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Trade-offs in Centralizing/ Decentralizing Governance: the Impact of Populations' Characteristics

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Trade-offs in Centralizing/Decentralizing Governance: the Impact of Populations' Characteristics

Abstract

This paper proposes a framework for analyzing governance in terms of centralization versus decentralization of the provision of an order to a given community. This is an essential trade-off behind many issues related to the organization of the institutions that frame either political activities or the economy. We systematically analyze how the level of centralization impacts on the costs of governance, i.e., the costs of establishing rules and ensuring compliance. We show that scale and scope effects, cognitive biases as well as interdependencies tend to favor centralization. These positive effects are balanced by maladaptions to local specificities, private capture and information costs. Highlighting the cost function of governance allows us to identify four characteristics of transaction grids characterizing the nature of collective coordination problems in a given population. Two of them refer to the characteristics of the population (its size, and the heterogeneity among individuals). The two others (clusterization and interconnectedness) describe the topology of the relational networks among members of this population. We show how these characteristics should impact the choice of a governance level.

JEL classification: D23, D71, L14, L22

Keywords: centralization, multilevel governance, order, transaction costs.

1 - INTRODUCTION

Contrasting forces are producing an ongoing restructuring of political and economic governance. Many examples suggest an ongoing discussion about the appropriate "level" of governance. For instance, many countries have been undertaking programs to shift political decision-making from the "central" or "federal" government to cities or provinces. At the same time, the construction of the European Union and the development of many inter-governmental organizations led to the creation of new levels of government either by better coordination, or through the amalgamation of existing national states via processes of harmonization or political integration. The regulations of industries and the provision of public goods have also been the locus of opposite forces. On the one hand, a strong call for decentralized regulations/public good provision developed in various contexts. Proponents of this opinion argue that decentralization produces a better outcome partly because economic agents or "communities" are more able than governments to design relevant and efficient systems of rules for their interactions or to overcome the difficulties of collective action. On the other hand, the nature and scope of some issues such as climate change and financial stability seem to call for regulation mechanisms designed at the inter-industry and international levels. Generally speaking, in all these discussions, the main issue is not whether the entity in charge should be governmental or not. Clearly, the scope of the population submitted to a common order is at stake, whether it is question of optimal currency zone, relevant competitive field, scope of ecological issues, etc. This paper aims to contribute to the analysis of the underlying institutional/governance choices by investigating the costs and benefits of alternative governance "levels".

The term "governance" has been increasingly used in social sciences in versatile ways. In what follows, it refers to organizing or framing (economic) interactions within a population through the provision of an "order", i.e., systems of rules and of compliance mechanisms that shape behaviors, and therefore economic and social performances (see also Dixit, 2009, p. 5). Our paper relies on the insight that governance is a service, that has to be produced, and whose costs are impacted by the level of provision. The notion of "level" refers to the fraction of a population to which a particular order applies, or its "scope" of application. The lowest tier in our analysis is the provision of an order to a pair of agents. If a society is organized on the sole basis of bilateral contracts, it can be labeled as being governed in a fully decentrally manner. The provision of both common rules and common enforcement to society as a whole is

described as “generic” or “centralized” governance (our highest tier). We then consider that there are several intermediate levels on this “centralization/decentralization” axis.

We propose to analyze governance in terms of “technology” for establishing an order. An (economic) order is a set of rules establishing rights in matter of access, use and transfer of resources among agents.[1] It also encompasses the mechanisms by which these rights are renegotiated and transmitted among agents. Since these rights could be unclear ex-ante, and since agents could attempt to infringe on the rights of others ex-post, the establishment of an order encompasses the ex-post operations linked to the necessity to guarantee compliance and to manage conflict resolution. In line with Barzel’s analysis of property rights settlement (1989), the establishment of an order therefore relies on two sets of operations: delineating rights and ensuring compliance. In terms of “technological” operations, the delineation of rules and rights relies upon a capability of gathering information about the alternative use of resources (which induces an understanding about the capabilities of the available assets), and computing the consequences of alternative arrangements.[2] This is (economic) decision making which might benefit from access to relevant information (about needs) and to adequate knowledge (about potential solutions and their consequences). As well, in terms of “technology”, ensuring compliance relies on auditing actual behaviors, and imposing sanctions when rules are infringed upon. This is control that is dependent upon the capacity to observe and assess behaviors, and upon capabilities to exercise credible threats.

In a world of heterogeneous and interdependent agents in which information, decision, and actions are costly the degree of centralization of the management of these operation might matter since, on the one hand, the difficulty of information gathering and decision-making raise with centralization, while, on the other hand, the joining of capabilities might leverage both the capability to identify efficient solutions and to implement credible threats. Moreover, centralization leads to deal with more diversity. It may negatively impact the ability to design governance mechanisms fitting with coordination needs. At the same time it allows to take into account interdependencies, and therefore to internalize “externalities”.

This perspective allows us to propose a normative analysis of the optimal level/centralization of governance in a given population. Given the identified sources of efficiency and costs related

[1] A Leviathan may intentionally and centrally build an order, or it can result from the decentralized (repeated) interactions among agents.
[2] This does not mean that a social planner is at work — an order can be decentrally established —, nor does it mean that an “optimal” solution is selected; designers of governance systems are not necessarily “benevolent”.

to the level of provision of governance services, we identify the "attributes" of the population/society/economy that impact the collective needs in matter of coordination. Two characteristics of the considered population (size, and heterogeneity of individuals), and two features of the relational networks among its members (clusterization and interconnectedness) are the main drivers of the relative performance of alternative degree of centralization of governance. This effort results in the formulation of empirical predictions.

The normative analysis we propose is not aimed at explaining how "levels" of governance are established in the real world. As illuminated by the tradition inaugurated by Douglas North, many governance choices and strategies can be explained by the will to establish or maintain coalitions aimed at capturing rents (see North et al.; 2009). Our framework aims to analyze how governance systems should be vertically organized, and how different dimensions/objects of governance should be devolved to different levels of governance. We show that the scope of public goods is not the only variable to considered when making these choices.

Beyond issues, like political federalism, which are naturally analyzed in terms of level of governance, other issues might also benefit from this type of analysis; such as the contrast between public and private ordering for example. Much research on specific sectors and industries show how "private institutions" or "self-regulations" govern exchanges by creating a private and collective order through deontological codes, collective agreements, "quasi-private laws" and their related enforcement mechanisms (see Richman, 2004, for a survey). Part of the contrasts among these regimes might well depend upon the fact that they generally do not cover the same scope of the population. In a national context, for instance, private/self-regulations are organized on a more decentralized basis than the public one. In the same spirit, informal coordination often refers to mechanisms at play in closed and small communities. Some of the contrasts between "formal" and "informal" institutions might therefore be linked to differences in levels of governance. Identifying the institutional properties that are actually linked to the level of governance leads to a more precise identification of the actual effect of other characteristics including the public or private character of governance, or the degree to which the order is formalized. Disentangling the centralization/level issue from others might prove to be helpful both for analytical progresses and policymaking.

