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# Historical effects of shocks on inequality: the great leveler revisited

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Inequality of wealth and its associated power has varied greatly over human history. It is often thought that the main levelers of inequality were natural disasters such as epidemics or earthquakes, and social turmoil such as wars and revolutions. Here we critically review evidence of the effects of such events on inequality from medieval times till the present. We show that in spite of the marked differences in character and direct impact of the shocks we consider, most historical disasters were rather followed by a widening of wealth gaps. This can be understood from the wealth distribution and institutional outlay of these societies at the moment of the shock, which to a large extent shaped both the impact and the institutional measures chosen in response to the crisis. As most societies were characterized by economic and political skewness, the result mostly was a further widening of disparities. Over the centuries, exceptions to this rule have occurred in situations where the ordinary people had strong leverage in shaping the response to the crisis through organizations such as guilds, fraternities, trade unions, cooperatives, and political movements. Our results provide empirical support for the view that in nations where such leverage of ordinary people is weak, the responses to novel crises such as the COVID-19 pandemic may boost inequality.

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## Introduction: the great leveler?

It is often thought that big shocks to society offer a kind of clean sheet helping to reduce societal and material inequalities. A prominent argument for this idea is made by Walter Scheidel, who argues that inequality can be reduced only as a result of catastrophic events, including pandemics and, most particularly, massive warfare (Scheidel, 2017; Scheve and Stasavage, 2012). The ‘Great Leveler’ argument is echoed by Thomas Piketty, who stresses how the two world wars resulted in a substantial reduction in wealth inequality through the nationalization of foreign assets, the destruction of capital goods, and the installation of progressive taxes for covering the costs of war (Piketty, 2014).

Earlier periods in history have also been used to make the argument of disasters as levelers. The most salient case used is the Black Death of 1347–1352, a large-scale pandemic that killed up to half of the Eurasian population. The suggested logic behind its equitable effect is the decimation of people while capital remained intact, thereby shifting the economic balance in favor of labor. According to this supply-and-demand line of reasoning, voiced by M.M. Postan and other Malthusian-inspired historians in the 1960s and 1970s, the gap between elites such as aristocrats and non-elites such as peasants and laborers was narrowed by the demographic collapse. More specifically, it was argued that the fall of landlords’ incomes in conjunction with higher wages, easier mobility, reduced extra-economic impositions, and greater opportunity to acquire property for peasants and laborers made post-pandemic societies more equal (Hatcher and Bailey, 2001). Quantitative research in recent years has indeed found many cases where wealth disparities were reduced after the Black Death, as most notably in Italy by Guido Alfani, or where real wages of ordinary people rose (Pamuk, 2007; Alfani and Ammannati, 2017). Building on these results, Scheidel and others in recent years have furthered their argument of the Black Death and other catastrophes as levelers (Scheidel, 2017). In line with such thinking, one of the eminent scholars of inequality, Branko Milanovic, suggests that the rise and decline of inequality in pre-industrial economies, in the absence of endogenous forces of economic development, is driven by accidental or exogenous events and that “declines in inequality in the pre-industrial era [...] were most often caused by cataclysmic events such as wars, epidemics, or natural catastrophes.” (Milanovic, 2016).

## Our approach

Here we argue that—even if some disasters may have reduced inequality—the great leveler hypothesis puts us on the wrong footing. Instead, in most cases, disasters have worked to boost inequality. We unravel the mechanisms responsible for this effect, as well as the explanations for the more exceptional instances when crises ‘made the ball roll the other way’ and equalized societies. The main point we make in this paper is that when explaining the effects of a disaster on equality, we need to distinguish between the immediate impact, the medium-term effects of the institutional measures taken in response to the disaster, and the indirect outcomes in the long run. Shocks did not hit one, uniform type of society with uniform effects, but hit societies that markedly differed in organization, thus leading to different outcomes in terms of equality. More specifically, these outcomes are formed during the three stages mentioned. First, there is the combination of the nature of the shock and the pre-disaster distribution of wealth and institutional outlay of that society, which shape the impact of the shock and the *direct effects* for different groups within that society. Second, there are the differences in disaster responses, which in their turn are shaped by the pre-disaster configuration of that society. Third, these

responses, jointly with the pre-existing configuration, contribute to set society on a further developmental path shaping the *indirect long-term effects* on inequality.

