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The Power of Networks: Integration and Financial Cooperative Performance

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Abstract: The purpose of this paper is to perform a cross-country survey of the level of integration of systems of financial cooperatives (FC) and its effect on measures of performance. We develop a classification scheme based on a theoretical framework that builds on published work using *transaction cost economics* (TCE) to explain integration of large numbers of financial cooperatives into *networks*. We identify three critical level of increasing integration we call respectively atomized systems, consensual networks and strategic networks. Further, we test some of the propositions that result from the theoretical framework on an international sample of financial cooperative systems. Based on this analysis we can conclude that : i) Integration is less (more) important is developing (more developed) countries and for very small (large) financial cooperatives as a determinant of efficiency. However, integration tends to reduce volatility of efficiency and performance regardless of development. ii) Integration appears to help control measure of managers' expense preferences that tend to affect performance of FC. iii) Despite high costs of running hub-like organizations in highly integrated system, these systems economize in bounded rationality and operate at lower costs that less integrated systems.

Keywords: Transaction cost economics, financial cooperatives, credit unions, networks, corporate governance, technical efficiency, x-efficiency

JEL Classification: G2, G3

Résumé: L'objectif de cet article est de comparer le niveau d'intégration de systèmes de coopératives financières opérant dans plusieurs pays et d'évaluer l'impact de cette intégration sur les mesures de performance. Nous développons une classification basée sur un cadre théorique utilisant le concept économique des coûts de transaction pour expliquer l'intégration d'un grand nombre de coopératives financières en réseau. Nous identifions trois niveaux d'intégration que nous appelons respectivement les systèmes atomisés, les réseaux consensuels, et les réseaux stratégiques. De plus, nous testons quelques-unes des propositions issues du cadre théorique sur un échantillon international de systèmes de coopératives financières. Selon cette analyse, nous concluons que : i) L'intégration est moins (plus) importante dans les pays en développement (industrialisés) et pour les très petites (grandes) coopératives financières comme déterminant d'efficacité. Cependant, l'intégration tends à réduire la volatilité de l'efficacité et de la performance, peu importe le niveau de développement du pays. ii) L'intégration semble améliorer la gouvernance des coopératives financières, notamment en contrôlant de façon plus stricte la préférence pour la dépense des dirigeants, ce qui en améliore la performance financière. iii) Il semble que les coûts élevés qu'implique l'organisation en un réseau intégré sont plus que compensés par les économies réalisées grâce à une gouvernance plus stricte.

1 Introduction

In some countries the highest Corinthian cornices do not belong to a venerable *capitalist* banking institution, but to a just as venerable but less revered, *cooperative* banking institution. The halls and offices of those giants are not designed to welcome business executives performing M&A or "red carpet" private banking operations, but for the common man (butcher, carpenter, teacher or peasant), with just a few dollars in the account. But there are millions of them, and together they have assembled the largest banking institution in the country. Networks of mutual financial intermediaries have become the, or one of the, primary financial institution include Austria (Raiffeisen and Volkbanks), Brazil (SiCoob and Sicredi), Finland (Okobank), France (Crédit Agricole, Crédit Mutuel and Banques Populaires), Germany (Raiffeisen), Italy (Banchi de Credito Cooperativo); Japan (Shinkin Bank), Korea (National Agricultural Cooperative Federation, NACF; National Credit Union Federation of Korea , NACUFOK, and the Korean Federation of Community Credit Cooperatives, KFCC), Netherlands (Rabobank), Quebec (Canada, Desjardins) and Switzerland (Raiffeisen). Many other less dramatic but remarkable examples exist. Since their mission is to serve local common folks, rarely engaging in international operations, they are unknown abroad. In Germany, *Sparkassen* (community banks) and FC together control nearly 60% of the country's financial assets and serve 70 million clients, or 87% of the population. In Quebec, the market share is over 40% in terms of assets with 5.2 million members out of a population of 7.5 million. In the Netherlands Rabobank, in France Crédit Agricole, Crédit Populaire and Credit Mutuel, in Finland the Okobank Group, in Austria's Volks- and Raiffeisen banks, in Italy Banche di Credito Cooperativo and Banche Popolari controlled in 2002 a market share in term of assets of 40, 39, 33, 32, and 29 percent, of the financial sector respectively (DG-Verlag [2000]). In other countries, however, FC play a small or marginal role in the economy, with only a minor share of financial assets. Often, relative size of the system appears to be related to the level of integration But differences in integration do not appear to cut randomly across countries and regions.[1] As income increases, more advanced integration becomes frequent but not universal.

