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Chapter 5

Governing the (Banking) Commons

Polycentric Solutions to Bank Runs

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The 2007–2008 financial crisis has led macroeconomists to reconsider some fundamental ideas about monetary institutions and banking stability (Beckworth 2012; Sumner 2012; Paniagua 2016). The recent experiences with business cycles and the Great Recession have led some economists to put monetary institutions in general, and central banking arrangements in particular, under institutional scrutiny (Hetzel 2012; Sumner 2012). These institutional concerns have largely come from the passive, or even negative, role that central banks, particularly the Federal Reserve, played while managing the housing boom and in exacerbating the early stages of the 2007–2008 recession (Beckworth 2012; Selgin, Lastrapes, and White 2012).

Despite these critical apprehensions about the passive (and distortive) role of central banks, as well as the Fed’s contractionary monetary policies at the early stages of the financial crisis, most economists now recognize the important role that the Fed played later for providing additional liquidity to the system when the financial system experienced a panic (Bullard 2010). Indeed, as Bullard (2010, 156) has commented, one of the greatest lessons that economists have gained from the crisis is “about the Fed’s role as lender of last resort on a grand scale. . . . The Fed’s ability to act decisively in a crisis through its lender-of-last-resort (LOLR) function far outstrips previous conventional wisdom.” Paradoxically, it means that most economists now recognize the importance of central banks as providing the services of liquidity and “lender-of-last-resort” services to the banking system in order to avoid panics; however, they do so without questioning why the system entered a financial panic in the first place (Hetzel 2012; Sumner 2012). A positive outcome of the post–Great Recession literature is that questions about how to best deal with banking panics, with bank runs, and how to institutionally attain a robust banking system have once again risen to notoriety (Salter 2016).

Alas, institutional analysis concerning different banking arrangements, and attention to the “institutional details” that make monetary institutions robust or fragile are one of the most pressing, yet highly disregarded, subfields of monetary policy and banking scholarship.

Yet, despite the advances in the post-recession literature, not much research has focused on any fundamental and institutional questions derived from the empirical evidence concerning central banks’ poor performances (Selgin, Lastrapes, and White 2012); research has also ignored analyzing the recent unfortunate results of central banks in managing the macroeconomy (Hetzel 2012). In other words, considering the statistical evidence and the recent poor track record of central banks (Selgin, Lastrapes, and White 2012), the disregarded question concerns the institutional and inherent need for central banks in order to achieve a resilient and stable banking system (Schwartz 1993; Paniagua 2016).

Hence, despite the growing number of criticisms of our current institutional state of affair in money and banking, few scholars have seriously engaged with the more fundamental question: Ultimately, are central banks necessary? (Schwartz 1993). The present macroeconomic consensus and policy perspective on financial stability and bank runs are persistently narrow and monocentric (Salter and Tarko 2018). What is missing in the postcrisis literature on banking stability is a more fundamental questioning about the institutional need for monocentric-only solutions, such as central banks, in order to attain a robust and stable banking order (Paniagua 2017). The banking literature is also conceptually trapped within the false dichotomy broadly identified by the Ostroms between “Leviathan” and “anarchy”; in other words, they disregard the possibility of a social and self-governing order that potentially exists in between these two polar ends (E. Ostrom 2010). Consequently, the banking literature lacks the proper conceptual tools for understanding institutional diversity and polycentricity in banking; thus, we find few banking scholars thinking positively about banking governance and bank runs *without* necessarily thinking also about monocentric forms of financial government.

The present chapter argues that a polycentric system can better provide crucial banking services—such as safeguarding from bank runs and emergency liquidity—than a monocentric system. Goodhart’s (1988) *The Evolution of Central Banks* established that central banks are institutionally necessary, and that they evolved naturally, to provide banking services such as economizing on reserves and surveying bank members. These “natural” evolutionary claims of central banking have been deeply questioned, for example by Paniagua (2017). Goodhart, and most contemporary banking scholars, have contended that what makes central banks ultimately indispensable are their unconstrained capacities to create money in order to solve banking panics. The need to govern bank runs *must* incorporate the institutionalization of a

“lender of last resort” to allow the expansion of liquidity. Goodhart claims that providing these services must be delivered by a single and dominant center of decision-making. This chapter explores these monocentric claims, examining them throughout the work of the Ostroms on polycentricity and self-governance.

By borrowing from the Ostroms, this chapter argues that polycentric banking systems would not need a single and dominant center for providing LOLR services; rather, they would develop a polycentric and overlapping system of institutions and contracts that achieve *both* severely lessening the possibility of systemic panics in the first place (*ex ante* functions) and providing also crucial banking, reputational, and liquidity services whenever needed (*ex post* functions). By arguing that polycentric systems can deal with governing bank runs and provide LOLR services, this chapter contributes to the literature on alternative monetary institutions. Ultimately, understanding the capacity of polycentric systems in effectively self-governing the banking reputation commons and bank runs will also challenge Goodhart’s “Gargantuan claims” concerning the inherent need for a monocentric banking system in order to manage panics.

First, this chapter explores Goodhart’s institutional justifications for central banks and the arguments employed by the banking literature for the inherent need of monocentric structures in governing bank runs. Second, it reviews relevant Ostromian insights on polycentricity and institutional diversity, relating them also to polycentric banking. Third, it analyzes the role that clearinghouses play *within* polycentric banking systems and how they contribute to self-governance and the coproduction of confidence. Fourth and finally, it presents necessary historical evidence concerning how polycentric banking systems have provided crucial governance and monitoring banking functions to govern bank runs. There is a concluding section.

THE GOVERNANCE OF BANK RUNS AS INSTITUTIONAL JUSTIFICATIONS FOR CENTRAL BANKS

Goodhart’s (1988) *The Evolution of Central Banks* established that central banks are institutionally necessary and theoretically justified. Moreover, he argues that they have evolved naturally, as to provide a crucial bundle of banking services such as economizing on reserves, financial stability, and the surveillance and regulation of its bank members. Goodhart (1988) proposes that central banks evolved institutionally and gradually from commercial proto-central banks as the natural outcome of banking systems’ inherent economies of reserve holdings. In this seminal book, he provides

both historical and theoretical arguments to sustain his claims. However, these “inevitable” and “natural” institutional-evolutionary claims of central banking and the claims concerning their inherent institutional necessity have been questioned both theoretically and historically, such as by Dowd (1994), Paniagua (2017), and Selgin and White (1999).

Nevertheless, in responding to Paniagua (2017), Goodhart has restated his arguments, stating that what makes central banks *ultimately necessary* is their unconstrained capacities to create a great deal of extra money (liquidity) in order to solve banking panics and ameliorate bank runs. Goodhart contends that the need to govern bank runs must incorporate the institutionalization of a liquidity “safety valve,” or an uncompetitive (nonprofit making) “lender of last resort” within the banking system, in order to allow the expansion of massive additional liquidity when required, and when illiquid banks are under financial distress.

Goodhart (1988) admits that competitive alternative institutions and decentralized (nonmonocentric) systems can indeed provide *some* crucial banking services such as internal regulation, monitoring bank members, and the netting and clearing of reserves (as Paniagua [2017] argues); however, he also suggests that those decentralized and polycentric banking orders are unable to promptly, and at will, create a great deal of extra money in the quantities and to the scale that central banks can. Consequently, he argues, *nonmonocentric* banking systems are unable to provide massive liquidity services, and thus are also incapable of successfully governing systemic banking panics. As seen by the financial panic and events of 2008–2009, the resolution of banking panics and bank runs requires a great deal of extra money (Bullard 2010; Gorton 2010). Nevertheless, Goodhart continues to claim that voluntary banking associations and private self-interested banks are unable to cooperatively provide those services and *at the scale* required to curtail bank runs and panics. At the very least, Goodhart further contends that the need to deal with banking panics must incorporate the institutionalization of a nonprofit-seeking, hierarchical, and massive “safety valve” for the expansion of liquidity to banks when required.