For such an approach, which requires us to follow the trajectory of societies over the long term, historical research is vital. Opportunities for this have greatly increased in recent years. Alongside the more traditional descriptions of historical disasters and the large narratives, which easily capture the imagination, increasingly large historical datasets are constructed, enabling quantitative analyses (Pamuk, 2007; Alfani, 2010; Alfani and Ammannati, 2017). Further, the study of history is now increasingly using comparative analysis of selected cases, holding as many variables constant as possible to identify crucial factors, particularly by investigating separate disasters and analyzing how they each affected different localities or societies (Van Bavel and Curtis, 2016; ERC, 2014; Van Bavel et al., 2020; Soens, 2018; Van Bavel et al., 2018). Taking this approach, a recent large-scale research program on disasters in pre-industrial Europe has tested several hypotheses on the effect of disasters, including the hypothesis that disasters typically function as levelers (ERC, 2014; Van Bavel et al., 2020). Here, we will build on this research and the growing number of studies by historians and economists now working on historical disasters and discuss some of the main cases, in order to assess main mechanisms of direct impact, medium-term institutional responses, and long-run effects on inequality. We will use these as components of a unifying framework which is presented in the last part of this paper.

## Opposite effects of shocks

Perhaps surprisingly, studies across cases reveal that the direct and indirect effects on inequality can hugely vary per society even with the same type of shock, depending on the social context at the moment the shock happens. This can clearly be seen with the Black Death, which killed a similar share of the population in many societies and in the short run resulted in reduced wealth inequality yet in the longer run had divergent effects, as a result of the different characteristics of these societies and in combination with the endogenous dynamism and associated inequality outcomes generated by these societal characteristics themselves. In Northwestern Europe, data on wealth distributions are lacking, but we do know the pandemic generally stimulated more freedom and higher wages for ordinary people and more equality (Scheidel, 2017; Dyer, 2007). For the Mediterranean, however, long-run effects were different. While parts of Italy saw wealth equality decline to a lower level for about a century (Scheidel, 2017; Alfani and Ammannati, 2017; Alfani and Murphy, 2017; Alfani, 2020), other parts of the Mediterranean did see growing inequalities, as in the southern Castilian borderlands which saw the rise of large estates owned by a military elite (Oto-Peralías and Romero-Ávila, 2016). Also, in places in Italy where wealth inequality initially did decline, this did not necessarily come with more freedom or equity for ordinary people, particularly in the countryside, where the large majority of people lived. Strict rural labor laws were enacted by urban elites as a response to labor shortages, the tax pressure on the rural population was increased and sharecropping arrangements were adapted to the detriment of rural tenants (Cohn, 2007; Van Bavel, 2016). For Northeastern Europe, due to the lack of sources, we do not know the direct impact of the demographic decline, but for the long run, the picture is even more negative. While peasants there had generally received freedom, privileges, and land ownership during the colonization process in the centuries preceding the Black Death, they saw freedom and equality being diminished in the long period after the Black Death, in some regions even resulting in the

introduction of serfdom. Even though earlier accounts of post-Black Death developments perhaps have been too generic (Domar, 1970; Brenner, 1982), and some Northeastern European regions have undergone these negative developments only later or to a lesser extent, as Bohemia (Cerman et al., 2002), the contrast with Northwestern Europe is stark (Table 1).

One way to find explanations for such differences is by analyzing the response to comparable shocks in the same geographical area, as social conditions change across time. Particularly illustrative is the well-studied case of Italy subject to subsequent episodes of the plague that haunted Europe on-and-off throughout the 14th to 17th centuries. In the first part of this period, that of the Black Death, the high numbers of deaths tended to enhance wealth equity. Contrarily, in 1630 a mortality event of a similar extent did not have an inequality-reducing effect anymore. Instead, as empirically demonstrated by Alfani and noted by Scheidel, it was followed by a further rise in wealth inequality (Scheidel, 2017; Alfani, 2010, 2017, 2020). An important factor explaining this difference was the changing nature of inheritance rules. The initially prevailing systems of partible inheritance had facilitated a leveling effect of the Black Death. By contrast, in seventeenth-century Italy wealthy urban elites had come to rule supreme and introduced new institutions, including fiduciary entails, in order to keep their properties intact and undivided (Alfani and Ammannati, 2017). This was related to a broader, more fundamental change that had taken place in Italy in the intermediate centuries. Urban elites had seized the opportunities offered by emerging markets for production factors such as land, labor, and capital, amassing enormous wealth, which they subsequently used to acquire political leverage (Van Bavel, 2016). Using this position, they developed the rules that protected their material wealth. As a result, when the massive pandemic struck in 1630, this new setting precluded a redistributive effect; instead of leading to a further rise of inequality.