What explains differences in the level of integration of these systems, and what are the consequences in terms of macro –system wide–and micro–institution level–performance? Even more fundamentally, why do FC create these sometimes highly complex structures? In an earlier work Desrochers and Fischer [2003] (D&F) proposed a theoretical framework that provides an explanation to some of these observations. In particular, D&F's model generates hypotheses on why FC integrate into networks, what are some of the factors that explain differences in their organizational complexity and the impact they may have on performance of member institutions. They test some hypotheses derived from the model using data for two FC systems (United States' credit unions and Quebec's *caisses populaires*) operating in societies with similar development but where integration differs markedly. In another paper Desrochers, Fischer and Gueyie [2004] (DF&G) performs a similar comparison of Quebec and Ontario FC systems. However, both these tests, while indicative and supportive of the model's predictions, are limited by two fact: first, they cannot separate the country effect (related to regulation, tradition, etc.) from the effect of network organization; second, and more importantly, they cannot test the prediction that the level of development of financial markets influences the level of complexity of networks required to face contractual risk. To overcome these limitations requires a sample with specific characteristics: i) it must be multinational and preferably in panel to control for country specific factors and separate country and integration effects; ii) it must cover economies that differ with respect to financial sector development to assess

[1] Under "integration" we understand the affiliation of FC into more or less closely bound organizational structures that serve to provide members with a wide variety of services including representation, private ordering, meta coordination, management of infrastructure and as custodian of joint investments in service-producing affiliates.

the link between this and networking needs; iii) it must present data for individual institutions to assess the impact of integration on individual FC performance. We set out to build that database and present the results of the analysis here.

The answers obtained from this research are of interest to three constituencies. Leaders of FC systems, for whom the link between performance and integration has long term planning implications. Regulators, facing the task of creating a regulatory framework that encourages stability in the financial system and who will be able to assess the link between regulation and the organization of the FC system, and, in turn, with performance. Supervisors, *whose role is to limit the likelihood of low performance events* that may put savings by consumers –particularly poor ones– at risk, will be able to learn the type of organizational environment that promotes stability within the FC system.

The paper consists of two parts. The first, classifies systems of FC around the world based on key features that suggest qualitative jumps in the complexity of inter-FC contractual relations, using a *transaction cost economics* (TCE) framework. We use a small set of networks features to differentiate them into three categories which we call atomized systems (AS, very low level of integration), consensual networks (CN, medium level of integration) and strategic networks (SN, high levels of integration). The second part presents an empirical study based on 23 systems of FC, in which we test some of the *hypotheses* that result from D&F's theoretical framework.

2 Classification of systems

As a first step we develop a set of criteria that may be used to assign the 23 systems into categories.[2] We base our taxonomy on the theory proposed by D&F with extensions by DF&G that explains integration of large numbers of FC into *networks.* The central proposition in D&F is that the level of macro-organization of systems of FC is the result of the risks associated with the procurement of inputs necessary to perform the function of financial intermediation. This risk encourages the formation of inter-FC collectives to pool input procurement. The resulting inter-FC collective may be short term (spot) repeated contracts, long term alliances (hybrid relations) or may lead to the merger of FC (hierarchies). Which form of collective they adopt depends on the level of contractual hazard inherent in the relation and the governance cost of the collaboration. Hybrid relation, in the form of networks, is a superior form of governance, over spot relations and mergers, for relatively wide and relevant –but not all–ranges of contractual hazard. We now present a description an outline of this theory emphasizing key features that are relevant to articulate the classification scheme. For details of the theory see D&F.

2.1 A review of the TCE based theory of cooperative networks

The *contractual relations* on which the model focuses is the one established *between FC* (horizontal) to jointly procure a designated segment of inputs or pool investments to produce those inputs. The span of inputs covered by the resulting collective is the designated segment. This focus on horizontal relations contrasts with the analysis of buy vs. make, usually performed in the context of TCE, where researchers stress the contract between suppliers and buyers (vertical). The lateral contract arises from a pure production-economics imperative, when FC join forces to exploit economies of scale and reduce uncertainty in the procurement of inputs needed in the intermediation process.

[2] An alternative approach is to develop an index of integration that can be used as explanatory variable. We never considered such an approach since it is in inconsistent with the theoretical tools used as the framework of analysis. This will be made explicit shortly.

However, lateral contracts between partners to form a "shared supply alliance" imply appropriability hazard (AH) for the members of the alliance. AH results when counterparts act opportunistically to appropriate the rent generated by the alliance. This hazard is not particular to FC. It arises in any inter-firm alliances that involve technology transfers and joint production of goods and services in the presence of weak property rights (Burr [2003], Hagedoorn [1993], Oxley [1997]). AH "can be traced to difficulties in adequately specifying payoff-relevant activities, monitoring the execution of prescribed activities, and/or enforcing contracts through the courts" (Oxley [1997]: 389). As the span of the designated segment subject to joint production/procurement increases and technology involved in their production becomes more complex, FC increase their mutual dependence. With it, increases the amount of resources invested in developing the capacity to produce those services, and the risks of their loss. With AH increases the need to introduce cooperative adaptation mechanisms and the range of hierarchical features proposed in the literature of joint ventures and alliances.[3]

