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ABSTRACT

Sufficiently shared values lead to a common purpose that constitutes an organization, and this choice of constitutive purpose itself constrains constitutional choice. But collective action costs increase in an organization's members' heterogeneity of governance preferences, and are also partly determined by an organization's constitutive purpose. Given that these costs of collective action are never zero, this makes mechanisms to accommodate conflict optimally present in impersonal governance contexts above a certain scale. Because of this ubiquitous institutional need, a variety of institutional mechanisms to accommodate heterogeneity of governance preferences have emerged in formal organizational governance. These mechanisms can be separated into ex-ante and ex-post solutions that respectively mitigate and resolve conflict among heterogeneous governance preferences. Mitigating and resolving future conflict are therefore both design priorities for collective action organizations, and the animating purposes of decentralized autonomous organizations (DAOs) present both conflict accommodation priorities with positive probability. Just as shared norms and accommodation of future conflict are interlinked and integral inputs to resilient organizational constitutional design in general, they are essential protocol design considerations for DAO designers as the complexity and magnitude of these organizations' purposes increases alongside their user bases and assets managed.

I. INTRODUCTION

Organizing collectively involves the constitution of the organization, although the complexity of this constitution varies considerably as a function of the organization in question, as well as its chosen purpose. Nonetheless, organizational constitution is predicated on a sufficiently shared set of values, or agreement as to the collective action's underlying purpose. The constitution of decentralized autonomous organizations (DAOs), whether fully or partially governed by smart contracts delineated in comparatively rigid protocol, implicates a specific set of shared governance preferences. Yet for many organizational purposes, it is unclear whether this form of decentralized governance will dominate compared to traditional forms of private governance, especially in contexts where exit costs for users and consumers is low. Nonetheless, the constitutive potential of the values animating DAOs may be more than a narrow economic organizational analysis would suggest, because of the extent to which DAO members tend to intrinsically value a more decentralized form of governance, and the likelihood for institutional innovation in the organizational form.

Regardless of the set of shared values animating a constitution, though, such a characterization of organizational constitution derivative of shared community values is inexcusably rosy absent consideration of collective action's inevitable structural costs. Collective action at scale poses mechanical representative losses to the individual preferences of organization members. The questions of central relevance to governance of impersonal organizations are those surrounding disagreement or dispute among members. This means the extent to which a given organization's governance can accommodate heterogeneity in members' governance

preferences is also an integral input to that organization's resilience. Despite sufficient agreement being a precondition to voluntary organizational constitution, that same organization's survival will also depend on how well it mitigates and resolves disagreement.

Therefore, even if an organization assembles under the guise of well-understood and widely shared values, and continues to attract like-minded members, that organization cannot avoid the reality that its mechanisms for resolving disagreement as to how to proceed in the face of changed circumstances (or underlying membership demographics) are essential to resilient governance. Oddly, then, shared values and the inevitability of disagreement are the yin and yang of voluntarily constituting organizations. This makes a more rigorous understanding of these areas of constitutional and organizational theory (and their vexing underlying tradeoffs!) important for DAO designers. This analysis explores how shared norms and conflict remediation are interlinked and integral inputs to resilient protocol design for DAOs.

Section II examines in the context of DAOs how sufficiently shared values lead to a common purpose that constitutes an organization, and how this choice of constitutive purpose itself constrains constitutional choice. Section III proceeds by identifying the well-understood costs to collective action that increase in members' heterogeneity of governance preferences, and are partly determined by an organization's constitutive purpose. But given that these costs of collective action are never zero, this means that mechanisms to accommodate conflict are optimally present to some degree in impersonal governance contexts above a certain scale. Section IV therefore proceeds to describe a variety of institutional mechanisms that accommodate heterogeneity of governance preferences within a given organization. Because public governance entails the long-term rule-based ordering of heterogeneous groups with many competing demands over the many spheres of government authority, many of these institutional mechanisms are drawn from the study of public constitutional governance. Given the extent to which DAOs' animating purpose can be likened to more democratic control of an organization in pursuit of a given purpose, it is likely that some of these emergent institutional remedies to the long-standing challenge of disagreement will appear in the context of DAO governance. This analytical narrative results in the conclusion that while the nature of ex-ante institutional solutions to conflict will be more tractable to protocol-based constitution, the need for ex-post institutional solutions is nonetheless non-zero in the case of DAOs with a sufficiently complex or large-scale constitutive purpose. Mitigating and resolving future conflict are therefore both design priorities for collective action organizations, and DAOs' animating purposes present both priorities with positive probability.

II. THE SHARED PURPOSE(S) ANIMATING DAOS' COLLECTIVE ACTION

How DAOs (Wright 2021) prove resilient to shocks and increases in use or membership is a direct function of their constitutive governance choices, both initially and in an ongoing sense. The extent to which a given community that constitutes an organization has shared norms is an input to that constitutional structure itself, as well as the ability of that organization to weather future shocks (Alston Working Paper 2022b). This makes shared norms of central relevance to understanding DAOs constitutive properties. However, the insight that

shared norms are central to organizational resilience often conflates three fundamentally distinct channels by which norms are an input to the success of a given organization. The first is the emergent nature of institutions from norms when sufficiently shared within a social group whose numbers (interactional intensity/complexity) make the definition of institutions warranted. This makes norms a precondition to institutional definition, and of central importance to the initial design choices that lead to constituting and launching a DAO (Alston Working Paper 2022b).[1] In competitive governance contexts, a second condition surrounding scaling and underlying norms (i.e., extent of shared values) presents itself. The extent to which a given organization can attract and *retain* members of sufficiently shared values is partly defined by other organizations competing to produce similar to identical outputs (Shy 1995). Third, individual organization members' norms are at least partially endogenous to the operation of an organization itself, such that a third channel by which norms can be aligned for optimal organizational resilience surrounds the way in which well-governed organizations can inculcate norms of central importance to that organization's constitution.[2]

Finally, and perhaps most vexingly of all, is the fit between the mode of governance that most suits the shared values of an organization's members, and that same organization's intended purpose. Many multinational private organizations (corporations or no) cannot be organized according to perfect democratic governance – the nature of what they're trying to do individually and competitively means some modicum of concentration of authority (and division of distinct sub-authority) strictly dominates total decentralization due to the comparative cost-savings (efficiency) of delegated/representative decision-making (Buchanan and Tullock 1962; Olson 1965; Thompson 1967; O'Toole and Meier 1999). In addition to the deeply endogenous triumvirate of shared norms among organization members and optimal organizational performance already described, the chosen purpose of an organization likely defines its optimal governance structure on many, if not most margins (Alston et al 2021).

This makes the output of an organization (or animating purpose for collective action) a central determinant of distinct aspects of collective action. The costs of collective action themselves limit the scale and scope of activities a given organization can undertake – even absent intervention of antitrust regulators, a single organization devoted to the production of all outputs currently created by formal collective action in our society would topple under its own bureaucratic inefficiencies (Coase 1937). In a world of many organizations providing many outputs through pursuit of their distinct purposes, choice of purpose simultaneously determines the extant set of organizations competing for members (or customers in the case of private revenue-seeking firms) (Shy 1995; Belleflamme and Peitz 2015). This has structural implications for the governance choices of any organization competing for a similar to identical output. Efficiencies obtained in the governance choices of one's competitors should ideally be mimicked, because past a certain point of unnecessary costs to collective action, one organization will ultimately fail compared to its competitors. To the extent that certain member or customer classes care more about governance features, such as conformity with ESG principles (Pedersen et al 2021), then organizations who clearly display these features can charge a premium for them. This is the component of governance that I describe as having intrinsic value to organization members. If all

DAO users have normative preferences for more decentralized or democratic governance, this suggests some measurably higher governance costs that a competitive market will sustain, just as organic foods carry a higher price tag than non-organic varieties.

