain the life cycle of basic informal (“enculturated”) institutions. I will explain this as “hysteretic asymmetry.”

### ***Emergence of Institutions and “Hysteretic Asymmetry” of Collapse***

As said, the analysis of the complex emergence process of informal institutions (e.g., Hodgson 2000) provides us with some insight about their expected process of decline and breakdown. So we have to take a brief look at the basic conception of institutional emergence first.

#### ***Emergence of Institutional Cooperation***

The famous “puzzle of cooperation” (Why should rational agents cooperate, when they have to sacrifice their short-run maximum?) gained attention in economics in the context of the *private provision of collective goods* in the 1960s (e.g., Runciman and Sen 1965; Olson and Zeckhauser 1967), parallel to a similar issue in psychology, there called “social trap.” The interest in cooperation, and from there in game theory, further developed through behavioral experiments, led game theorists to incorporate psychological, behavioral, biological, anthropological, and finally neuro- and brain-sciences evidence into their models since then (e.g., Bowles and Gintis 2013), and vice versa made game theory diffuse into all sciences. The emergence of cooperation is usually based on iterated prisoners’ dilemmas (PD)



and related evolutionary game theory (EGT), namely in an *evolution-of-cooperation* approach (e.g., Axelrod [1984] 2006)

Since unconditional cooperation is a strictly dominated strategy in the PD, the main interest was first on simple (two-state-) automata such as tit-for-tat (TFT) or other retaliating (or trigger) strategies. This provided a straightforward derivation of the “folk theorem” according to which, compared to unconditional defection, any trigger strategy may be evolutionarily stable if, at a given incentive (payoff) structure, the discount parameter, “the shadow of the future” (Axelrod), is high enough.<sup>10</sup> Original institutionalists had considered this substantially half a century earlier already, as encultured “futurity” (socially aligned expectations of the “similarity of repetition,” according to John R. Commons [1934] 1990, 738–741).

Of particular interest here is this consideration for evolutionary-institutional theory: Cooperation is well-known to be logically infeasible through myopic hyper-rationality, but only as an interactively learned and habitually applied social institution, as carried by boundedly rational agents, who could not know the entire future of an unregulated interaction. The institution then is based on experienced and learned expectations, trusting “to meet again,” either the same interaction partner or a person who “knows” about one’s earlier behavior (through memory, monitoring, or reputation chains), or, more generally, to meet a cooperator “on average” in a population. This then is also a question of interaction density, the size and network structure of the relevant interaction arena, group, or population, and its inward and outward migrations. Following an institution may then even be based on some “rational” superiority of a longer-run calculation in a culturally learned long-run rationality (common “futurity”), acquired in the same evolutionary process (the famous single-shot formalization as popularized by Axelrod; also, e.g., Elsner 2012). This also requires a strategy that exhibits a credible threat of punishment (a future retaliation of defection as an endogenous punishment, or endogenous sanction mechanism) (as a classic: Schotter 1981; further, e.g., Marco and Goetz 2017).

With sufficient interaction density, known but indefinite repetition, and a favorable constellation of the factors mentioned (size, structure, learned futurity, etc.), a learned, acquired, and habituated cooperation in some interaction arena, a psychological spill-over and a generalization into other games or arenas, where the agent may interact in another position and with other partners, may become feasible in an evolutionary process (e.g., Gintis 2004, 2007; Bednar, Jones-Rooy, Page 2015). After institutionalization and habituation, such generalization, and even a “norm-ativation” may anchor cooperative behavior beyond myopic calculus and defection (which however still remains dominant, tacitly, in any single interaction). Institutionalized cooperative behavior then may become part of the “human nature” (e.g., Bowles and Gintis 2013; McCain 2014), and human agents eventually may cooperate even with strangers in known one-shot interactions, or spend effort and money to extra punish defectors in the relevant population (“costly punishment”), even if defectors had exploited third parties only. With this, cooperation even must no longer relate to the original problem (incentive) structure but may be maintained, as the formally same behavior, even after a problem situation has changed.

In formal EGT models, emergence and collapse of cooperation would appear symmetric and to be reversals, given a discount factor, group (population) size, minimum critical mass

<sup>10</sup> Simply put, the Folk Theorem states that every outcome of an infinitely repeated game can be realized as a Nash equilibrium if the discount rate is chosen adequately.

(of cooperators in a population), repetition intensity, or a dynamic replication function for evolution as elements of specific models. When for instance an incentive structure, an informal social discount factor, a group size, a minimum critical mass of invaders (cooperators or defectors), an interaction density, or parameters of the replication mechanism, which once may all have been favorable for the learning of cooperation, may reverse again to initial unfavorable sizes, cooperation would “symmetrically” switch back to defection. Generally, all other critical factors held constant, decline and collapse would occur below the same set of values of, for example, the discount factor or incentive structure, above which emergence did occur before. However, the very institutional embeddedness of behavior requires considering a more sophisticated picture, with some sophisticated asymmetry between emergence and collapse.

### *Factors of Emergence Involve Hysteretic Asymmetry*

The complex, evolutionary process of learning, experiencing, building expectations and trust, and eventually habituating a behavioral rule of conditional cooperation has implications for the particular form of asymmetry between institutional emergence and collapse. This relates to the fact that, under certain settings, people’s experiences and expectations for repeating interactions in a population, their trust regarding others’ trustworthiness, and their willingness to behave trustworthily and cooperatively, may converge onto an emerging institution, a rule of habitual cooperation (unless there is particular reason not to do so). Veblen coined the result of such complex (and thus in no way predetermined) dynamic process patterns of thought, J. R. Commons ([1934] 1990, 73–74, 698) named it *institutionalized mind*.