**Necessary conditions for shocks to equalize**

The cases of the Black Death and the Italian pandemics point to two key factors that determine whether crises will reduce or amplify inequality: the distributions of pre-existing *wealth* and of decision-making *leverage*.

*Wealth* offers the potential to buffer a crisis or even make use of the opportunities that a shock or disaster creates. This effect is demonstrated, for instance, for shocks occurring in the countryside, most notably during severe famines. As a host of empirical studies have shown, savings helped wealthy farmers to ride out hard times and avoid selling off goods or even land like the poor, and even benefit from the situation by buying up this land at relatively low prices. The effects of this are demonstrated, to give one example, for England during the food crises around 1300. Both empirically (Schofield, 2008) and by way of a simulation (Bekar and Reed, 2013), it is shown how the functioning of land markets in a context of rising food prices and growing distress led to forced sales by the poor, accumulation of landholding and social polarization. This process of polarization between rich and poor came to a climax during the Great Famine of 1315–1317 (Slavin, 2014). Similarly, studies of destructive floods hitting riverine and coastal areas show how the incapacity to buffer the losses of capital goods and the high costs of dike repair caused poorer peasants to sell their land to wealthier neighbors or investors (Jakubowski-Tiesen, 1992; Soens, 2013; Curtis, 2016). Although such floods hardly killed any people, they did destroy the land, harvests, buildings, cattle, and other capital goods (Soens, 2018). Initially, this tended to level wealth inequalities somewhat. However, in most empirical studies the longer-run wealth inequalities were found to be reinforced or even sharpened

**Table 1 Schematic overview of the effects to European societies of the pandemics of 1347–1352 and 1629–1631, which all had a similar death toll (c. one-third of the population killed).**

	Setting: wealth distribution	Setting: leverage	The immediate effect on economic inequality	Resulting institutional change	Long term effect
Northern and Central Italy	Medium inequality	Rather unequal, the growing dominance of urban elites	Reduced	Disequalizing institutions	More inequality
Castile	Low/medium inequality	Unequal, dominance of military lords	???	Disequalizing institutions	More inequality
North-western Europe	Medium inequality	Equal, strong organizations of ordinary people	Reduced	Equalizing institutions	More equality
Eastern Europe/Baltic	Medium inequality?	Unequal, dominance of rural lords	???	Disequalizing institutions	More inequality
Northern Italy 1629–1631	High inequality	Unequal, dominance of urban elites	Unchanged	Unchanged	More inequality

???: Data not available.

as a result of these floods (Jakubowski-Tiesen, 1992; Soens, 2013; Van Bavel et al., 2018). One mechanism is that smallholding peasants often did not have the resources to buffer their exceptional losses and thus became susceptible to expropriation, as documented for instance for the early eighteenth-century floods that hit the northern coastal areas of Germany (Jakubowski-Tiesen, 1992; Van Bavel et al., 2018; Curtis, 2016). Also, reinvestment in protective embankments in the wake of such inundations by wealthy urban citizens led to a consolidation of absentee large-scale landownership (Soens, 2013).

*Leverage* to shape decisions is the other key determinant of outcomes after disasters. In most societal settings the differential leverage in making decisions and setting rules is closely connected to wealth. Wealth offers a pathway to obtaining political leverage while political leverage offers the possibility to protect and enlarge wealth, thus creating self-reinforcing feedback (Milanovic, 2016). Not surprisingly, in most settings, adaptations of the rules in response to the disaster were in line with the interests of those who held wealth and political leverage. The long-term institutional responses to the Black Death we discussed are a striking example. Whereas direct supply-and-demand reasoning would predict that the death of half of the population would push up wages and bargaining power of laborers, and in several cases, this indeed did happen (Pamuk, 2007; Fochesato, 2018), in the long run, outcomes differed, as a result of differential leverage. This can even be seen within a relatively small area, for instance within Northern Italy, where urban elites had become the dominant political actors and from these towns had extended their grip over the surrounding countryside, leaving the rural population without political leverage. While real wages in the large Italian towns rose after the Black Death (Pamuk, 2007; Fochesato, 2018), these urban elites succeeded in enacting labor laws aimed at containing rural wages, increased taxes in the countryside, and adapted the sharecropping system to better suit their interests, preventing the rural population to benefit of the scarcity of labor (Cohn, 2007; Van Bavel, 2016). Also, in the subsequent period, the same elites adapted inheritance and property rules in order to keep large properties intact even under circumstances of massive death (Alfani and Ammannati, 2017). In Eastern Europe, the dominant rural elites even succeeded, in the long run, to fully coerce labor by way of newly introduced forms of serfdom and concentrate it on large-scale estates under their surveillance (Brenner, 1982).