Importantly, it is assumed above that both competitive and private banks, as well as groups of them in clearinghouses, lack the incentives, coordination capacities, long-term vision, and the capacities to overcome collective action problems—during times of a banking panic—and thus unable to overcome the tragedy of the banking commons (Goodhart 1987). In other words, narrow and self-interested banks will have the immediate incentives to *not* contribute to *collective solvency* and liquidity; they will refrain from lending to each other and, as a result, threaten the interbank liquidity and overall solvency of the system. In their own narrow and self-interested quest for survival and liquidity, banks will make a rational, yet long-term inefficient, use of

resources during panics by hoarding money and negligently allowing other banks to fall into insolvency, which would exacerbate the tragedy for all banks, including themselves (Gorton 1988).

Consequently, the resolution of banking panics requires strong coordination, leadership, overcoming short-term private and commercial interests, and a great deal of extra money or liquidity (Gorton 1988). Nevertheless, these are exactly the banking services and group coordination that Goodhart contends clearinghouses and private banks *cannot provide* together in times of distress, and at the scale, that central banks can. Goodhart maintains that the provision of these crucial kind of cooperative and collective banking services (e.g., collective action to confront the sudden and massive expansion of liquidity in times of stress, and the governance of bank runs) must be delivered by a single (noncompetitive and government appointed) dominant center for monetary decision-making.

Accordingly, Goodhart's institutional justification for central banking, or for a monocentric organization in banking, ultimately relies on two points. First, it rests on correctly recognizing an economic need for providing *both* crucial liquidity or LOLR services, and also the need to govern the reputational banking commons as to manage bank runs. Second, on the rather questionable assumption that alternative *nonmonocentric* or polycentric arrangements in banking are *incapable* of providing those crucial LOLR services, meaning they are also unable to robustly maintain banking governance, uphold joint-confidence, and manage bank runs.

As suggested by the banking literature, bank depositors may not be equipped with specialized and accurate knowledge, nor prompt information to be able to distinguish between the behavior and soundness of the banking industry's individual members (Bordo 1990; Gorton 1988). Thus, in the face of severe information asymmetries, opacity, and search costs, depositors and investors basically use collective or generalized reputation in order to judge an individual firm or a bank. Because of those information asymmetries, depositors simply use narrow information that is revealed about a few specific banks in order to evaluate the soundness of other banks (Yue and Ingram 2012). As a result, a financial shock that affects a few banks can have *larger spillover effects* and damage the confidence in the entire banking system (Goodhart 1988). If an illiquid but *solvent* bank cannot quickly and successfully distinguish itself from the insolvent and distressed banks in the system, then the reputational commons problem arises, which would then exacerbate the financial panic throughout the entire banking system (Gorton 1988).

Negative reputation spillovers from insolvent banks during panics are what ignite indiscriminate bank runs (Bordo 1990; Diamond and Dybvig 1983). Consequently, it makes sense to interpret financial crises, such as the panic of 2008, as essentially informational or reputational problems (Gorton 2010),

or as systemic challenges to correctly governing the joint production of banking confidence (Gorton and Mullineaux 1987). Hence, the severity and magnitude of indiscriminate bank runs are largely dependable upon financial information available and the existence and maintenance of systemic banking confidence (Gorton 1988). Consequently, the crucial collective challenge of governing the “reputation and confidence banking commons” lies at the core of both: the emergence of indiscriminate bank runs and hence a subsequent need for an LOLR agency (Gorton 1988, 2010).

Under such a potential systemic panic situation, the banking “reputation (confidence) commons” problem arises because banks under the LOLR theory are assumed to be unable to collectively manage the system’s informational, reputational, and liquidity commons (Yue and Ingram 2012). Thus, sound (but illiquid) banks are assumed to be *unable* to collectively and confidently signal to markets, and to communicate credibly also to bank depositors the actual differences between insolvent and solvent banks in the system (Goodhart 1987, 1988). They are assumed to be incapable of conveying the long-term soundness and viability of potentially illiquid banks to markets, which comprises sensitive information for depositors that would have been required in order to subside indiscriminate bank runs and to reestablish confidence in the banking system (Goodhart 1987; Gorton 1988). In other words, “the effects of negative spillover on market confidence created a ‘reputation commons’ for banks during times of panic” (Yue and Ingram 2012, 3). Thus, the reputation and economic viability of banks during financial shocks are affected by factors and relevant information *beyond* their narrow and individual control (Gorton and Mullineaux 1987). In consequence, the “interdependence of organization and industry reputations creates a challenging problem of [an intangible reputational and confidence] commons” (Yue and Ingram 2012, 23).

Essentially, the LOLR literature critically assumes that profit-seeking banks are unable to collaborate and jointly manage the production of collective reputation, the governance of confidence, and the correct provision of information diffusion mechanisms for banks, which are required to govern bank runs. The joint reputation of sound management, transparency in banks’ balance sheets, and low systemic risk are “intangible commons” because banks share illiquidity and insolvency penalties and risks, as well as the long-term rewards associated with the collective reputation and soundness of the banking system as a whole (Yue and Ingram 2012).

Indeed, if we consider the classification of the types of goods (V. Ostrom and E. Ostrom 1977), then the problems of generating and preserving banking joint confidence and the challenges of preserving a banking group’s reputation—to avoid indiscriminate bank runs—more closely resembles a problem of governing intangible “commons” or “common-pool resources” (CPRs)

than managing a public good. This is mainly due to *rivalry in consumption* that affects the shared reputation capital of all banks (Yue and Ingram 2012). If one bank is unsound, is insolvent, and has mismanaged its financial activities, it in turn degrades the reputation capital of the group and the other banks can no longer enjoy the system's collective reputation capital and sound confidence. Thus, if a few insolvent and mismanaged banks degrade the image and undermine the reputation capital of the group, then *less* reputation capital is left for other sound banks to manage and to use accordingly to subside indiscriminate bank runs.

Interpreted in this Ostromian manner, the systemic problem of bank runs relates to a banking self-governance challenge, and to an *intangible reputational commons problem*. Put differently, a collective banking challenge concerns "how a group of principals [e.g., banks] who are in an interdependent situation can organize and govern themselves to obtain continuing joint benefits when all face temptations to free ride, shirk, or otherwise act opportunistically" (E. Ostrom 1990, 29). The broad task of this chapter is to extend the Ostroms' framework of institutional analysis and self-governance to the banking literature in order to analyze how systems of self-governance and polycentricity could be applied in banking to overcome the collective challenge of bank runs without a definitive center of financial power.