While many users of stablecoins prefer DAI because of its distributed and transparent governance relative to other stablecoins, DAI's experience suggests an upper limit on its ability to avoid centralized intermediation with respect to the issuance of its reference assets due to what producing a stablecoin functionally means, which is in part determined by competing alternatives. DAI was initially fully backed with cryptocurrency (obtainable through derivative instruments), but the risks associated with departing fully from US-dollar-linked digital currency instruments as reference assets were made clear when the price of ETH dropped precipitously, provoking a crisis of confidence in the redeemability of DAI for its reference assets intended to provide stable convertibility (Klages-Mundt and Minca 2021). In response, the voting community in the DAO governing DAI decided that 60% of the token's backing would be held in USDC, another highly used stablecoin (MakerDAO 2020). This choice in response to market volatility that more decentralized cryptocurrency backing entailed poses the recursive question of what USDC's backing was, though, which is more closely linked to US-dollar-denominated financial instruments than advocates of decentralized finance would prefer. Posing the ultimate functional futility in chasing a recursive problem, the organization governing DAI has reduced its USDC holding to below 49% in response to criticism but is also contemplating securing ongoing financing through a collaboration with one of France's largest investment banks (Société Générale-Forge 2021).

This continued adjustment of reference assets with respect to consumer demand and structural financial realities surrounding what the market considers low-risk assets at any point in time (as reflected through these assets' liquidity) displays the tension between shared values defining an organization's purpose and the extant alternatives available for that purpose. At some point of choice of level of cryptocurrency backing for a given stablecoin, this would result in significantly less usage compared to stablecoins backed by more liquid financial instruments (Kozhan and Viswanath-Natraj 2021). Despite backing with assets that are less centralized being more consistent with a stablecoin issued through truly decentralized governance, the availability of stablecoins backed by highly liquid (and therefore stable) assets constrains the production choices of any one organization issuing stablecoins. In the case of stablecoins' choice of reference assets, these are inextricable from governance choices themselves. While a digital token backed by the future performance of cryptocurrencies is a more decentralized instrument than a token backed by the future performance of US treasuries, the former is more akin to a cryptocurrency derivative, something which is ill-suited to provide price stability compared to more traditional liquid financial instruments (and their eponymous transactive benefits).

Therefore, the potential value of new organizational forms cannot be understood without a firm grounding in the efficiencies (and equities) that existing legacy systems have provided. The benefits of traditional organizational hierarchies can be summarized as attracting specialized individuals and concentrating their incentives to make value-adding decisions on the part of the larger whole. Furthermore, creating an

organizational shell within which people can coordinate their productive activity has benefits in terms of reduction of transaction costs (Coase 1937) and incentive problems associated with investment (Williamson 1985; 2003). It is likely that a subset of these benefits are why non-profits tend to have centralized decision-making hierarchies that mirror those of profit-seeking firms. Another major benefit to delegated decision-making is an implied condition of a small subset of individuals exerting concentrated decision-making on behalf of a larger whole – most organization "members" (including shareholders/donors) do not have to engage in the day-to-day processes of the organization's production (whether revenue-generating or no). Indeed, even in shareholder voting processes, the level of direct engagement is typically quite low, where most more atomistic shareholders let concentrated incentives on the part of other shareholders substitute for their own voting (Appel et al 2019).

This is a significant institutional design challenge that DAOs will have to confront and many DAO voting rules including minimum participation requirements to validate a particular vote. This is a direct testament to the countervailing benefits to most organization members being able to disengage from these types of governance or operating decisions. Thus, one overarching structural weakness to which DAOs are subject is those of the costs associated with democratization of decision-making among organization members. In many contexts, this low engagement is rational – it is inefficient to vote on the operating and governance decisions of every organization against which someone has a claim against future returns or output.

These benefits to traditional forms of collective action are the structural reason for their existence and persistence to date.[3] Put more simply, we can achieve more when we work together through large impersonal organizations. Nonetheless, these existing systems of private governance have their own serious drawbacks, which makes the narrative thus far unfair to DAOs' potential. This is for two reasons: intrinsic (ideological) valuations and the possibility for ongoing institutional innovation. These also provide the basis for identification of the set of core values likely to create a community constitution whose formalization (and ongoing gap filling role in cases of Knightian uncertainty) is one that is a direct input to resilience, as a function of the internal political economy that this constitution reflects and thus shapes in an ongoing sense. In a context of organizational choice (as is the case for most distributed blockchain network users), the extent to which the organization reflects any given user's core values is a direct input to that organization's ongoing success (Alston Working Paper 2022a). But the very fact that collective action is costly, creates its internal political economy likely to define margins of gain and loss with respect to every collective decision (Levmore 1999; Shavell 2008), and needs to address uncertain future outcomes that entail dispute as to how to respond, means the ability to resolve disputes in a way that reflects majoritarian values while respecting the rights of minority interests is a core input to resilience.

First, resilient, functional DAOs are ones that are likely to develop a stable and engaged set of members. For many organizational purposes out there, the level of decentralization that most DAO designers envision may never be efficient (because of the comparative efficiency of delegated representative decision-making in

facilitating collective action). Nonetheless, what is more likely is that there are contexts where this decision-making structure is comparatively efficient (Hasan and de Filippi 2021). What is clear is that some people currently strongly prefer this organizational structure, despite it being more costly on important margins. A cynic would characterize current interest in DAOs as either speculative (users don't care about the blockchain) or misinformed (users think the structure is more efficient but it never will be). Such a dim view rules out the possibility that there are contexts of organizational output where more distributed governance offers net comparative gains. Regarding non-profits, one argument surrounds low-denomination donations being facilitated through the transparency (and therefore commitment credibility) of such a structure (Groshoff 2014). Nevertheless, it is not yet clear that blockchains strictly dominate centralized provision of crowdfunding services, as the current success of Kickstarter and Gofundme might indicate. Another non-profit DAO argument surrounds cases (especially internationally) where transparency and cross-border transaction costs currently hinder or prevent entirely the existence of a philanthropic model. In theory, a distributed network overcomes a subset of these problems (Howson 2020), although such a model would still rely integrally on credible local partners and does not get around the problem of rational inattention on the part of donors.

There's a problem with the narrative thus far, though. The Chinese Communist Party could argue the United States government's constitution overvalues the cumbersome and incremental nature of a quasi-democratic republic, given the costs this poses in terms of administrative effectiveness.[4] The communist argument here can also be read more cynically to emphasize the counterargument that components of governance structures can have intrinsic value apart from the efficiency they provide with respect to output. When an organization's fundamental nexus of interaction surrounds the currently-agreed-upon allocation of future gains and losses in defined units of economic account among contributing parties today (this characterization excludes BTC, ETH, etc because they are more like commodities exchange networks), this is one where centralized governance still dominates in practice in the forms that incorporated organizations take around the world (Lamoreaux and Rosenthal 2005). But for a long time, this structure dominated in part because there was no viable alternative given extant technological constraints on how individuals mechanically engage in the processes of collective decision making - assemble decision-makers in the same office to reduce communication costs, and adopt transparency-enhancing documentation and accounting processes where possible to scale in terms of available capital through more accountable and efficient governance. But what if enough well-capitalized individuals care about the decentralization (and transparency) of decision-making in organizational governance for its own sake, just as many cherish democratic constitutionalism for reasons that outstrip strictly calculating organizational output as a function of its input costs? What remains to be seen is if a large subset of private organizations out there were organized into traditional centralized firms simply due to technological constraints that are no longer binding. But even if one disagrees with the most optimistic takes on the transformative potential of distributed digital governance, the fact that these takes correspond to a large set of individuals' intrinsic (ideological) valuation of these processes is undeniable (De Filippi and Lavayssière 2020).