D&F also propose that in the case of FC, *expense preferences* (EP), one type of organizational costs, play a key role increasing significantly the slope of the efficient frontier. This reduces the range over which mergers are the cost minimizing alternative. Managers are not neutral when it comes to the allocation of resources into different inputs used by the firm they control. They display bounded rationality and opportunist behavior, and as such are likely to engage in sub-goal pursuit if given the opportunity. Sub-goal pursuit increases with diffusion of ownership (Nicols [1967], Marks [2000]) which raises managerial discretion and, in the case of cooperative institutions, is positively correlated with the size of the institution. This is due to the cooperative principle of one-member one-vote and the free riding of monitoring phenomenon. Thus, Downs [1957] "Law of Diminishing Control" has a larger impact in mutual organizations. *Ceteris paribus*, larger mutual institutions can be expected to display increasing deviations from the cost minimizing optimum. The role of EP in the context of mutual financial intermediaries has found unambiguous support in empirical studies across very different economic contexts (e.g. Benin: Gueyie, Sinzogan and Solé [2005]; Bolivia and Peru: **?**; Colombia: Barona, Caicedo and Zuluaga [2005]; Philippines: Desrochers and Lamberte [2005]; United States: Gropper and Hudson [2003], Gropper and Beard [1995], Akella and Greenbaum [1988], among others). Recently, evidence was found that the wave of mergers and rapid growth in size in the United States credit union system that followed the 1982 elimination of multiple bond restriction, is resulting in measurable increase in "agency costs" Leggett and Strand [2001]—-a parallel concept proposed by Jensen and Meckling [1976] that describes manager-owner relations from a different theoretical perspective. The effect was also found in the United States Savings and Loans sector (Mester [1991], Mester [1989], Verbrugge and Goldstein [1981], Verbrugge and Jahera [1981]), in other industries (Oswald and Gardiner [1994], Awh and Primeaux [1985], Rhoades [1980]) and in mutual property liability insurance firms (Cummins, Weiss and Zi [1999]). Further, there is an extensive empirical literature of the role of "agency conflicts" in firm performance.

As the span and complexity of the designated segment increases, so does AH. Thus FC must decide among three choices: i) remain tied up in spot contractual relations increasingly unsuitable

[3] As noted Gulati and Singh [1998], when firms anticipate appropriation concerns, they are likely to organize alliances with more hierarchical contracts. According to Stinchcombe [1985] business alliances may create a number of hierarchical features including: i) a command structure and authority system; ii) incentive systems; iii) standard operating procedures and control mechanisms; iv) dispute resolution procedures and mechanisms (that is, private ordering mechanisms that bypass courts and markets); and v) a non-market pricing system. The literature also suggests that inter-firm alliances build governance structures to manage anticipated coordination costs –in TCE terminology, cooperative adaptation mechanisms–and to address appropriation concerns. Likewise, it has been proposed (García Canal, Lianeza and Arino [2003]) that the need of introducing formal control mechanisms to manage an alliance increases when it involves multiple parties, clearly the case of FC networks. For a systematic treatment of the problem of building alliances see Zentes, Swoboda and Morschett [2003].

for the long-term nature of the collaboration; ii) engage in alliances which enhance procurement costs reduction effects but require organizational structures to control AH, but where the exercise of EP is limited by the size of the institutions and by organizational mechanisms that limit managerial discretion; or iii) engage into merger with partners, suitable for higher levels of AH, thus internalizing contractual relations but where EP hazard associated with the dilution of ownership is high. Accentuated governance costs associated with mergers due to EP in turn implies that hybrids –networks– will be the governance mechanism of choice over a wide range of levels of AH–the "swollen middle" Hennart [1993].

The extension by DF&G replicates the reasoning that explains the existence of U-form and M-form organizations.[4] It proposes that networks may take different forms. They distinguish between highly integrated *strategic networks* (SN) and more loosely structured *consensual networks* (CN).[5] CN operate on the basis of continued consensus of all or a subset of participants of the collective. Members of the collective remain free to opt out from the use of network services. The key difference is that in SN the traditional apex of cooperative federations becomes a "hub node" with a function of strategic leadership. The hub is thus endowed with strategic planning and decision management for the entire network (absent in CN) over at least some relevant domain of input procurement. A representation governance structure (usually the General Assembly and the Board of Directors) performs decision control in representation of independent member FC. The individual first-tier nodes retain operations management and control for the unit and over all strategic issues that fall outside of the hub's competence. Thus, a *separation between operational and strategic decision management and control* develops for at least some relevant domain of activities in the network. Based on TCE arguments, DF&G conjecture that SN are created to control AH when the scope of the collaboration, realized or desired, demands higher level of coordination between and control of partners.[6] The hub is thus empowered to perform this coordination and control function. Thus, with AH, the organizational kernel expands as the network adds cooperative adaptation mechanisms consisting of the range of hierarchical features proposed in the joint-ventures literature noted before (footnote 3). Maladaptation within the network is reduced by standardizing operations, establishing common strategic plans across the relevant domain of activities and introducing private ordering mechanisms to insure party compliance and credible checks against opportunism over the activities in which AH is most relevant. The trade-off between the nuisance of giving up control for strategic decision over the designated segment on one side, and the benefit of expanded pooling of input procurement and control of the resulting AH in the network on the other, favors the second. In

[4] M-form organizations are created for the purpose of economizing on bounded rationality and to attenuate subgoal pursuit by managers. The issue of M-form and U-from organizations has been covered in the industrial organization literature (e.g. Ingham [1992], Armour and Teece [1978], Steer and Cable [1978] and Williamson [1975]).

[5] This follows the terminology proposed Greve [2002], Polster [2001] and Bonus, Greve, Kring and Polster [1999]. SN are interpreted in the sense of Jarrillo [1988], Jarrillo [1993] and Sydow [1992] Other classifications of networks with different names but similar content exist: e.g. hierarchical (for strategic) vs. heterarchical (for consensual) networks (Windeler [2003]: 49-50).