It is important to recognize that the Ostroms did not explicitly use the ideas of polycentricity and self-governance in the banking literature, nor more broadly in macroeconomics. They did, however, acknowledge that institutional analysis and the concept of polycentricity could be successfully applied to numerous challenging situations in which groups of individuals *seem* to be "trapped" in settings resembling the tragedy of the commons, but were able to overcome them through collaboration and endogenous rules (E. Ostrom 2010). Moreover, V. Ostrom (1991) recognized that polycentricity seems to be the "structural basis of [resilient] self-governing systems." In other words, successful cases of self-governance and groups overcoming several challenges related to collective action problems or the tragedy of the commons seem to be strongly associated with the groups' capacity of properly using the principles of polycentricity and endogenous rule formation to overcome collective challenges through institutional creativity and consent (Aligica and Boettke 2009; E. Ostrom 2005). Following, if banking scholars are concerned about the potential self-governing capacities of banks as voluntary groups and their actual collective capacities to move away from the reputational "tragedy" of the banking commons, then banking theorists should also be concerned about how the principles of polycentricity could also apply to banking regimes and financial governance. It seems appropriate to extend the Ostroms' oeuvre toward new avenues of research, such as the institutional possibility of polycentric banking systems to govern bank runs

(Paniagua 2017; Salter and Tarko 2018). Such novel banking extensions and new applications of the Ostroms' existent polycentric framework will be this chapter's main contribution.

As hinted at earlier, regrettably the LOLR literature still holds a "Hardinian" view regarding the capacity of private banks to self-maintain the reputational commons and, thus, to subside a banking panic. This pessimistic "Hardinian" view is sustained upon the assumption that the mere presence of self-interest, opportunism, and competitive relations among banks will be enough to permanently undermine the willingness and capacity of banks to cooperate (Goodhart 1987, 1988). Thus, the LOLR theory, similar to the monocentric theory of governance in political science and echoing the underlying setting of the tragedy of the commons, also seeks to "invoke an image of helpless individuals caught in an inexorable process of destroying their own resources" (E. Ostrom 1990, 8). Put differently, the proponents for monocentric solutions for bank runs make institutional claims based on the crucial assumption that local actors and commercial banks would not be able to negotiate or bargain their way around inefficiencies or collective challenges, no matter how hard they try.

To conclude, the LOLR theory obtains the negative and system-wide outcome of an undistinguishable and general bank run; it does so by impinging on the crucial, yet questionable, assumption that private banks are unable to *self-govern* the "intangible" reputation and confidence commons, thus making them incapable of collectively ameliorating "the negative spillover effect on market confidence during bank panics" (Yue and Ingram 2012, 1). Thus, similar to the Hardinian vision of the social order that E. Ostrom challenged in political science, the theory on bank runs seems to be also "undertaken with a presumption that individuals cannot organize themselves and always need to be organized by external authorities" (E. Ostrom 1990, 25).

The Ostroms' work shows that other sources of governance might exist beyond requiring a single and dominant center for decision-making. Yet, similar to the Hobbesian view that the social order *cannot* exist without a definitive center of power, macroeconomists have always considered that banking stability requires a single and dominant center for providing banking governance (Goodhart 1988). This "Gargantuan" and monocentric banking stability assumption echoes what E. Ostrom broadly identified as the "fundamental presumptions about the nature of governments as external authorities governing over societies" (E. Ostrom 1990, 18). The alternative proposed here is to instead think about the institutional possibilities for self-governance under polycentric forms of banking.

POLYCENTRIC BANKING AND THE OSTROMS' PRINCIPLES OF POLYCENTRICITY

Bank runs are negative outcomes that arise from being *unable* to collectively govern an intangible and reputational commons challenge (Yue and Ingram 2012). Nevertheless, and following E. Ostrom (1990) insights about collective challenges, the fact that banks' survival largely depends on the reputation of the industry as a whole should create strong private interests for protecting mutual welfare, which in turn should motivate banks to collaborate in order to manage the commons. Similar to what E. Ostrom (2005, 2010) argued regarding local governance, the need for monocentric solutions to govern bank runs and the reputational commons could be avoided and potentially overcome through self-governance within a polycentric banking system that allows for institutional diversity and cooperation among banks.

Theories of polycentric governance have been more consistently developed and successfully applied within the context of governing *tangible* CPRs and also applied to local or ecological communities facing collective dilemmas (Aligica and Boettke 2009; E. Ostrom 1990, 2010). The Ostroms did not apply the principles of polycentricity and self-governance to *intangible* or reputational commons problems, nor to the theory of banking stability and bank runs. However, since indiscriminate bank runs, financial panics, and the need for LOLR services are closely related to cooperative and social challenges of reliably delivering forms of governance and public goods (Bordo 1990), and with collectively governing an intangible and reputational *commons* in banking (the joint-production of banking confidence) (Gorton and Mullineaux 1987; Yue and Ingram 2012), the principles of polycentricity, self-governance, and institutional diversity could be fruitfully extended to financial stability and the theory of bank runs (Paniagua 2017; Salter and Tarko 2018). Indeed, as V. Ostrom suggested, the "principles of polycentricity need to be extended through the whole system of human affairs. This applies to public economies as well as to market economies, . . . in short, to all of the conditions of life" (V. Ostrom 1991, 243). Hence, this section draws a theoretical connection between the Ostroms' general principles of polycentricity and banking institutional diversity and financial self-governance. It does so to argue that the Ostroms' general principles of polycentricity are applicable to some cooperative and competitive forms of banking.

It is important to delineate what it is meant by a polycentric system, and particularly a polycentric system of banking. This chapter's Ostromian approach to understanding alternative (*nonmonocentric*) forms of banking governance is built upon the Ostroms' notion of polycentric governance (e.g., V. Ostrom 1991). A polycentric system of governance is one that is

comprised of many heterogeneous—both collaborative and competitive—decision centers (or nodes), in which

citizens are able to organize not just one but multiple governing authorities at different scales. . . . Each unit exercises considerable independence to make and enforce rules within a circumscribed domain of authority. . . . In a polycentric system, some units are general-purpose governments while others may be highly specialized. . . . In a polycentric system the users of each common-pool resource would have some authority to make at least some of the rules. (E. Ostrom 2005, 283)

Additionally, within polycentric systems, “cooperation is conditional [among the small scale units], involving a certain degree of conflict, as well as entry and exit from larger associations” (Tarko 2017, 66). Thus, “to the extent that these political jurisdictions take each other into account in competitive relationships, enter into contractual and cooperative relationships, or turn to central mechanisms to resolve conflict, they may exhibit coherent, consistent, and predictable patterns of behavior and may be said to function as a ‘system’” (V. Ostrom 1991, 223). For the Ostroms, polycentricity develops as a nonhierarchical, institutional, and cultural framework that allows for cooperation and coexistence of multiple decision centers holding different objectives and principles. Such a nonhierarchical framework therefore contains an evolutionary process of competition, cooperation, and contestation among those diverse viewpoints and governing principles of the coexisting decision centers (Aligica and Boettke 2009).

Put differently, the concept of polycentricity refers to a governance or a social system that possesses many decision centers (individuals, associations, civil society, institutions, etc.) having autonomous yet limited and constrained prerogatives, while such decision centers also simultaneously compete and cooperate under an overarching system of rules (V. Ostrom 1972). However, as the Ostroms noticed, such a system is neither chaotic nor entirely fragmented, as the decision nodes display ordered, overlapping, and cooperative relationships among themselves that persist through time (V. Ostrom 1991). Indeed, spontaneous patterns of collaboration and competition stemming from consent comprise a fundamental feature of polycentricity that allows the systems to attain adaptability, self-organization, spontaneity, and “emergent order” properties. In other words, “patterns of organization within a polycentric system will be self-generating or self-organizing in the sense that individuals will have incentives to create or institute appropriate patterns of ordered relationships” (V. Ostrom 1972, 8).

It is important to recognize that “the existence of a predominantly polycentric political system need not preclude elements of monocentricity from

existing in such a system” (V. Ostrom 1972, 3). This suggests that some elements of command and vertical organization might still exist within a predominantly decentralized and polycentric system. Yet, importantly, under a polycentric system *no* single decision center has an ultimate monopoly over the legitimate use of force and coercion; moreover, the rule of law or an overarching system of constitutional rules constrains the centers. Polycentric systems are ultimately constitutional and rule-of-law-oriented type of systems (V. Ostrom 1991).