If there is a non-trivial subset of economic actors who intrinsically value this distributed form of organizational governance, this has two implications for DAOs' success. First, it strictly lowers the net costs of DAOs compared to what a narrower economic organizational analysis might suggest. Second, it provides an additional criterion for a DAO's comparative organizational resilience – they need to attract individuals who intrinsically value decentralized governance because these individuals' intrinsic valuation also lowers the likelihood of governance-destroying inattention on the part of too many DAO members. Therefore, the costs are lower to DAO organization than a strictly economic calculus would suggest due to the tendency for those engaged in these communities to intrinsically value the process itself, and that the sustainability of a DAO's governance will hinge on how well it can attract members who have this intrinsic motivation (alongside economic or philanthropic alignment with the DAOs purpose). This intrinsic valuation for DAO governance means that a subset of DAO projects will succeed in overcoming the relative inefficiencies of decentralized governance noted thus far.[5]

But the sober value investor would rightly note that the market characterized thus far is limited by the intrinsic value that this governance structure provides as compared to its economic inefficiencies with respect to more predominating governance alternatives. This is in a static comparative sense, though. The United States spent well over a century ironing out the broadest brushstrokes of corporate law before converging on the economic-welfare-maximizing alternative of open access to this form under an impersonally enforced set of conditions.[6] It is thus also highly unlikely that the early forms of these new distributed organizations display the optimal design features they may eventually converge upon through innovation governed by competition. Therefore, there are dynamic reasons to be cautiously optimistic about the institutional development that is likely to occur as DAOs emerge, compete for members, occasionally spectacularly fail, and eventually converge upon efficient design features that enable them to capture private and philanthropic market share by finding a niche where this form of governance is more efficient, and/or is able to attract a subset of members (whether investors or donors) who are willing to pay a premium for this specific form of governance. This is the second way in which too narrow of a focus on DAOs current incentive problems may not fully characterize their net present value in terms of likely innovation within their protocol design itself. But this makes continued resilience, and hence adaptability, of governance an integral component to the future success of these distributed organizations.

Given thousands of competing cryptocurrencies, there is surely a confusion of purposes for blockchain networks. Setting aside the problematic question that many networks lack a differentiating purpose from one another (let alone a clearly articulated one), there is still a female chicken, male chicken, and egg problem with respect to the trio of norms, institutions and organizational success questions posed above. From an ideal theoretical perspective of voluntary association, the Bitcoin network should serve people who fundamentally value its governance structure. To be able to compete with comparatively decentralized alternatives, to survive the Bitcoin network needs to attract users who value distributed governance compared to competing networks. But attracting new users presents two alternatives for new users who do not fully share the set of constitutive

values that have already proven to attract a sufficient set of users and participants to the network: (i) convince new users of the truth (or individual benefit) of the network's constitutive beliefs; or (ii) accommodate greater user heterogeneity through the adaptiveness of the network's institutions.

The first condition delimits the viable scale of the Bitcoin network. But positing that there are users out there who would use the network if the costs of access were sufficiently low (users who already share the underlying values of the organization/network), the question becomes how to attract and continue to provide competitive benefits to all members (users). A third question surrounds the extent to which the ongoing activity of the network can shift potential and actual users' values toward those evinced by a dynamically sustainable predominance of network members. Constituting an early set of highly like-minded members may be simpler than attracting similarly like-minded members from within a much larger group (especially when competing with other organizations to do so), and this latter is still far easier than shifting potential members' values in an ongoing sense in order to attract them (let alone maintaining a shifting coalition of minimally shared yet highly pluralistic values that becomes more likely as a group scales, a question to which the following section is directly devoted). This need to dynamically maintain constitutive resilience of shared values necessarily involves resolving areas where values, or governance preferences, are not shared, because perfect unanimity is not only an unattainable ideal, but one that least implicates governance questions (Alston Working Paper 2022b). It is this unavoidable countervailing tendency to constituted organizational action, dealing with areas of heterogeneous governance preferences (despite an underlying basis of shared agreement as to organizational purpose) with which the next section grapples.

III. REPRESENTATIVE LOSSES TO COLLECTIVE ACTION MAKING CONFLICT INEVITABLE

The focus thus far on shared constitutive values can paint an overly unifying vision of how voluntary community governance occurs and proceeds. This is unintentional. There are always some measure of representative losses from what an individual would prefer compared to the outcome of the collective decision-making process. These representative losses are inevitable to collective action but pose an ongoing structural challenge to organizations – how to resolve disagreements and disputes among members. Protocol-based governance means these disputes will enjoy a large degree of knowability ex-ante, unlike the uncertainty of many real-world governance processes which must countenance all human action in a messy, non-ergodic world. But protocol-based governance is itself incomplete in the face of scalar pressures surrounding increasing use or complexity of transactional processes (Alston Working Paper 2022b). This leads to the need to update protocol to respond to unforeseen circumstances, but also to make relatively minor adjustments to processes as bugs are revealed or improvements are identified. The need for ongoing governance of adjustments as significant as the Ethereum network's response to the DAO hack (DuPont 2017), and the minor network improvements that are much more routine span a much larger continuum of governance choice than these two dichotomous endpoints would suggest. Is adjustment of network process to accommodate new

classes of users a minor process improvement? Is it an urgent unforeseen circumstance? My analysis in this section suggests that it is neither, and is instead a predictable consequence of the inescapably dynamic nature of governance. The need to accommodate changing user demands directly implicates an internal political economy defined by an organization's initial constitutional margins, but each potential collective decision implicates the internal balance of rents and authority relevant to each users' preferences in different ways. Moreover, in private organizational contexts, such as those of DAOs, the ability of competing networks (organizations) to more effectively achieve the demand of different subgroups of user also influences the collective choice dilemmas that each organization faces in practice.

Organizing at impersonal scale to achieve a given purpose animating collective action entails some measure of concentration of authority and losses to individual autonomy. The first means by which impersonal organizations create losses surrounds delegated decision-making, in which a subset of individuals exercise collective decision-making on behalf of a much larger set of individuals (Buchanan and Tullock 1962). This leads to a need for checks on the special authority exercised by these specially empowered decisionmakers generally, often deemed constitutional constraints in public governance contexts. But with respect to within-group heterogeneity, these losses are greater the more the governance preferences of those represented by a single decision-maker diverge. While proportional representation systems get around the representative problem posed by single member geographic electoral districts, the upper limit of representative parties given parliamentary seats mapped to population also constrains representation. Given their link to democratic ordering, these are the two forms of delegated decision-making that are least costly in terms of representation – as a decision-making centralizes, representative losses to autonomy increase, and more so as the heterogeneity of governance preferences increases within the represented organizational subgroup (Alston Working Paper 2022b). These mechanical costs to collective action mean that representative losses are present in all organizations, but also that the constitutive choice of collective action institutions greatly defines the scope and form of disagreement over representative losses that will be present in an organization (Buchanan and Tullock 1962).

