Article:

Feinman, Gary, Quequezana, Gabriela Cervantes, Green, Adam Stuart orcid.org/0000-0002-3324-5165 et al. (6 more authors) (2025) Assessing grand narratives of economic inequality across time. Proceedings of the National Academy of Sciences of the United States of America. e2400698121. ISSN 1091-6490

https://doi.org/10.1073/pnas.2400698121

Assessing grand narratives of economic inequality across time

Gary M. Feinman[a,1], Gabriela Cervantes Quequezana[b], Adam Green[c,d], Dan Lawrence[e], Jessica Munson[f], Scott Ortman[g], Cameron Petrie[h], Amy Thompson[i], and Linda M. Nicholas[a]

Affiliations are included on p. 7.

Edited by Charles Stanish, University of South Florida, Tampa, FL; received February 12, 2024; accepted June 12, 2024

Long-entrenched grand narratives have tied inequality in large human aggregations to generally linear trends, a direct outcome of domestication, then fostered by population growth and/or stepped scalar transitions in the hierarchical complexity of human institutions. This general pattern has been argued to short-circuit or reverse only in the context of cataclysmic disasters or societal breakdowns. Yet, for the most part, these universal deterministic frameworks have been constructed from historical or ethnographic snapshots in time and afford little systematic attention to human institutions or agency. Here, we leverage quantitative, temporally defined archaeological, and ethnographic data from a suite of global regions, most of which transitioned through the process of urbanism and complex hierarchy formation, to examine shifts in degrees of inequality over time. Although broad temporal patterns are evidenced, the regional trends in inequality are neither linear, uniform, nor triggered immediately or mechanically by Malthusian dynamics or scalar increases.

governance | grand narratives | inequality | urbanism | wealth

Significance

Inequality is a central focus of contemporary scholarship. How did it reach its current extent? Is inequality a natural consequence of modernization, scalar growth, and/or Malthusian forces? Or, were increases in degrees of economic inequality less linearly driven such that the factors that underpinned rises in the potential degrees of inequality were not necessarily realized? Drawing on a large global sample of house sizes compiled principally from archaeological contexts, we assess alternatives with broad analytical implications. For the past, as in the present, variance in the institutions in governance is advanced as one key factor with implications on the degree to which household wealth inequalities were manifest.

Once viewed as a natural consequence of general evolutionary progress (1), an inevitable outcome triggered by persistent demographic growth (2), or increases in the size and hierarchical scale of societies (3), economic inequality has now moved from the background to the forefront of social scientific research and debate (4–7). In its present cross-disciplinary spotlight, questions concerning temporal and spatial inequalities in wealth abound. Yet, until recently (8), tracking and investigating the roots, cross-regional variance, and history of economic inequality remained largely outside a systematic empirical scope. Here, we build on recent research to examine wealth inequalities at a broad global scale, drawing on a large compilation of house-size data largely from archaeological contexts. In the process, we assess grand narratives. Did the degree of inequality increase uniformly over time? Was it triggered through a neo-Malthusian dynamic—persistent population growth and the pressures then placed on resources (9)? Over time, can the extent or degree of economic inequality be explained largely by population growth and its consequences or by the growth of nucleated settlements (cities) and/or larger, more hierarchical political units (6, 10)? Did the breakdown of urban polities necessarily usher in episodes of diminished economic inequality (9)? Was humanity's path to modern inequalities a linear, uniform, universal path, or was there variance (different historical paths) region to region, indicative that human institutions and governance as well as other factors had a critical role (6)?

The aforementioned queries are central to the identification and assessment of factors that promote inequalities in wealth. Yet the conceptual implications are potentially broader. If inequality in the past either was largely stagnant or, alternatively, increased linearly or mechanically through a presumed homogeneous past without consideration of institutions, governance, or choices (11), then an approach driven by universal factors, such as scalar growth and/or Malthusian forces, would seem warranted. On the other hand, if wider sociohistorical and deep time lenses are necessary to account more fully for the spatiotemporal variance in wealth inequalities, then middle-range theoretical construction and approaches more in line with other historical sciences would seem essential (6, 12–15).

Approach and Methods

Although often beyond the conceptual center stage, the deep global history of economic stratification and inequality has received extensive scholarly attention (16). Recent syntheses tend to rely on comparative studies of colonial-era and more contemporary, synchronic accounts, which then are ordered into stepwise sequences presumed to mirror diachronic processes (17). Each step up in scale is seen as accompanied by greater degrees of economic stratification (17, 18). The accounting of variation within societal stages often

Author contributions: G.M.F., A.G., D.L., S.O., and A.T. designed research; G.M.F., G.C.Q., A.G., D.L., J.M., S.O., C.P., A.T., and L.M.N. performed research; G.M.F., S.O., and L.M.N. analyzed data; and G.M.F., G.C.Q., A.G., D.L., J.M., S.O., C.P., A.T., and L.M.N. wrote the paper.

The authors declare no competing interest.

This article is a PNAS Direct Submission.

[1]To whom correspondence may be addressed. Email: gfeinman@fieldmuseum.org.

This article contains supporting information online at https://www.pnas.org/lookup/suppl/doi:10.1073/pnas.2400698121/-/DCSupplemental.

Published April 14, 2025.

then is left to idiosyncratic, cultural historical factors (19). Other approaches draw principally on European sequences of recorded inequality, whether derived from more recent accounts (20–22) or the Classical world (23). Although certainly informative, none of these approaches provide a global foundation from which shifts in wealth inequality can be systematically and quantitatively compared across deep historical time frames in ways that also can be potentially compared to assessments of wealth inequalities today. Given the narrow temporal scope, patchiness, and predominately top–down foci of preserved written texts in premodern contexts, only the incorporation of archaeological data has the potential to yield such a widespread temporal and spatial empirical foundation (24, 25).

Nevertheless, a suitable archaeological indicator to compare economic inequality only became available following several advances in the discipline's field and collaborative practices over the last decades. Most notably, archaeological research projects across the globe have shifted from a predominant focus on temples and tombs prior to the mid-twentieth century to investigatory programs designed to gather information on domestic contexts. From the inception of household archaeology, a key aim was to explore residential differentiation along a series of dimensions (26, 27), including the examination of whether differences in the sizes of residences reflect variation in wealth (28). More recently, collaborative research agendas in archaeology (29) have stimulated the archiving and harnessing of a growing sample of published house size data from sites across the world (8, 30). As these studies employ a common metric across sampled contexts—distributions of house sizes—they facilitate transparent, empirically grounded, spatiotemporal comparison (*SI Appendix*, section 1).

In this comparative investigation, residences are the principal unit of analysis. "Housing is a window into ancient patterns of life and society" (31). Wealth is defined as that which has value for a residential or domestic unit (32). Both in the past and the present housing is a principal component of domestic material wealth, possibly accumulated over generations where such transmission is practical (33–38). Material wealth in housing is durable in the sense that it is transmitted intergenerationally between coresidents (39). Relative house sizes therefore are a key dimension of differences in value and hence material inequality (8, 30, 40). By definition, inequality is relational (41), and so comparisons between domestic units situated within specific communities provide a metric to compare the degree of disparity or inequality between localities in the sample. Comparative analyses of inequality in the past are important not merely to assess food insecurity and demographic imbalances but also to investigate and ultimately examine relationships with other dimensions of security, opportunity, well-being, and sustainability (42, 43).