Further specifying the concept of polycentricity, V. Ostrom (1971) acknowledged that the “spontaneity,” beneficial emergent properties, and the self-organizing tendencies of a polycentric system are conditioned on three specific institutional conditions or properties at different levels. “Such conditions must be met before . . . a polycentric . . . system becomes a technically-feasible, empirical possibility” (V. Ostrom 1971, 8). The first condition is the freedom of association and thus the entry and exit within a particular social or economic system. Individuals and organizations must be able to establish new and contestable decision centers, public economies, and collaborative arrangements. The freedom of association, contestability, and disassociation ensure that entities’ spontaneous collaborations will morph into an adaptable polycentric order (V. Ostrom 1971, 7).

The second condition relates to the existence and enforcement of general and abstract rules of conduct or procedures, “which provide the legal framework for a polycentric order” (V. Ostrom 1971, 8). The third relates to a level of organization pertaining to “the formulation and revision of the basic rules of conduct which provide the framework for any particular polycentric order” (V. Ostrom 1971, 8). The idea is that individuals and entities cannot only (dis)associate freely; they can also change and adapt the general and abstract rules of conduct in an orderly and procedural manner. In sum, the Ostroms’ polycentricity is a complex system of overlapping powers, checks and balances, incentives, rules, and institutional diversity combined with a complex network of dynamic (cooperative and competitive) relationships among multilevel units (Tarko 2017).

At this point, we can recognize that the properties of polycentricity suggest that not all decentralized, competitive, fragmented, and lightly regulated banking systems are necessarily polycentric systems (Paniagua 2017). One of the defining features is that the local decision centers that together form an overall order, which are at the same time independent enough to make and enforce local rules, are also governed and guided at the preconstitutional level by an *overarching set of rules* or meta-procedures (E. Ostrom 2005; V. Ostrom 1991). This overarching set of rules should attempt to guide the incentives of the decision centers and nodes, so that their individual actions and local rules at the post-constitutional level will contribute to (and align

with) desirable social goals (E. Ostrom 1990). The existence of general procedures and the overarching system of rules does *not* mean that the many decision centers share all their types of procedures and local rules for their action situations.

“Patterns and regularities which occur under an illusion of chaos may involve an order of complexity that is counterintuitive” (V. Ostrom 1972, 23). In this banking context, the desirable social goal and overarching objective is to govern bank runs and the reputational banking commons in order to attain banking stability and achieve the sustainability of banking businesses activities (Bordo 1990). In most polycentric systems, local agents operating *inside* the overall social system usually enforce the overarching rules. Therefore, they are endogenously enforced and locally administered through: mutually agreed procedures for decentralized monitoring and patterns of accountability, well-defined schemes of graduated sanctioning to guide and enforce compliant behavior, and dynamic systems of checks and balances among the different units (E. Ostrom 1990, 70–74, 2010). The decision centers and nodes within a polycentric order can have overlapping jurisdictions, and thus do not need to be territorial or geographically defined (E. Ostrom 2010).

Consequently, the delineated general properties of polycentricity suggest that polycentric banking systems are neither unregulated nor anarchic financial arrangements. They are different from speculative forms of “wildcat” banking that are unregulated, unorganized, and uncooperative; moreover, these “anarchic systems” lack the general properties delineated above and thus cannot be said to function as an *orderly* “system” (Paniagua 2017; Salter and Tarko 2018; V. Ostrom 1991).

Instead, polycentricity in banking occurs when there are coexistent and competing banking groups within cooperative interactive networks comprised of a wide range of banks, financial institutions, and banking associations (or clearinghouses) that possess different kinds of ends, rules, business models, and goals (such as maximizing banking profit, increasing banking resilience, improving banks’ reputation, etc.). Moreover, a polycentric banking system is characterized by the presence of freedom of association and disassociation; banks have the freedom of entry and exit from different banking associations or clubs (clearinghouses). Under such a banking system, banks and banking organizations must be able to freely establish: new and contestable decision centers, bank branches, and more complex collaborative arrangements, if deemed necessary (Paniagua 2017). Hence, there are (a) no legal or governmental boundaries on entry and exit from the banking industry; (b) no restrictions on banks forming clearinghouses, and (c) no restrictions on competing to offer notes and money issuance and other financial services.

Importantly, under a polycentric banking system *no* single bank or banking association has a residuary or ultimate monopoly over the services of notes

and money issuance activities, or over the legitimate use of financial, banking, and regulatory powers. The contestable banking nodes, banking clubs, and bank branches are not constrained by monocentric central banks, but rather by banking competition, legal contracts established between banks and their customers, the rule of law, and by an overarching system of constitutional rules (Salter and Tarko 2018). Whenever these banking and institutional features are present, we can contend that such a financial system indeed possesses the general features of a polycentric system. A paradigmatic example of these polycentric properties in banking can be found in the 1716 to 1845 competitive banking period in Scotland (Goodspeed 2016; White 1995 [1984]). They can also be partially found in the contestable clearinghouses episodes in Massachusetts and New York during the nineteenth century, as well as in several others banking systems throughout history (see Dowd 1994; Paniagua 2017; Timberlake 1984).

Finally, considering the Ostromian polycentric characteristics, a polycentric banking system is an overlapping and cooperative system that broadly retains three important systemic features. First, local banking actors *endogenously* create local banking regulation, monitoring, and sanctioning. In this way, the banking units and/or associations (such as clearinghouses) exercise what E. Ostrom identifies as the required “independence to make and enforce rules within a circumscribed domain of authority” (E. Ostrom 2005, 283). Within a polycentric banking system, there are many legitimate generators and enforcers of banking rules, such as banking clubs, banking associations, and clearinghouses (Yue and Ingram 2012). Second, cooperation, contestability, and competition among different banking units and associations are *not* mutually exclusive; instead, they coexist in predictable patterns of banking and legal interactions. The banking units could also replicate a very important feature identified by the Ostroms in other polycentric regimes: the subunits (e.g., banks) might “enter into contractual and cooperative relationships, or turn to central mechanisms to resolve conflict” (V. Ostrom 1991, 223). Hence, private banks could establish ordered and coherent (cooperative and competitive) relationships with each other that persist through time (e.g., clearing and netting arrangements, shared rules and banking processes, and interbank lending procedures). Third and finally, given their higher degrees of contractual and procedural agreements, cooperation, and coordination, the network of competing banks might be defined as what V. Ostrom described as a “system”; meaning that they “exhibit coherent, consistent, and predictable patterns of behavior and may be said to function as a ‘system’” (ibid, 223). Thus, private banks in a polycentric system establish competing and collaborative centers of “banking power” at different organizational levels. For instance, financial power could lie in—and be distributed among—unit banking structures, systems of branch banking with their headquarters,

interbanking networks for clearing and lending, and finally—if deemed necessary—among contestable clearinghouses.

Following, it is relevant to ask, how are these three core properties and systemic features of polycentricity generated and encouraged *in practice* within a polycentric banking system? The most significant collaborative institution, or broad “banking unit,” in this regard is forming a contestable network of “banking clubs” or a system of contestable clearinghouses; these are multiple governing and competing authorities at different scales and with *circumscribed* domains of authority (Paniagua 2017). Clearinghouses could align the overarching self-governance system of banking rules to the private incentives of banks (endogenous rules are considered useful by bank members). These will be explored in depth in the following sections through historical evidence illustrating their main governing mechanisms. Importantly, the potential capacity of polycentric banking systems in correctly building resilient forms of banking self-governance and effective systems of self-regulation could potentially challenge Goodhart’s (1987, 1988) institutional justifications for the necessity of central banks to attain banking stability.