The previous paragraph takes governance preferences as relatively fixed with respect to the decision rules of a given organization – different levels of heterogeneous governance preferences create predictable variance in representative losses. However, the margins of each organization's constitutive institutional choices themselves define an internal political economy that partly defines the scope and substance of disagreement among organization members in the future. Conditioned on the costs of exit (Hirschman 1970) and constitutional change itself (Riker 1984), decisions of importance will necessarily create disagreement or conflict among members. In cases of constitutional ordering, disagreements emerge as a function of which aspects of the constitution should be implemented prior to others (Alston 2018). In even more structural cases, the provenance of some rights will conflict with others, typically requiring judicial reconciliation in order to clarify which rights should carry the day in cases of direct conflict (Posner 2008; Henkin 2009). The study of legal transitions identifies how any institutional change tends to create winners and losers compared to the status

quo, a direct testament to how the outcome of any given collective choice process will be a subject of disagreement in part due to the way in which the change affects the balance of interests among organization members. Finally, from a purely theoretical perspective, the more agreement among members about what a collective response should be to a given need for institutional change, the less such a response needs to be subject to consideration within the formal governance processes of the organization; in the case of total unanimity about how to proceed, resolution through formal collective action becomes at best a formality, if required to take place at all.

The ability for expression of heterogeneous governance values increases predictably according to increases in the scope or magnitude of organizational output. As the scope of an organization's output increases, it requires more specialization to achieve its objectives, which tends to result in greater benefits to deconcentration of decision rights to specialist organization members within the organization hierarchy (Graham et al 2015; Lo et al 2016; Aghion et al 2017). As an organization scales in its intended output (or influence), it tends to require greater numbers of individuals to engage in production, and subunits to get this production to a greater number of consumers. In each case, deconcentration results mechanically due to the scope and scale of the organization's chosen purpose. Organizational contexts where decision rights are relatively deconcentrated are ones where coordination costs predominate, due to the relative inability of administrators to command outcomes. This makes such organizations more "democratic" than private firms where executive authority is tightly concentrated. This stands as but one example of how expressed heterogeneity of governance preferences is partly determined by a given organization's choice of purpose. Notably, DAOs' constitutive choices tend to involve forms of democratic input as a function of network activity or staked value, which makes them necessarily reflect a form of constitutional ordering more so than traditional firm governance. This means DAOs will be subject to internal collective choice dilemmas at a greater level than the centralized autocratic decision-making that is associated with private economic organizations. More generally, an organization's chosen purpose, through reifying a constitutive set of shared values, defining an internal political economy, and a set of competing organizations which members can plausibly join, is a principal determinant of the heterogeneity of member's preferences with respect to collective action.[7]

As noted previously, competitive governance forces delimit the scope of governance choice available to any organization. If an organization with a similar purpose is observably more effective at achieving that purpose, it is likely to attract members from competing organizations as a function of the superior collective action outcomes that the competitively superior organization offers. This creates another source of collective choice, and therefore internal disagreement, for a given organization subject to competition. While the numerous ways in which competitive governance forces shape outcomes for any given organization is outside the scope of this analysis,[8] it is important to mention that these forces are an example of outcomes external to the collective choice decisions of an organization that can nonetheless create the need for an internal response. Additional forces external to an organization that can demand internal collective action include those of the laws and regulations of society, whose changes often require a response from a given organization. Alongside

uncertainty more generally (which includes changes over time in the values and preferences of organization members), competitive and public institutional governance forces often require a response from an organization's collective decision-making apparatus. This response then creates margins of disagreement as a function of the heterogeneity of members' governance preferences, which include the ways in which their respective interests are affected by this potential response.

Even though collective action poses representative losses to all members, these losses increase as heterogeneity of governance preferences increases within a given organization, because of the mechanical way in which heterogeneity of governance preferences make collective action more costly. A chosen purpose for an organization greatly defines an internal plurality of interests whose gains and losses to any institutional change in turn partially determine the scope of institutional change that is possible. Similarly, like-minded individuals can disagree in good faith about how to proceed in cases of uncertainty, and the more the unforeseen event is unlike anything that came previously, the more this disagreement is likely.[9] A plurality of visions as to how to proceed are thus themselves a critical source of disagreement for governance of large impersonal organizations. Finally, competitor's governance and production choices themselves constrain the choices of any given organization, such that a chosen purpose (through determining competitive substitute purposes) is also choosing a set of constraints of governance decisions that are possible to resolve political economic and uncertainty-related disputes within a given organization. This makes institutions to accommodate disagreement as necessary for all collective action organizations at impersonal scale, institutions whose value increases given divergence in shared values within a particular organization.

As Section II emphasizes in the context of DAOs, sufficiency of shared values (or agreement on organizational purpose) is a precondition to organizational definition. But given the costs of impersonal collective action itself, disagreement among members about the process and substance of collective action are inevitable. These costs are an increasing function of the heterogeneity of governance preferences of organization members.[10] Importantly, though, the costs of collective action that I have enumerated are present across all organizations and vary in predictable ways as a function of the internal political economy created by an organization's constitutive choices, as well as in response to forces external to the organization itself (like competition and changing circumstances). This ubiquitous need for institutional mechanisms to accommodate disagreement over collective action means numerous examples exist from public and private governance contexts that provide a menu of options for organizational designers in the unique context of decentralized autonomous organizations. This menu of options is accordingly explored in the next section, coupled with discussion of what these canonical institutional solutions might look like in the context of DAO governance specifically.

IV. INSTITUTIONAL MECHANISMS TO MITIGATE AND RESOLVE CONFLICT

Organizations vary in terms of the extent to which they need to countenance disagreement among members, as well as the specific forms of disagreement that the specific balance of governance preferences within any organization might create. This means a wide range of institutional solutions to mitigate or resolve

disagreement have emerged in governance systems around the world. Notably, most of the examples are taken from public governance contexts. This is derivative of the structural distinction between private and public organizations surrounding the ability of individuals to exit – in contexts where exit costs are low, a more efficient governance outcome tends to involve voluntary individual exit coupled with highly centralized decision-making. But the extent to which centralized decision-making for private organizations is still efficient is an open question given technological change surrounding information transparency and distributed governance possibilities facilitated by blockchain – indeed, the belief that more "democratic" (or equitable) means of private organizational governance is now possible is an animating set of principles (or shared values) likely to prove constitutive for many DAOs, as section II emphasizes. This means public institutional solutions to the challenges of pluralism[11] are likely to be relevant for DAO designers. Indeed, the prevalence of these institutional solutions in public sector contexts is a direct testament to their comparative importance in contexts where citizens must "get along" despite deep differences in their underlying governance preferences.[12] DAOs' constitutive choices tend to be more decentralized by design, which makes the need for these institutions that mitigate or resolve disagreements increase in importance relative to more centralized governance contexts that have predominated in private organizations to date.