[6] This statement may contradict the intuition of observers of FC systems that perceive strongly integrated networks–along the lines described in this paragraph– as pyramids with a powerful top and powerless FC at the base, "not much different from a bank with branches." While this may *exceptionally* be the case, it is not the norm. A well designed alliance representation governance structure–and most SN have one– will protect the property rights of members in individual FC from opportunistic behavior by both, other members of the collective and management at the hub. The span of activities over which the hub has responsibility and authority is, after all, decided upon by the representation governance bodies with decision control power, and can be revoked, limited or expanded anytime by the same within the rules established by statutes of the network, which, in turn are decided upon by the general assembly. In fact, we argue that the property rights of members of a FC that belongs to a network are better protected from the ravages of entrenched management than in large FC that result from the merger of several FC as is increasingly common in, say, the North American context.

turn, better control of AH creates safe conditions for enlarged further pooling of input procurement and valuable investments that allow the network to expand the range and quality of financial services they offer to members.[7] Network members define the domain for the hub's strategic management and control powers according to the particularities of the market and the span of the designated segment. Thus it varies from one system of FC to another, although it coincides over wide ranges due to similarities of financial products offered internationally.

2.2 Impact on individual FC performance

The theoretical framework summarized above has empirical implications for individual FC performance. This is of interest for regulators and supervisors whose role is to limit the likelihood of low performance events that may put savings by consumers at risk. It is know that in M-form organization the separation of functions between the head-office and divisions has the effect of both: i) economizing on bounded rationality (specializes the function of strategic and operational planning), and ii) limits sub-goal pursuit (as both levels control each other in the performance of their respective functions).[8]

SN have the same effect on FC systems: economize on bounded rationality and limit sub goal pursuit. By separating strategic from operational planning and decision making, strategic networks economize on bounded rationality. Paraphrasing Chandler (cited in Williamson, 1996, pp. 82) the M-form "clearly removed the executive responsible for the destiny of the entire enterprise from the more routine operational activity, and so gave them the time, information, and even psychological commitment for long-term planning and appraisal". In the case of FC, as the complexity of the market and the diversity of financial products and services required by member-clients increases, bounded rationality by managers limits their capacity to make informed decisions at *both* strategic and operational levels.[9] The relatively small size of (most) FC prevents establishing local capacity to perform the evaluation and planning function required to accomplish this competently. Thus, local managers of nodes may find it useful to pool resources with other nodes and create the capacity in the apex to perform this complex function. Managers at the hub thus can focus on the network's strategic issues while not being occupied by operational aspect of FC management which become the exclusive competence of local managers. It is in this sense that SN economize on bounded rationality.

The second aspect, attenuation of sub-goal pursuit is, perhaps even more important. In our context, sub-goal pursuit translates into suboptimal allocation of resources. The separation of function of first-tier nodes (focus on operational decisions) and apex (focus on strategic goal planning and control) managers, reduces the difficulty of assessing and controlling sub-goal pursuit at both levels. It is not surprising that an almost universal feature of SN is the presence of a private ordering mechanism (a network supervising body) that monitors compliance of members to key prudential and strategic standards established for the network. Thus, management at first-tier nodes is now supervised both by members-shareholders and the network's private ordering mechanism. Simulta-

[7] One of the visible features of SN is the wide range of financial services offered, and that it is uniform for all members of the collective regardless of their size or (rural) location. The range of services offered by FC of AS and CN to its members, on the other hand, typically varies considerably and is positively related to the size of the institution.

[8] This proposition counts with a solid empirical support. Examples are Ingham [1992], Armour and Teece [1978] and Steer and Cable [1978].

[9] This is not just theory. As an example of this take the dilemma facing the FC system of Peru. There, *Cajas Municipales* (municipal savings banks, modeled after the German *Sparkassen*) have been advancing aggressively into the territory of FC. These, due to lack of centralized planning and strategic management, have thus far failed to present a unified strategy to counter the loss of market share to the *Cajas*.

neously, the decision control bodies (e.g. the network's General Assembly and Board of Directors) apply checks to prevent opportunism by management at the hub. A narrowly defined strategic responsibility for the hub facilitates performance control (compared to that of a large FC where managers assume both strategic and operational management responsibilities).

Economizing in bounded rationality and limiting sub-goal pursuit should have double effect: i) reduce the *variance* of individual first-tier node performance measures; ii) reduce the *cost* of running the combined bureaucracy at the level of the individual FC and the hub. The latter is, likely, one of the most controversial hypothesis that derive from this analysis and one worth of further analysis...and testing. Yet, it is a direct consequence of the organizational features of SN which accomplishes: pooling strategic management facilities, improves efficiency and scope in pooling input procurement and maintains opportunism in check at both levels of the organization.[10]

2.3 A taxonomy of FC networks

An important goal of this research is to design a FC system taxonomy that allows meaningful comparisons across systems. This classification must link predictions obtained from the theoretical analysis with institutional features observed in practice. The problem is that key features are usually hidden. No system calls its apex a "hub" as it became a SN, or calls itself "strategic", and no system, consensual or strategic, offers to the public a list of items included in what we called the designated segment of joint production or contracting, or the domain over which decision management and control has been ceded to the hub. In practice, most apex call themselves federations, leagues or associations and at best provide a list of services they offer to their member institutions. Thus the challenge is to pick easily observable institutional features but that are meaningful to assign systems to categories. Particularly important is to identify key observable institutional features that represent qualitative jumps in the nature of the integration process and for which we have a theoretical backing. Only by paying attention to the small print, or through direct interrogation of authorities in the respective systems, were we able to raise the fine details needed.