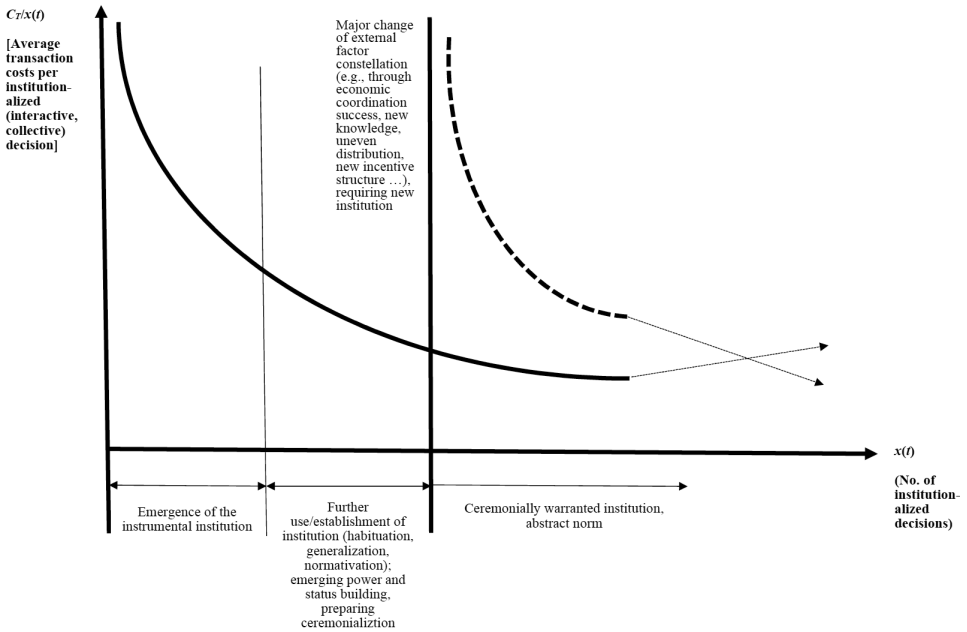
This very process will be time-consuming and costly for a potential behavioral innovator and early willing cooperator (in a benchmark population of dominating defectors), in terms of risk-taking (to be exploited at least once by a defector), of many trials and errors with others (not only with initial defectors but also with misunderstanding asynchronous TFT players), and of being not too envious, since the behavioral innovator switching from always defecting to cooperation, being exploited at least once, and then entering common cooperation with the other, learning one who also then innovates, will leave the other one, who learned cooperation later and thus yielded at least one extra gain from exploitation, somewhat better off at the end of the day.

Agents thus have invested high costs and effort in terms of time, trial and error, risk, and non-enviousness, in the process of institutional emergence, until the insight that in the longer run all will fare better with some cooperation has been learned and sufficiently diffused, relatively sufficient meetings among cooperators make them better off over all in the population in an evolutionary process. Such cost and effort, early social “investment” required (so to speak), is to be considered *fixed sunk costs*, which renders initial marginal and average cost of each joint, collective decision in the frame of the beginning institution high. In turn, the ever more establishing institution will run down the decreasing transaction-cost curve of decision-making. See Figure 2 for an illustration.

All involved will then have an incentive to stick to the institution once established, as their invested social-learning costs were high for each in the beginning and would be high again with unlearning and social relearning of a new institution. Thus they tend to use it infinitely as the marginal and average costs may be approaching zero. This not only explains the general relative persistence and stability of institutionalized behavior over more volatile economic variables, but specifically its hysteresis vis-à-vis a major change of values of critical

sets of factors. Note that institutional change here is considered a major one indeed, an exchange of institutions rather than an incremental adaptation of the old one.

Figure 2. Average Transaction Costs Of Collective Decision-Making: “Institutional Economies of Scale,” “Institutional Hysteresis,” and Degeneration into a Ceremonial Norm



Note: after Elsner 2012

Note, as Figure 2 illustrates, the old, established institution will have an advantage of narrowly understood “transaction costs” over a potential new institution for most of the time, even after it has entered its degenerative, dysfunctional, ceremonial phase. Its smooth replacement, it is suggested, will not occur endogenously, as it remains open, when the new institution would ever have lower average decision costs than the old one. We might even consider increasing average decision costs of the old one at some point (as indicated in Figure 2). But they may have to increase steeply to considerable heights to become competitive with the average costs of the potential new one. But such replacement of old by new will probably not occur without a major crisis and collapse of both the old institution and its socio-economy and natural environment, as I will argue.

In other words, the sunk fixed costs and decreasing average transaction costs of decision-making suggest that institutions will tend to exist longer than would be functional for a high performance of societal decision-making, related socio-economy and natural environment, and will continue to exist even under unfavorable circumstances, in which cooperation would not have emerged before. For instance, the minimum critical mass of cooperators once required to make the institution emerge, and cooperators to evolutionarily diffuse and to take over the population, may have been larger than the minimum critical mass that still keeps the old institution running (how increasingly poor ever it may perform) (e.g., Bednar

and Page 2007). The low average transaction costs of the old institution and the fear of high fixed sunk investment into a new one, leaves the old one further existing and dominating.