We use the Gini coefficient to compare spatial and temporal variation (the degree of unevenness) in the distributions of house sizes across sites or settlements. Gini indices have an extended history in archaeology (44, 45); they are a standard metric for assessing inequality relationally across populations (8, 30, 46). Gini values vary between near 0 (perfect equality) to near 1 (maximal inequality) and so provide a relatively straightforward quantitative measure to compare inequality across spatiotemporal cases that employ similar aggregation methods (47).

To assess long-entrenched grand narratives regarding the often-assumed roles that political complexity, polity size or population, and time have been afforded as universal drivers or determinants of economic inequality, we focus on a key dimension of inequality, disparities in house sizes that are measured through Gini coefficients calculated at the level of sites [SiteGiniLevel compilation] (48).

This set of data (drawn from 1,176 sites, which include 47,019 houses) ensures integrity for each site sample, as the houses included for each were all derived from a specific site or settlement pertinent to a defined temporal range (48). When Gini coefficients are specified in temporal context for a particular site, we employ the midpoint of the temporal range. In addition, we examine two large subsets of that archive (*SI Appendix*, section 2). One subset, apex sites (includes 717 sites and 29,916 houses), is limited to settlements ranked at the top level in their polity (48). The second, the H50 subset (includes 176 sites and 33,180 houses), is composed of only those sites for which we have robust samples of at least 50 houses. Although these subsets reduce the size of the site sample, they still include more than half of the houses in the SiteGiniLevel file while diminishing distortion that might result from sites with small samples of houses.

Empirically Assessing Grand Narratives

We stress that we are committed to framing big questions, such as the empirical foundations of interhousehold inequality. But asking big questions does not presume that the answers will be universal or a general grand narrative [(49); contra (50), whose "grand narrative" is specific to a sociohistorical context]. For example, economic inequality is often presumed inevitable, an epiphenomenon or an inherent function of growth, spatial scale, or time (3, 11). Increases in political complexity or the population size of polities are presumed to generate greater degrees of economic inequality. If these relationships are determinative, then variability in inequality values should not be pronounced and threshold effects might even be expected with each increment in hierarchical complexity or scale.

To assess, we examined whether greater political complexity was strongly linked to higher degrees of economic inequality. The variable, Number of Levels [NofL] of political complexity (*SI Appendix*, section 3), which often is associated with the number of levels in the settlement hierarchy, was recorded (along with other information) by relevant regional experts for the polity in which each site was situated. For the SiteGiniLevel sample, this variable [NofL] ranged between one, where all settlements in a polity were of equal rank, to six (Roman England) for the vertically most complex political systems included in the sample. The number of levels of political complexity, a cross-cultural measure of jurisdictional hierarchy (51), was examined in relation to wealth differences in three ways (Fig. 1). We first plotted all sites included in the SiteGiniLevel archive that pertained to a particular phase or time slice (Fig. 1*A*). The relationship was weakly positive (r^2 = 0.16, $P < 0.01$) with the Gini coefficients markedly variable for each level of complexity. And yet, when the number of hierarchical levels was three or greater, the extent or range of variation in Gini coefficients increased as did the magnitude of inequality in the most unequal cases.

This basic pattern remained comparable in the two subsets (apex sites and H50), although the relationships were slightly stronger. For apex sites (Fig. 1*B*), the top-ranked sites in their respective polities, r^2 = 0.22 ($P < 0.01$), while for the H50 subset (Fig. 1*C*), r^2 = 0.27 ($P < 0.01$). The subset of apex sites does not include small sites in hierarchical polities. These small sites tend not to reflect the polity's full range of inequality (what ref. 48 refer to as the Polity-Scale Effect), so their exclusion may help account for the stronger relationship. The H50 subset includes sites with robust samples of houses. The exclusion of sites with small house samples may minimize measurement noise, contributing to a stronger r^2 value (Fig. 1). One way to think about this pattern is that as the hierarchical complexity of polities increased, the

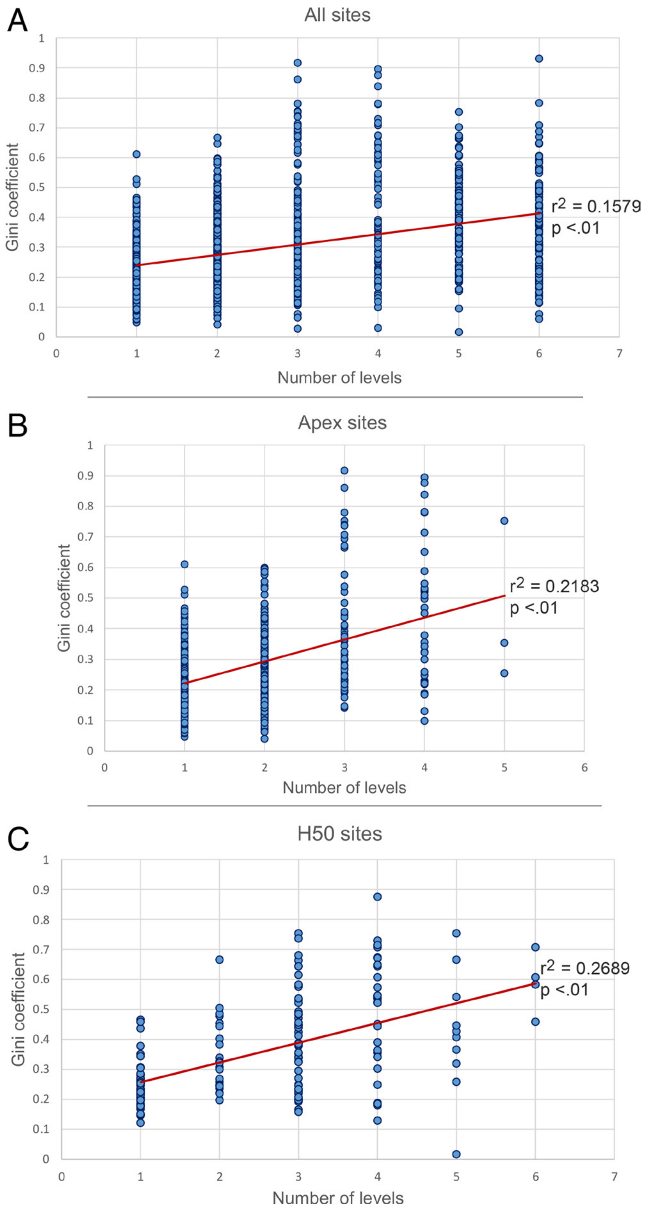

Fig. 1. Relationship between the number of levels and Gini coefficients of residential disparity: (*A*) all sites in the SiteGiniLevel file (n = 1,164, number of residences = 46,350), (*B*) apex sites (n = 711, number of residences = 29,916), and (*C*) sites with 50 or more measured residential units (n = 170, number of residences = 32,611).

potential for greater inequality did as well (especially in polities with at least three hierarchical levels), but that potential was not necessarily realized.