This paper is structured as follows. Section 2 discusses the theoretical frameworks already addressing the issue of alternative levels of governance and points our contribution. Section 3 proposes a systematic analysis of the various categories of costs and benefits casting the "centralization/decentralization" trade-off. Section 4 deduces an "alignment principle" similar

in spirit to the one developed by Williamson (1985, 1996) at the transaction level. We match governance levels with the characteristics of the social interactions at stake. Conclusions follow.

2. – THE ANALYTICAL FRAMEWORK

2.1. Beyond "level of government" and "mode of governance"

The existing literature essentially includes two sets of contributions:[3] Fiscal Federalism (hereafter, FF), which focuses on the choice of an appropriate level of governance, but in the specific context of the provision of public good; and New Institutional Economics (hereafter, NIE), which proposes elements for the analysis of the alternative properties of governance levels. However these later elements are not fully consistent. Moreover, the centralization/decentralization issue is not the central purpose of NIE. Our contribution relies on insights drawn from both approaches. Here, we briefly summarize these frameworks and explain how we contribute.

Fiscal Federalism describes the government as having several levels (typically, "local" versus "federal"). Its main goal is to analyze how competences should be allocated among these different levels and the fiscal instruments necessary to align the incentives of governments with citizens' needs (see Oates, 1999, 2005; Mueller, 2003; and Weingast, 2005 for surveys). FF focuses on the problems drawn by the aggregation of individual preferences that occur when a good that is indivisible in consumption has to be provided to a community. The choice of a level of provision fundamentally draws from two sets of factors: the (technological) constraints in accessing the good; and the heterogeneity and the distribution of individual preferences.[4] For (exogenous) technological reasons, public goods are localized in the sense that they only benefit those who can access them. Then there are different types of public goods — e.g., street lightening versus climate preservation — and they should be provided by the jurisdiction

[3] More specific contributions exist. In particular, Roland (2004) contrasts governance levels in terms of speed of adaptation. He highlights that lower levels of governance evolve more quickly than higher levels. Thus, one contrast among levels of governance could be their respective adaptive capabilities, qualified in the managerial literature of agility. Although arguments to the centralization/decentralization debate are bought in, they do not provide a general perspective on the issue.

[4] There are two approaches. The positive one considers the current design of jurisdictions — i.e., the levels of government with their prerogatives — as a given historical heritage too costly to modify. Then the discussions is about shifting domains of decision between levels of government or organizing cooperation across them to get a better fit in the provision of public goods. The normative approach deals with the optimal design of the federal system given the nature of public good and the distribution of preferences.

covering the relevant territory/population. Heterogeneity of preferences within jurisdictions designed along the above-mentioned principle, and the resulting difficulty to make unanimous choices could lead to over- or under-provision of public goods. Indeed, individuals might have different preferences among the alternative public good to be provided and the volume of provision of each, since there is competition among public goods, and since the provision of the latter compete with the provision of private goods. The literature studies therefore how the design of jurisdictions based on homogeneity of preferences could deal with this issue. The conditions are the existence of sub-populations — whatever the criterion to identify them is: geography, ethnic or religious differences, socio-economic characteristics, etc. — with relatively homogeneous preferences, and relatively low costs of exclusion from access to the public goods. Since the preferences of some individuals belonging to different jurisdictions may overlap, or because the costs of exclusion may allow outsiders to access to a local good, there might be externalities among jurisdictions. Transfers among them are therefore a complementary governance tool to reduce the issue of misalignment.

Since the analysis focuses on how the design of a federal system influences the fitness of the provision of public good to preferences, FF relies on the assumption that the agent in charge of decisions is unbiased. He is a benevolent dictator. Should not this be the case, analysis is then left to the other branch of Public Choice, which specifically focuses on the agency relationship between the citizens and the politicians or bureaucrats. There is a vast amount of literature on this issue (among others, Buchanan, 1949; Buchanan and Tullock, 1962; Olson, 1965; Niskanen, 1971; see also Mueller (2003) for a synthesis and survey), which may easily be combined with the fiscal federalist one. However, these two types of research insist on two contrasted phenomena: the heterogeneity of individual preferences for public goods, and the (sometimes prohibitive) cost of delegating collective decision. These two issues are considered as independent.[5] In addition, the latter phenomenon is not considered to be related to the level.

Our framework differs from FF one on two grounds. First, a key dimension of our analysis is that a common order might provide asymmetric benefits (or result in asymmetric costs) to those who benefit from it. The public good we consider is therefore imperfect in the sense that its benefit to each marginal/additional member is lower than that of “core members”/“insiders”. This does not mean, however, that a common order is a “club good” — i.e., a public good with

[5] This comment is more accurate for the “first-generation” theory of FF, which has its roots mainly within the field of public economics. What Oates (2005) calls the “second-generation” theory of FF starts to integrate both approaches.

decreasing marginal benefit to the insiders — since its provision to an additional user results in increasing return for all. Benefits are just asymmetrically distributed. Second, we consider that centralization impacts on the degree of *de facto* benevolence of "rulers". In a decentralized context, competition exists among rulers that is less stringent in a centralized context. This influences the ability of rulers to distort the order in their favor, which impacts the asymmetry in the private benefits drawn from a common order, and even the collective benefits brought by this common order.

For New Institutional Economics, governance itself is the provided public good. In contrast to standard FF analyses, NIE focuses on the costs of establishing an order. Economies in designing an appropriate order and in ensuring compliance are the focal point of the analysis. NIE therefore considers not only the efficiency aspect of governance — i.e., the degree of fitness between needs and the quality of provided public goods — but also the cost of designing and implementing alternative governance solutions. NIE also considers the provision of governance services in a non-benevolent context.

As compared with FF, NIE is broader in scope as it identifies and analyzes various institutions (public or private, formal or informal, etc.), as well as their interactions involved in securing property rights and enforcing contractual agreements in order to support market-based exchanges (Barzel, 1989, North, 1990, Williamson, 1985, 2000). The government plays an important role in this aspect, however NIE also analyzes numerous alternative governance devices such as private ordering and social networks (see, among others, Aoki, 2001, Greif, 2006, North, 1990, Williamson, 1996). Prominent authors in this field already envisaged various layers of order provision. North (1990, p. 47), for instance, distinguishes four categories of formal rules — constitutions, statute and common laws, specific bylaws, individual contracts — that can be interpreted in terms of levels of order provision. Williamson (2000) also proposes a four-level approach with cultural or moral norms at the top, contracts at the bottom, and the law in-between. Ostrom (2005, p.58) as well describes a nested hierarchy of rules: "operational rules" framing repeated interactions; "collective-choice rules", which are rules set for choosing operational rules; "constitutional rules", which are designed to choose the previous ones; and "meta constitutional rules", which are rules for choosing constitutional rules. This rapid and incomplete quotation of examples does not result in a comprehensive and consistent analytical framework. In fact, each of the above quoted analyses relies on specific assumptions, and is developed in the context of contrasted research programs. Moreover, in most cases, these typologies are aimed at establishing the domain of relevance for the specific theories developed

by these authors. North develops an analytical framework to understand how constitutions are established, while Williamson highlights that Transaction Cost Economics is relevant when analyzing the choices of governance regimes (between contracts and legal framework). Ostrom, for her part, contrasts the various types of collective-choice ruling. None of these authors, in a sense, truly developed a theory of the level of governance since they focus on comparing alternative modes at a given level. The interplay among levels are considered in the perspective of studying top-down constraints and bottom-up influences.[6]

Despite this heterogeneity among the various branches of NIE, there are commonalities in the adopted analytical perspective. Beyond a common analysis of the sources and consequences of transaction costs, an analysis of the benefits and risks for the "governed" to adhere to a common order is at the core of the NIE analysis: locks-in bring stability, but may also lead to enduring distortions in favor of some. This is explicit in the Northian tradition (North, 1990; North et al, 2009), and is also central in the Williamsonian approach with its concept of "specificity" (Willliamson, 1985). Lastly, government, clubs, or other forms of organizations are considered as alternative modes of framing coordination and organizing collective action, which are chosen by agents who consider their respective benefits and costs. This results in an endogeneization of the emergence of alternative governance options, and in a common framework for comparing them as a function of the coordination service provided (and the cost of provision).