By contrast, the Low Countries are characterized by the absence of labor coercion in the long period after the Black Death, in both town and countryside, and rather saw the dissolution of the last remnants of unfreedom. This cannot be seen apart from the associations and organizations ordinary people had formed in the preceding period, including guilds, fraternities, an organization for the management of the commons, water management boards, town, and village communities, which had been founded by the ten-thousands (Van Bavel, 2016, 2020; De Moor, 2008; De Keyzer, 2018). In Italy, these associational organizations had emerged earlier but they also lost again most of their political leverage earlier, while associations in the countryside had always been weaker there. In other parts of Europe, particularly in the east, such associations always had been weaker. It was Northwestern Europe where these associations came most strongly to the fore and retained their position for centuries, into the early modern period.

Albeit to differing degrees depending on their exact organization, these associations offered direct access to decision-making to broad layers of the population, in all kinds of matters of direct importance, from social assistance to security, safety, organization of work etcetera. They also possessed collective property themselves or set rules on the exchange and allocation of property rights, often entailing caps on ownership or use of wealth (Van

Bavel, 2020; De Keyzer, 2018). Moreover, in large parts of the Low Countries, and Northwestern Europe more generally, these associational organizations gained direct access to the political domain at the local level, by exerting influence on the appointment of town and village councils and governments or by forming these themselves, thus having the leverage to set rules (Van Bavel, 2016). In these contexts, the choice of responses to disasters rather tended to enhance equity.

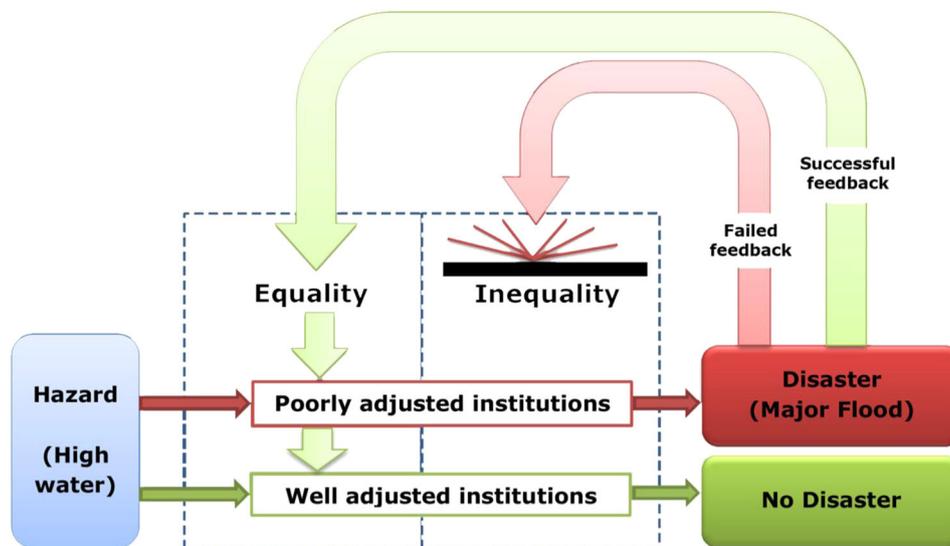
In summary, the response to a disaster tends to be shaped by those who have the material means (wealth) and the political leverage. As in most societies, those were unequally distributed, disasters generally enlarged inequities, but exceptions did clearly exist.