2.3.1 The categories and classification criteria

The theoretical framework justifies a scheme with four categories: *atomized systems* (no or very low integration); *consensual networks* (medium level of integration), *strategic networks* (high level of integration) and *mergers* into a single (or just a few major) FC or cooperative bank. The fourth category has no representation in reality thus it is ignored.[11] The three levels we use are

[10] Interestingly, D&F find that the intermediation margin of Quebec *caisses popularies* (that include the cost of running the hub) is smaller than of equivalent sized United States credit unions that do not have to support the load of a similar hub, while the range of services offered by all *caisses* compares favorably with those offered only by the largest credit union.

[11] Some readers may object to this statement. We provide three plausible counter-examples that turn out no to be. The first one is the *Cooperative Bank* (CB) of the UK. This institution –like the Cooperative Insurance Society (CIS)– is not the result of a merger of individual FC in the search of economies of scale and an optimal lateral contracting mechanism. Rather, it is a bank owned by the Cooperative Group created for the purpose of serving (with financial products) members of the consumer (i.e. non-financial) co-operatives. Affiliation to the CB is not separate of that in the Co-operative Group. The CB does, however, provide financial and other services to UK Credit Unions with some apex functions. The second is *Rabobank* of Netherlands. *Rabobank*, despite its image of consolidated bank, is not. Its image as unique bank is a marketing strategy adopted after the "merger" of the two federations (Raiffeisen and Boerelenbank) into a single federation, thus a network. The third is *Okobank* of Finland. This is a joint stock company owned by the network of FC (used to provide banking services to the FC members of the network and to service customers in territories not covered by the network itself), thus not the result of a merger of individual FC. We are not saying that there are no mergers in the FC sector. Indeed there are plenty of mergers that have taken place in most FC systems in the world, particularly in the last 10 years and in CN countries. One often finds–specially

consistent with the theoretical framework outlined above. We proceed as follows. First we provide definitions of each of the categories that are consistent with the theoretical framework but that reflect observable institutional features. We use 10 features typically present in networks. Of these 10 features, two are particularly important on theoretical grounds: pooling of resources and separation of strategic and operational management and control. They will become benchmarks in the classification system. Second, we identify for each system the extent to which each of the 10 institutional features are present. Based on this roster we then assign each of the 23 systems into one of the three categories. Now the details.

We define each of the three categories as follows:

- *Atomized systems* (AS). Consist of collectives of FC with little or no formal ties that bind their operations with no meta-coordination in the procurement of inputs and practically no pooling of resources. As a result, no mutual lateral dependency exists. Autonomous adaptation to consequential disturbances dominates, with each FC responding according to own incentives and possibilities. Inter-FC transactions (if any) tend to be repeated but transient rather than lasting. Relation are supported by classical contracts. It represent the lowest level in the market-hybrid-hierarchy schema. However, following well-established cooperative tradition –and institutional isomorphism (DiMaggio and Powsell [1983]– even an AS will present an apex that performs some activities. They include representation, cooperative education and advisory services on management and prudential issues. It is, in fact, unusual that a FC system does not at least present an association with a representation function.[12] However, these are functions that represent low inter-FC AH. All three are functions that involve no significant investment and their value for opportunist behavior by members of the alliance is low. In consequence the organizational kernel is minimal with almost no features designed to perform cooperative adaptation.[13] We classified a system as AS by exclusion if it didn't present the key feature of pooling of resources or some degree of standardization.[14]

- *Consensual network* (CN)*:* Consist predominantly of collections of multilateral agreements between first-tier nodes with a designated segment of voluntary joint input production or contracting. The agreement is driven by the economic rationale of seeking economies of scale and the reduction of uncertainty in the procurement of inputs. These relation are supported by neoclassical contracts. The apex expands its role to become custodian of the resources pooled by members of the network. A CN may have the function –in addition to those described for the atomized systems– such as: the setting up of market sharing rules between first-tier nodes; specify separation of responsibilities between the first and second tier nodes (principle of subsidiarity); work towards the introduction of a unique image of trademark that will distinguish the network. It may also start to delegate some of the strategic planning

under the AS and CN–some very large individual FC that are the result of radial growth and/or mergers. However we contend that there exist no major cooperative banks resulting from the large scale mergers that has resulted in a single (or a few) institutions. Even when some very large FC are observable (e.g. VanCity Credit Union of British Columbia, Canada), they are accompanied by a large number of smaller FC that operate as a CN or have no link among them (AS).

[12] Exceptions in our sample are Philippines' cooperative rural banks, the later being even deprived of any representation apex structure.

[13] We define the organizational kernel as the minimal set of institutional features required to accomplish the objectives set for the network.

[14] Pooling of resources represents an important qualitative jump since it creates conditions for opportunistic behavior by members as some may manipulate appropriation of benefits related to the joint investments. Standardization represents both a pooling of resources and an effort by the alliance to introduce private ordering mechanisms, by allowing comparison of inter-FC behavior and performance.

function towards the central node. However, strategic decision *control* and *management* is explicitly excluded. These networks operate on the basis of continued consensus of all nodes: members of the collective remain free to opt out from the use of network services.[15] This implies that strategic decision making remain under control of first-tier nodes for a significant domain of operations, and may conflict over that domain with the collective. Reciprocity and hostage taking (Jarrillo [1993], pp. 136f) is the dominant mechanism for contract enforcement. The organizational kernel is more complex than in AS but remains relatively simple.