As said, this may even hold independent of some major parameter change, so that the old institution may no longer be appropriate and somehow become ineffective with respect to its socio-economic performance and ecological effects. And in the longer run, the average transaction costs of the potential new institution may be expected to be below those of the old one. So in total, some new institutional arrangement will be more appropriate and effective even in the short-run, in terms of the socio-economy and the natural environment, and also cheaper in the long-run in terms of average decision costs, but nevertheless, the lower short-run average transaction costs of the old one may still dominate and determine the individual behaviors for a considerable while—as long as the socio-economy or the natural environment will not enter phases of open crisis and collapse.

This implies that agents' perspectives are changing (reverting) into a short-run behavior, led by the narrow average decision costs of the old institution, while at the same time collective decision-making incurs an ever-greater distance to the new problem structures. Agents then tend to act on a narrower base, considering narrow costs, striving to make some *short-run extra gain* (over a more appropriate institutional behavior)—motives that may have changed to some *ceremonial warrant* (e.g., Elsner 2012; for an elaborated model of such institutional asymmetry, Heinrich and Schwardt 2013). The inappropriate and inferior old institution will then be upheld beyond the point of instrumentality or proper problem-solving, not the least in terms of socio-economic performance. A new short-termism will emerge with the new ceremonial culture, putting the old institution over the new instrumental solution that would be socio-economically more effective. The old ceremonial institution, providing its carriers, or the entire population carrying it, with some differential status and short-run advantage over the hypothetical instrumental situation, usually at the expense of nature and future generations, and if we consider other populations, at the expense of outsiders and other countries. With this short-run status preservation (status quo preservation), the old institution will have changed its character to ceremonial.<sup>11</sup>

With the increasing distance of the old institution to the “external” problem constellation will become increasingly inappropriate and ineffective, the increasing institutional dysfunction may lead, in another complex interaction with the real socio-economy, to socio-economic decline and breakdown (next section), and perhaps only with this to decline and eventual collapse of the institution itself.<sup>12</sup>

Under such increasingly institutional inappropriateness, ceremonial dominance, and related poor performativity, through the effect of the institutional economies of scale, an hysteretic asymmetry of institutional decline and collapse is to be expected, first, *vis-à-vis* emergence and, second, that it will be upheld beyond the point of appropriate change. The

<sup>11</sup> One of the reviewers mentioned the relations among the mechanisms of short-termism, ceremonialization, and elite-domination. That reminds me to briefly clarify the inner relations among the three conceptions used here: ceremonialization is by definition about differential status and power and thus implies some elite dominance. This may also apply to the relation between some in-group or incumbent population (“us”), and out-group, potential invaders, or simply migrants (“them”). I have also suggested that such ceremonialization relates to short-termism, as one-shot extra gains for some group, from its differential status and power and under conditions of any uneven distribution, will seduce agents to pursue the extra gains by short-term behavior. Securing extra gains has an immanent time dimension: They must and can only be saved by short-term action.

<sup>12</sup> And again, this may be mirrored in terms of average transaction costs, when the transaction costs of the petrified institution may increase at some point, perhaps even explode to infinity in the end (particularly for the fewer who would still stick to it and invest in it), so that they even might become higher than the expected decision costs of the potential new institution. I only slightly indicated this with the upward arrow at the right hand of Figure 2.

once instrumental institution will, with its continuing use, assume an ever more abstract and normative character the greater its distance to the original problem structure, and will degenerate into a fully ceremonial abstract norm.

### *A Graphical Illustration*

From the above, a hysteretic asymmetry of decline and collapse results also vis-à-vis the factor constellation existent at previous full emergence and with respect to the time distance from the major factor-constellation change. In Figure 3, I illustrate a simple, ideal time-symmetric life cycle and a stylized “Seneca asymmetry” as benchmarks, and compare to a stylized institutional hysteresis.

Note that I leave the meaning of the y-axis, complex as it is, somewhat open, as it may cover multiple dimensions of institutional performance (as given by examples in Figure 3), always depending on specific models: number (or population share) of carriers of the institution, number (or share of all actions) of institutionalized cooperative actions, or, performance-wise, the GDP (as used in Figure 4 below).