### Carryover effects to the next shock

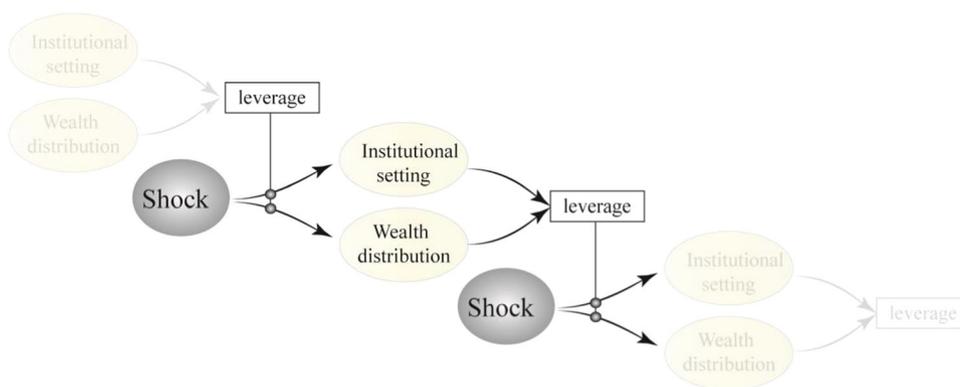
Institutional responses to disasters also set the stage for the way the next shocks will play out. This is well illustrated by a comparative analysis of responses to disastrous floods in the Low Countries, over the period 1300–1800 (Fig. 1) (Van Bavel et al., 2018). These floods are a very different type of disaster than a large-scale pandemic, of course, but because of their recurrent nature, they do offer the opportunity to better analyze carry-over effects. The comparison aimed at is, therefore, not that between floods and other types of disasters, but between areas situated closely together each with their distinct societal characteristics, thus showing how they dealt differently with the recurrent hazard of high water tables. The set-up of the comparative analysis over a long time span, and the availability of relatively abundant sources, made it possible to not only identify direct institutional responses but also separate their effects at least to some extent from the more general dynamism and the associated inequality outcomes in these societies. The latter is most cases is much more difficult to do, or even near impossible, as the two are intertwined, as argued in the above.

This analysis showed that high levels of material inequality did not necessarily lead to higher vulnerability to floods. There were, however, indirect effects, by way of the institutional organization of water management and flood defense. In situations of high economic and political inequality, there was often no institutional adaptation upon a disastrous flood (Soens, 2018; Van Bavel et al., 2018; Rohland, 2018). Only when the interests of those with wealth, resources, and decision-making power were directly hit, adaptations occurred. By contrast, in situations with a broader dispersion of wealth and decision-making power, institutions often were adapted upon a disaster leaving society more resilient in the face of future hazards. However, such leverage effects require strong organizations of ordinary people to be in place, which can only happen if prior to the shock there had been a period conducive to their development. This was the case, for instance, when water management organizations were formed with broad participation and representation of small-scale, peasant owners (Van Bavel et al., 2018).

The preceding discussion of the hazard of high water tables and ensuing floods, exactly because of their recurrent nature, illustrates how each disaster, its direct impact, and the institutional responses jointly set the stage for the next crisis and its impact (Fig. 2). In a situation of economic and political inequality, non-adaptation leads to further vulnerability to the hazard of high water and disastrous floods, thus sharpening material inequality. This is exactly what happened in several areas around the North Sea in the early modern period, where peasants and farmers in the long run lost grip on the organization of flood protection, especially to large-scale investors who gradually bought up land in the coastal areas (Soens, 2018; Van Bavel et al., 2018). The disastrous floods did thus not fundamentally change property distribution



**Fig. 1 Generalized scheme of carry-over effects of flooding events during the 1300-1800 Low Countries.** When wealth and political decision-making power were concentrated in the hands of a small elite, disastrous floods generally did not lead to institutional adaptations, thus allowing next high water tables to have disastrous outcomes and further exacerbate inequality. By contrast, egalitarian settings generally enabled institutional adjustments in ways promoting broad resilience to subsequent high water tables and preventing those to hit the ordinary people disproportionately (Van Bavel et al., 2018).



**Fig. 2 Generalized scheme of carry-over effects of shocks.** Political leverage of the ordinary people vs. elites determines the response to a shock, reshaping the institutional setting and long-term wealth distribution, which in turn determines the political leverage when the next crisis hits.

or cause institutional adaptation themselves but rather accelerated developments already underway (Soens, 2018).

**Shock effects over the past century**

Our core observation from the historical material is that a combination of economic and political inequality typically caused institutional responses to crises that amplified inequality. This invites the question of how crises work in modern times and might play out in the near future. If we understand institutions not as logical, rational answers to challenges but also as the outcome of the negotiation, tension, or even conflict between social groups (Ogilvie, 2007), the element of power is brought into the picture. There is much recent work unraveling what in modern societies determines power, defined as the ability of groups (e.g., within the state, socioeconomic classes, racial and ethnic groups) to structure the rules (Kashwan et al., 2019) In addition to *overt power* (Incentivizing behaviors and outcomes desirable to more powerful actors), there is *agenda power* (Crafting and popularizing agendas that appeal to multiple constituencies) and *discursive power* (Promoting values and discourses germane to the outcomes of interest to dominant actors), all synergistically contributing to the leverage over institutional change (Kashwan et al., 2019). Thus, while the complexity of

societies may have increased, power dynamics have been important in the process of shaping institutions throughout history. This invites the question of whether recent shocks have served as windows of opportunity for the ones with the most leverage to reshape institutions to their advantage, similar to what we showed for early history.