- *Strategic network* (SN): As CN, they consist predominantly of collections of multilateral agreements between first-tier nodes with a designated segment of joint input procurement/production. The apex is custodian of the resources pooled by members and network-wide strategic decision management over the designated segment is transferred from management at the first-tier nodes to management at the apex, and decision control is shifted from the first-tier governance bodies to the network wide governance bodies. Decisions taken by the collective over the specified domain, according to defined governance mechanisms, become mandatory for the entire collective. The apex becomes a "hub node" (Greve [2005], Greve [2002], Polster [2001], Bonus, Greve, Kring and Polster [1999], Jarrillo [1988]) with power of decision control and management in representation of the collective (with or without "vote" by the collective). Relation are supported by neoclassical contracts. The separation of strategic and operational management and control implies that first-tier nodes consent to adhere to strategic decision made by the collective including some or all of the following: the mandatory use of network services, use of standard procedures and systems, control of key variables (such as rates on deposits and loans), unique brand name and marketing strategies and dispute resolution mechanisms.[16] The network will have established a private ordering mechanism and a contingency fund used to compensate members of failed institutions or finance restructuring plans. SN present features that are specific to hierarchies and that provide an additional effectiveness to operate in highly competitive environments (Bonus, Greve, Kring and Polster [1999], Greve [2002]). Regulation is the dominant mechanism for contract enforcement. The organizational kernel is complex.

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Please insert Table I here
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We present our schema and a short explanation of each of the 10 features in Figure 1 and in Table I, respectively . The list of Table I does not cover all activities a network may perform but

[15] The United States credit union movement is an excellent example. One of the service organizations created by the movement is the CUNA Mutual Group. The CUNA Mutual Group is the leading provider of financial services, *on a voluntary basis*, to credit unions and their members, offering lending, protection, financial, employee and member solutions through strategic partnerships, technological innovations and multiple service channels. Further, CUNA Mutual Group is owned by a group of credit unions. Thus, individual credit unions that are not co-owners of CUNA Mutual Group have no incentives to procure services from it and instead seek to maximize their individual benefit scanning the market for the most competitive offer of the service, encouraging autonomous rather than cooperative adaptation strategies.

[16] From a practical point of view, we found that the mandatory use of *some* network services is a key feature, easily observable, that allows us to pinpoint the presence of a SN. Usually, a short exchange with a functionary of the movement or a cognizant resource person allowed us to establish this. The move is likely to be motivated because resources pooling necessary for the provision of that designated segment has become important and opportunistic or divergent behavior–or plain bad management– by a member may cause losses to other or all members of the alliance. Clearly, if a FC member of a network is not free to opt out of the use of the service, decisions over this particular domain have been transferred to the hub. Any modification about the provision and use of this service will henceforth not lie with the member but with the collective, unless the member decides to abandon the alliance.

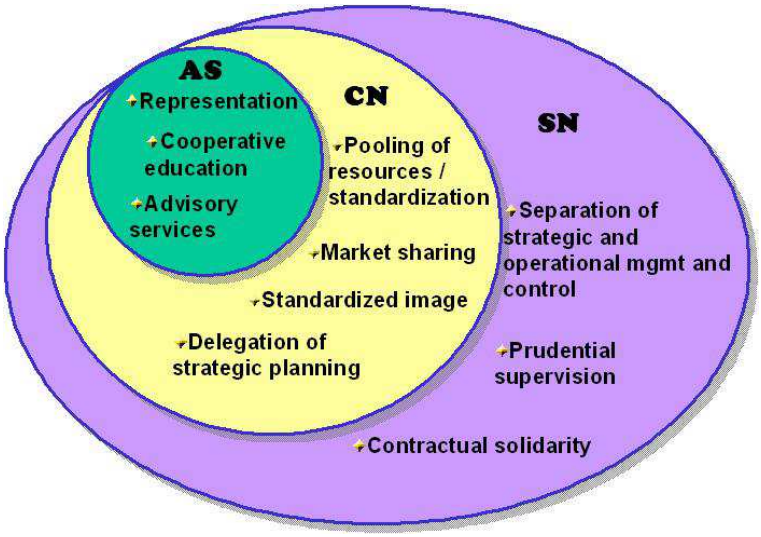

Figure 1:

we consider those we use to be key functions that are observable with relative ease. The schema is simple, the main difficulty is to assess to what extent each of the 10 features are present in the 23 systems under study. In Figure 1 we present features in circles, larger circles are inclusive of smaller ones. We classified systems without features included in the medium circle as AS; systems that present any feature in the middle circle but none of those in the large circle as CN; and systems with features in the large circle as SN. This is less arbitrary than it sounds. Network functions do not appear randomly and there is a clear economic logic to the accumulation of functions. Once a function appears it is likely that several do simultaneously.[17] There is, for example, no network in which there is a clear separation of strategic and operational management and control (large circle) without *substantial* common investments, market sharing arrangements and most likely a standardized image (medium circle) as well as representation and advisory services (small circle). On the other hand, it does not make sense to separate strategic and operational planning (or introduce prudential supervision or contractual solidarity) if there is no common investment and pooling of resources that increases AH to justify the introduction of such advanced and expensive governance mechanisms.