An alternative grand narrative presumes that population growth is the inevitable driver of inequality (9). Two distinct and entrenched scenarios are prominent. One envisions steady demographic increases as eventually putting pressure on resources or constraining mobility, making flight from burgeoning inequality more difficult (52), possibly promoting hoarding, shortage, and inequitable distribution (53). The other relies on a more functionalist argument: Population growth inherently leads to differentiation in roles and activities, the innate and ultimate by-product of which is inequality (3). To investigate the relationship between population and inequality, we examined the same three samples, in each case regressing the Gini coefficient for residential disparity on logged population size estimates. The measurements by Gini coefficients (Fig. 2 *A*–*C*) were both internally similar and illustrated a comparable pattern to that found for political hierarchy. Each regression was weakly positive with a broad range of variability. As polity populations grew, the extent of that variation also expanded, particularly for greater degrees of inequality. Nevertheless, larger demographic scale was not sufficient to result in uniformly high degrees of inequality; that outcome was consistent across all samples.

A further expectation of the Malthusian frame sees declines in inequality basically as only occurring in the face of cataclysmic conditions, such as major political breakdowns (9). Our sample is not sufficiently robust to test this expectation fully. Yet, we do have regional samples (*SI Appendix*, Fig. S1) surrounding two epic

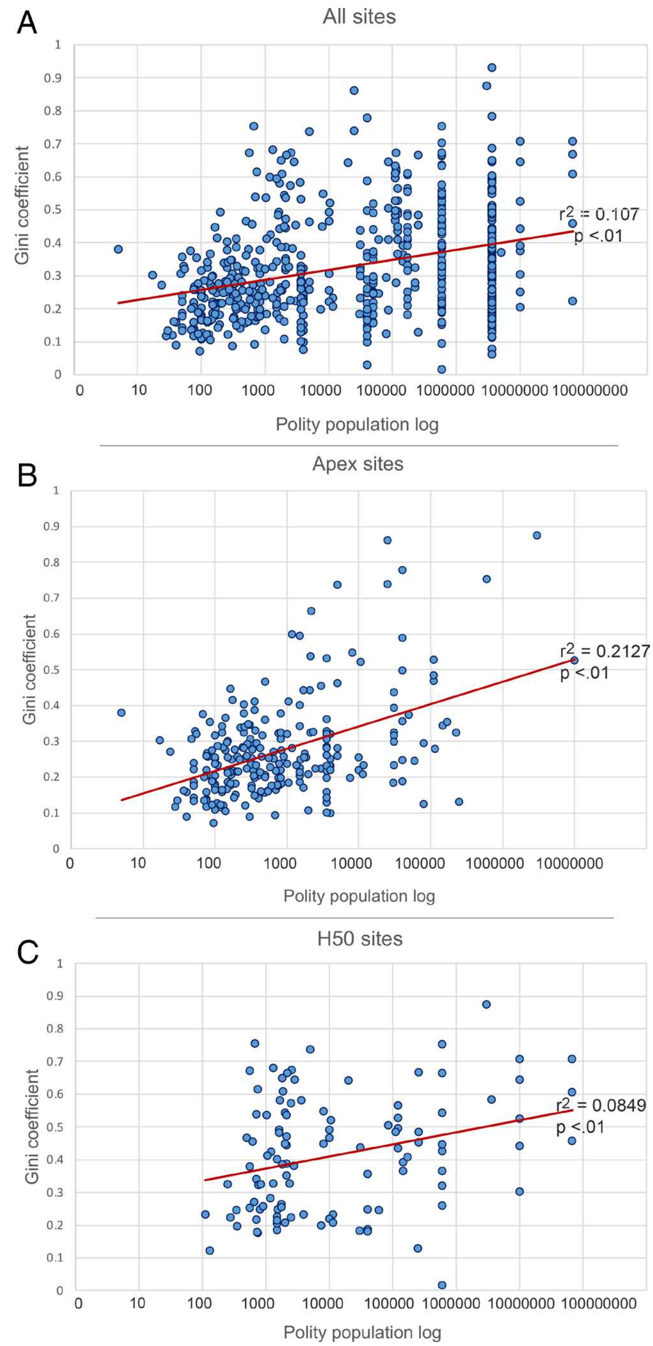

Fig. 2. Relationship between the log of polity population and Gini coefficients of residential disparity: (*A*) all sites in the SiteGiniLevel file (n = 590, number of residences = 31,452), (*B*) apex sites (n = 243, number of residences = 17,421), (*C*) sites with 50 or more measured residential units (n = 110, number of residences = 25,238).

episodes of political collapse, the fall of Roman England (ca. 410 CE) and the decline of the early Central Mexican urban center of Teotihuacan (ca. 600 CE). While the Gini coefficients for England after Rome meet the expectations, Central Mexico following Teotihuacan's decline seems not to; inequality rose at several spatial scales following the fall of that highland Mexican metropolis. Although we lack quantitative results, the collapse of early cities in Mexico's Southern Highlands (ca. 800 to 900 CE) also was followed by seeming increases in the sizes of the largest residences and episodes of increased inequality (54–56).

In this vein, even though for most global regions human populations have generally increased over time (albeit not necessarily at a consistent tempo), inequality has not. If we view the five global continental-scale regions (Asia, Europe, Mesoamerica, North America, and South America) for which we have the largest site samples that also cover a long time-series (*SI Appendix*, Fig. S2), the marked variation within and between component subregions is apparent. Subregion to subregion, there is neither a consistent temporal trendline nor a uniform or unilineal pattern. Likewise, house-size disparities were neither stagnant nor stable either within or between regions. In each macroregion [Bigregion] (48), we do however see a recurrent tendency for sites with the greatest levels of inequality to be present later in the temporal sequence.

Yet, for all five macroregions [Bigregions], neither domestication, the potential for agrarian surplus (57), nor even initial aggregations in protourban and urban centers consistently led to major or generalized increases in inequality. The entrenched presumption that major increases in inequality were an immediate and direct outgrowth of farming and its potential for excess food production (58) must be reconsidered. In Southwest Asia (*SI Appendix*, Fig. S2*A*), the greatest uptick in inequality values postdates the earliest cities (ca. 3500 BCE). Likewise, in Mesoamerica (*SI Appendix*, Fig. S2*C*) the largest rise in inequality occurred centuries after the emergence of the earliest cities (ca. 500 BCE). In North America (*SI Appendix*, Fig. S2*D*), the greater inequality at and around Cahokia (ca. 1000 CE) long follows the presence of locally domesticated plants in eastern North America (and even the later introduction of exotic maize), but it was more closely timed with the adoption and reliance on that exotic plant (59). In each macroregion, when higher degrees of inequality did arise at certain settlements, variation in the degree of inequality remained (8). So, while the potential for (and specific expressions of) greater inequality increased in most subregions over time, such inequities were not uniformly materialized. More context-specific theoretical construction at middle ranges (60, 61) of generality below the grand narratives is necessary to define the institutions and governance practices (at different scales) that check and impede inequality as well as those that promote and foster it. Only in this way do we stand a chance to understand "the diversity of inequality regimes that followed different" sequences through time (62, 63).

Governance Matters

Although the driving prime movers at the heart of grand narratives do not on their own fully account for or determine degrees of economic inequality, they nonetheless are important as these scalar factors do seem to expand the potential for greater inequalities to develop both within and between populations. Modes of governance, likewise, have not been found to have a deterministic effect on the specific degrees of inequality (64–67). And yet, past and present, it would be hard to refute that on a case-by-case basis differences in institutions and governance can affect the extent of inequality (12, 68, 69).