More practically, these institutional mechanisms can be separated into ex-ante constitutive design choices that mitigate the likelihood of disagreement, and ex-post corrective mechanisms that seek to resolve disagreement as and where it occurs. Protocol-based governance is necessarily that of mechanism design surrounding ex-ante definition of the action space of members of a given network. This makes the mitigation mechanisms discussed first of principal importance for DAO designers in the principal phases of designing and constituting a DAO. This ex-ante stance creates an understandable tendency to strive toward complete definition of interactional processes within a given network – if smart protocol designers can think through all relevant downstream contingencies, the need for ex-post reconciliation falls to zero. The goal of completely defining the action space of organization members is almost baked into the choice to organize around a distributed blockchain network; credible delineation of the action space of network participants and users is necessary to convincing any given individual that an incentive compatible equilibrium has been achieved with respect to the performance of network processes. Yet as the introductory discussion in Section II emphasizes, the rules defined in network protocols are themselves incomplete in the face of changing circumstances, just as more traditional institutions of governance require mechanisms for ex-post adaptation. This means that despite the desirability of automatic governance in many contexts, institutions for resolving disputes after the fact are likely an important design component to be considered, especially as the complexity and magnitude of interactions within a given organization increases.

A. Minimizing the Shared Values Precedent to Constitution and Collective Action

As emphasized in the preceding sections, an organization's chosen purpose and its constitutive choices delineating collective action in pursuit of that purpose define a specific balance of interests within that

organization. This results in a specific balance of competing governance demands which gives rise to a specific set of conflict-accommodating institutional solutions which vary in terms of the extent to which they ex-ante mitigate this disagreement or resolve this disagreement ex-post. Regarding the prior class of solutions, these can be understood to begin at the earliest stage of organizational development, where sufficiently shared values lead to a common purpose that causes constitution of an organization in the first instance. While a minimum baseline of shared values is a functional prerequisite to institutionalized collective action, this tendency can be taken too far in cases of defining the formal constitution of an organization from this constitutive set of shared values. A constitutional moment for a society is a necessarily fundamental one, where the need to define (or re-define) a nation's fundamental rule set inflames constitutional passions and leads to heightened social discussions and focus on the constitutional institutions that best reflect the shared set of values animating that constitution (Alston et al 2018).

This necessary tendency to identify and reflect upon shared values and animating purpose at the time of organizational constitution carries a weakness with it, though, which is the possibility for entrenching values exceeding those strictly necessary to constitute the organization. This calls to mind the canonical constitutional preamble, stating everything that "We, the People" (purportedly) stood for at the constitutive moment. Constitutionalizing shared values involves entrenching these values at a level of importance for organizational activity that makes them important referentials for shared group purpose in future states. Problematically, though, the extent to which values are shared decreases probabilistically as the set of potentially shared values increases past a given point.[13] This creates a theoretical limit past a set of shared values sufficient to animate organizational purpose where more definition of shared values leads to disagreement costs exceeding the coordinative benefits that constitutionalizing these shared values brings. This suggests that constituted values beyond those strictly necessary to animate the organization's purpose should be avoided to the extent they create greater future collective action costs due to each marginally constituted shared value increasing the probability of future conflict. This is an underappreciated value to minimal constitutional definition and institutional entrenchment of values, even though constituting necessarily entails definition of these shared values in furtherance of a given organization's purpose.

An applied example from constitutional design surrounds how interim constitutions provide a limited set of commitments to which one another's adherence distinct actors within a given political system can collectively observe. In places with sufficient disagreement (or outright conflict) among groups whose adherence to a constitutional order is necessary for its functional survival, an arguable benefit to interim constitutions (and explanation for their institutional emergence around the world) is that these minimalist constitutions create a minimum institutional baseline necessary for coordination, while abstaining from defining the more contentious areas where values are less shared between groups in outright conflict (Ginsburg and Alston 2017). Displaying successful coordination under a narrower set of agreed upon rules can prove to be the foundation for the ultimate definition of a broader set of values, once different groups' commitment credibility can be proven under the "leaner" agreement (Alston et al 2018). Transition provisions within a wholesale constitution

also play a similar role by delineating an immediate set of implementation steps, providing a coordinative basis by which opposing interests within the system can observe the good faith commitment of those whose animating values are most orthogonal or opposing to their own (Alston and Ginsburg 2017). Both these constitutional mechanisms display the more structural theoretical reality that a narrower set of shared commitments can provide more viable coordination than a broader set (that is more likely to result in disagreement due to that very breadth!).

A truly canonical constitutional mechanism further displays how limiting the set of shared values animating collective action can benefit the organizational vehicle constituted in furtherance of that same collective action's purpose. The Bill of Rights delineates spheres of individual autonomy that the democratic will of the collective cannot reach. Even in cases where shared agreement is sufficient to result in a democratic decision, these decisions cannot typically deprive citizens of their life or property. While the ongoing expression of agreement as to the path forward is essential to voluntary collective action at impersonal scale, the will of the majority does not always result in outcomes desirable to individual citizens. This is a restatement of the possibility for disagreement discussed in the preceding section. By carving out areas where collective decisions cannot reach, this reduces the stakes associated with any particular collective decision for those likely to be in the minority of some or all future group decisions. In a general sense, the constitutional institution of rights can be understood as creating firm limitations on the scope and process of collective decision-making (Dixon and Ginsburg 2017), but this at the same time reduces the set of shared values necessary to reaching a decision. If one's life is not on the line in ordinary legislative decisions, then the scope of values these decisions implicate for that individual are necessarily less than the all-encompassing possibility of the organization collectively deciding to kill that individual (or deprive them of their property). By guaranteeing that collective decisions cannot reach certain areas of individual autonomy, this reduces the extent of agreement necessary for collective action to obtain. In practice, though, the assurance of rights is imperfect, and more importantly for this analysis, requires considerable ex-post review by judicial actors to achieve even an imperfect level of rights provenance, an *ex-post* institutional mechanism considered in greater detail at the end of this section.

B. Systems within and alongside systems

Another hallmark constitutional solution to heterogeneity of governance preferences resultant from divergence of shared values surrounds the division of governance authority into overlapping horizontal levels, or parallel vertical systems. The first solution involves the definition of subsidiary units of governance authority within a larger national constitutional order. The design options for decentralization of authority to subsidiary units are too many to enumerate here,[14] but a few of these options emphasize the more general principle of how decentralization within a given system can reduce the scope for disagreement within the larger system. Subsidiary units, frequently called states or provinces, are commonly granted their own competencies within a larger constitutional order, allowing for tailoring of policy questions to variance in local preferences. The existence of subsidiary authorities with their own competencies is emergent as a function of scaling

governance across a more heterogeneous territory and groups of citizens contained therein. To give but one example to emphasize this tendency, coastal and landlocked cities have very different substantive governance needs, at least as pertains to marine pursuits and the economic activity emanating from it. Rather than defining law for all places at a singular centralized level, enabling subsidiary units to define certain areas of governance themselves allows for a level of fit that would otherwise be obviated. The general theory animating this tendency is known as principle of subsidiarity, which is that all else equal, governance emanating from a source of authority closer to the governed is preferable to a more centralized source of that same authority (Bardhan 2002; Enikolopov and Zhuravskaya 2007).