While accumulating analyses on the costs and benefits of alternative governance solutions, NIE does not consider the level as a central variable of choice. This is linked to this separation between the analysis in terms of alignment (developed by TCE at the transaction level) and the analysis in terms of emergence and evolution (developed by the political economy of economic governance inaugurated by North). Brousseau and Raynaud (2011) developed a framework that highlights how alternative governance solutions are selected on the basis of transaction costs incurred by heterogeneous agents and how the quest for lower transaction costs might explain the development of governance devices at various levels. We rely on this framework for our analysis of the costs and benefits of centralization of governance.

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[6] That said, at the same time, NIE scholars often carry on an implicit analysis of multilevel governance. If we compare between the market and the hierarchical modes of governance as does Williamson, one of the contrasts is that the market relies upon more "centralized" governance than the hierarchy. In the market, most governance efforts are carried out at the collective level by legal norms and collective enforcement mechanisms (and before all courts). Conversely, in a hierarchical mode of governance, the parties internalize the governance efforts: the party with decision rights decides upon the behavior of the subordinates and it arbitrates conflicts.

2.2. A bottom-up process of multilevel orders formation

In our framework, the process of the emergence of governance capabilities partly explains the relationship between the level of governance and the coordination properties. Common governance results in a mutual recognition of rights, and the ability to exchange. It provides agents with the benefits of labor division, as well as with the protection of their investments. Costs are linked to the negotiation and design of rules, and to the mobilization of resources to ensure compliance.

These benefits and costs might be unequally shared among those who benefit from a common order, because alternative rules may have contrasted impacts upon the ability to value assets or to exchange. The process through which common systems of governance are built is critical to our analysis because it explains why asymmetry in terms of cost and benefits may be "accepted" by individuals. Governance devices do not result from a generalized negotiation in a cooperative game framework in which all agents in a society would have an equal say, and in which a benevolent and powerful arbiter would guarantee the implementation of the optimal order among all possible options, making sure that adequate Hicks-Kaldor compensations are paid to the losers. It is the result of a process of emergence in which the path matters. The will to capture rents or benefit from a competitive advantage explains why some solutions are sponsored by governance entrepreneurs.

Consider a finite and heterogeneous population of agents. All agents have both contrasted preferences and endowment, which result in heterogeneous coordination needs. As a result, a more centralized order must deal with increasingly heterogeneous coordination needs.[7] Agents have incentives to make individual efforts to more clearly tailor their rights over the use of economic resources, to transfer them and to ensure they are enforced. Bilateral contracting is an option, and leads to the proliferation of (bilateral) decentralized orders. However, when several pairs of agents face similar coordination challenges, they are motivated to build collective governance devices to more effectively manage these issues by benefitting of scale effects and cognitive gains, or by taking into account interdependencies among them.

[7] Heterogeneity may be assessed in terms of "distance" between agents. Our understanding of "distance" between individuals in the reference populations is fairly wide. Distance may be geographic, or more generally socioeconomic (for instance, based on needs or preferences).

Collective governance emerges to address coordination problems at a lower cost than a set of bilateral arrangements. Section 3.1 details the benefits of centralization more closely.

However, since they are heterogeneous, agents do not spontaneously adhere to the same common rules. Each of them has its own first best when considering collective rules. He prefers to have them based on his preferences and constraints. The only way to escape the resulting social dilemma ("battle of the sexes" type of situation) is to form coalitions whose logic is to promote "imperfect" compromises among members that is preferred by each of them over more imperfect ones promoted by alternative coalitions.

These coalitions result in the creation of "clubs"; i.e., sets of agents who agree to adopt common coordination rules and decision mechanisms for creating additional rules or adapting existing ones, and ensuring compliance. Within these clubs, agents benefit from lower transaction costs, even if these costs reductions are asymmetrically distributed among members. The "competitive" advantage of the club is that it provides its members with bargaining power: outsiders — she — seeking to coordinate with members of already established clubs — he/they — are more likely to adhere to the club's order than the reverse: the club adopting her preferred set of rules. The larger the club, the more likely is an individual to accept an order that is not her first best in terms of transaction cost minimization, because it is the best second rank solution for her.[8] Not only collective orders are spontaneously emerging, but also they grow by adhesion of increasingly heterogeneous agents. Generic orders thus result from a process of expansion and competitive selection of (formerly) local orders. More details are provided in Brousseau and Raynaud (2011).

This genealogy of governance mechanisms is at the root of our identification of a continuum between centralization and decentralization of order provision, with various properties attached to each level. Since orders are built by expansion of local orders in the population under consideration, the notions of extension in scope of an order, centralization of order provision, increased genericity of governance and higher level of governance are synonymous: more centralized/generic orders or higher level of governance apply to wider sub-communities in a given population.

[8] Note, in addition, this second best option does not depend upon a general "second best minimization", given the frictions that characterize real world. It results from the dynamic of club formation, which is characterized by path dependence (due to increasing return of adoption and strategic linking; cf. David, 1985).

3 - THE TRADE-OFF BETWEEN VARIOUS GOVERNANCE LEVELS

In what follows, by relying on an extended literature, we analyze in more detail how centralization impacts positively and negatively on the costs of governance (in sections 3.1 and 3.2 respectively). In the discussion, we reason "everything equal" in order to focus on the relationship between "level" and "cost" of governance. We consider a finite population of agents (e.g., the population of a country), and analyze how the efficiency in the matter of design or compliance is influenced by the degree of centralization (and therefore the inverse degree of fractionalization) of governance, given the assumption that the best choice is made to organize the various tasks implied by governance at each level. We therefore push aside the issue of misalignment of incentives of those — individuals or organization — in charge of governance. This is done to disentangle the "level" effect from other effects. This also falls in line with the normative approach of this paper, which seeks to identify the optimal alignment between the level of governance and characteristics of coordination issues to be dealt with.[9] Assuming that governance is effectively performed at each level does not however guarantee efficiency, since the level can bias incentives and constraints framing the design of rules or their enforcement.

To review all possible relationships, we start by listing the efficiency gains linked to centralization before discussing its increasing costs. The benefits of centrally and uniformly solving coordination problems may be inherently lost when these problems are settled on a decentralized basis through the proliferation of small-sized jurisdictions/clubs, and *vice versa*. Our analysis of costs (respectively, benefits) of centralization is therefore by contrast an analysis of the benefits (respectively, costs) of decentralization. In doing so, we attempt to be parsimonious by identifying the most general categories of benefits (Section 3.1.) or costs (Section 3.2.) that can be linked to increased centralization.