INTERBANK CLEARINGHOUSES: THE FOUNDATIONS FOR A SELF-GOVERNING BANKING SYSTEM

The interbank clearinghouse system can be conceived as an evolving and voluntary mechanism for governing banking organizations’ behavior and for self-regulating their financial practices. Clearinghouses can also be understood as local community-based “banking clubs” and as self-regulatory programs among private and commercial banking organizations. Originally, clearinghouses were endogenously designed by private banks under competitive forms of banking systems, in order to minimize interbank redemption and clearing costs (Dowd 1994). Usually, clearinghouses were city-based “banking clubs” and voluntary forms of association within a close-knit banking community (Yue and Ingram 2012). Under a polycentric and competitive system, profit-seeking banks have incentives to collaborate to a certain degree in order to establish regular clearing patterns and predictable banking procedures. These serve to help them clear and net bank liabilities against each other (or offset the value of multiple positions or payments due to be exchanged between inter-bank parties) in a quicker and cheaper way than otherwise. In Cosean terms, the establishment of clearinghouses has generally been the rational and collective intention of *lowering* transaction costs for banks, and thus to jointly *mitigate* the management and organizational problem of the complex, costly, and time-consuming note redemption process between them (Dowd 1994). Banks that initially settled and cleared

liabilities only bilaterally eventually found that establishing a clearinghouse was economically beneficial for all of them; this is because it allows netting and clearing interbank liabilities and interbank debt positions quicker and multilaterally, hence economizing on time as well as organizational and transaction costs.

The crucial functions of a clearinghouse can be broken down into two broad categories: clearing liabilities and banking self-regulation (or financial governance) (Cannon 1910; Dowd 1994). To fulfill its first and original function, the clearinghouse provides centralized clearing and netting services for all of its bank members over notes, drafts, checks, and bills of exchange. To fulfill its second function, it establishes also internal rules, norms, sanctions, and banking procedures for controlling and monitoring its members. This second function is crucial since its provision collectively ameliorates the banking reputation commons problem, which exacerbates bank runs.

It is important to recognize that the clearing and netting function (lowering transaction costs for banks) historically *preceded* the other regulatory, liquidity, and monitoring functions. Nevertheless, those original and previous cooperative experiences of multilateral clearing created the social conditions (trust) and cooperative foundations from which self-regulation could take root (Yue and Ingram 2012). In other words, once clearinghouses evolve to a level of performing more professional and institutionalized multilateral clearing, bank members realize that they could also use such an arena of collaboration and trust for other more complex and additional banking activities such as self-regulation. This is because they could collectively reap further economies of scale and extra benefits if clearinghouses offered also additional services, such as collecting and disseminating relevant banking information, enforcing minimum quality and banking standards—such as leverage and capital ratios—or working as a counterparty and center coordinator for interbank credit and liquidity allocation (“credit intermediary”); these additional services would ultimately facilitate low transaction cost emergency lending among solvent bank members during times of stress (Salter and Tarko 2018).

Put differently, clearinghouses or “bank clubs” could be interpreted as successful voluntary mechanisms for efficiently providing crucial banking services and self-governance. As such, they could be potentially successful at solving the challenges of the intangible banking reputation commons and banking panics, mainly through dual roles: first as ex post coordinators and facilitators of interbank emergency lending, like interbank “liquidity intermediaries,” and second (more importantly), through the ex ante effective provision of crucial informational, reputational, and governance functions. It is mainly through providing these latter functions that clearinghouses are able to effectively solve ex ante the banking reputation commons challenge—thus ameliorating bank runs before they can even materialize. Importantly,

clearinghouses provide these governance services in the form of club goods (V. Ostrom and E. Ostrom 1977), meaning that these services are accessible *only* to clearinghouse members. Therefore, free riders, noncompliant banks, and noncontributors to the reputational banking commons are excluded from the banking club. This scenario of exclusion also avoids negative reputational spillovers that can ignite bank runs.

Furthermore, being part of a respectable and self-regulated “banking club” works as a confidence and reputational device. It also acts as a valuable signaling mechanism for banks to ease the concerns and doubts of creditors, depositors, and financial markets regarding their solvency and liquidity conditions. This organization allows for clear and swift financial information sharing, and for disseminating relevant epistemic resources among the network’s different banking nodes, such as clearinghouses, between bank members of a single clearinghouse, and among creditors and depositors. In addition to clearly transmitting banking information among the network, this *joint production* of confidence and a sound and collective reputation help to overcome banking’s inherent reputational opacity and asymmetric information problems plaguing the financial relationships among banks and between banks and depositors. Clear information diffusion and banking signaling mechanisms help to overcome the problem of negative reputational spillovers (reputational externalities) during bank panics; in turn, this reduces the overall risk of indiscriminate and chaotic bank runs among bank members.

Moreover, imposing sound regulation and credible discipline among banks work as reassurance mechanisms, good signaling strategies, and information diffusion mechanisms. Through them, investors and depositors can gain confidence regarding the banks’ soundness, and on the banking group as a whole, which reassures them that banks are solvent as a single banking cluster. This greatly lowers the threat of an undistinguishable financial panic among banks. Clearinghouse membership therefore provides a form of “banking certificate,” a signal of quality, or a “badge of honor” to bank members. This allows them to show markets and depositors that they abide by both sound self-imposed rules of banking management and prudential financial procedures co-established with the clearinghouse.

Additionally, clearinghouses are able to generate and disseminate accurate information about banks to markets by constantly assessing and monitoring their financial activities, balance sheets, and collateral (Gorton and Mulineaux 1987). Clearinghouses’ assessments, monitoring, and epistemic properties are particularly relevant for ameliorating indiscriminate bank runs during financial stress; this is because one of the most important collective challenges that banks face is to quickly and accurately differentiate between sound and unsound banks in order to discover and communicate which banks are in liquidity and/or solvency danger (Gorton 1988). In short,

a clearinghouse-validated status and membership work as a sort of signaling strategy to generate confidence in banks' management, or as a clear *epistemic signal* (or epistemic shortcut) about the soundness of their management and liquidity conditions that banks can easily use to swiftly convey this information back to customers and depositors.

The fact that such relevant—clearinghouse generated—banking information is distributed in a simple, transparent, and democratic manner allows depositors to simultaneously have access to the same information, and in a credible manner, avoiding information inconsistencies, unwarranted rumors, and uncertainty from spreading across the system. This allows depositors to more quickly judge different banks and avoid indiscriminate bank runs due to a lack of detailed and reliable information about them (Gorton and Mullineaux 1987). Maintaining clearinghouse membership thus provides a clear and discernible *reputational boundary*, or a “confidence fire-wall,” and a distinguishable mechanism for sorting between sound (but potentially illiquid) bank members from unsound and poorly managed *nonmember* banks. Membership and its signaling thus decreases systemic contagion and negative spillover effects since it reduces uncertainty and a lack of clear financial information that usually exacerbate banking panics (Gorton 1988, 2010).