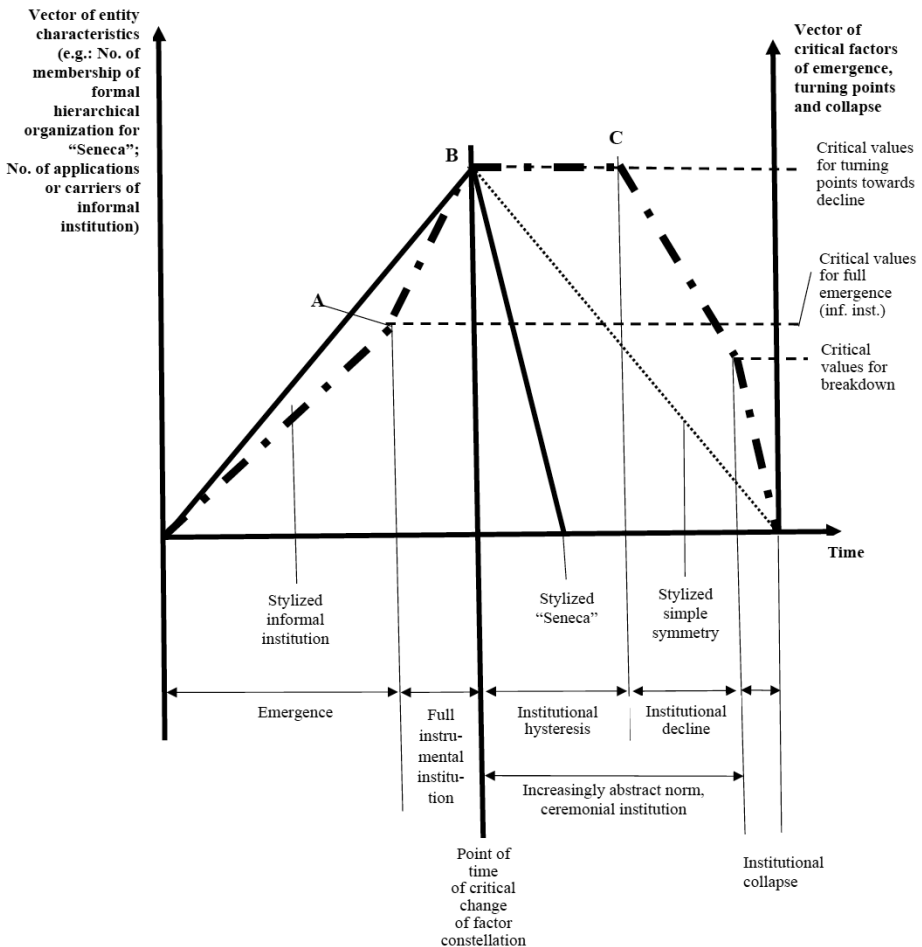
I distinguish an emergence phase of the instrumental institution (up to the level of point A), ideally with a continuing increase (of the share) of applications of institutional decision-making and (share of) its carriers (users) (left-hand ordinate), and a phase of the ideal full-fledged instrumental institution, where institutional applications and carriers will quickly attain their maximum attainable shares of the population (at the level of point B). The related critical values of the relevant factor constellation appear at the right-hand ordinate. I show the critical values of the factor constellation for a full emergence of the instrumental informal institution (at the level of point A) and for an ideal “turning point,” where a major institutional replacement and change would be required (at the level of point B).

I illustrate the *institutional inertia* between B and C that implies an increasing decoupling of the institution from its basic problem situation (decision situation and larger factor constellation) and increasing ceremonial warrant of the institution, due to the fact that people prefer the lower short-run average narrow transaction costs of the old institution over the potentially higher long-run efficacy of a potential new instrumental institution in terms of socio-economy and natural ecology (see the ceremonial phases in Figures 2 and 3).

Only after that phase of hysteresis, the institution will decline in terms of societal validity and relevance (i.e., its relative intensity of applications and size of carrier group) as its substantial distance (inappropriateness) and its time distance (time lag) to the constellation of point B increase, and with these norm-atization, abstractness and ceremonial dominance. So even with (and in fact by way of) relatively low transaction costs, the petrified, ceremonial institution will cause severe socio-economic and environmental damage—and decline. In addition, supposedly, the quality of decision-making under its rule will deteriorate.

After some time of decline, a lower threshold of (the vector of) the factor constellation ideally will be touched so that collapse will occur quickly in coevolution of the institution and its socio-economic and natural environments. I illustrate the hysteretic asymmetry on the dimension of factor constellations (right ordinate) through the fact that the value level of beginning collapse is below the levels of both original full emergence (at point A) and of the “turning point” (B).

Figure 3. Stylized Symmetry, “Seneca,” and Hysteretic Asymmetry Compared



### ***Endogeneity of Collapse: Interrelations of Institutional Decision-Making and Socio-Economic Performance***

I have already considered the quality (efficacy) of institutional decision-making in terms of its general socio-economic and natural effects (performance), but I have focused the conceptualization of hysteretic asymmetry so far on the properties of the institution as they stem from its very process of formation (sunk costs). This of course already implied the endogeneity of its (over-)endurance, inertia, and hysteresis, its belated deterioration and eventually faster complete collapse. This already included the institution's increasing deviation from the "exogenous" problem situation, and here particularly its increasing incapacity of maintaining high socio-economic performance.

But to fully consider the endogeneity of the institutional *and* system collapse, we also will have to focus on the development of the institution's socio-economic performance and the

complex interrelation between, and co-evolution of the “endogenous” hysteretic development of the institution and its related socio-economic performance. This shift of perspective is a question of degree and complementarity of aspects rather than an independent, new focus. I will get somewhat more illustrative by imagining the qualitative dynamics of a GDP instead of any general “socio-economic performance.”

Emerged instrumental institutionalized cooperation, by definition, bears socio-economic success through its superiority over individualistic short-run hyper-rationality and its common defection, a superiority for both the individual and the relevant collective (population, group) in the longer run. Nevertheless, the individualistic incentive to defect and exploit always remains a dominant strategy in the short run (the threat of the old Nash equilibrium over the new one, so to speak), and thus, in fact, a latent alternative, should the culturally acquired (socially learned) long-run perspective for decision-making be unlearned and break down, together with changing socio-economic conditions, known by institutionalists as regressive institutional change (e.g., Elsner 2012).

### *Growth of Wealth and Population Size: Outward Expansion, Immigration, Perceived Turbulence, and Regression*

This may intensify again exactly under the cooperation success: The successful, cooperating relevant population (group) will grow in income (GDP) and wealth, and in its own size, through more progeny. This will result in a higher outward (expansionary, export) orientation of its members, and related emigration (for trade, capital investment, tourism, exploration, settlement, war and occupation). It may also exert a higher attraction to outsiders, and the population may experience increasing immigration, supporting population growth and perhaps even some population pressure.