3.1- The Benefits of Centralization

Centralization provides agents with (i) scale and scope effects, (ii) learning and specialization benefits, and (iii) the means to reduce collective welfare losses. We point out how these factors work both for rules design (3.1.1) and efforts to ensure compliance (3.1.2).

[9] In a positive perspective, il could be argued that, given the competition among club's sponsors that is described in Brousseau and Raynaud (2011), the latter have incentives to provide their governance service effectively.

3.1.1 Designing Rules

To show how centralization might reduce the cost of designing rules, we contrast in the following sections two regimes: full centralization where a single set of rules govern the relationships among agents in a given community, versus full decentralization where only specific rules are established at the bilateral level.

3.1.1.1- Scale and Scope Effects

One benefit of centralization is the potential for economies of scale in the establishment of rules. When there are redundancies in bilateral coordination problems (trading of comparable goods, pairs of principal-agent relationships for providing a similar service, etc.), the rules developed to govern a given interaction can be used in other and similar sets of interactions. For instance, in agro-food industries, collective organizations set common rules to define and grade quality along vertical chains of transactions (e.g., Pirrong, 1995). Common rules also generate economies of scope. Even different types of interactions can share similar problems. For instance, contract law provides some general remedies against opportunistic behaviors for a wide range of transactions. When collective principles are created to settle problems encountered during a given type of interaction, it may well be that these mechanisms would prove useful for other forms of interaction, saving agents the efforts of designing new solutions every time they transact.

3.1.1.2- Learning and Specialization Benefits

Since collective rules are applied to a wide range of different interactions, the actual performance and potential improvements to these rules can be more easily measured and tested than those applied uniquely to one particular bilateral relationship. All things being equal, the designer of a rule applied to a larger community benefits from greater feedback on the actual performance of the rule in various contexts than those who design rules for a small community or a pair of agents. Additionally, learning costs are written off on a larger number of interactions, and learning takes place at a higher pace. “Communities” also have the capability and incentive to have agents focus and specialize on creating rules to settle their coordination problems. When greater cognitive resources are devoted to creating rules, the latter should be of a higher quality.

3.1.1.3- Reducing Collective Welfare Losses

"Local" regulations may generate incompatibilities. For instance, sector-based standards may be the cause of incompatibilities (Brousseau, 1994). By definition, rules designed by a subset of agents aim to enhance coordination effectiveness within their group. If members of different groups are connected, or if an individual belongs to several groups, the "internal" consistencies of local collective rules might generate negative externalities or even conflicts.[10] Risks of systemic failure such as electrical blackouts, panic in the banking industry, or food safety crises, are examples of externalities within an economic system. When interdependencies, resulting in externalities and systemic effects, exist, rules designed at a "systemic" level can take these collective effects into account, resulting in enhanced efficiency.

Another factor plays a positive influence on the efficiency of centralized solutions: network externalities (Katz and Shapiro, 1985). The greater the number of users for a coordination rule, the higher its utility. A main reason is a reduction in the possibility of lock-in and the resulting contractual hazards or inefficiencies in matching. An agent facing a larger community of potential traders applying the same rules runs less risk of being held up and dominated by its peers. He is also more likely to obtain a match by meeting a co-trader able to provide him with the quality and quantity he needs.

3.1.2- Ensuring Compliance

Scale and scope effects, cognitive benefits, and internalization of externalities also play a role when it comes to ensuring compliance. What does centralization means when it comes to enforcement? Centralization is the collective implementation of an order; so centralization of enforcement describes any situation where the mutualization/collectivizationn of supervision and punishment of infringers exists. This is what occurs when a founding rule of a given community is that each member must oversee the conduct of the others, and punish both those who break the rules and those who fail to punish identified infringers. It is also what takes place when members delegate supervision and retaliation tasks to any entity that becomes a last-resort enforcer at the community level. Decentralization corresponds to situations where local enforcement regimes co-exists and are independent from each other. Modes of rules

[10] Positive externalities might exist, but it does not change the argument about the superior efficiency of more centralization in case of externalities.

interpretation, incentives to comply and punishment are all different across sub-communities/clubs and the various clubs are not accountable to each other.

3.1.2.1- Scale and Scope Effects

It is convenient to illustrate the scale and scope effect in enforcement by starting with the literature on the self-enforcement of bilateral relations. This literature extensively describes the ability of repeated relations and reputation effects to support self-enforcing relations.[11] It also points out how economic agents build collective information and sanction mechanisms to widen the scope of "self-enforcement" from bilateral to multilateral contexts (see Dixit, 2004; Greif, 2005; and Richman, 2004; for overviews).[12] For instance, Milgrom, et al. (1990) point out how "communities" make their constitutive rules enforceable by credible fear of exclusion and the corresponding loss of access to various benefits provided by the communities.[13] Such mechanisms decrease transaction costs and generate positive network externalities. Furthermore, the expected opportunity costs of exclusion may expand beyond the loss of future trade to exclusion from social relations (see Aoki, 2001; Bernstein, 1992, 2001; Landa, 1981 and Richman, 2004, for example). Thus, the collectivization of enforcement generates scope effects.

The sanction mechanism is complemented by devices for collecting and disseminating information in the community. Information mechanisms must exist to trigger ostracization of rule/commitment-breakers, including those who do not ostracize rule-breakers. One of the original features of collective self-enforcement is indeed the fact that supervision is peer-based. As a larger community implements a common order, each individual behavior tends to be monitored by more people (Carpenter, 2007), which increases the likelihood of being identified in the case of fraudulent conduct.[14] In addition, supervision by multiple peers reduces the gap between observability and verifiability when detecting and punishing non-compliance. Indeed, the contrast between "observability" and "verifiability", so prevalent in the contract literature,

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[11] See Klein and Leffler (1981) for a path breaking contribution, and MacLeod (2007) for a survey.

[12] These findings also fall in line with studies on the ability of close communities to implement self-enforceable collective rules, such as those providing for the efficient supply and exploitation of public goods and commons. Contributions by Ostrom (1990) and Ostrom et al. (1994), in particular, reveal that mutual supervision and ostracism lie at the core of these local, collective self-regulations.

[13] These benefits differ, depending on the context. They may involve access to social networks, collective reputation, assets facilitating trade (which may be as tangible as marketplaces, whether a medieval fair or an electronic platform), trust, self-regulation, etc.

[14] We will see however in Section 3.2.3 that a larger community also ends up with larger information costs that might balance scale and scope effects in enforcement;

refers to an information asymmetry that would be less severe among peers or parties in a transaction than with a third part enforcer. This is generally justified by two factors: the third party has higher costs in acquiring information on the way the interaction is performed; and the third party is assumed to be less specialized in the specificities of the actions taken by the parties. In collective enforcement by peers, neighbors "naturally" observe others, and each individual behavior is scrutinized with high intensity and from several viewpoints.