Moreover, clearinghouses' *raison d'être* and entire profitability ultimately reside in providing decent “club goods” type of valuable services to banks. This helps maintain a strong image of quality and a banking reputation commons through time. Clearinghouse's managers have strong incentives to protect the group from bad banking practices, risky strategies, and from a bad reputation that could damage the group image. Thus, they have strong incentives (and “skin in the game”) to monitor and protect the group from “bad (banking) apples” either within the group or that want to become a part of it just to free ride on its reputation capital (Dowd 1994; Yue and Ingram 2012). Clearinghouses have strong vested interests to safeguard the group reputation because their own survival and economic viability is entirely at stake if the “reputation commons” of the banking group is degraded, or if depositors and creditors question its soundness (Gorton and Mullineaux 1987).

Consequently, a direct threat to its reputation (a threat to its own economic survival) generates strong incentives for the clearinghouse to monitor and treat unsound and mismanaged bank members accordingly. This entails implementing strong and graduated sanctions on imprudent banks. These sanctions act as a signal to customers regarding the specific riskiness of the irresponsible and insolvent banks. Another complementary approach would also be to temporarily suspend bank members from using the “club's services.” Ultimately, if deemed necessary, the clearinghouse would expel unsound banks from the club, negating them from emergency liquidity services, thus allowing them to fail outside the club.

Importantly, a polycentric system that engages in the coproduction of confidence and information helps to provide an *ex ante* (or before the fact) robust micro-prudential form of governing bank runs and panics before they even materialize. This makes an *ex post* and emergency need for actual LOLR and liquidity interventions far less necessary to save bank members in distress (Gorton and Mullineaux 1987). Regarding LOLR services, generating accurate financial information alongside clear reputational boundaries greatly lessens the negative spillover effects of a single bank failure. This reduces the probability that the failure of mismanaged banks would “contaminate” other sound, but potentially illiquid, banks in the network. A prudent clearinghouse “quality certificate” and the membership signal provide a strong reputational and informational “banking-quality firewall” that quickly distinguishes banks and protects sound banks from contagion and negative reputation spillover effects from insolvent and unsound banks.

The “reputational and informational firewalls” and “quality sorting” processes allow unsound and insolvent banks to potentially fail *outside* clearinghouses’ “firewalls,” while also protect sound bank members from negative reputational spillovers and unwarranted liquidity drains that could trigger chaotic bank runs (Gorton and Mullineaux 1987). Indeed, unsound “members were expelled from clearinghouse membership for failure to repay [emergency] loan certificates after the panic had clearly ended and their failure would result in weaker externality effects” (Gorton and Mullineaux 1987, 464). These micro-prudential and sorting mechanisms greatly lower the entire banking system’s overall emergency liquidity needs, since more and accurate information about specific banks and their quality sorting help customers and depositors to *not* indiscriminately run on all banks simultaneously, which lowers concomitantly the systemic need for massive liquidity across the entire network. In other words, there is a potential redistribution and reallocation (recycling) of both deposits and liquidity from unsound and insolvent banks to sound banks (“flight to banking quality”), *rather* than a systemic and indistinguishable liquidity drain and overall chaotic deposit withdrawals throughout the system (Hetzel 2012).

Thus, the presence of clear resource (reputational banking commons) boundaries and the signaling and informational diffusion mechanisms for reputational differentiation and bank-quality sorting *during* bank failures allow the system to deal with isolated bank runs and panics in an orderly and predictable manner (Goodspeed 2016). It also allows them to do so without necessarily engaging in massive provisions of additional *ex post* interbank lending and emergency liquidity. Conceivably, some minor *inner*-clearing-house liquidity might be necessary for a few solvent, but illiquid, bank members in times of stress; however, the need for system-wide, indiscriminate, and massive amounts of liquidity to all banks will be substantially reduced

(perhaps even entirely eliminated) through the complementary and reputational “informational firewall” and “bank-quality sorting” *ex ante* processes (Gorton and Mullineaux 1987).

Accordingly, the actual LOLR services and the liquidity “safety valve” that is required in a polycentric banking systems can be *substantially smaller* whenever compared to monocentric arrangements; due to the fact that the need for dealing with panics through the *ex post* expansion of liquidity is here complemented, and largely sustained instead, by the *ex ante* correct management of the “reputation banking commons,” and through clear information diffusion mechanisms and reputational boundaries. Therefore, the presence of the other aforementioned complementary banking governance and regulatory services provided *ex ante* by voluntary banking groups and branch banking networks substantially reduce the actual need for *ex post* LOLR emergency liquidity services.

Consequently, the success and efficacy of polycentric banking systems in governing bank runs resides not merely in clearinghouses’ *ex post* capacities to provide emergency liquidity. As argued in this chapter, a “multi-layered” or “nested” form of correctly governing the “banking (reputational) commons” challenge makes the subsequent emergency liquidity and interbank “safety valve” aspects of the LOLR bundle of services much less necessary. Hence, a polycentric system would largely govern bank runs in a decentralized, micro-prudential, and *ex ante* manner, without requiring the institutionalization of a monocentric and definitive center for liquidity and LOLR services to subside financial panics.

To conclude, a polycentric banking system largely solves the problem of bank runs by transforming the previous Hardinian setting of the banking confidence commons and the reputational capital “open to all” (to both sound and unsound banks) into the restricted provision of a limited bundle of reputational and governance functions, under an institutional form of excludable banking “clubs.” Through clear reputational boundaries and “informational firewalls,” a contestable network of clearinghouses prevents rumors and perceived insolvency of a few banks from cascading into a full-blown banking panic. As such, polycentric banking systems lower the actual need for massive *ex post* last resort emergency lending. In such a nested and polycentric manner, the problem of bank runs is alternatively governed, not through the *ex post* and monocentric production of massive liquidity, but rather through both the correct governance of the “reputational banking commons” and a polycentric creation of endogenous and prudential rules for robust banking self-governance. Indeed, such polycentric banking systems have successfully governed both the banking reputational commons and bank runs *in practice*, without the need for a monocentric and definitive center of financial power, as the historical evidence in the following section illustrates.

CLEARINGHOUSE GOVERNANCE FUNCTIONS AND HISTORICAL EVIDENCE OF BANKING SELF-GOVERNANCE

Clearinghouses' capacities to ex ante govern the reputation banking commons reside in their ability to provide an important "bundle" of banking services and a set of governance functions such as the following: exclusion strategies (clear boundaries for excluding unsound banks and noncontributors to the reputational banking commons), the creation and maintenance of regulatory and minimum quality standards (e.g., capital requirements) enforced through bank members' local monitoring (banking inspections), and graduated sanctions to noncompliant members (Dowd 1994; Yue and Ingram 2012). This creates a wide set of formal mechanisms that enforce, punish, and monitor in order to prevent (or at least greatly discourage) any one bank from "misbehaving"; it also discourages free riding on existent banking confidence, reputation capital, or sound management stemming from the coproduction between compliant members within the association (Salter and Tarko 2018).

The institutional properties and aforementioned governance functions are *not* merely theoretical conjectures devoid of empirical content or historical evidence; contrarily, they have been the real practices and institutional properties throughout history that self-governed and polycentric banking arrangements have employed to deal with the reputational banking commons (Goodspeed 2016; White 1995 [1984]). Thus, I will here briefly provide some historical evidence that illuminates how self-organized banking arrangements have successfully provided crucial governance functions and regulatory banking services in order to govern together the problem of bank runs, both ex ante and ex post the actual need for emergency liquidity services (meaning both before and after the actual materialization of systemic bank runs).