In the twentieth century great shocks and disasters, most notably the 1929 economic crisis and the two World Wars, led to reduced wealth inequalities, as extensively established by Piketty and others (Scheidel, 2017; Piketty, 2014). The immediate impact of the wars by way of destruction of capital goods and financial wealth, to an extent unprecedented in human history, had a leveling effect. In the longer run, however, the distribution of the costs was more important. As extensively noted by recent studies, during and after the wars all kinds of measures were taken to ensure that the wealthy would carry the highest-burden, including the imposition of very high inheritance and wealth taxes (Scheidel, 2017; Scheve and Stasavage, 2012; Piketty, 2014). When wealth recovered, these ensured that its distribution fundamentally differed from that before the two World Wars. Our preceding analysis of the earlier historical cases suggests, however, that these institutional choices made to fund the costs of war and recovery were not at all automatic ones. More than the

direct effect of war itself, we argue, the main explanation for the large modern wave of equalization may be the fact that the response to the wars was shaped by societies where the massive self-organization of ordinary people in trade unions, cooperatives, voluntary associations, and political movements in the decades around 1900 had created a balanced social and political context, with widely dispersed leverage. This allowed imposing inheritance taxes and wealth taxes in order to finance the costs of these disasters. Importantly, these taxes and the social security systems financed by them were kept in place in the decades after the Second World War, as they were embedded in the fiscal, social and economic organization of post-war societies (Piketty, 2014). This kept reducing wealth inequality until it reached a low in the 1970s when much wealth had come in the hands of collectives, cooperatives, and public authorities. In this case, the immediate impact of the war destruction, the institutional responses, and the societal context in which these were formulated jointly contributed to a leveling effect in the long run (Table 2).

When the next shock hit, with the oil crisis of 1973, and the subsequent period of soaring inflation and massive unemployment, this post-Second World War constellation ensured that the burden was equally shared and did not enlarge economic disparities. However, the crisis formed the impetus and legitimization to change the organization of the economic system that already was under stress, and the subsequent institutional changes did in fact pave the way for a rise in wealth concentration that has continued until today (Warloutzet, 2018; Prasad, 2006). Especially in the 1980s, the position of organized labor weakened, and deregulation and privatization became the ruling paradigm in the policy. This new institutional constellation in turn set the stage for the way next a crisis would unfold. The financial collapse of 2008 and the ensuing economic downfall became the first post-1900 crisis that pushed wealth inequality up, despite the initial fall of stock market prices and the value of other assets (Goda, 2018). This could only happen because the societal setting had become markedly different from that in most of the twentieth century. Privatization, globalization, and deregulation had pushed wealth inequality up again, while political and societal leverage became more skewed as a result of the influence of large firms and wealth owners through lobbying, financing, etc. (Milanovic, 2016; Gilens and Page, 2014). This contributed to shaping responses to the crisis, aimed at keeping the financial system intact, saving the banks, limiting inflation, and recovering stock prices, by having public bodies pump lots of cheap money into the economy.