3.1.2.2- Benefits of Learning and Specialization

The alternative solution to supervision/sanction by peers is the delegation of theses task to some individual or organization. Medieval fairs analyzed by Milgrom et al. (1990) as well as more contemporaneous system such as eBay are examples of systems that collect information about agents' behaviors and that influence their payoffs. As in any activity, there are benefits from specialization in the matter of retaliation against infringers. There are lessons to be learned when controlling either physically or morally conduct, and there are therefore learning effects. Additionally, specialized supervisors and enforcers are encouraged to develop their skills and to invest in equipment aimed at more effectively observing or constraining. In addition, they avoid a redundancy of efforts. On the population level, more centralization of enforcement allows for deeper specialization of observation and enforcement, which negatively impact the cost of compliance.

3.1.2.3- Taking into Account the Net Social Benefit of Enforcement

Whether "centralized" enforcement relies on peers or on a specialized entity, it provides two benefits (relative to decentralized enforcement). Firstly, being accountable to the order, the mechanism should avoid under-provision of effort in supervision and punishment.[15] In particular, it must take into account the potential collective distrust that may emerge and threaten the order when failing to punish infringers (see for example Dixit, 2004). Secondly, the enforcement mechanism should consider the potential side effects of sanctions. It is widely acknowledged that overly-harsh sanctions — implemented as deterrents — can miss their mark: they may discourage agents (like in the classroom with weaker students); they may hinder

[15] This obviously depends on adequate incentives for the enforcer(s). In the case of several enforcers, it is clear that sharing the surplus creates a free rider problem similar to the one described by Alchian and Demsetz (1972) in the context of team production. It raises then the question of collective action, and further studies should include a detailed analysis of the trade-offs of various alternatives in organizing supervision, based on the possible alternative incentive schemes for enforcers.

action (for fear of heavy sanctions, agents no longer take risks); or they may no longer deter conduct (as noted in criminal justice, when individuals definitively excluded from society, with no chances of rehabilitation, no longer fear sanctions).[16] This results in central enforcement being more effective than a collection of un-coordinated decentralized enforcers at weighing up and tailoring sanctions and remedies in light of the "net social cost" of infringements and sanctions. Central enforcement will consider the true dissuasive effects of sanctions, their actual costs and potential negative externalities for the society to optimize deterrence, whereas decentralized enforcers would not consider the "social cost" of under- or over-provision.

3.2. - Costs of Centralization

We now analyze how centralization increases costs (or decreases efficiency) by highlighting how it impacts the maladaptation of governance solutions to the coordination needs (Section 3.2.1), the level of capture due to bargaining asymmetries (Section 3.2.2), and the scope of information asymmetries (Section 3.2.3).

3.2.1- Maladaptation Costs

The concept of maladaptation and the related maladaptation costs are related to the discrepancy between collective orders and individual coordination needs. As agents have heterogeneous preferences, a given collective order cannot perfectly meet their coordination needs. Therefore they bear opportunity costs, compared with what they would obtain with more tailored rules. The difference between net output obtained by implementing the best (feasible) tailored solution in a transaction and net output obtained by following a generic rule is what we describe as "maladaptation cost".

These costs should increase with the size of the "jurisdiction" as size increases the heterogeneity of coordination needs. To see this, let us start with bilateral relations. The two parties are generally not identical (otherwise, there would be no gain from trade), but bilateral negotiations should result in a contractual agreement that balances their needs. When a collective rule is designed, additional heterogeneous needs will be "brought to the table" and the resulting rule is a compromise adapted to common denominators. Therefore, we expect maladaptation to be comparatively lower in bilateral rather than as in collective governance.

[16] On the economics of deterrence, see Bar-Gill et al. (2001) and Donohue et al. (2005).

What has held true for rules settlement is also true for enforcement. The comparison between arbitrators and courts illustrates the maladaptation costs inherent to centralizing enforcement. Studies on alternative dispute resolution mechanisms (e.g., Cooter and Rubinfeld, 1989) focus on the idea that arbitrators and private courts can better take into account the preferences of parties, and that they may also be more specialized than judges and public courts (because they are nominated depending on the specific nature of the case, and because they experienced in the field, etc.). In addition, they tend not to apply generic default rules.

The impact of heterogeneous preferences is also relevant to evolving situations, resulting in discrepancies between *ex-ante* established rules and *ex-post* coordination needs. When coordination requirements or possibilities (technology) change, it may be necessary to change the rules framing interactions among agents. However, changing the initial compromise can be complex because changes in a system of rights are likely to have redistribution effects (Libecap, 1989, North, 1990, Pirrong, 1995) either because there are losers and winners, or because the benefits of changes are unequally distributed. On the implementation level, a collective action problem might also emerge since it would be difficult to coordinate all the stakeholders to have them switching spontaneously and timely to a new equilibrium (see Aoki, 2001). The difficulties found in modifying an existing order tend to rise with the size of a community, because of the larger heterogeneity. More collective orders are more likely to fail to evolve in line with changing preferences, needs, or capabilities: "dynamic maladaptation costs" (opportunity costs of poor or bad adaptation to a new context) rise.

3.2.2- Capture

Centralization also generates an effect in terms of asymmetry among individuals. It increases bargaining imbalances even if they are pre-existing. To understand how asymmetries in bargaining power increase with centralization, consider the process of institutional emergence described in Section 2.2. Collective orders result from processes of progressive adhesion by agents. Initially, these orders are created by a kernel of agents with close or similar needs. This initiates "clubs". Other individuals can decide to join a "club", but they face maladaptation costs because the rules were not initially designed to meet their specific needs. However, they have incentives to join a club because the benefits of doing so (lower transaction costs when interacting with other members) more than offset these maladaptation costs. Clubs are then organized around a kernel of core members, who are able to impose their preferences to more peripheral members. The balance in bargaining power between core and peripheral members increases with centralization, as the latter have fewer exit options when the order becomes more

centralized in a given society, not to mention the case it becomes the generic/hegemonic one. Additionally, the clubs leverage the initial bargaining power of core members, since its existence and growth decrease the exit options of non-members, who have fewer opportunities to create alternative clubs. [17] Therefore, collectivization of ordering entails redistribution of transaction costs and capture of wealth. The fundamental driver is the reduction of the exit options for the victims of this capture. In a normative perspective the point is that capture is not only a matter of redistribution: it impacts efficiency because it biases incentives in the use of resources.

Capture occurs internally between members, and also externally towards outsiders. Both "internal" and "external" capture increase with centralization. The probability of internal capture increases with the scope of application of an order because there are both more incentives and more opportunities to do so.[18] First, the larger the population under a unified order, the greater the incentives for core members to collude since the area for collecting rents is wider. Second, the size of the population also impacts the probability to form coalitions. Jurisdictions with greater reach have a more heterogeneous population of members, which encourages sub-groups to push for the creation of generic rules in their favor. These sub-groups can be members of the initial kernel, or coalitions that attempt to oust them to redesign the collective order to their benefit.