To prevent moral hazard, clearinghouses can encourage bank members to maintain minimum quality standards, such as requiring a high level of reserves (or well-defined capital ratios) and then constantly monitor and enforce such sound behavior and best practices (Lake 1947). Indeed, the New York Clearing House Association (NYCHA), which was the first clearinghouse in the United States and established in 1853, "closely monitored the balance sheets of member banks and required them to report their condition every week. Moreover, the clearing house had the authority to audit members' books at any moment, which it could do in response to rumors about the state of a particular member" (Yue and Ingram 2012, 17). US clearinghouses, such as the NYCHA, were founded voluntary and had special committees in charge of member admissions. Also, new members had to be approved by the majority of existing members (Cannon 1910). Roughly between 1853 and 1914, clearinghouses in the United States not only closely monitored member

banks' balance sheets and required them to report their financial conditions weekly, but they also had the authority to audit and scrutinize their books and financial ratios at any moment (Gilpin and Wallace 1904; Gorton and Mullineaux 1987).

More specifically, the NYCHA utilized voluntary and regulatory tools such as reserve requirements, deposit rate ceilings, and random bank examinations to incentivize and control how bank member institutions chose to behave (Gorton and Mullineaux 1987). The NYCHA included a number of different institutional aspects that provided screening, sanctioning, and monitoring services. For example, they required

that member institutions satisfy an admissions test (based on certification of adequate capital), pay an admission fee, and submit to periodic exams (audits) by the clearinghouse. Members who failed to satisfy CBCH [Commercial-Bank Clearinghouses] regulations were subject to disciplinary actions (fines) and, for extreme violations, could be expelled. . . . The ability of the CBCH to audit a member's books (to measure quality) at any moment provided strong incentives for prudent behavior by each bank. (Gorton and Mullineaux 1987, 461)

The NYCHA would quickly investigate rumors concerning the financial states and liquidity positions of particular member banks under pressure. They would audit the banks in question and publish the results, making the minutes available and transparent to the public (Gorton and Mullineaux 1987). Throughout history, clearinghouses have thus played the role of both generating and transmitting relevant and accurate information about banks' behavior and financial positions to the public and depositors; by doing so, they also reduced unwarranted financial rumors and informational asymmetries that can ignite indiscriminate bank runs.

The success and advantages of the NYCHA were such that in less than a decade a large number of new and local clearinghouses were voluntarily established throughout the United States, such as in Buffalo, New York, and Sioux City, among several others around the country (Cannon 1910). Before the Federal Reserve System was established in late 1913, there were more than 200 city-based clearinghouses in the United States alone, forming a kind of contestable—albeit imperfect—network of clearinghouses and competitive banking (Timberlake 1984; Yue and Ingram 2012).

The success of US clearinghouses in governing the reputation banking commons and in regulating their members have been further corroborated by the recent historical and statistical findings of Yue, Luo, and Ingram (2009). These scholars find that the NYCHA drastically reduced the operational risk of banks and the failure rate of member banks by 56 percent. They also find that NYCHA members were relatively more prudent and avoided highly

risky financial operations. They confirmed that the NYCHA was successful at imposing self-regulation and in organizing cooperative ad hoc arrangements. Additionally, and echoing E. Ostrom's (1990, 2005) findings, the "effectiveness of the private institution [the NYCHA] hinges on its nature as a local organization that includes a relatively small number of homogenous and densely-connected banks. Localism enables strong monitoring and enforcement mechanisms that are critical to solve the problem of collective action" (Yue, Luo, and Ingram 2009, 1). Conclusively, their statistical results showed that

the overall bank failure rate is lower when the NYCHA was the sole market order maintaining institution, even compared with the relative stable period after the Great Depression. . . . Our results suggest that cooperation among banks themselves is not only an effective way to prevent bank failures but may achieve better monitoring. (Yue, Luo, and Ingram 2009, 5)

Finally, the welfare and overall systemic implications of the NYCHA were substantial. The survival benefits did not only remain solely with NYCHA members, but spread to all Manhattan commercial banks. The efforts of the NYCHA in rescuing its members in distress and in dampening waves of banking panics stabilized financial markets and allowed the entire population of commercial banks to flourish (Cannon 1910). The overall failure rate of this banking population during the clearinghouse self-regulatory period was significantly lower than in the previous period without clearinghouses, which had no endogenous regulation (Yue and Ingram 2012). Thus, the banking population in Manhattan thrived under the presence of clearinghouses. The number of commercial banks located in Manhattan increased from 51 in 1853 (when the NYCHA was established), to nearly 100 banks in 1913. Hence, it is not surprising that the NYCHA was considered "a most important and beneficial part in the general economic health of the nation" (Gilpin and Wallace 1904, 5).

Clearinghouses have been neither accidental nor minor institutional outcomes throughout history; on the contrary, the emergence of contestable clearinghouses has been the most likely outcome in most banking systems that have allowed the financial freedom of banking association (banking self-governance) as well as allowed entry and exit within the banking system (Paniagua 2017; White 1989). In this sense, clearinghouses have been established regularly throughout history (Dowd 1994; Lake 1947). Some of these banking systems have possessed some of the crucial polycentric and competitive features described in the previous sections (Paniagua 2017). Consequently, under a polycentric banking system that promotes both freedom of banking association and competitive entry and exit, "eventually all the

banks within an economy will be connected through one or a small number of clearinghouses . . . the histories of the best-known early clearinghouses, in London, Edinburgh, and New York, all conform to this general pattern” (White 1989, 231). Additional and paradigmatic examples of contestable networks of clearinghouses, networks of interbanking cooperation, and systems of banking self-regulation can also be found in the Suffolk Banking System in New England between 1824 and 1858 (Lake 1947; Trivoli 1979). The same goes also for the eighteenth-century competitive Scottish banking system from 1716 until 1845 (Goodspeed 2016; White 1995 [1984]).

In sum, so far there is abundant circumstantial evidence showing how competitive clearinghouses can effectively self-regulate and monitor its members (Dowd 1994). Governance, monitoring, and reputational functions help ex ante to accurately govern the potential challenges of indiscriminate bank runs via micro-prudential banking measures such as the accurate provision of self-regulation, the maintenance and enforcement of strong quality standards, and the correct diffusion of relevant banking information. This bundle of ex ante governance banking functions makes far less necessary the actual need for ex post LOLR and emergency liquidity services. In what follows, I review some additional historical evidence of how clearinghouses have complementary also governed ex post the problem of indiscriminate bank runs when they indeed materialize, with particular attention to the NYCHA.

The success of the NYCHA in mitigating ex post banking panics was largely the result of an interbank system of loan certificates. The clearinghouse loan certificate was a new security created by the NYCHA in 1857 (Gorton and Mullineaux 1987). These clearinghouse loan certificates were issued only in emergencies on the basis of loans made to bank members by the clearinghouse policy committee (Timberlake 1984).

During the panic of 1857, the NYCHA organized a voluntary emergency loan committee. It issued fixed interest loan certificates to commercial banks, which could be borrowed by a financially distressed (illiquid) bank member if backed by sound collateral (Yue, Luo, and Ingram 2009). Illiquid member banks could use the loan certificates in the interbank clearing and netting processes, instead of using directly cash and currency, which freed liquidity and cash to be used alternatively for depositors’ claims and demands for currency (Gorton and Mullineaux 1987). So clearinghouses’ loan certificates served as a *temporary liquidity medium* to transfer cash away from sound and liquid banks in surplus, toward illiquid or financially distressed banks to help them survive banking panics or sudden periods of illiquidity and deposit claims (Timberlake 1984). Borrowing bank members were charged interest rates varying from 6 to 10 percent, and they were also required to present acceptable collateral to be discounted by the clearinghouse (Gorton and Mullineaux 1987, 463). These loan certificates served mainly as *temporizing devices*

promoting the efficient reallocation and recycling of transitory liquidity and elasticity throughout the banking system (Timberlake 1984, 9). They were then promptly extracted (withdrawn) from the banking system when the panic and the sudden demand for liquidity ceased (Cannon 1910). As banking panics and rumors subsided, the loan certificates were retired from the system as banks redeemed their collateral securities (Timberlake 1984).