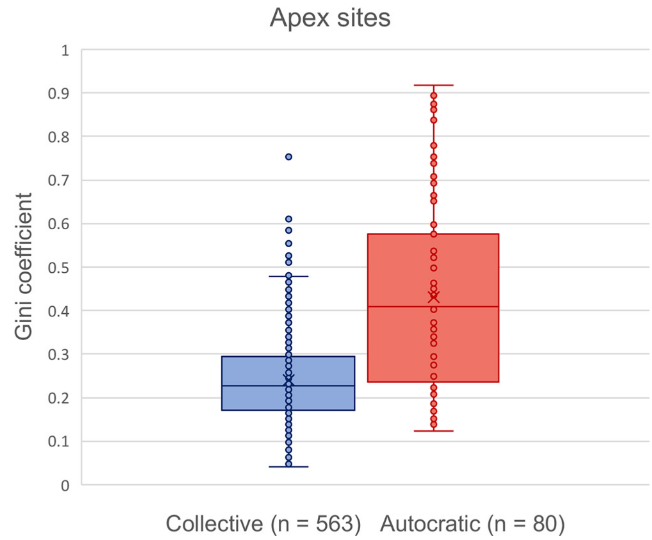

Fig. 3. Comparison of Gini coefficients of residential disparity for collectively (n = 563, number of residences = 22,110) and autocratically (n = 80, number of residences = 6,596) governed apex sites.

Governance is defined as all processes associated with governing (70). Thus, in many cases, it is multiscalar and with multiple levels. The contrast drawn between land-limited and labor-limited subsistence production encompasses an aspect of bottom–up governance (71), and the relationship of this axis of variation to inequality is explored elsewhere in this collection (72). Here, we focus on what is now widely recognized as another key dimension of governance, the degree to which decision-making power is centralized or distributed (73, 74). An expanding body of literature has documented that the centralization of decision making and the personalization of power do not necessarily neatly correlate (in the past or the present) with scale or hierarchical complexity of governing institutions (12, 73–75). The expert coding for this variable was undertaken at the same time that the individual houses and other variables were entered in the data archive. For the governance variable, the regional experts coded three nominal dimensions (political economy, leadership, and architecture), designed specifically for archaeological cases, that mirrored an earlier study focused on prehispanic Mesoamerica (75). Following that study, each dimension was coded as either zero or one: zero for more autocratic and one for more collective/democratic forms of governance (in a few cases where the available information was equivocal values of 0.5 were coded). The scores for the three dimensions were summed to make a governance variable with values ranging from zero to three. For clarity, and since autocracy is generally expected to be associated with greater degrees of inequality, we also use the inverse [Gov_I] of the original governance variable (*SI Appendix*, section 3) for certain analyses (48), in which zero indicates more collective/democratic governance and a score of three reflects greater concentrations of political power and decision making (autocracy). For some analyses, summed values of 0 to 1 were considered as collective and were compared nominally to values of 1.5 to 3, which were lumped as autocratic.

To evaluate whether this dimension of governance was reflected in inequality values, we nominally compared governance with the Gini coefficients for inequality using the subset of apex sites (Fig. 3). We found similar variance between the two ranges whether level 1 sites were included or not (*SI Appendix*, Fig. S3). This pattern also was borne out for all three analyses (*SI Appendix*, Fig. S4) when inequality was compared in relation to the inverse of the full range of governance values [Gov_I]. In fact, this dimension of governance (collective–autocratic) accounts for roughly the same amount of the variation in inequality as the number of hierarchical levels (Fig. 1).

Autocratic leaders in a multitiered hierarchical polity have more opportunities to amass and concentrate wealth than autocratic leaders at the top of less hierarchical polities. To assess this expectation, we constructed a composite variable (Hierarchical Clout) that summed the number of levels [NofL] and the inverse of governance [Gov_I] so that potential values ranged from one to nine (*SI Appendix*, section 3). The top values in this scale reflect hierarchical polities with autocratic governance and so concentrated power or clout at the apex of a hierarchical polity, while low values reflect nonhierarchical polities with more collective forms of governance. Combining the hierarchical extent of polities and concentrated power into a single variable (Hierarchical Clout) permits the assessment of the expectation that at scale concentrated power facilitates the accumulation of wealth (76). We examined the same three subsets of the data file as in prior analyses (Figs. 1 and 2); the sizes of the samples were affected by the elimination of some cases due to missing data. Hierarchical Clout made little difference in the r^2 for the SiteGiniLevel file as a whole (Figs. 1*A* and 4*A*). But the relationships (Fig. 4 *B* and *C*) were stronger for the subset of apex sites ($r^2 = 0.30$, $P < 0.01$) and H50 subset ($r^2 = 0.42$, $P < 0.01$); an even stronger positive relationship ($r^2 = 0.50$, $P < 0.01$) was found for another subset (H100) in which cases were limited to sites with at least 100 house measurements (*SI Appendix*, section 2 and Fig. S5). How power is concentrated affects the realization of inequality.

As the potential for inequality expands at the central places (apices) in more hierarchically organized polities ([NofL] ≥ 3), the degree to which political power is concentrated impacts the extent to which inequality is materialized. Even at scale, the institutions and practices associated with collectively organized polities were able to mute or level (at least to degrees) the concentration of wealth. To assess this relationship, we compared apical sites as either collective or autocratic by simply dividing the range of the governance scale into two halves (Figs. 3 and 5*A*). For apical sites in this sample that are the central place (generally cities) in hierarchical polities of three or more levels, governance clearly matters for the degree of inequality. Only two of the 29 apex sites in hierarchical polities of three or more levels (Xochicalco and Tenochtitlan) that had collective forms of governance also had Gini coefficients larger than (above the) the regression line for autocratic sites at the apices of polities of the same ranks (*SI Appendix*, section 4). The collectively governed sites with low Gini coefficients are present in five macroregions (Asia, Europe, Mesoamerica, North America, and South America) and include such premodern urban centers as Athens (Greece), Monte Albán, Teotihuacan, and Tlaxcallan in highland Mexico, Cahokia (North America), and Mohenjo-daro in Pakistan (77–81). Only eight apical sites with at least three levels had Gini coefficients larger than 0.75 (high degrees of inequality). All eight of these central places were situated in Southwest Asia (Assur, Babylon, Zincirli Höyuk, Nuzi, and Tel El Amarna), South America (Chan Chan and Gallindo), or Europe (Knossos).

When the relationship between inequality and Hierarchical Clout is examined using the H50 subset and sorted by macroregions [Bigregion] (Fig. 5*B*), a similar pattern is observed. The highest degrees of inequality are found for hierarchically organized polities with autocratic governance, and these polities largely were situated in Southwest Asia, Europe, and South America (in contrast to Mesoamerica or North America). In other words, greater degrees of inequality were realized in the three (of these five) macroregions where two key resources were present, herd animals and metals. Metals (82) are found in prehispanic Mesoamerica after 600 to 700 CE, which coincides with higher Gini values at some Mesoamerican central places (*SI Appendix*, Fig. S2*C*). The relevance of herd animals extends beyond the plow and traction. And South American camelids were never used in that way. Rather, herd animals (as well as metals) have been termed external resources (12, 54, 68, 73, 83), that is, sources of wealth that can in themselves be accumulated and monopolized without heavy dependence on labor. Herd animals also serve to minimize the friction of distance and facilitate long-distance exchange (84). External resources, including metals, herd animals, and control over trade routes, underpin the institutions of governance that facilitate the concentration of power (85). As an example, another Southwest Asia city, Kültepe Kanesh, had a Gini value above 0.70, a high Hierarchical Clout score (≥7), and an economy heavily dependent on long-distance exchange (86).