The decision to create subsidiary units of governance authority within a larger singular governance authority also generates a subsequent question of whether to represent these subsidiary units in the decision-making processes of the larger system. In geographically disparate territories where regions have the potential power to choose whether to join the central authority, this leads to the need to guarantee a certain measure of subnational representation on the national level – Switzerland and the United States are two hallmark examples of considerably decentralized constraints on the central authority. The key distinction in representation rules for subsidiary units in democracies surrounds the choice of proportionally representative decision rules for governors as opposed to geographic selection of governors, which reflect distinctions in how interests are territorially dispersed in a given society. The specific balance and concentration of interests that a given governance authority contains directly influences the outcome of distinct representation rules. As vexingly, the choice of representation rule can itself affect the viability of parties within this same system – Duverger's law holds that single member geographic representation decided in first past the post electoral contests converge to a two party system (Riker 1982). But decision rules for representation of subsidiary units in collective decision-making processes themselves partly defining the composition of interests present implies that rule choice can define downstream interests, just as the two-party system greatly defines political discourse in the systems governed by such a choice of electoral rule. In voluntary organizations, this effect can be heightened to the extent interests defined by constitutive choice are entrenched and attract like-minded individuals from competing organization. It is beyond the ability of mechanism designers to predict the entire political economy that constitutive choices will create, but this is not to say that this distinction does not merit consideration. At a minimum, unintended consequences due to the entrenchment or changes in the balance of interests within a particular organization are a direct testament to the need for mechanisms by which institutions can be tailored to fit these changing circumstances.

In contrast to definition of horizontal levels of governance authority, another option surrounds parallel systems of governance in cases where heterogeneity of governance preferences is sufficiently high. This institutional mechanism to reduce the margins of disagreement among organization members resultant from heterogeneous governance preferences involves distinct authorities into which members can opt for resolution of certain classes of disputes. One of the most frequent public institutional contexts utilizing this mechanism is societies with considerable religious diversity – Christians frequently find the application of sharia law to be ill-suited to

their fundamental governance values, just as Muslim communities frequently resist the application of purely secular law due to such law permitting behavior at odds with the requirements of their faith. In either case, this has resulted in the ability for discrete religious communities to govern certain aspects of their affairs according to their own sources of law (Vikør 2005). In private sector or transnational contexts, private arbitration is a similar mechanism (Ware 1998; Burke-White and Von Staden 2010). Nonetheless, the decisions of these alternative courts tends to be subject to review by a nation's highest court to ensure constitutional conformity. Court review of private arbitration is quite limited in the United States, due in great part to the voluntary nature of resolution through arbitration through specifying the choice of arbitration in a contract ex-ante. In contrast, courts given jurisdiction among parties whose presence is not fully voluntary require greater review in the case of non-conformity with overarching constitutional requirements.

Critically, both these horizontal and vertical institutional systems involve the clear division of competencies between authorities. Each case results in significant boundary questions between the competencies of the subsidiary units or parallel systems as relative to the primary constitutional order. One of the critical institutional design questions in subsidiary systems surrounds the residual authority to legislate as between national and subnational units: for competencies not explicitly granted to a given level of government, where do those "residual" competencies lie? In relatively decentralized systems like the United States, residual authority to legislate rests with the states, which gives these subsidiary units considerable authority due to how this effectively means that for novel issues, states have the principal authority to legislate in those areas.[15] In parallel systems of adjudication, the competencies of the alternative system tend to be more tightly circumscribed, due to the incentives this can create for forum shopping and inequitable outcomes across systems if both purport to administer the law in its entirety with comparable finality. This creates a need to reconcile these alternative systems' outcomes with those of the primary constitutional order in its entirety. This same concern exists for subsidiary courts overseeing the administration of law defined by a specific subsidiary unit; while a State Supreme Court's interpretation of an area of subsidiary competency will receive deference from federal courts, these same federal courts are the final word on questions of federal law, including that of a constitutional nature.

The ability to create alternative governance units, whether horizontally or vertically, is a powerful institutional design tool to remediate problems of fit in terms of the heterogeneity of governance preferences within a given system. However, these institutional mechanisms require frequent reconciliation in terms of the outcomes in subsidiary units or parallel courts and the consistency of these outcomes with the national constitution. This poses a specific problem for organizations that coordinate around a set of rules that have been rigidly defined in protocol – understanding blockchain networks as a form of constitution is instructive (Rajagopalan 2018; Alston 2019; Cowen 2019), but this analogy can conceal important distinctions between public constitutional ordering and blockchain networks. While both can be amended (with all the controversy constitutional amendments can carry) (Alston 2019; Alston et al 2022), blockchain networks are not currently well structured to facilitate ex-post adjustment of the requirements of protocol by human actors. This has deep structural

consequences for the extent to which subsidiary or parallel networks (governed by a single blockchain) can adjust to network members' heterogeneous governance preferences.

Subsidiary networks are being designed to reduce the processing load required on the main blockchain network. A major upgrade to the Ethereum network under consideration involves the recognition that ensuring consistency with the primary blockchain of subsidiary processes validated on distinct networks is less costly than processing all the transactions on the primary blockchain network directly (Buterin 2021). By presenting the primary blockchain with proof of subsidiary validation of a batch of transactions, this can result in significantly lower processing requirements, and therefore transaction costs to users. Furthermore, to the extent subsidiary network validation processes (performed by "relayers" in what is called a "rollup") are governing transactions that vary in terms of temporal frequency, size, or number of counterparties (all of which can be implicated differently across smart contract applications), these validation processes will require distinct design to provide proof to the primary blockchain that the transactions are valid. Allowing for specialization in terms of the transactions being validated on subsidiary networks is akin to allocating competencies to subsidiary or parallel governance systems. But this has a corollary implication for the design and implementation of subsidiary networks – just as constitutional reconciliation becomes more costly as subsidiary courts are more likely to present divergent rulings on the same issue, a wider diversity of transactions facilitated on distinct subsidiary networks means more challenging mechanism design for the validation process, and more likelihood of unforeseen outcomes resultant from the coordination of many distinct validation processes for distinct subsets of network transactions. Accommodating the complexity resultant from a more heterogeneous set of user demands is costly and may prove to constrain to some upper bound the extent to which any single network can accommodate all potential users. This necessity for increasingly costly mechanism design ex-ante is only heightened absent the presence of ex-post resolution mechanisms considered in the following subsection.

C. The Inevitable Need for Ex-Post Adjustment and Correction

In complex constitutional orders, ensuring a Bill of Rights merely begins with their enumeration in the constitutional document itself. As noted previously, rights can come into conflict with one another, which requires clarification as to these rights' priority and limits with respect to one another, clarification which is typically overseen by a nation's highest court (Henkin 2009; Alston 2018). Even more importantly, simply determining whether a rights violation has occurred in specific instances is a core function of courts in the constitutional orders worldwide that choose to enshrine (and credibly enforce) rights protections. More generally, courts are the most salient example of ex-post reconciliation of disputes that emerge among individuals in society, either due to direct disagreements between individuals (governed by torts, contracts, and property law) or due to transgression by a subset of individuals of the rules defined by the collective whole (governed by criminal law). In either case, these disputes represent how individuals' governance preferences inevitably misalign in complex constitutional social orders. An important subset of disputes (if not the outright

majority) result from the divergent interests that greatly inform individuals' distinct governance preferences. To give but one example, one may prefer less regulation of the industry in which they work because of the negative economic consequences that will be borne disproportionately by those working in the industry, while those not working in that industry may prefer better regulation due to the externalities that industry poses to them or society. In addition, these same interests are often bound up in legitimate disagreement as to the extent to which regulation will achieve its intended purposes, another example of divergent governance preferences, in this case resultant from distinct visions as to how to proceed (including whether or not a collective problem is even a problem in need of resolution).