But this very expansion in economic wealth, population size, and perceived complexity and turbulence may undermine the very basic cognitive conditions that earlier had made cooperation feasible and emerge, at smaller population sizes and less disembedding migration, with higher probabilities to meet (again), a higher density of interaction, tending to generate a stronger behavioral (strategic) homogeneity and identity of the relevant population (as is the state of the art in evolutionary modeling; see above; the role of group size for the intensity of pro-social behavior has intensely been investigated empirically, and corroborated, even in large social-science field studies; e.g., Henrich et al. 2004).

In a fast-growing population, incumbents' progeny and/or immigrants may no longer sufficiently quickly learn the incumbent cooperative culture and related general trust and commitment. More *uprooting mobility*, both outwards and inwards, will reduce the velocity, with which trust and commitment can be built, reproduced or regenerated (e.g., Glaeser, Laibson, Sacerdote 2002; Solari and Gambiarotto 2014), due to a higher perceived complexity and turbulence and a higher probability of meeting strangers. The incumbent cooperators' share in the population may fall below a minimum critical mass.

This may particularly be the case if no sufficient counter measures towards the critical factors (above) are launched by some government or powerful professional groups (e.g., international traders), professionally interacting with strangers and often individually building new trust with them.<sup>13</sup>

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<sup>13</sup> Note that in developed societies nowadays, in a phase where “globalization” has already gone astray for some decades, mass frustration and (felt) deprivation have relatively suddenly burst open at the political level and the political pendulum is swinging back to racism, nationalism, localism, xenophobia, etc. In these conditions, it is obvious that particularly professional groups with international connections, exporter, investors, academics,



A population with an established instrumental institutional cooperation may first be able to accommodate some greater differentiation and heterogeneity of agents and relations. A higher systemic complexity may then be compensated for some time by a reduction of complexity of the individual decision situation through more and perhaps more rigid institutionalization (i.e., more rigidly sticking to the established institution). For instance, incumbents will try to keep their interaction partners and to interact longer with a particular partner, as far as possible, if the interaction has been successful.

However, as many incumbents increasingly travel abroad and more and different agents immigrate, heterogeneity and perceived (over-)turbulence may exceed the average incumbent's cognitive capacity, and institutions may no longer be able to spontaneously adapt accordingly (for the brain sciences, see the *social brain* thesis of maximum group sizes, e.g., Dunbar 2008; also, e.g., Elsner and Schwardt 2014). Experience and expectations of trust and trustworthiness may deteriorate, and cooperation will decay.

This all may also imply a loss of recognized interdependence (e.g., Bush 1999), of the knowledge about the underlying problem structures to solve, about the social breadth and long-term-ness of the interdependence structures, about perceived connections between action and reactions (perceived feedback on own actions), and about a sufficient long-run perspective. Rather, myopia and hyper-rational individualism will re-emerge (e.g., Elsner, 2012, 2017; similarly Ostrom's cooperation conditions, e.g., Ostrom 2009). Unfavorable expectations to meet a cooperator and the deterioration of cognitive conditions will increase (again) perceived uncertainty, over-complexity, and over-turbulence and entail opacity, short-termism, with the extant institution (formally same behavioral rule) becoming ever less instrumental (similarly, e.g., Setterfield 1996).

Real-world examples of processes of collapse in the contemporary global economy seem to include increasing corporate and financial short-termism (e.g., Aspara et al. 2014; Marco and Goetz 2017) and winner-takes-all cultures, entailing decreasing system resilience (e.g., Helbing 2013; Acemoglu and Robinson 2012).

And with returning myopia, the incentive to try to get the short-run maximum-payoff may become the actually dominant strategy again, even under recurrent interactions, time horizons of decisions becoming shorter again, with non-cooperation resulting (e.g., Jennings 2005). Interactions with known or "knowing" agents, or cooperators in general, will be expected to occur too infrequently, or be of a duration too short to learn, and build trust and commitment. Diamond (2005, 427–431) considered such backsliding into "rational bad behavior" the "most frequent" reason of collapse.

In addition, once a culture of noncooperation and distrust spreads, it will be aggravated by increased monitoring costs and more costly punishment (e.g., Horiuchi 2015). And too fierce a punishment culture will prevent innovation, and further both the degeneration of the institutional setting and socio-economic decline. High degrees of punishment indeed tend to be negatively correlated with cooperation, problem-solving, and socio-economic thriving (e.g., Povey 2014). Other related costs may then increase as well, such as costs of building reputation, signaling, contracting, formalizing, controlling, or insuring. (e.g., Fu et al. 2008).

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representatives of internationally active corporations are among those defending openness, tolerance, understanding, and the building of new commitment, interaction and cooperation. Neoliberal governments, in contrast, often are doing nothing to change the cultural and political climate. Rather, the oligopolistic party competition often even leads to a rat race to the right.

### *Uneven Distribution of Institutional Benefits, and Emerging Conflict and Defection*

We may of course also consider mechanisms and processes of uneven distribution of the gains of economic success under conditions of historically received differential hierarchical status, power, and even more generally: network centrality. I have shown elsewhere that in “predatory” societies (Veblen), the very cooperation success may easily be connected with an increasingly uneven distribution of the gains of cooperation in favor of the superiors in the team, group, company, financial industry, political system, or entire relevant population. This may even revert the basic latent PD, once solved, into a new overt PD with new open conflict (Elsner 2012), which transforms the character of the incentive structure, makes the formally same cooperative behavior the short-run dominant strategy for the superiors, and in fact establishes a new dilemma under the old behavioral forms (Heinrich and Schwardt 2013). And it will eventually render the old institution ceremonial, as generating or reinforcing differential status and power among those involved in the formally same old cooperation behavior (superiors and inferiors).