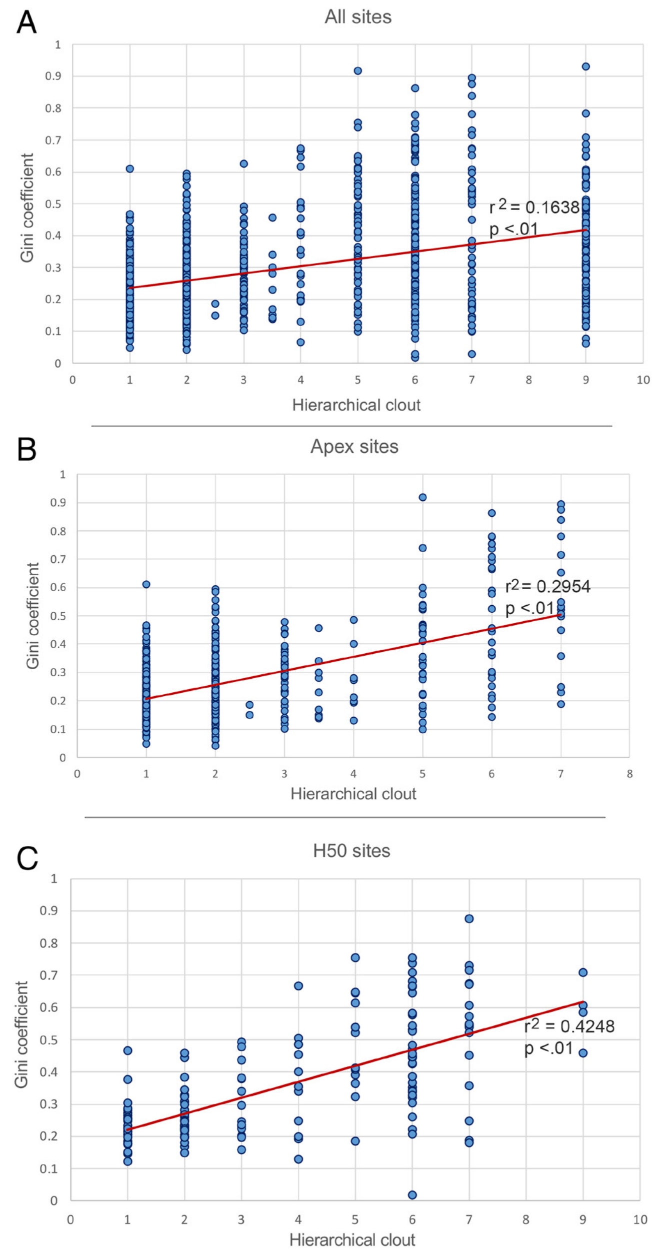

Fig. 4. Relationship between hierarchical clout and Gini coefficients of residential disparity: (*A*) all sites in the SiteGiniLevel file (n = 1,059, number of residences = 44,501), (*B*) apex sites (n = 643, number of residences = 28,706), and (*C*) sites with 50 or more measured residential units (n = 164, number of residences = 32,259).

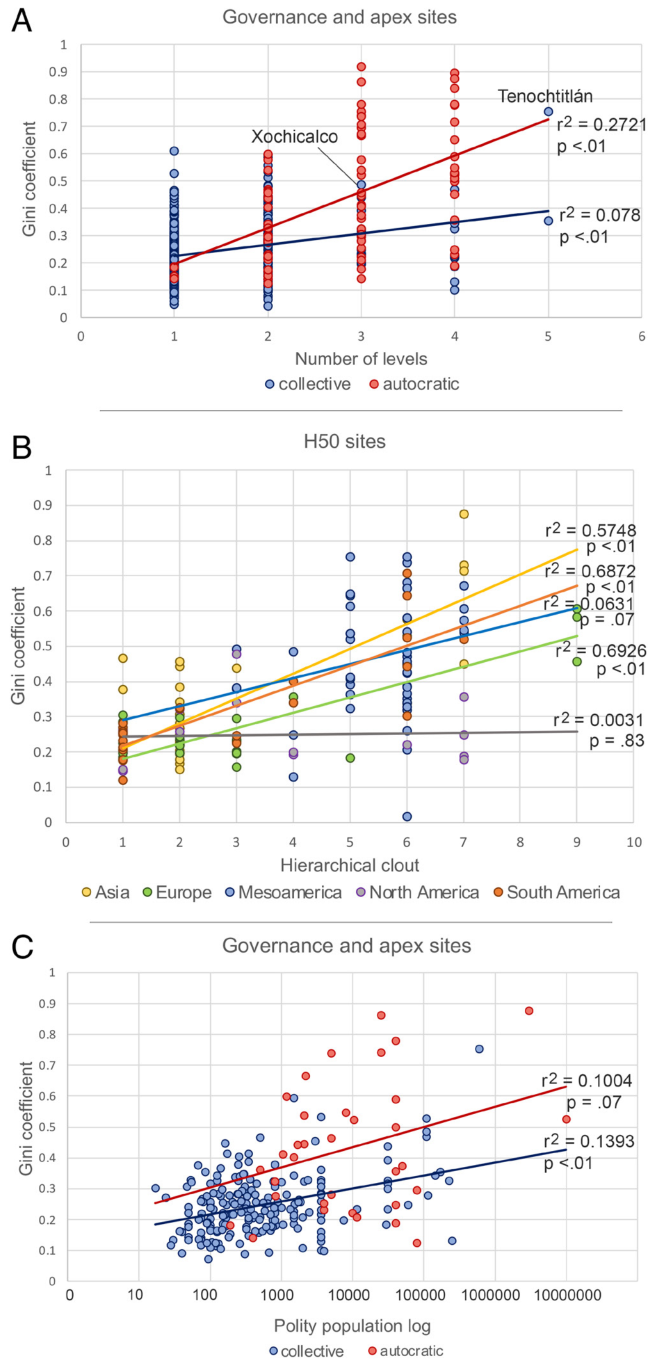

Fig. 5. Variability in governance and inequality: (*A*) relationship between number of levels and Gini coefficients of residential disparity for collectively (n = 563, number of residences = 22,110) and autocratically (n = 80, number of residences = 6,596) governed apex sites, (*B*) relationship between hierarchical clout and Gini coefficients of residential disparity for sites with 50 or more measured residential unit in five macroregions [Bigregion] (Asia, n = 34, residences = 4,644; Europe, n = 31, number of residences = 10,088; Mesoamerica, n = 52, number of residences = 11,629; North America, n = 17, number of residences = 1,874; South America, n = 23, number of residences = 3,305), and (*C*) relationship between the log of polity population and Gini coefficients of residential disparity for collectively (n = 202, residences = 11,890) and autocratically (n = 34, residences = 5,454) governed apex sites.