2.3.2 The classification exercise

We present the result of this classification exercise and the presence or absence of the key 10 features in each system in Table II. This table is essentially a matrix of Boolean (0/1) values with respect to the features in question.

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Please insert Table II here

[17] E.g., once an important pooling of resources is accomplished, it is likely that the feasibility of the venture depends on a commitment of all members to acquire the inputs generated through this investment. This in itself implies a transfer of decision power to the apex (which now becomes a hub). Further, it is likely that along with this commitment networks will add private ordering mechanisms to monitor performance and delivery of services by members. From there to include contractual solidarity mechanisms, such as a contingency fund, is a minor step. This yields a full fledged SN.

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In the process of preparing this table we completed a system by system analysis of the key institutional features. That is, we interrogated the sources of information available to us, to what extent each of the 10 features was present in a system. In the process of completing this interrogation, we assembled a system by system description available from the authors. We classified as atomized the following systems: in the OECD group, the U.K. Credit Unions that do not belong to the ABCUL system, and among non-OECD Bolivia, Colombia and Philippines (cooperative rural banks). We classified as CN, among OECD countries Japan Credit Unions, Ontario and United States Credit Union systems, the Italian Banche Popolari, the Spanish FC and the UK ABCUL systems and among non-OECD countries the FC systems of Benin, Lituania, Mali and Peru. Finally, among OECD countries, we classified as SN Germany's Raiffeisen, Japan's Shinkin Banks, ILCU's credit unions (Ireland) and Quebec caisses populaires Desjardins, and among non-OECD countries Madagascar, Senegal and Uruguay.[18]

3 Data

We required three types of data to accomplish this research: i) the institutional data that would allow us to classify the systems, ii) the individual FC-level financial data necessary to compute efficiency scores and performance ratios; iii) macroeconomic and social variables used as proxies of AH and to describe the level of development of the countries in the sample.

3.1 Institutional data

There are two main sources for our institutional data. Documentary and direct interview. Our source of documentary information was predominantly the Internet, where we obtained information about the systems based on published research in the form of articles and working papers and in web-sites created by the institutions themselves. Documentary sources were used extensively for most of the OECD country based systems. The second source was interviews. Our access to Development International Desjardins (DID) officers with detailed information about systems with which they have a working relation, allowed us to obtain unpublished institutional information about several non-OECD country based systems. Our personal experiences working with some of Latin America's systems allowed us to complete the institutional information for these systems.

3.2 Financial data

Individual FC financial data was obtained from variety of sources:[19] i) Bankscope was the source for FC systems of Germany, Italy and Japan; ii) United States credit union data was obtained from the web-site of the National Credit Union Administration (NCUA); iii) Desjardins *caisses populaires* system data was obtained from the Desjardins federation; iv) Spanish FC system data was obtained

[18] Madagascar is definitively a problem case. A consistent use of our criteria led us to classify it as a SN, a ranking that would surprise many, even us. However, the institutional details, in particular the presence of a mandatory use of a designated segment of apex generated services–although this might be an almost empty set– leaves us no room.

[19] The collection of this complex data set was possible thanks to the intervention of several institutions and persons, including: DICO of Ontario, FENACREP of Peru, DID (with several country data), Desjardins, Superintendency of Bolivia, our colleagues in the COFI-project who collected the data–sometimes by hand– for Benin, Colombia and Philippines. At a more personal level we thank Dr. Inmaculada Buendía Martinez for assistance in obtaining the Spanish data and to André Leclerc for his devoted collaboration in the elaboration of the data base on Québec's cooperatives.

from the Association of Spanish Cajas Rurales; v) Ontario Credit Union data was obtained from the Deposit Insurance Corporation of Ontario (DICO); vi) data for FC Benin, Bolivia, Colombia, Peru and Philippines was available to us from earlier works on individual countries performed under the IDRC/DID financed research program;[20] vii) data for Lithuania, Madagascar, Mali, Senegal and Uruguay was provided to us by DID with authorization of the respective systems. All data used in this work was subject to careful verification for consistency. We obtained data for 17,000 FC over 23 systems, in an unbalanced panel covering the period 1996-2002.

3.3 Macro-economic and social data

We ordered FC by the level of AH to which they may be exposed. We used two proxies of AH, i) whether a country belongs to the OECD, and ii) the ratio of private credit by money banks and other financial institutions to GDP. These are items 32d and 99b respectively of the IMF's *International Financial Statistics*. Our rationale to use these proxies of AH is that, other things equal, the more developed an economy and the larger the level of *private* credit, the more complex will be the mixture of financial products offered to customers of the financial system.[21] We also made use of the human development index (HDI)–that considers various factors associated with quality of life– and governance quality indicators to describe the overall level of development of the countries in the sample. All macro-economic and social data was obtained from the World Bank's database web site. Combining measures of AH and integration we obtain the following matrix:

		Level of organization		
Level of AH	**Ratio***	**AS**	**CN**	**SN**
Low/ non-OECD	0.00-0.20		Benin Lithuania Madagascar Mali	Senegal
Medium/ non-OECD	0.20-60	Bolivia Colombia Philippines	Peru	Uruguay
High/ OECD	0.60-1.50	UK (Indep. CU)	Canada (Ontario CU) Italy (B. Popolari) Spain Japan (CU) UK (ABCUL) United States	Canada (Desjardins) Germany Ireland Italy (BC Cooperativo) Japan (Shinkin)

*Note: Ratio of claims on private sector by bank and non-bank financial intermediaries over GDP. The ranges were arbitrarily fixed to distribute into three relatively balanced groups.