Rights protections, in delineating areas of individual autonomy that collective and individual action of organization members cannot reach, can be understood as a response to the "majoritarian difficulty". This is the concern that checks on democratically expressed governance preferences are necessary to protect the interests of individuals in the minority to any given collective decision. Beyond the role that rights play in ensuring minority interests are not dominated by the majority, there are other institutional checks also intended to ensure minority groups' rights. These include special commissions or process dedicated to the representation of specific subgroups, especially subgroups that have been historically mistreated or disenfranchised within a given governance system (Ghai 2001). Due process protections are also of specific benefit to subgroups whose interests are less well represented within a given system. In providing a means of embedded error correction, those minority interests whose rights are more likely to be implicated negatively by majority interest decisions stand to benefit more from protections against errors on the margins that are likely to occur in delimiting the boundary between legitimate decisions of the majority, and those that cross the line into rights infringement of a protected minority interest to a given decision.

This is a set of institutional mechanisms to resolve disagreement resultant from members' heterogeneity of governance preferences that is fundamentally ex-post with human input. The role of courts of appeals with ultimate authority displays the inevitability of boundary and rights questions like the need for reconciliation between overlapping and polycentric spheres of authority between subsidiary and parallel units. Therefore, this section could rightly be construed as describing the role of courts as interpreters of the law and final resolvers of legal conflict in their most general sense. As such, enumerating the entire set of ex-post adjudicatory institutional mechanisms that have emerged in constitutional orders to mitigate or resolve disagreements among citizens is well beyond the scope of this (and perhaps any) analysis. Those specifically interested in DAO design challenges may well wonder as to the extent to which rights tradeoffs and substantive due process ensured by judicial review have applicability in a context where semi to fully automatic governance is considered a motivating constitutive principle.

Admittedly, in decentralized finance contexts where decision rules can be fully defined for the allocation of investment funds, and the only relevant metric is financial return on investment over an agreed upon time period, this is an automated organizational context with less need for ex-post resolution mechanisms due to

how narrowly defined the action space is as mapped to observable outcomes. Indeed, if the investment is irreversible, then the only function of observed returns is providing a means for members to assess future investment projects. However, DAOs have already emerged to allocate funds for community development purposes that are broadly defined to a point where clear satisfaction of a funding purpose is considerably harder to objectively verify, including at the proposal review stage (GitCoin 2022, MakerDAO 2022). This single example displays how changing funding allocation decisions from a simple vote on an investment opportunity to a (less simple) vote on research and project proposals in furtherance of community development can make proposal and outcome assessment considerably more complex and subject to interpretation by individual community members. This more generally displays that as the scope and magnitude of an organization's purpose increases,[16] the inability of ex-ante institutional definition to fully countenance the future action and decision set of all organization members increases (Scott 2008; Alston et al 2021).

Put differently, as the coverage of an organization's purpose comes to dominate the field to where it faces less competition (and members therefore have less choice in organizations), the value of constitutional constraints to diminish representative losses increases commensurately (Alston 2022 Working Paper 2022a). This further indicates that as a DAO's constitutive purpose (encoding the bylaws and assets of an entire organization (Buterin 2014)) increases in scope and/or magnitude, that the need increases for ex-post adjudicative institutional solutions to address the interaction between ex-ante governance incompleteness and the heterogeneous interests within the organization (that make ex-post disputes more likely to emerge). The extent to which this role can be fully automated is unlikely, precisely because institutional incompleteness is most likely in the cases of Knightian uncertainty; institutional definition requires ex-ante specification of the conditions that will trigger the application of a given rule, and this requires knowing the relevant predicate conditions for rule application ex-ante. Unknown unknowns, and their incidence in terms of a given organization's objectives, pose a vexing obstacle for fully automated governance (Alston Working Paper 2022b). The inevitability of heterogeneity of governance preferences and the incompleteness of this governance together mean that ex-post resolution of organization outcomes is likely optimal for organizations whose purpose entails a considerable level of specialization in outputs and number of organization members.

The need for juries in certain digital governance contexts is a topic that has been ably explored in detail elsewhere (Fan and Zhang 2020; Pan et al 2022), and these juries' emergence is an arguable testament to their governance benefits. More generally, juries are an example of a specific decision rule in adjudicatory processes, such that the ideal form of ex-post check on the conflict between heterogeneous governance preferences is likely to vary considerably depending on the digital governance context in question. DAOs are no different, such that the extent of ex-post governance required will vary as a function of a DAO's constitutive purpose. Systematic presentation of data, and algorithmic assessment of risk factors are computer-assisted governance solutions being tested in criminal justice contexts (Simmons 2017; Huq 2018), which presents the possibility that some margins of ex-post dispute adjudication can be more programmable than this subsection might make them out to be. Indeed, there is likely a role for machine learning applications in highly automated

digital contexts, where human input reconciles a decreasing number of edge cases as an algorithm is trained to resolve disputes through the human input obtained in initial cases.[17] Nonetheless, the role for human adjudication of (or appeal from) especially complex or unprecedented cases is likely never zero, due to the way in which complex organizational purposes necessarily implicate the non-ergodic nature of the world with higher probability.

V. CONCLUSION

Sufficient agreement as to the purpose of collective action is precedent to effective organizational constitution. Groups at war with one another tautologically cannot come to agreement to cease violent conflict; the opposition of these groups' interests makes constitution impossible. This trivial example displays how sufficiently shared values, or agreement as to the animating purpose of an organization being constituted, are a precondition to successful organizational constitution. These shared values (or norms) by definition result from forces external to the organization at the time of its constitution, but are also shaped in an ongoing sense by the organization's constitutive choices itself, as well as those of competing organizations pursuing similar purposes. The choice to constitute an organization as a DAO, with assets and (a subset of) organizational processes encoded into smart contracts on a blockchain network, itself displays a shared set of constitutive values surrounding the relatively decentralized, transparent, and automated nature of DAO governance (Alston et al 2022 Working Paper). Nonetheless, the specific purpose to which a DAO is dedicated will constrain governance choices on observable margins, as the example of DAI's reference assets in Section 2 emphasizes. Despite the challenges in DAOs achieving more complex organizational objectives through the choice of constitutive values that the organizational form entails, these organization's potential is higher than a strict organizational economic assessment of the form would suggest. This is because many members of DAOs intrinsically value the organizational form, and innovation is likely to continue in terms of protocol design as facilitating a greater and more complex number of interactions subsidiary to any given network.

Yet however well-designed a DAO may be upon its launch, these organizations' constitutional nature means this form of collective action poses discrete losses likely to result to organization members from future collective action decisions. All collective action poses representative losses compared to the ideal of unanimity and creates a likelihood for future disagreement as to how to proceed; these are each non-zero costs for all members of collective action organizations. As structurally, due to the heterogeneity of individuals and their purposes for associating with a given collective action organization, future collective action decisions implicate different members' interests differently. Given the unavoidability of costs to collective action and their heterogeneous effect on organization members, this mechanically creates heterogeneous governance preferences within a given organization. Furthermore, the polycentric nature of governance suggests that heterogeneity of governance preferences also result from forces external to an organization itself. Many of the heterogeneous interests contained within a given organization derive from the organization's choice of purpose, both initially and in an ongoing sense. An organization's purpose greatly defines an internal political economy,

competing organizations, and the specific incidence of future shocks (even if these shocks cannot be predicted by any organization's institutional designers). The costs of collective action, as increasing in the heterogeneity of governance preferences contained within a given organization, constrain the constitutive choices available to an organization, as well as create the need for institutional mechanisms to mitigate and resolve future disagreement.