We must be careful about causality here. We are not proposing that herd animals, metal, or the control of trade routes directly caused the concentration of power and wealth, but rather that when governance institutions and practices were in place that did not check, or even fostered, the consolidation of power, those external resources facilitated the accumulation, monopolization, and personalization of wealth. In collectively organized polities, labor, mainly subaltern labor, is necessary to fund governance and amass small amounts of wealth. The importance of labor is indicated for apex sites (Fig. 5*C*) by the significant relationship ($r^2 = 0.14$, $P < 0.01$) between polity population and governance for collectively organized polities. In contrast, there was basically no relationship between polity population and governance for autocratically organized apical centers. This relationship also was found for the H50 sample (*SI Appendix*, Fig. S6). Autocratic principals amass wealth, invest in their houses and other property, without making the infrastructural investments that attract and maintain large labor forces, and hence concentrated populations over time (87, 88). These findings accord with warnings (89, 90) against overly deterministic frames and uncontextualized grand narratives that see inequality as an inevitable outcome of scalar increases in human sociopolitical formations. As the scale of human polities increased, the potential for greater inequalities emerged but clearly that prospect was not necessarily or inevitably realized and the institutions of governance (and their associated leveling mechanisms and values) were factors that could mute or check the extent to which wealth was concentrated. As Elinor Ostrom (91) cautioned in her Nobel Prize address: "When the world we are trying to explain…however, is not well described by a simple model, we must continue to improve our frameworks and theories so as to be able to understand complexity and not simply reject it."

Conceptual Implications

Taken at face value, the conceptual implications are both scientifically disruptive (92) and wide reaching. Before following these inferential threads, a frank discussion of study limitations (and strengths) is in order. Of course, wealth inequality is only one dimension of inequality, and although housing is generally seen as a key element of cumulative wealth (8, 34, 93), relative house sizes are just one metric. Despite these caveats, the global and temporal scope as well as the number of sample cases in this analysis far exceed that in any previous research program (20, 30, 94, 95). Not only can we assess a longer time horizon than was quantitatively examined before, but the time-series sequences for regions outside Europe are now more ample. The use of a consistent metric grounded in material remains (rather than documents) also provides consistency and is free of the top–down biases that can affect textual records. The analytical potential and importance of this empirical sample drawn mostly from archaeology's material record cannot be dismissed as these new data sharpen the ocular for a truly global history.

The spatiotemporal breadth of this record clearly outlines a past for our species that was neither homogeneous, static, nor universally aligned with a linear or progressive sequence. The recorded variability in inequality at all scales likewise makes clear that we have not uniformly moved from an equitable past to an unequal present (96). Different historical paths are empirically evident, and they reveal patterns and trends that are neither uniform or linear, but afford roles to human agency and institutions (13, 97). No longer should we rely exclusively on select snapshots from the recent past, the last centuries of European history, or even the Classical Mediterranean world as appropriate analogs for human history writ large. Unquestionably, sedentary life and plant and animal domestication underpinned a potential for greater degrees of inequality, but the effects were not immediate and the specific paths and processes of change were variable place to place and region to region. The empirical patterns that we see illustrate that growth in the scale of settlements and increases in the hierarchical complexity of institutions were neither determinative nor inevitable (necessary and sufficient causal) drivers of higher degrees of inequality. Yet, they did raise the potential for greater degrees of inequality to manifest.

Rather, our results reflect probabilities and align with the view that degrees of inequality are to an important extent socially constructed albeit in patterned ways (98). "On balance, this wave of research pushes the frontier away from simple global patterns toward a richer set of explanations of inequality episodes" (99). Theory building that breaks from now-refuted presumptions of universality, linearity, and progress, as well as overly generalized grand narratives is in order. If we are to understand cities and the variable manifestations of inequality in them, human choices, institutions, and governance must be integrated into conceptual construction, whether the explanatory target is the present, the past, or the sequences of deep time that connect the two.

Data, Materials, and Software Availability. csv file has been deposited in tdar (https://core.tdar.org/project/496853/the-global-dynamics-of-inequality-gini-project) (100).

ACKNOWLEDGMENTS. The GINI project is funded by the NSF (NSF Grant No. BCS-2122123) and supported by the Coalition for Archaeological Synthesis (http://www.archsynth.org/) and the Center for Collaborative Synthesis in Archaeology (https://ibsweb.colorado.edu/archaeology/). We appreciate the Santa Fe Institute for generously hosting project Working Groups. We thank Timothy A. Kohler and Amy Bogaard for asking us to prepare this paper for this special feature. They as well as Richard E. Blanton and two anonymous reviewers provided constructive suggestions on prior versions of this manuscript.

Author affiliations: [a]Negaunee Integrative Research Center, Field Museum of Natural History, Chicago, IL 60605; [b]Department of Anthropology, University of Pittsburgh, Pittsburgh, PA 15260; [c]Department of Archaeology, University of York, King's Manor, York YO1 7EP, United Kingdom; [d]Department of Environment and Geography, University of York, King's Manor, York YO1 7EP, United Kingdom; [e]Department of Archaeology, Durham University, Durham DH1 3LE, United Kingdom; [f]Department of Anthropology-Sociology, Lycoming College, Williamsport, PA 17701; [g]Department of Anthropology, University of Colorado, Boulder, CO 80309-0233; [h]Department of Archaeology, University of Cambridge, Cambridge CB4 2JE, United Kingdom; and [i]Department of Geography and the Environment, The University of Texas at Austin, Austin, TX 78712