External capture occurs when rules are used to create barriers to entry in order to benefit from an oligopolistic market structure and to control competition among rivals (Richman, 2004). This corresponds to the well-known case of regulation of quality by medieval guilds, the management of technical standards within technological alliances, not to mention pricing and

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[17] In this section centralization increases the imbalance in bargaining capabilities/exit options, which allows for capture. The difference with the previous section on costs of maladaptation is that the driving phenomena, here, is the formation of coalitions, while previously we discussed the mechanical effect of managing more diversity with centralization of ordering. Maladaptation would occur even if there were no asymmetry in bargaining capabilities among players. Either agents would choose systems of rules that would be poorly adapted to their needs, or they would opt for system of very incomplete rules allowing adaptation through local/bilateral negotiation, which would mean that the order would be, in practice, quite decentralized. Asymmetries in bargaining capabilities allow the adoption of common, while asymmetric, rules.
That said, the (rising) bargaining asymmetries induced by more centralization impact the consequences of the (increasing) heterogeneity of preferences. Core members of expanding institutions have less incentives to adapt collective rules to peripheral members' needs, since they can externalize costs of maladaptation on them, and since the coalition face lower degree of competition.

[18] This relationship between "core-periphery" structure and asymmetric bargaining capabilities fits with recent results from the economics of social networks (see, for instance, Hojman and Szeidl; 2008, Goeree et al., 2009). This literature shows that a wide variety of social networks share two features: a small number of agents act more "centrally" in the network (like in a "star network" where only one agent has a connection with all others); a positive correlation between centrality and payoff.

quality management rules in force in transaction chains. In a decentralized context, "external" capture is less likely than in a more centralized one. Indeed, there are more exit options. Moreover, the victims of monopoly (or monopsony) capture by a community have strong incentives to form a coalition aimed at weakening or even destroying this capacity for capture. Both possibilities decrease with centralization. [19]

3.2.3- Information Costs

The last factor hindering the benefits of centralization is the rise in information costs due to the cumulative effects of information asymmetries and bounded rationality since a common regime of governance is applied to a larger population. This phenomenon does not rely on population heterogeneity.[20] Costs of decision and incomplete information lead to base the management of larger communities on information that is biased through communication and processing chains. These biases are magnified when agents act strategically. This is also true when it is question of designing/negotiating rules. Those in charge of the design — if it is centralized — or the community of negotiators — if it is decentralized — will have to take into account a larger set of information transmitted along longer lines of communication in a wider community than in a small one, with scaling-up phenomena in terms of complexity and in terms of information biases. The question of enforcement is discussed more extensively below. Indeed, enforcement becomes more crucial with centralization since the incentives to shirk are boosted by the rising cost of maladaptation and intensity of capture weighting on the increasing share of marginalized agents in the society.[21]

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[19] Capture is not only the "dark side" of private ordering (like organized crime) as pointed out by Milhaupt and West (2000), it is also a potential strong risk of public institutions, as highlighted by North and Weingast (1989), and, more generally, by Public Choice. The former are focusing on "external" capture; the latter on "internal" one. When ordering is centrally implemented, the only way to limit capture is to implement checks and balances in the governance system — i.e., "constitutional" guarantees — as extensively discussed by the literature in political science and in political economy; from Montesquieu to Weingast (see also Brousseau et al., 2010, to cast this debate in the centralization/decentralization one).

[20] Information asymmetries are obviously positively influenced by the heterogeneity between two individuals; i.e., by the number and the amplitude of their differing characteristics. However, even for a homogeneous population the average level of information asymmetries between individuals increase with the size of the population governed under a common regime for reasons — bounded rationality and information costs — analyzed in details below. To put it another way, information asymmetries raise both with the heterogeneity of agents in type and with the number of agents. We consider here the second effect only, since the former is a structural characteristic of the population, which is not influenced by the level of governance chosen, while, of course, it influences the level to be chosen; see Section 4.

[21] A centralized order that applies to a heterogeneous population results in higher maladaptation costs. Agents "struck" in this order have therefore greater incentives to cheat, which increase enforcement needs. Using Hirshman's categories (1970), we can compare the relative tendency of agents to comply with centralized and decentralized orders. The more generic the order is, the fewer exit option for members: agents should therefore be

As pointed out in Section 3.1.2, centralization offers benefits in terms of enforcement because of the ability to rely on peers and/or specialized supervisors to detect infringers and punish them. However, this requires transmission of information among agents to ensure rule breakers are truly punished. Group size hinders the capability of both community-based and specialized enforcement. In peer-based monitoring communities, information asymmetries are likely to rise with the size of the community for at least three reasons.[22] Firstly, if each peer remains in touch with all the members of the community, he will devote less attention to each of them (Carpenter, 2007). Secondly, if the costs of transmitting information to peers increase with the size of the community, not all members will be informed.[23] Furthermore, the costs of transmitting information and the resulting information asymmetries decrease the chances of being detected as a negligent supervisor. This hinders incentives for each member to participate in supervision and retaliation. Thirdly, information about misconduct may simply fail to reach the agents able to punish infringers. Moreover, some peers can use their low profile to harm the reputation of some members (for various strategic reasons), even if the latter has not cheated, which affects the credibility of the statements made by peers.

The same phenomena occur with specialized supervisors. If the supervisor has restricted observation capabilities, he will devote less attention to monitoring each individual as the size of the community expands. Secondly, if a network expands in such a way that the supervisor has no longer a direct link with each individual, the "distance" between the supervisor and peripheral agents increases as well as the number of links in the networks. If there is a loss of information (or additional information costs) for each added links or for larger distances, a growing network exhibits higher information costs. As the size of the community to be overseen grows, the greater the information asymmetries between specialized supervisors and supervisees will be. One example is provided in Bernstein (1992) and Richman (2004) when they stress that, while public courts are reluctant to incorporate lost profits into expectation

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encouraged to exercise their voice. However, given the wide diversity of interests at stake, an individual voice is hardly likely to convince the other parties to modify the order. Thus, when it comes to compliance, individuals subject to a generic order have stronger incentives to cheat., Whereas, when governance is decentralized, individuals can either depart or negotiate adaptations according to their specific needs. This could also be interpreted in terms of "legitimacy" of the rules resulting from the voluntary adhesion of individuals to contracts and local institutions. Members of a more local order should more "spontaneously" comply with the order.

[22]The following factors might explain the limits of reputation-based enforcement for large population. This is consistent with the idea suggested by Li (2003), and formalized by Dixit (2004), that the extension of self-enforcing agreements is plagued by rising marginal costs.

[23] The same applies if information costs are related to the "span of control" by each peer. Each peer will only monitor a sub-set of the community.

damages (due to lack of information for accurately measuring this lost value), arbitrators in community-based private law routinely rely on them. This highlights the ability of "local" supervisors to finely assess compliance, being close to the field and aware of current practices.

To conclude Section 3.2, the combination of maladaptation costs, higher willingness and ability to capture rents, and information costs might explain why certain institutions remain local. Given the nature of the coordination task to be performed, the heterogeneity of the population, the topology of potential transactional networks, centralization costs may well hinder the benefits highlighted in Section 3.1. Figure 1 sums up the different factors at play in the centralization/decentralization trade-off discussed in Section 3.