Given that an organization's choice of purpose varies in terms of the heterogeneity of governance preferences likely to be subsumed within, this means that public and private organizations vary in terms of the extent of governance preference heterogeneity they must accommodate in pursuit of their purpose. Put differently, the balance of competing governance demands within an organization determine the set of conflict-accommodating institutions necessary to reduce the specific costs of collective action these conflicting demands create. These institutions either mitigate or resolve conflict, and as such can be understood as ex-ante and ex-post institutional solutions, respectively. Ex-ante solutions include minimally constituting only the shared values necessary for successful achievement of the organization's purpose, and circumscribing the governance authority's ability to implicate individual members' interests in certain spheres of autonomy. Other ex-ante remedies to sufficient diversity of governance preferences within a larger constituency involve discrete subsidiary and vertical governance subunits that apply to distinct subgroups of organization members with heterogeneous governance preferences. Despite the relative tractability of ex-ante institutional solutions to mechanism design, and therefore definition in smart contract protocol, these ex-ante institutional solutions become increasingly incomplete as an organization pursues a larger or more complex set of objectives through collective action. This creates the need for ex-post institutional mechanisms to resolve conflicts, such as judicial review of rights violations and due process, and specialized review mechanisms to ensure the rights of minority interests. As DAOs' purposes come to grow in scope or magnitude, the benefits of ex-post conflict resolution mechanisms will also grow in value in terms of their ability to reduce the costs of collective action through addressing conflicts institutional foresight can never completely address.

More generally, the centuries of governance of constitutional systems around the world display the necessarily intertwined nature of these institutional solutions that I have distinguished by temporal application for the purposes of analytical simplicity. A Bill of Rights is only effective when subject to credible enforcement, and credible enforcement reduces the number of rights violations likely to even require ex-post resolution in future periods. Ex-ante constitution of shared values, rights protections, and subsidiary units tailored to distinct interest groups' governance preferences are an essential component of organizational governance, but without ex-post measures to adjust the rigid fit of ex-ante institutional requirements, the extent to which an organization can achieve a more complex purpose requiring the coordination of greater numbers of specialized and diverse members will necessarily be constrained to some upper limit. I have therefore argued herein that shared norms and accommodation of future conflict are interlinked and integral inputs to resilient constitutional design in general, and as such, are essential protocol design considerations for DAOs. More specifically, I identify institutional mechanisms that deal directly with these unavoidable structural tradeoffs surrounding voluntary

impersonal organization at scale, and how these mechanisms can be separated into ex-ante and ex-post solutions that respectively mitigate and resolve conflict among heterogeneous governance preferences.

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Footnotes

1. In narrower organizational contexts, shared norms may be entirely encapsulated through use or membership, however ephemeral. A given user implicitly agrees sufficiently with the Bitcoin network’s terms of use and ongoing governance to allocate their value there, however long or briefly. ↩

2. For some cryptocurrency users (and network participants), convincing new users of the benefits of decentralized governance is a major component to the adoption these existing users see as necessary to achieving a given cryptocurrency network's intended purpose. ↩

3. Many private associational forms have long since received public definition within most legal systems and are subject to ongoing regulation. This may be a reason for these institutions' persistence past their strictly providing efficiencies to collective action; through entrenching specific institutions in public institutional systems, this can make it harder for novel forms to compete. ↩

4. Centralized oversight of otherwise decentralized functions has been argued to be a key differentiating force in the comparative economic performance of China as opposed to Russia following the introduction of market-liberalizing reforms (Blanchard and Schleifer 2001). ↩

5. This may be even more likely considering that individuals with these intrinsic motivations for decentralized governance are currently flush with speculative gains made in cryptocurrency markets more generally. ↩

6. None of this is to belittle the continued legislative and judicial refinement to corporate law that has occurred since 1876, of course. ↩

7. Throughout, I shorthand these preferences for collective action at any moment as "governance preferences", although these can importantly be separated in substantive and procedural components in terms of the decision rules in play at any moment. A piece of legislation treats substantive questions, whereas gerrymandering alters an institutional input to the collective decision-making process itself. ↩

8. I have elsewhere considered the processes of competitive governance in the context of blockchain networks, both considering the effect of competition on the "constitutional" margins of permissionless cryptocurrency networks (Alston 2019), as well as the ways in which product competition and differentiation can shape outcomes from these same cryptocurrency networks (Alston et al 2022). ↩

9. To the extent a future state in which individual organization members disagree is predictable, then mechanisms will be embedded ex-ante to reduce or resolve this disagreement. Unanticipated events ("unknown unknowns") by definition cannot receive this kind of treatment ex-ante (Alston Working Paper 2022b). ↩

10. This is an all else equal ("ceteris paribus") argument, and my language throughout is deliberately agnostic as to the sources of disagreement within collective action organizations. Some heterogeneous governance preferences derive directly from the shared values that constitute an organization in the first instance, and others are a function of larger social identities and organizations, such as political parties,

ethnicity, religion, and place of upbringing, to name but a few of the many forces that influence individuals' preferences for how they and their fellow organization members are governed. ↩

11. It warrants explicit mention that this analysis is silent as to the normative preferability of a more pluralistic group of organization members. In many (if not most) contexts, a given organization will be able to achieve more with a more pluralistic set of members. Different perspectives and skillsets are an important input to the specialization and complex decisions that achieving many organizations' purposes requires. ↩

12. A pluralistic society is one that involves much more than heterogeneity of governance preferences. Nonetheless, one consequence of increasing the heterogeneity of organization members is that this is likely to simultaneously increase the heterogeneity of governance preferences internal to that organization. This makes dealing with disagreement more important, ceteris paribus. This analysis is centrally concerned with this structural characteristic of pluralism. Given that collective action entails working with other individuals in pursuit of a shared goal, some measure of disagreement is inevitable given the natural heterogeneity that exists between individuals as compared to the unified preferences of a single individual as to how to act or proceed. This makes the accommodation of some measure of disagreement (which can increase with the dimensions of pluralism that I discuss here) necessary for all impersonal organizations. ↩

13. This is not to argue this is a monotonic function. For certain organizational purposes, a minimal set of shared values is necessary to coherently constitute a collective action apparatus in pursuit of that purpose, suggesting that below a certain level of shared values, agreement is zero. This is a logical corollary to the analysis in the first section arguing for the baseline necessity of these values for the constitution of any voluntary organization. ↩

14. I have elsewhere considered how the benefits of decentralization of governance authority vary as a function of characteristics outside the control of national constitutional designers. This analysis therefore enumerates, and limitedly quantifies, the forms that constitutional decentralization can take. These vary across important dimensions, and are likely themselves instructive to design of subsidiary networks as complex as those contemplated by the Ethereum network currently (Buterin 2021). ↩

15. Over time, the US federal government has consolidated considerable legislative authority from the states through judicial interpretation of the commerce clause and the use of fiscal grants to states to induce outcomes where Congress lacks the legislative authority to command. Nonetheless, the original constitutional design displays the decentralized design choice of placing the residual authority to legislate with subsidiary units. ↩

16. Alston et al (2021) define the scope of an organization's purpose as the number of distinct outputs that achieving an organization's purpose entails. They define the magnitude of an organization's purpose as the number of individuals the organization's output is intended to reach or influence. Both of these have

predictable consequences in terms of the extent of specialization required among organization members, as well as the number of organization members required to achieve a purpose of greater scope and or magnitude. ↩

17. To the extent possible, this could present a beneficial synthesis of machine learning and the benefits of incremental legal definition argued to undergird the common law. ↩