1. L. White, "Energy and the evolution of culture" in *The Science of Culture*, L. White, Ed. (Farrar, Straus, and Giroux, 1949), pp. 363–393.
2. M. N. Cohen, *The Food Crisis in Prehistory: Overpopulation and the Origins of Agriculture* (Yale University Press, 1977).
3. K. Davis, W. E. Moore, Some principles of stratification. *Am. Sociol. Rev.* **10**, 242–249 (1945).
4. B. Milanovic, Income inequality is cyclical. *Nature* **537**, 479–482 (2016).
5. T. Piketty, *Capital in the Twenty-first Century* (Harvard University Press, 2014).
6. M. Savage, *The Return of Inequality: Social Change and the Weight of the Past* (Harvard University Press, 2021).
7. J. E. Stiglitz, Inequality is not inevitable. *NYTimes*, 27 June 2014.
8. T. A. Kohler *et al.*, Greater post-Neolithic wealth disparities in Eurasia than in North America and Mesoamerica. *Nature* **551**, 619–622 (2017).
9. W. Scheidel, *The Great Leveler: Violence and the History of Inequality from the Stone Age to the Twenty-first Century* (Princeton University Press, 2017).
10. D. Rogers, The evolution of inequality. *New Sci.* **215**, 38–39 (2012).
11. M. Scheffer, B. van Bavel, I. A. van de Leemput, E. H. van Nes, Inequality in nature and society. *Proc. Natl. Acad. Sci. U.S.A.* **114**, 13154–13157 (2017).
12. R. E. Blanton, L. F. Fargher, *How Humans Cooperate: Confronting the Challenges of Collective Action* (University Press of Colorado, 2016).
13. G. M. Feinman, Reconceptualizing archaeological perspectives on long-term political change. *Annu. Rev. Anthropol.* **52**, 347–364 (2023).
14. E. Mayr, *The Growth of Biological Thought: Diversity, Evolution, and Inheritance* (Harvard University Press, 1982).
15. H. S. Klein, History and the study of inequality. *J. Interdiscip. Hist.* **11**, 429–441 (2021).
16. A. F. Blanco, On economic inequality and schools of economic thought. *Econ. Alt.* **4**, 511–524 (2020).
17. M. H. Fried, *The Evolution of Political Society: An Essay in Political Anthropology* (Random House, 1967).
18. A. W. Johnson, T. K. Earle, *The Evolution of Human Societies: From Foraging Group to Agrarian State* (Stanford University Press, ed. 2, 2000).
19. K. V. Flannery, J. Marcus, *The Creation of Inequality: How Our Prehistoric Ancestors Set the Stage for Monarchy, Slavery, and Empire* (Harvard University Press, 2012).
20. G. Alfani, W. Ryckbosch, Growing apart in early modern Europe? A comparison of inequality trends in Italy and the Low Countries, 1500–1800. *Explor. Econ. Hist.* **62**, 143–153 (2016).
21. G. Clark, *A Farewell to Alms: A Brief Economic History of the World* (Princeton University Press, 2007).
22. B. Milanovic, Towards an explanation of inequality in premodern societies: The role of colonies, urbanization, and population densities. *Econ. Hist. Rev.* **71**, 1029–1047 (2018).
23. W. Scheidel, A model of real income growth in Roman Italy. *Historia* **56**, 322–346 (2007).
24. R. McC. Adams, Review of "Understanding early civilizations: A comparative study". *Int. Hist. Rev.* **26**, 349–353 (2004).
25. G. Alfani, Economic inequality in preindustrial times: Europe and beyond. *J. Econ. Lit.* **59**, 3–44 (2021).
26. G. R. Willey, Foreword. *Am. Behav. Sci.* **26**, 613–616 (1982).
27. K. V. Flannery, Ed., *The Early Mesoamerican Village* (Academic Press, 1976).
28. R. McC. Netting, Some home truths on household size and wealth. *Am. Behav. Sci.* **26**, 641–662 (1982).
29. K. W. Kintigh *et al.*, Grand challenges for archaeology. *Am. Antiq.* **79**, 5–24 (2014).
30. T. A. Kohler, M. E. Smith, Eds., *Ten Thousand Years of Inequality: The Archaeology of Wealth Differences* (University of Arizona Press, 2018).
31. M. E. Smith, Housing in premodern cities: Patterns in social and spatial variation. *Archnet-IJAR* **8**, 207–222 (2014).
32. M. E. Smith, T. A. Kohler, G. M. Feinman, "Studying inequality's deep past" in *Ten Thousand Years of Inequality: The Archaeology of Wealth Differences*, T. A. Kohler, M. E. Smith, Eds. (University of Arizona Press, 2018), pp. 3–38.
33. R. E. Blanton, *Houses and Households: A Comparative Study* (Springer, 1994).
34. O. Causa, N. Woloszko, D. Leite, Housing, wealth accumulation and wealth distribution: Evidence and stylized facts (OECD Working Paper No. 1588, 2019), www.oecd.org/eco/workingpapers.
35. A. Squitieri, M. Altaweel, Empires and the acceleration of wealth inequality in the pre-Islamic Near East: An archaeological approach. *Archaeol. Anthropol. Sci.* **14**, 190 (2022).
36. G. Zucman, Global wealth inequality. *Annu. Rev. Econ.* **11**, 109–138 (2019).
37. A. Killewald, F. T. Pfeffer, J. N. Schachner, Wealth inequality and accumulation. *Ann. Rev. Sociol.* **43**, 379–404 (2017).
38. E. A. Smith *et al.*, Premodern systems, inheritance, and inequality in premodern societies: Conclusions. *Curr. Anthropol.* **51**, 85–94 (2010).
39. M. K. Shenk *et al.*, Intergenerational wealth transmission among agriculturalists. *Curr. Anthropol.* **51**, 65–83 (2010).
40. R. E. Dwyer, The MacMansionization of America? Income stratification and the standard of living in housing 1960–2000. *Res. Soc. Stratif. Mobil.* **27**, 285–300 (2009).
41. C. Tilly, Relational studies of inequality. *Comtemp. Sociol.* **29**, 782–785 (2000).
42. J. Beckert, Varieties of wealth: Towards a comparative sociology of wealth inequality. *Socio-Econ. Rev.* **22**, 475–499 (2023), 10.1093/ser/mwad068.
43. D. Z. Chase *et al.*, Mesoamerican urbanism revisited: Environmental change, adaptation, resilience, persistence, and collapse. *Proc. Natl. Acad. Sci. U.S.A.* **120**, e2211558120 (2023).
44. R. H. McGuire, Breaking down cultural complexity: Inequality and heterogeneity. *Adv. Archaeol. Method Theory* **6**, 91–142 (1983).
45. A. S. Z. Chase, A. E. Thompson, J. P. Walden, G. M. Feinman, Understanding and calculating household size, wealth, and inequality in the Maya lowlands. *Ancient Mesoam.* **34**, 1–20 (2023).
46. T. Jackson, The new history of old inequality. *Past Present* **259**, 262–289 (2023).
47. E. R. Crema, M. Fochesato, A. G. Mejía Ramón, J. Munson, S. G. Ortman, Toward multiscalar methods of inequality in archaeology. *Proc. Natl. Acad. Sci. U.S.A.* **122**, e2400700121 (2025).
48. T. A. Kohler *et al.*, World prehistory of wealth inequality. *Proc. Natl. Acad. Sci. U.S.A.* (2024).
49. A. Megill, "'Grand' narrative and the discipline of history" in *A New Philosophy of History*, F. Ankersmit, H. Kellner, Eds. (University of Chicago Press, 1995), pp. 151–173.
50. A. Sherratt, Reviving the grand narrative: Archaeology and long-term change. *Eur. J. Archaeol.* **3**, 1–32 (1995).
51. M. J. Hamilton, R. S. Walker, B. Buchanan, D. S. Sandeford, Scaling human sociopolitical complexity. *PLoS ONE* **15**, e0234615 (2020).
52. T. A. Kohler, D. Bird, R. K. Bocinsky, K. Reese, D. Gillreath-Brown, Wealth inequality in the prehispanic northern US Southwest: From Malthus to Tyche. *Philos. Trans. R. Soc. B* **378**, 20220298 (2023).
53. B. Spooner, Ed., *Population Growth: Anthropological Implications* (MIT Press, 1972).
54. L. F. Fargher *et al.*, Wealth inequality, social stratification, and the built environment in late prehispanic highland Mexico: A comparative analysis with special emphasis on Tlaxcallan. *J. Anthropol. Archaeol.* **58**, 101176 (2020).
55. G. M. Feinman, L. M. Nicholas, "After Monte Albán in the Central Valleys of Oaxaca: A reassessment" in *Beyond Collapse: Archaeological Perspectives on Resilience, Revitalization, and Transformation in Complex Societies*, R. K. Faulseit, Ed. (Southern Illinois University Press, 2016), pp. 43–69.
56. G. M. Feinman, R. K. Faulseit, L. M. Nicholas, "Assessing wealth inequality in the pre-Hispanic Valley of Oaxaca: Comparative implications" in *Ten Thousand Years of Inequality: The Archaeology of Wealth Differences*, T. A. Kohler, M. E. Smith, Eds. (University of Arizona Press, 2018), pp. 262–288.
57. R. C. Allen, The Neolithic Revolution in the Middle East: A survey and speculation article for the Economic History Review. *Econ. Hist. Rev.* (2024), 10.1111/ehr.13307.
58. C. A. Tisdell, S. Svizzero, The agricultural evolution: Childe's theory of economic development as outlined in Man Makes Himself and contemporary economic theories. *Hist. Econ. Rev.* **71**, 55–72 (2018).
59. T. E. Emerson, K. M. Hedman, M. L. Simon, M. A. Fort, K. E. Witt, Isotopic confirmation of the timing and intensity of maize cultivation in greater Cahokia. *Am. Antiq.* **85**, 241–262 (2020).
60. R. K. Merton, *Social Theory and Social Structure* (Free Press, 1968).
61. M. E. Smith, Empirical urban theory for archaeologists. *J. Archaeol. Method Theory* **18**, 167–192 (2011).
62. M. O'Sullivan, Constructing a big history of inequality. *Hist. Compass* **20**, e12719 (2022).
63. T. Piketty, *Capital and Ideology* (Harvard University Press, 2020).
64. D. Acemoglu, J. Robinson, Non-modernization: Power-culture trajectories and the dynamics of political institutions. *Annu. Rev. Polit. Sci.* **25**, 323–339 (2022).
65. J. Birch, Premodern confederacies: Balancing strategic collective action and local autonomy. *Front. Polit. Sci.* **4**, 807239 (2022).
66. K. Scheve, D. Stasavage, Wealth inequality and democracy. *Annu. Rev. Polit. Sci.* **20**, 451–468 (2017).
67. M. Singh, L. Glowacki, Human social organization during the Late Pleistocene: Beyond the nomadic egalitarian model. *Evol. Hum. Behav.* **43**, 418–431 (2022).
68. R. E. Blanton, G. M. Feinman, S. A. Kowalewski, L. F. Fargher, The fiscal economy of good government: Past and present. *Curr. Anthropol.* **62**, 77–100 (2021).