Sticking to the old institution then obviously is attractive for those in favored positions. But, as institutional economist Clarence Ayres (1962) already pointed out, such dominance of ceremonial institutional behavior tends to lead even the disadvantaged to continue the established institutional habits. Those may be provided with institutionalized identity and belongingness, belonging to the successful group, the winning team, social stratum, company, region or nation (e.g., Brewer and Kramer 1986).

However, some countermovement may burst at some point, stemming from poverty, deprivation, or frustration about that inequality and the newly emerged overt social dilemma, perhaps resulting in a renewed social conflict, distrust, and non-cooperation (e.g., Goerner 2016). In predatory societies, however, such countermovement is often channeled as resentment against strangers, reinforcing the mechanisms already described. In game theory, it is generally known that the inequality of payoff structures in games is detrimental to problem-solving (e.g., Binmore 2011; also Elsner 2017).

But it is also a well-known empirical correlation that unequal societies display lower levels of general trust and institutional cooperation (as a classic: Pickett and Wilkinson 2010). But distributional aspirations for individual higher relative positions usually dominate over instrumental values for higher performance of the socio-economy. And interestingly, the more distributional aspirations dominate, the less socially mobile the society, and the worse overall performance will usually become (already, e.g., Veblen 1899, on the unavailing positional struggle in predatory societies), which is also empirically well analyzed nowadays (e.g., Torgler, Schmidt, Frey 2006; Wilson, Ostrom, Cox 2013; Kesternich, Lange, Sturm 2014; Krockow, Pulford, Colman 2015; López-Pérez et al. 2015; Nishi et al. 2015; Sun 2016; Furman 2017). Finally, long historical evidence of the relevance of inequality as a cause of socio-economic decline and collapse is also considerable (e.g., again, Turchin 2003; Goerner 2016).

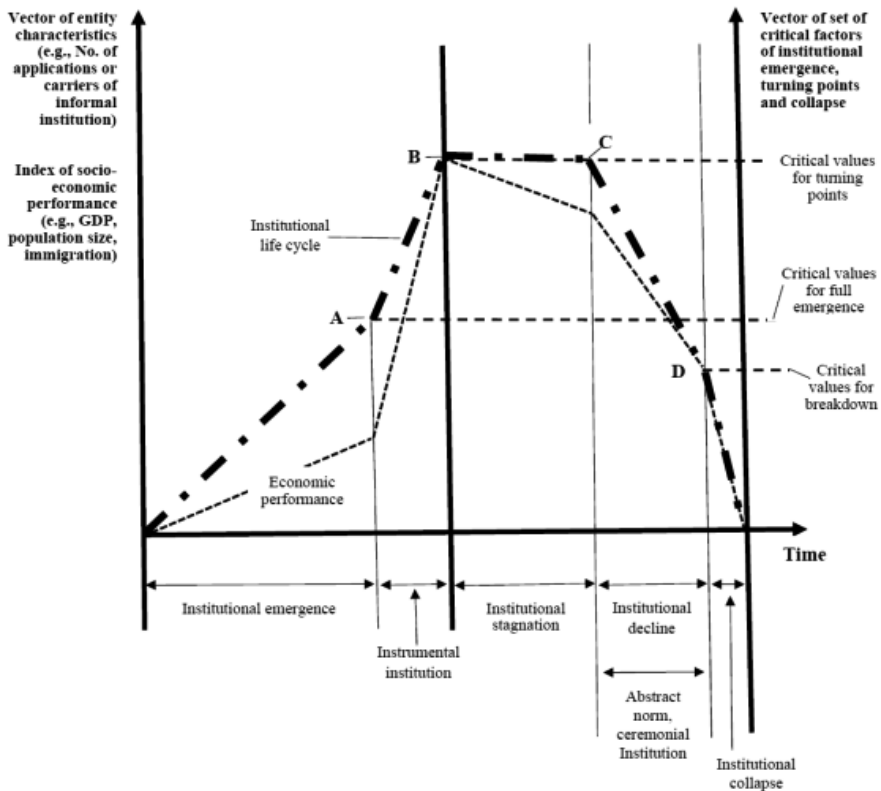
In all, the formally same habituated behavior will then, at some point, be applied with different consequences, including a shift to its non-cooperative character, towards exploitative relations, an increasing inappropriateness, renewed distributional conflict in a PD, and more socio-economic conflict in general, less trust and commitment, less innovation and socio-economic performance, and eventual economic decline and collapse. I will exemplify the related development of the GDP.

### A Graphical Illustration

I illustrate the particular interaction of the institutional process with socio-economic performance, with the example of GDP (Figure 4). I have discussed the phase of institutional emergence, which went along with some socio-economic improvement (up to point A) above. The second phase of full-fledged social validity, application, and success of the established instrumental institution (up to B) will then cause a considerable increase of GDP.

But beyond the critical factor configuration for the turning point (at B), socio-economic conditions will have changed and the interrelation between GDP and the institution may turn into a lead of the economic performance over the institutional development: Institutional hysteresis and increasing inappropriateness of the institution may cause the economy already to decline, which will lead to an institutional decline in turn. This then will co-evolve with an accelerated economic decline, until both institution and economy (GDP) may collapse rather suddenly.