Figure 1: Factors affecting Trade-offs of Centralization

Benefits *(Advantages of collectively settling coordination problems compared with more decentralized levels)*	Costs *(Inefficiencies of collectively settling coordination problems compared with more decentralized levels)*
• Scale and scope effects (reduction of redundancies) • Learning and specialization benefits • Reduction of collective welfare losses (internalization of externalities among local orders, positive networks effects of common rules)	• Maladaptation (increasing heterogeneity of preferences, reduced renegotiability of existing set of rules) • Private capture (increasing imbalance in bargaining capabilities, greater incentives to distort collective governance) • Information (cumulative asymmetries of information and bounded rationality)

4- ALIGNING GOVERNANCE LEVEL WITH THE CHARACTERISTICS OF INTERACTION GRIDS

Up to now, we have been describing the main drivers of cost-benefit of alternative governance levels. We will now identify a set of factors that are relevant to designing an efficient governance framework based on the "alignment" between the level of governance and the relevant factors. As stressed before, Fiscal Federalism explains the multilevel nature of the state by the scope of the various public goods under consideration and the distribution of preferences in the matter. The provision of economic order through the creation of rules and related enforcement devices is a particular type of public good. We aim at identifying the

characteristics of the coordination issues that justify different scope of provision.[24] We identify the factors driving heterogeneity in coordination needs of a population to analyze how the level of governance may be aligned on these needs (Section 4.1). We then discuss the exogeneity of the considered drivers of governance level (Section 4.2).

4.1. Four Characteristics Shaping Coordination Requirements

We identify and describe four "independent" characteristics of a population's coordination needs. Two of these characteristics concern the set of individuals in the population, while the others concerns the structure of their relationships (which relate to the social division of labor). We analyze how each characteristic impacts the relative cost of alternative levels of governance.

First, the *size of the population*. The wider the population of the jurisdiction under consideration, the larger scale and learning effects (due to fixed costs), and the larger information distortions and risk of private capture ("larger field to harvest" effect). This results in contrasting impacts on measurement and enforcement costs. On the one hand, larger scale and learning effects call for more centralization of the design of rules. On the other hand, larger incentives to capture combined with wider information asymmetries increase incentives to shirk, and therefore enforcement costs of more centralized order. A decoupling between designing order and ensuring compliance is to be expected with the increasing size of a population. While centralized (common) rules could be adopted, enforcement should remain partly decentralized. "Partly" draws from the fact that there exists nevertheless scale, scope, and reduction of collective welfare losses effects when centralizing/mutualizing enforcement (see Section 3.2). Anti-trust policy in the European Union illustrates this decoupling. While many member states had competition laws, the EU legislation now prevails over national ones. However, its implementation lies in the hands of national judiciaries and anti-trust authorities. Anti-trust cases are under the responsibility of national competition authorities. Only those with a "community dimension" (for instance, international mergers) are under the responsibility of the European Commission. In a sense, this is similar to the enforcement of the US Federal

[24] In a sense, designing rules and ensuring compliance could be considered as alternative "public goods" with different optimal levels of provision. It might justify providing them at different levels in specific contexts. In our analysis, we show that except for the size of the population, the impact of the various features of the population we analyze on cost of centralization/decentralization goes in similar directions for the two dimensions. The magnitude of the relative effects could however differ for the two public goods, and a more detailed analysis and precise assessments are certainly needed.

legislation. It is essentially implemented by local courts at the city or state levels, while the federal level is essentially responsible in specific cases or in appeals.

Second, the *degree of heterogeneity* also impacts on the relative costs of centralization versus decentralization.[25] Effects on measurement and enforcement costs fall here in the same direction. Increasing heterogeneity calls for more decentralization. It negatively impacts scale, scope and learning effects, since there are few common characteristics across individuals and their coordination problems. Increased heterogeneity raises maladaptation and enforcement issues because information asymmetries are, everything equal, wider in a more heterogeneous population (see Note 20 in Section 3.2.3). In other words, less centralized/uniform design and enforcement should be expected in a more heterogeneous population. Alesina et al. (2004) illustrate this in the context of local political jurisdictions (US school districts): the population heterogeneity (in terms of race, ethnicity, income, etc.) has a significant positive impact on the number of local jurisdictions. One driver of this result is the need to compromise in order to reach a shared policy. Heterogeneity of preferences increases maladaptation costs, which results in smaller districts.

Third, the *degree of clusterization* matters. This notion characterizes the agglomeration effects in the structure/topology of the network of bilateral interactions. There are clusters when links among individuals are not uniformly distributed. Among some "groups", these links are multiple and intensive, while inter-groups connections are weak and scarce.[26] Increasing clusterization calls for centralization (of both design and enforcement) at the sub-population level. While drivers of centralization play positively within each sub-population characterized by strong links, all the inhibitors — maladaptations, information asymmetries, etc. — play strongly against centralized governance at the population level. Clusterization of relationships should result in centralization at the cluster level i.e., at intermediate governance when considering the entire population. Ostrom (1990) provided numerous examples of collective/community governance implemented by agents exploiting a common good (like a fishery). Milgrom, et al. (1990) and Greif (2006) also provide examples of self-governance of

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[25] Heterogeneity may be proxied by the average "distance" among individuals in the population even if other measures might also be relevant. For instance, the degree of "fractionalization" of a population defined as the diversity of the population around several dimensions like religion, race, ethnicity, and language is relied upon by Alesina et al. (2003).

[26] It can be "measured" by the standard deviation of the distance among individuals in the population. For a given degree of heterogeneity across individuals, a wider standard deviation indicates clusters made of "close" individuals separated from each other.

trade within the communities of long-distance traders. Governance operates on a collective level within communities characterized by the intensity and frequency of their interactions.

Fourth, the degree of interconnection among individuals matters. The average number of links among individuals in a population indicates the intensity of relationships among individuals. This is a direct consequence of the degree of division of labor in the society being considered. Under autarky, it tends to zero. When the social division of labor is deep, each individual in the society needs to interact with many others. A higher degree of interconnection should favor centralized governance. On the one hand, a higher degree of interconnection reduces the relative cost of centralization, since centralized governance allows managing scope effects, to cope with collective welfare, and since information asymmetries are decreasing because of the intensity, redundancy and crossing of links among individuals, resulting in reduced negative effects of centralized governance. In contrast to this, a higher degree of interconnection raises maladaptation and private capture issues, because of the reduced exit options of each individual in the society.[27] These negative effects should however be mitigated in the long run. Those harmed by a given order may consider the possibility of escaping its negative effects by reducing their dependency and moving to autarchy. Restricted propensity for capture should therefore be expected of those able to manipulate governance in their favor, since they could anticipate the potential negative impact of increasing autarchy on their own welfare.[28] The creation of the Federal Reserve System illustrates the governance consequences of a higher degree of interconnections among agents. This was created in 1913 with the Federal Reserve Act (see Broz, 1999, for a more detailed account). At that time, innovations in the transportation and communication systems improved interconnections among economic agents (increasing both the number of "connections" among agents and the frequency of transactions). The economics benefits of this increased exchange activity rested however on the financial system's ability to facilitate exchanges. The banking system was characterized by thousands of state-chartered banks issuing notes in order to supply money. While various acts in the 1860s enacted legislations that helped provide a uniform national currency (through the incorporation of banks chartered by the federal government), this system still suffered from a series of financial panics

[27] We are considering here the exit option of an individual toward the collective governance regime. Of course, in a more interconnected network, each individual has more exit options when considering bilateral/interindividual relationships.