69. Z. Qureshi, *Rising Inequality: A Major Issue in Our Times* (Brookings, 2023), https://www.brookings.edu/articles/rising-inequality-a-major-issue-of-our-time/.
70. M. Bevir, *Governance: A Very Short Introduction* (Oxford University Press, 2012).
71. D. M. Carballo, G. M. Feinman, A. López Corral, Mesoamerican urbanism: Indigenous institutions, infrastructure, and resilience. *Urban Stud.* (2022), 10.117700420980221105418.
72. A. Bogaard *et al.*, Labor, land and the global dynamics of economic inequality. *Proc. Natl. Acad. Sci. U.S.A.* **122**, e2400694122 (2025).
73. R. Blanton, L. Fargher, *Collective Action in the Formation of Pre-modern States* (Springer, 2008).
74. P. Bump, The newly important political axis: Democracy vs. autocracy. *Washington Post*, 18 March 2022.
75. G. M. Feinman, D. M. Carballo, Collaborative and competitive strategies in the variability and resiliency of large-scale societies in Mesoamerica. *Econ. Anthropol.* **5**, 7–19 (2018).
76. G. M. Feinman, "The emergence of social complexity: Why more than population size matters" in *Cooperation and Collective Action: Archaeological Perspectives*, D. M. Carballo, Ed. (University Press of Colorado, 2013), pp. 35–56.
77. L. F. Fargher *et al.*, Tlaxcallan: The archaeology of an ancient republic in the New World. *Antiquity* **85**, 172–186 (2011).
78. G. M. Feinman, L. M. Nicholas, "Framing inequality in ancient civilizations" in *Poverty and Inequality in Early Civilizations*, R. Bussmann, T. Helms, Eds. (Verlag Dr. Rudolf Habelt GmbH, 2020), pp. 107–117.
79. A. S. Green, Killing the priest-king: Addressing egalitarianism in the Indus civilization. *J. Archaeol. Res.* **29**, 153–202 (2021).
80. I. Morris, Economic growth in ancient Greece. *J. Inst. Theor. Econ.* **160**, 709–742 (2004).
81. A. E. Thompson, G. M. Feinman, M. Lemly, K. M. Prufer, Inequality, networks, and the financing of Maya political power. *J. Archaeol. Sci.* **133**, 105441 (2021).
82. D. Hosler, *The Sounds and Colors of Power* (MIT Press, 1994).
83. G. M. Feinman, J. E. Neitzel, The social dynamics of settling down. *J. Anthropol. Archaeol.* **69**, 101468 (2023).
84. A. Link, Beasts of burden, trade, and hierarchy: The long shadow of domestication (BGPE Discussion Paper No. 224, 2023), ISSN 1863–5733.
85. G. M. Feinman, Taxation: A vantage on the reframing of the economic past. *Cliodynamics* **13**, 1–7 (2022), 10.21237/C7clio13056526.
86. M. T. Larsen, *Ancient Kanesh: A Merchant Colony in Bronze Age Anatolia* (Cambridge University Press, 2015).
87. G. M. Feinman, D. M. Carballo, Communication, computation, and governance: A multiscalar vantage on the prehispanic Mesoamerican world. *J. Soc. Comput.* **3**, 91–118 (2022).
88. G. M. Feinman, L. M. Nicholas, "Framing the rise and variability of past complex societies" in *Alternative Pathways to Complexity: A Collection of Essays on Architecture, Economics, Power, and Cross-cultural Analysis in Honor of Richard E. Blanton*, L. F. Fargher, V. Y. Heredia Espinoza, Eds. (University Press of Colorado, 2016), pp. 271–289.
89. T. Piketty, Capital, inequality, and power. *HAU: J. Ethnogr. Theory* **5**, 517–527 (2015).
90. T. Piketty, Putting distribution back at the center of economies: Reflections on "Capital in the twenty-first century". *J. Econ. Perspect.* **29**, 67–88 (2015).
91. E. Ostrom, Beyond markets and states Polycentric governance of complex economic systems. *Am. Econ. Rev.* 100, 641–672 (2010).
92. M. Park, E. Leahey, R. J. Funk, Papers and patents are becoming less disruptive over time. *Nature* **613**, 138–144 (2023).
93. S. Connolly, D. O'Reilly, M. Rosato, House value as an indicator of cumulative wealth is strongly related to morbidity and mortality risk in older people: A census-based cross-sectional and longitudinal study. *J. Epidemiol.* **39**, 383–391 (2010).
94. P. de Zwart, The global history of inequality. *Int. Rev. Soc. Hist.* **64**, 309–323 (2019).
95. B. Milanovic, P. H. Lindert, J. G. Williamson, Pre-industrial inequality. *Econ. J.* **121**, 255–271 (2010).
96. D. Graeber, D. Wengrow, *The Dawn of Everything: A New History of Humanity* (Farrar, Straus, and Giroux, 2021).
97. G. M. Feinman, Rethinking premodern governance: Passing the torch. *Soc. Evol. Hist.* **22**, 4–17 (2023).
98. P. Manning, Inequality: Historical and disciplinary perspectives. *Am. Hist. Rev.* **122**, 1–22 (2017).
99. P. H. Lindert, J. G. Williamson, Inequality in the very long run: Malthus, Kuznets, and Ohlin. *Cliometrica* **11**, 289–295 (2017).
100. S. G. Ortman, The Global Dynamics of Inequality (GINI) Project. tDAR. https://core.tdar.org/project/496853/the-global-dynamics-of-inequality-gini-project. Deposited 1 May 2024.