Figure 4. Stylized Hysteretic Institutional Life Cycle and its Interaction with Socio-Economic Performance



### An Economic-Anthropological Argument: "Evo-Devo" and Group Selection

Modern economic anthropology (e.g., Boyd and Richerson 1985; Henrich 2004; Marlowe 2005; Richerson and Boyd 2005; Nowak, Tarnita, Wilson 2010; Cordes 2019), in

fact, corroborates the understanding of both endogeneity and asymmetry of emergence and break-down of cultures, while emphasizing the larger social environment of social groups. Namely, the presence or absence of competing groups (populations, societies) is considered to influence the cohesiveness or fragility of the cooperative regime of a population. Large-scale cooperation thus emerged particularly quickly and intensely through group-level competition, group selection, and related group evolution (also, e.g., Turchin 2003; Turchin et al. 2013). Evolution and multi-level selection at in-group and between-group levels was a central driver of large-scale cooperation, particularly reducing in-group behavioral variation. Under strong between-group rivalry and selection, institutions are likely to be maintained.

In early human evolution, group interaction (both hostile and friendly) and group selection, that is, the selecting out of entire groups that were too little cooperative, too fragmented or too much prone to social conflict, thus favored prosocial behavior within surviving groups to an extent that is exceptional among advanced animals and cannot just be explained by genetic evolution. It occurred far too quickly for just genetic evolution, but requires the frame of gene-culture coevolution as developed and used in biology, anthropology, evolutionary psychology, and the naturalistic approach in economics (e.g., Cordes 2019), or “evo-devo” perspective (e.g., Toth and Robinson 2007). In fact, the emergence of different levels of cooperative capacities facilitated processes of between-group selection, helping particularly cooperative societies to gain some advantage over less cooperative ones. As a result, the human behavioral repertoire has included cognitive, emotional and psychological predispositions in the *neocortex* of the human brain for cooperation (e.g., Dunbar 1993; Marlowe 2005) that were acquired in a co-evolutionary process of rising cultural capabilities and some genetic adaptation required to live in a close cultural environment.

However, the specific expression of those dispositions depends on some cultural and institutional constellations and dynamics. The history of the last circa 10,000 years provides evidence for multiple and quite distinct solutions to large-scale cooperation with different levels of cooperation and hierarchical dominance, and with different broad performance levels (in addition to the literature mentioned, e.g., Wilson 1975; Traulsen and Nowak 2006; Pacheco, Pinheiro, Santos 2009; Pinheiro, Santos, Pacheco 2012; Wilson, Ostrom, Cox 2013). This is consistent with the better-informed traditions of economics from Adam Smiths’ *Theory of Moral Sentiments* to Thorstein Veblen’s instinct theory, which altogether stress the plasticity of the human brain, instincts, predispositions, motivations, and institutional-behavioral structures in dependence of the structures of the material and social environments.

First, broad empirical evidence from combined historical, anthropological, economic-institutional, neuro- and brain-sciences corroborates an emerged strong cooperative tendency among humans, deeply entrenched in their cognitive, neuro, emotional, reasoning, and behavioral structures (e.g., Rolls 2019). It suggests that humans will not only be able to cooperate even with strangers in definite one-shot encounters, but also will behave with some persistence, including institutional inertia or hysteresis vis-à-vis both emergence and changing conditions.

But second, our physiological and psychological endowment as a heritage from thousands of generations of human social evolution, characterized by some predisposition to behave cooperatively, is also linked to an expectation that a partner will comply to the rules of reciprocity and equal treatment (basic equality). But under sufficiently adverse conditions, even the neural-behavioral propensity to cooperate may be considerably reduced. We may

switch back to a phylogenetically more ancient, pre-social propensity of aggressive, non-cooperative behavior. Particularly, cooperation may easily collapse through an intensifying, perhaps even turbulent interaction with out-groups, which, as described above, cannot be sufficiently cognitively absorbed at some point by the incumbents.

So cooperation applies mainly to the “own” group or population, according to a number of genetic, biological, and symbolic markers (family, kin, locality and neighborhood, common language, face forms, skin and hair color, regional and national symbols), and cooperation beyond the particular in-group depend on the factors of the incentive structures, encultured “futurity,” expectation “to meet,” perceived turbulence and complexity, and other cognitive conditions, as explained. Insufficient conditions then will render even larger-scale cooperation to decline and collapse. As we may see, these findings fit into the mechanisms elaborated above and have clear interconnections, so that we would find ample material to support the hypotheses derived on endogeneity and hysteretic asymmetry. But let us summarize now.

### ***Propositions***

I now may state the two complexes of theoretical arguments on the properties of the life cycle of informal institutions as hypotheses. I may integrate both constellations of socio-economic performance of institutional decision-making (i.e., increase in size and unequal distribution) into both (overlapping) complexes of mechanisms, endogeneity and asymmetry:

**H1: Endogeneity of Decline and Collapse** In the complex evolutionary process of emergence of institutionalized cooperation, there are mechanisms working that may make later institutional decline and collapse endogenously occur through the very institutional success. In particular:

1.1 The very success of institutionalized cooperation will make the economy flourish and outward-expanding, with increasing outward and inward migration, and make the population grow, through higher natality and immigration. This, however, may increase perceived (over-)complexity and (over-)turbulence. Cognitive conditions required for the reproduction of cooperation will then deteriorate, through higher volatility, opacity, and decreasing probabilities “to meet.” Myopic behavior will increase, reinforced by increasing costs of memorizing, monitoring, and reputation building. A fiercer culture of punishment will emerge, which will make institutionalized cooperation decline and eventually collapse.