**A unifying framework**

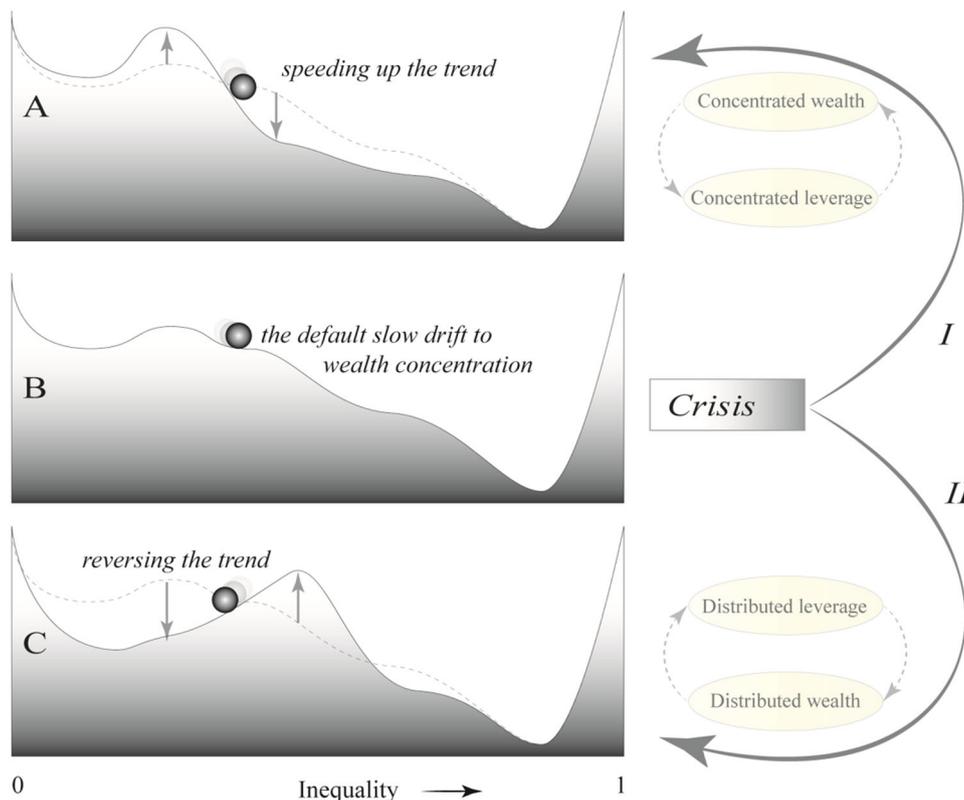
Our reanalysis of dynamics from medieval times until now leads us to hypothesize that shocks in most cases tended to catalyze inequality, as a result of both pre-existing inequalities in wealth distribution which were reinforced by the shock and the institutional responses to the shock, as these were mostly shaped in a context of skewed leverage. However, exceptions to this tendency occurred in periods when the self-organization of ordinary people and associated institutions had grown and empowered these people to overrule this pattern. In such settings, shocks have been windows of opportunity for setting new rules that ‘made the ball roll the other way’, towards more equity (Fig. 3, panel C).

That inequality when unchecked has the tendency to rise resonates with findings from stylized mathematical analyses illustrating that even if all players in an economy have equal skills and opportunities, wealth will tend to concentrate increasingly into the hands of a few (Piketty and Saez, 2014; Scheffer et al., 2017). In the simplest models, this is simply the statistical result

**Table 2 Schematic overview of the effects of the main crises in the Western world in the period c.**

Crisis	Setting: wealth distribution	Setting: leverage	The immediate effect on economic inequality	Resulting institutional change	Long term effect
First World War	Very high inequality	Growing organization of ordinary people	Reduced	Equalizing institutions	More equality
Great Depression	High inequality	Strong organization of ordinary people	All hit (?)	Equalizing institutions	More equality
Second World War	Medium/high inequality	Strong organization of ordinary people	Reduced	Equalizing institutions	More equality
Oil crisis, inflation	Low inequality	Strong organization of ordinary people	All hit	Privatization, deregulation, disequalizing institutions	More inequality
The financial and economic crisis	Low but growing inequality,	Dominance private wealth	All hit	Unchanged	More inequality
Corona crisis	Medium/low but growing inequality	Dominance private wealth	All hit	???	???

1900–2020, showing how each crisis impacts a society where the stage is set in part by the responses to the previous crisis. By exception in world history, this stage was relatively equitable, but from the 1970s this has changed, leading to less equitable outcomes.  
 ? Data not available.  
 ??? Data not available.



**Fig. 3 Opposite effects of crises on the dynamics of wealth concentration.** The usual situation is a slow drift towards more concentrated wealth in the hands of a small elite (panel B). If a wealthy elite has the most leverage to set the rules upon a crisis (arrow I) a crisis may be used to accelerate the trend of wealth concentration (panel A). By contrast, if ordinary people have more leverage (arrow II) the rules may be adapted to change the stability landscape of wealth dynamics and reverse the trend in the direction of reduced inequality (panel C).

of a multiplying effect of wealth on otherwise random gains and losses (Bouchard and Mézard, 2000). Such models also suggest that the destruction of capital by disasters will not change that pattern, as it just scales down all wealth proportionally (Scheffer et al., 2017). As we have seen this assumption is obviously an oversimplification for two reasons. First, in reality, larger assets may come with larger chances to pull through crises (Bekar and Reed, 2013; Slavín, 2014; McPeak and Barrett, 2001; Mendoza, 2009) and second, large wealth often comes with the power to set the rules in ways that favor further wealth concentration (Van Bavel, 2016; Acemoglu et al., 2005; Turchin, 2003). At the same time, such simple mathematical models do not include the emergence of organizations that may seize the opportunity that shocks offer to reshape the rules in favor of the ordinary man (Van Bavel, 2016; De Moor, 2008). Indeed, those dynamics are challenging to capture, as they are driven by a complex set of processes on multiple timescales.