[28] This assumption of farsighted rulers is relevant in our normative perspective. It is not in the interest of the rulers/members of the kernel to incite those who could choose their degree of insertion in the social division of labor to reduce their involvement, since it impact the collective wealth, which is the basis of harvesting rents for rulers.

and strong seasonal interest-rate fluctuations. The creation of a central bank superseding the national banking system largely mitigated these problems.[29]

These four dimensions that characterize the nature of collective coordination problems for a given population and for alternative domains of governance allows us to propose general predictions about the optimal level/degree of centralization of governance. They concern both the set of individuals and the structure of their relationships. The resulting (testable) propositions are summed up in Figure 2.

Figure 2: Expected Influence of the Characteristic of the Transaction Grid on the Level of Governance

Interaction Grid Characteristics	Prediction (everything else equal)
Size of the Population	Should favor centralization of rule-making, and decentralization of enforcement,
Degree of heterogeneity (Average distance)	Should favor decentralization of governance
Clusterization	Should favor intermediate level of governance (at the cluster level)
Degree of Interconnection (Average Number of links/individual)	Should favor centralization of governance

4.2. Endogeneity

Up to this point, we considered the structure of the transaction grid as exogenous. One might however expect the organization of governance at time t will impact on the networks of transactional relationships at time t+1, which, in turn, would determine the institutional framework required at this later period. For instance, unified/centralized governance provides the basis for the development of inter-individual links and should impact the degree of interconnection. Moreover, if we assume that agent's preference and motivations can be

[29] It would be probably more accurate to describe the Federal Reserve System as a "multilevel system" in which the national Federal bank (the "central bank") coexists with regional Federal Reserve Banks.

influenced by their interactions with others, the degree of heterogeneity in a population might be influenced by the governance regime which favors or not unity, depending upon its degree of centralization. A dynamic co-determination process might therefore exist between the vertical organization of governance and the characteristics of the population and its system of relationships. This however should come to play mostly in the long run. In the short term, those who design/choose or simply participate in the establishment of a governance regime are constrained by the structure of collective coordination problems caused by the socio-economic transaction grid, which is a "given", because it is based on wide sets of (partly interdependent) inter-individual relationships and agreements and choices in matter of specialization and investments. Therefore, they are slow to evolve because their evolution requires numerous decentralized decisions, which are not automatically coordinated over time. Evolutions are also hindered by the interdependencies among these choices, which raise a collective coordination issue. In the short run, then, socio-economic networks tend to be given and institutional design should be a question of adaptation of governance to the nature of the coordination problem. We say "should be" because our analysis is normative. In practice, coalitions (either economic or political) can emerge to prevent alignment.

Our analysis of the fitness between the degree of centralization of governance and the nature of the socio-economic network to be governed is relevant, both because it provides guidelines for efficient governance solutions, and because it deals with the implementability issue. Our "predictions" allow us to recommend governance solutions that should be acceptable because it would fit with the nature of the problems, resulting in efficiency gains that could then be redistributed, if necessary, to guarantee adoption.[30]

6 - CONCLUSION

Based on a theory of the formation and relative efficiency of different levels of governance within a given community, this paper considers the essential trade-offs in centralization/decentralization of governance. It proposes a comprehensive analysis for determining the optimal level of governance at which an issue should be addressed.

[30] If other considerations (e.g., the power to impose arrangements that allow those in power to capture rents) can lead to the choice of arrangements that are different from the efficient one, efficiency is nevertheless a choice that creates a "surplus" that can be redistributed among the various stakeholders. Thus, the efficient choice remains a point of attraction/equilibrium even if we admit that problem of credible commitment in compensating the losers may hinder the ability to switch to the more efficient equilibrium (in the logic analyzed by Acemoglu and Robinson, 2005).

Our framework is helpful for the analysis of institutional design (both in a normative and positive perspective). Actual institutional systems are made of many orders settled at various levels. Institutional design does not consist of choosing between full centralization (or uniform order) and full decentralization (or customized orders). It consists of aligning various coordination issues with diverse levels of governance. This might also imply implementing new governance levels when needed. Moreover, by disentangling the design of coordination rules and the issue of ensuring compliance, we highlight that the optimal level can be different for design and enforcement, while we acknowledge that there might exist interdependencies between the two components of governance. Exploring such interdependencies would certainly contribute to the exploration of the often highlighted, while remaining under-analyzed, issue of institutional complementarity.

Our analysis is also useful for generating empirical predictions about the match between governance levels and types of coordination issues. Our contribution lies in highlighting that, beyond the scope of public goods to be provided, a major driver of the selection of a level of governance lies in the relational characteristics of the population under consideration. Our analysis could certainly be further refined. For instance, the influence of the degree of recurrence of inter-individual transactions on the various drivers and inhibitors of centralization could certainly be explored in more depth. When transactions are repeated many enforcement issues are solved more easily, thus decreasing the need for more centralized enforcement. At the same time, we applied a principle of parsimony to point out the essential factors that influence the optimal degree of centralization of governance. Among other things, our framework is able to explain why, in a given population — e.g., a nation — different issues could lead to different organizations of governance, because the structure of relational networks to govern would be different. Furthermore, two networks of transactional relations similar in their structure could lead to contrasting degrees of centralization in two different populations. This might explain why polity or economic governance should be organized on different basis in countries of different sizes, or with contrasting degrees of population heterogeneity, or with contrasting levels of development (and therefore of division of labor), etc. Our analytical propositions certainly need to be tested in various contexts, essentially to measure the magnitude of the various effects highlighted in this paper. It is needed to result in practical recommendations and to analyze how the trade-offs in matter of centralization of governance work in practice.

While our contribution calls for more development, we believe our efforts to propose an integrated framework allows to point out the similarities across applied issues, which are, most of the time, envisaged from very different and hard to reconcile perspectives; e.g., organization of federal systems, global governance issue, public versus self-regulation, etc.

It should be pointed out, however, that in order to achieve better predictions/recommendations, our frameworks should be complemented by two types of developments. Indeed, our approach is an attempt to propose criteria for an optimal degree of federal adjudication. In the spirit of the economics of federalism, this paper suggests that each coordination domain has an optimal level of governance. This does not mean, however, that an optimal system of governance should be "panarchic" (Sewell and Salter, 1995) in the sense that each category of issue to be collectively governed (such as education, transportation, justice, defense, etc.) should lead to the creation of an ad-hoc jurisdiction specifically dedicated to this problem, which would, in turn, lead to overlapping jurisdictions (see the concept of Functional Overlapping Competing Jurisdictions proposed by Frey and Eichenberger, 1999, 2001). The ability to govern each problem at its optimal level relies on the possibility of isolating each domain of governance to guarantee that no externalities will occur among *ad-hoc* jurisdictions. Exploring whether complementarities among domains of governance exist or not is therefore essential to complete our analysis. Plus, if transaction costs are positive, the proliferation of authorities could generate social costs alleviating the benefits of optimally settling jurisdictions. Documenting the relative benefits of governing at the "right" level versus the marginal costs of creating an additional jurisdiction is therefore essential. We did not discuss these two problems in this paper, but our analytical propositions contribute to a broader approach aimed at identifying the relative efficiency of alternative designs for an institutional system of governance.

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