The fact that illiquid borrowing bank members paid lending banks interest rates encouraged reserve-abundant bank members to “share” their liquidity and concomitantly discouraged reserve-deficient banks from borrowing more frequently than necessary (Yue and Ingram 2012). Hence, the clearinghouse system “provided a selective incentive for banks to contribute to collective solvency, and to refrain from threatening that solvency. Serving as a credit intermediary [coordinator], the clearing house enabled a more efficient use of resources [liquidity] during panics, when banks [usually] hoarded money” (Yue and Ingram 2012, 16). Throughout this clearinghouse credit coordination procedure, “banks with stronger reserve positions loaned to those who felt deficient in reserves—a procedure that anticipated the contemporary federal funds market” (Timberlake 1984, 4). Hence, in this *ex post* manner, the NYCHA served as a factual, *ad hoc*, and private lender of last resort whenever necessary (Timberlake 1984, 8).

After the first issue of clearinghouse loan certificates during the panic of 1857, they were issued in every subsequent financial panic up until 1914 (Gorton and Mullineaux 1987). The certificates became prominent throughout the US clearinghouses due to their successful employment in subsiding the tide of banking panics and indiscriminate bank runs (Yue, Luo, and Ingram 2009). Specifically, before the establishment of the Federal Reserve System in late 1913, the NYCHA issued loan certificates eight times during financial panics, without losing even a single dollar in the rescuing process (Gilpin and Wallace 1904).

The NYCHA’s lender of last resort practices became prominent, and most local clearinghouses around the United States began to imitate them. Moreover, this system allowed NYCHA member banks to have *lower* failure rates, as compared to unregulated nonmember banks, because of their collective reduced probabilities of indiscriminate bank runs (Yue, Luo, and Ingram 2009). During banking panics, the NYCHA operated a vertical and small-scale capital market that allocated liquidity and financial resources by nonmarket, hierarchical (albeit private) means in order to safeguard the reputational banking commons and for private banks’ collective benefit. When financial panics subsided, the clearinghouse reverted toward its more horizontal and limited organizational structure (Gorton and Mullineaux 1987, 466).

Consequently, US clearinghouses in general, and the NYCHA in particular, clearly possessed a great deal of (delegated) control over bank members in times of financial panics. They also substantially “regulated” banks’ behavior during acute banking panics (Gorton and Mullineaux 1987, 464). Despite NYCHA only rescuing its own bank members in distress, its credible efforts at dampening waves of banking panics also generated positive reputational externalities throughout the banking system and generally throughout financial markets, allowing the entire New York commercial banking population to flourish (Yue and Ingram 2012). This evidences that contestable networks of clearinghouses have been an important cooperative and bottom-up element in polycentric banking systems in successfully self-governing the challenges of bank runs and the reputational banking commons. Indeed, Cannon (1910) concluded that the loan certificates were “one of the finest examples the country has ever seen of the ability of the people when left to themselves to devise impromptu measures for their own relief” (Cannon 1910, 96).

Finally, it is relevant to acknowledge that this aforementioned and specific way of dealing ex post with banking panics is not the only way polycentric forms of banking can successfully govern the threat of indiscriminate bank runs when they materialize. Throughout history, clearinghouse systems have never operated alone (isolated), nor within an institutional and financial “vacuum” (Dowd 1994; Paniagua 2017). As E. Ostrom’s (2010, 653) “design principles” suggest, the general efficacy and resilience of polycentric systems at self-governing collective challenges depend also on nested enterprises and broader sets of legal and political institutions that support them. Consequently, resilient “governance activities are organized in multiple nested layers” (E. Ostrom 2010, 653). Similarly, in regards to polycentric banking and clearinghouses, their effectiveness at self-governing bank runs *partly* depends also on a wider set of nested and overlapping banking activities, banking contracts, legal procedures, and other complementary legal and economic institutions (Paniagua 2017; Salter and Tarko 2018).

For example, different polycentric banking arrangements have utilized a combination of decentralized measures and services to deal with bank runs in a more multifaceted and polycentric (nested) manner. For instance, the eighteenth-century Scottish banking system at various times utilized a complementary set of ex post tools such as option clauses (temporary banking suspensions of deposit convertibility), enforceable legal systems of both liquidation procedures and of unlimited liability (or of extended liability regimes) for banking shareholders, and clearinghouse arrangements in order to coordinate interbank lending and emergency financial transactions to threatened banks (Goodspeed 2016; White 1995 [1984]).

All of these alternative banking measures and services have usually been historically provided concomitantly, at different institutional scales, and in

a decentralized-nested manner; this importantly reduces also (perhaps even entirely excludes) the institutional need for a strong and monocentric provision of ex post LOLR liquidity services (Goodspeed 2016; Gorton and Mulineaux 1987). Actually, extended and unlimited liability regimes of banks' shareholders "are ways to 'bail-in' funds. This solves the same problem as a lender of last resort, but without the problems of moral hazard" (Salter and Tarko 2018, 10). In other words, in addition to the aforementioned legal and liquidation processes, these alternative, ex post, and contractual run-proofing devices greatly complement the other ex-ante LOLR monitoring and regulatory services that polycentric banking regimes provide at different levels of complexity. Consequently, this polycentric and nested manner of providing heterogeneous, yet complementary, ex ante and ex post aspects of the LOLR bundle of services make it far less necessary to have a single and dominant institutionalized center providing large amounts of last resort liquidity and emergency lending.

CONCLUDING REMARKS

It has been argued that contestable clearinghouses could be able to successfully govern bank runs and liquidity shortages since they provide information about bank members and group confidence, as well as govern the reputational commons by various explored governance functions—delivered in the form of *club goods*. This prevents the insolvency of a few banks from spreading into a systemic and chaotic banking panic. In parallel to the reviewed historical evidence on banking and clearinghouses, the polycentric banking properties and measures explained in this chapter suggest that (contra Goodhart) self-regulation and nonmonocentric forms of banking could solve problems related to informational asymmetries, the coproduction of confidence, and the "reputational banking commons" that lie at the core of self-fulfilling banking panics (Diamond and Dybvig 1983).

Consequently, this chapter has also argued that polycentric forms of banking could be capable of governing bank runs and providing LOLR services without necessarily relying on a single dominant center for monetary decision-making. Thus, cooperative and nonmonocentric forms of providing those crucial banking services and governance could be feasible and effective within competitive banking structures that promote the general principles of polycentricity as outlined by V. Ostrom (1972, 1991).

Finally, this chapter has argued that polycentric banking systems could be effective and resilient at managing and self-governing the banking reputational commons. It had formed these arguments with historical evidence reviewing the crucial role of clearinghouses and other complementary

banking and legal tools that have effectively subsided waves of panics and bank runs. By borrowing from the Ostroms' self-governing vision about the social order, this chapter has contended that central banks could be neither essential nor preferable to polycentric alternatives for overcoming bank runs and other crucial banking challenges (Paniagua 2017). Moreover, the plausible polycentric provision of LOLR services and governance (regulatory) activities, organized in multiple and nested levels, indicate that banking stability could be achieved without a definite center of banking power and without governments providing also deposit insurance or acting as lenders of last resort. The historical evidence and the Ostroms' oeuvre suggest that central banks are far from being the only institutional arrangement that can govern successfully collective banking challenges and attain banking stability.

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