1.2 Increasingly unequal distribution of the gains of successful institutionalized cooperation, under given power-, status- and centrality-asymmetries (in hierarchies, in most network structures, and in predatory societies in general), may make the same formal (formerly successful) institutional behavior become increasingly ceremonial. The originally “solved” PD/commons structure may thus even transform into a new social dilemma, with the old cooperation form becoming a short-term dominant strategy for the profiting superiors. The then exploited inferiors may stick to the institution for a while by means of provisions of identity and belongingness. After a while of institutional endurance and hysteresis, however, the old cooperation form may eventually break up into renewed overt distributional and social conflict, and new distributive and positional struggles take effect again making the old cooperation behavioral forms may decline and collapse.

**H2: Asymmetry of Decline and Collapse** Due to high sunk fixed costs in the time-consuming and complex process of emergence, of learning, trial and error, risk-taking, and non-enviuousness, and required habituation and generalization (and probably some norm-ization), and perhaps further through some group-based predispositions stemming from the processes of group selection and in-group conformity, institutional collapse will occur asymmetrically in two aspects: (i) asymmetric vis-à-vis its emergence, which means at a different (less favorable, “lower” level of) factor constellation than its earlier emergence, and (ii) beyond (with a time lag over) the point in time of a major constellation change, where institutional change and new institutional emergence would have been required. In particular:

2.1 Institutionalized behavior will be maintained beyond a factor constellation valid at its emergence, when this constellation may revert and return. It will generally be maintained beyond the point of a major factor constellation change, to save cognitive effort by maintaining the old habituation, and to exploit the decreasing average transaction costs of collective decision-making of the old institution, incurring lower and narrow institutional transaction costs in the short-run (extra gains) than under emergence of a new (and more appropriate) institution, even in spite of worse socio-economic performance. The increasing institutional inappropriateness and decreasing socio-economic efficacy will deteriorate the economic performance, which at some point will take over the lead and accelerate institutional breakdown and co-evolutionarily the systemic collapse.

2.2 Especially under a cumulatively redistributive process and even under a transformed incentive structure (an emerged new dilemma, as above), not only the winners will stick to the formally same institutionalized behavior, as it now will be in their immediate short-run interest and becomes their new dominant exploitative short-run strategy; but even the inferiors may stick to it as they benefit through less cognitive effort, and perceptions of stability, identity, and belongingness, easing their cognitive limits, a situation preferred by them, for a more or less long period, over the higher short-term transaction costs of establishing a new (more appropriate) institution, independent of the possibly much larger socio-economic damage.

### ***Conclusion***

In this article, I conceptualized an evolutionary-institutional perspective on the decline and collapse of informal cooperative institutional arrangements and the interrelated, co-evolutionary decline and collapse of their socio-economies (and natural environments). I focused on theoretical mechanisms that explain their (1) endogeneity through (i) their very socio-economic success and growth and (ii) increasingly adverse distributional effects, and their (2) asymmetry in terms of (i) different factor constellations at emergence and collapse and (ii) the substantial and timely distance to a major constellation change and the appropriate time of a major institutional change. I complemented the conceptual considerations by some historical, anthropological, biological (cognition, neuro and brain science), and complexity-science insights and evidence, which all underpin forms of endogeneity and asymmetry of institutional and socio-economic decline and collapse. I summarized the findings in a set of somewhat extended hypotheses.

Future research along these lines, beyond the general evolutionary-institutional discussion above, could further be elaborated, for instance, through in-depth analyses of manifold basic *network structures* that also do influence emergence and collapse of cooperation and performance, as is well known in the literature, and network analyses may provide further mechanisms of their endogeneity and asymmetry. Many network structures and dynamics, reflecting agent heterogeneity and adaptive capabilities of link generation and link termination, may further contribute to the findings above. And particular limits of network adaptation may endogenously and asymmetrically lead to catastrophic collapse, rather than just symmetric gradual decline that would mirror previous emergence. But this has to be left to future research.

Considering possible developments after collapse, it appears unlikely that a population, its institutional arrangements, and its socio-economy, if not completely extinct, maybe through some form of ecological change, crisis or collapse, will easily recover or re-emerge towards previous levels of institutionalized cooperation and socio-economic performance within foreseeable time spans. This conclusion has been put forward in many theoretical, historical, and empirical literature, where complete collapse of cooperation proved to be *non-reversible* for very long periods (e.g., Acemoglu and Robinson 2012), perhaps another asymmetry, now of re-emergence vis-à-vis collapse.

I conclude that not only the process of emergence but also of decline and collapse of prosocial behavior may be fundamentally endogenous to complex adaptive systems and their evolutionary processes, and also asymmetric, and in different ways and disciplinary perspectives so. A system of hypotheses on institutional and system collapse should be derived in further research to prepare complex modeling and (empirically anchored and calibrated) computational research.

By all means, evolutionary-institutional economics appears to have something important to say on this emerging (and not at all declining or collapsing) field of collapse research. It has comparative theoretical advantages over the economic mainstream and over many other heterodoxies and thus would be a perfect disciplinary partner to modern interdisciplinary research in this upcoming field. But it is not only for theoretical and formal, but also for urgent practical and topical reasons that evolutionary-institutional economics should turn to problems of institutional and systemic decline and collapse.

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