One way to nonetheless visualize the effect of crises on the long-term dynamics of inequality is through stability landscapes (Fig. 3). In such landscapes, the slope indicates the direction and speed of the intrinsic tendency for change. We can visualize the intrinsic tendency for slowly rising inequality by a long and somewhat bumpy slope eventually leading to a stable state with highly concentrated wealth as represented by a high Gini index (the bottom of the valley in landscape B). However, stable landscapes themselves will change over time as they are shaped by slow institutional change. Such institutional change often speeds up greatly in the aftermath of crises. As we have argued, this tends to happen in one of two opposite ways: (I) promoting further wealth concentration, or (II) reversing the trend towards rising inequality (leading to panels A vs. C, respectively). Response type

I is most likely if the political leverage of the wealthy elite is large. Response type II happens in the historically rarer situation where the ordinary people represented in institutions have stronger leverage. Due to the slow nature of institutional dynamics in the periods between crises, there is a carry-over effect with the response to a crisis being shaped by the response to the previous one.

Although this captures the essence of the role of shocks in long-term inequality, it obviously leaves many important aspects untreated. For instance, in phases of scale-enlargement wealth-equalizing institutions have historically lost clout, causing the near-universal slow creep towards wealth concentration to resume (Scheffer et al., 2017). Thus, the reversals we depict are temporal as wealth will often allow an elite to undermine or bypass institutions and regain political leverage on scales ranging from villages to transnational corporations (Scheffer et al., 2017; Folke et al., 2019). Another limitation of our simple visualization is that using a single index for wealth inequality makes it hard to visualize how shocks can induce societal splits in wealth that are difficult to reverse as they involve tipping points. For instance, families may fall into a poverty trap if their assets drop below a threshold at which it becomes impossible to rebuild (Mendoza, 2009). This mechanism can work across scales to trap neighborhoods, regions, or even nations in an impoverished situation from which recovery is difficult due to a range of feedback mechanisms (Bowles et al., 2006).

Nonetheless, our simple framework captures the essence of the pattern we find throughout most of history, where economic and political leverage typically was skewed. Crises in these contexts tended to boost wealth concentration into the existing elite while at the same time enlarging the fraction of have-nots in societies.

Apart from the direct impact, a leveling effect of shocks, in the long run, may only be expected if there happen to be strong pre-existing institutions that give ordinary people leverage to shape the rules of response to the disaster.

## Outlook

These insights also hold relevance when thinking, more speculatively, about the fall-out of the COVID 19-crisis. The social and economic context at present is much more similar to that during the 2008 crisis than that during the twentieth-century disasters. If anything, existing inequalities have deepened since 2008. The skewness in the wealth distribution has further increased, in Western and non-Western countries alike, and also at the global level, with many households having no economic buffers, while a few hold vast resources (Piketty, 2014; Goda, 2018). Moreover, the COVID 19-crisis especially hits labor, while the reliance of people on IT infrastructure and its wealthy owner's increases. The direct impact is therefore likely to enlarge material inequalities. Also, the overlap between economic wealth and political power has further grown, with political decision-making mostly aligned with the interests of large wealth owners, as a result of lobbying and financing campaigns, even in Western democracies (Gilens and Page, 2014), while in some countries governments themselves have become closely aligned to the group of very wealthy or have become composed of them. In these latter cases, it, therefore, seems likely that institutional responses to this crisis, including fiscal ones, will be shaped in such a way that inequalities may be further sharpened, as was the case after the 2008 crisis. Other countries, however, where these tendencies have been less outspoken, are in a position where the outcome may shift either way. Sense-making of the kind we do comes at an important moment for such countries, as it could help swing the balance allowing restructuring of rules that makes the ball roll the other way.

## Data availability

All data generated or analyzed during this study are included in this published article.

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### Competing interests

The authors declare no competing interests.

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