There is obviously some overlapping when classifying countries by membership to the OECD

[20] The data for Peru, and for Bolivian FC supervised by the banking authorities (a subset of the 63 institutions included in this study) are available in the respective banking authorities web sites.

[21] Good proxies of financial system development are hard to come by, but, as often the case in TCE economics, proxies of contractual hazard are even harder. There is little agreement of what is a good measure of, e.g., asset specificity, a key measure of vertical relations contractual risk. Like every proxy, ours has limitations. Besides the fact that the correlation between private credit to GDP with AH may be uncomfortably low, other potential sources of error can be identified. One of them is the dominant location (rural vs. urban) of the FC system. For example, Bolivia and Senegal have a ratio of respectively 0.56 and 0.19 of private credit to GDP. However, Bolivian FC have a very strong rural base while the system from Senegal studied here (PAMECAS) is based in the Dakar and Thiès urban region. For those two regions (urban Senegal and rural Bolivia) the relationship could be reversed

and by the ratio of private credit to GDP. The two lower AH categories by the second criteria are all non-OECD countries, and countries included in the highest AH group are all OECD members.

4 The statistical analysis

4.1 Summary of testable hypothesis of interest

First we formulate the specific hypothesis we intend to analyze in the remainder of this paper. While the theoretical framework summarized above generates a number of testable hypothesis, we focus on the following.

- **H1: Over ranges of low (high) AH low (high) integration will be related to higher FC performance.**[22]

Interpretation: Over ranges of low AH, FC tied up in loose and transient relations conserve a relatively high level of efficiency. The situation is found in the poorest developing countries in which FC is an incipient sector offering only very basic financial services. This is often all the community they serve needs. We analyze whether integration has an effect on x-efficiency by comparing individual FC x-efficiency between systems with low and high integration in countries with low level of financial system development–our proxy of AH. In countries with low (high) AH, differences in performance, if any, should be in favor of low (high) integration countries.[23]

- **H2:Variability of FC performance (and size) falls with integration, particularly in SN**

Interpretation: The use of private ordering mechanisms (internal network regulation and supervision mechanisms) typically adopted by SN will result in a better control of performance indicators and a lower likelihood of extreme events. With respect to size, higher integration should result in a lower variance of size since networks solve input procurement problems through joint arrangements rather than by growth or mergers.

- **H3: EP increases with the size of the institution but less so in networks.**

Interpretation: Since exposure to EP is positively related to size of the institution (due to limits on governance and lack of separation of functions), over a range of large FC, differences in efficiency and EP between members and non-members of networks will be relatively large. Empirically this should translate into differences in x-efficiency or other measures of EP.[24]

[22] A more interesting hypothesis would have been the direct test whether integration is related directly to AH. Casual observation confirms that FC systems in countries with a low level of financial system development tend to present low integration. It is also obvious that FC systems in countries with a high level of financial system development tend to present high integration. Unfortunately we cannot formally test this hypothesis since our sample of countries is not randomly selected–we used countries for which we obtained the required institutional and financial data.

[23] Inter-country comparisons of x-efficiency can be problematic. Thus, we take care to do all tests and adjustments to the model the recent literature recommends in these cases and are presented below. Only after all correction possible have been completed do we compare x-efficiency internationally. Further, we also use less sophisticated measures of efficiency based on more primitive financial ratios. Thus, while the precisionist may object the use of the rather sophisticated x-efficiency measure in an international context, for exploratory purposes it remains valid to assess whether certain financial ratios are affected or not by integration levels.

[24] Once again, we are fully aware of the critique by Mester [1989] to the use of x-efficiency to measure EP. The main point of the critique is that of the use of dummies –that modify the intercept–to measure differences in EP. However,

4.2 Computing x-efficiency

Using a measure of x-efficiency and several performance ratios based on financial statement data, we compare systems under the three regimes –AS, CN and SN. Among measures of efficiency, we concentrate on the ratio of: i) *total costs over total assets*, ii) *salaries over loans*, of iii) *other expenses over loans*, and iv) *x-efficiency*. We compare the ratios for the pooled (all countries) data and for sub samples based on level of AH. In each case we will compare means and measures of dispersion. While comparing means is of obvious interest, we emphasize dispersion given our prediction that the more integrated systems make a more intense use of private ordering mechanisms which should, in turn, result in lower variability in performance measures. X-efficiency is based on a single standard translog cost function. The procedure adopted, follows the approach of Sealey and Lindley [1977] that has become somewhat of a standard in the literature. We refer the reader to Desrochers and Fischer [2003] (D&F) for details about it. More specifically, our model is inspired from the adaptation for financial intermediaries of the work of Mitchell and Onvural [1996]. The modifications are:

- Instead of using cross-sectional estimations, we adopt a distribution-free approach (DFA), a methodology previously used in other studies (Berger [1993], Berger and Mester [1997], Altunbas, Gardener, Molyneux and Moore [2001]).
- We include various dummy variables to form adequate categories, an approach sometimes favored (e.g. Westley and Shaffer [1999]). Following established practice (Fried, Lovell and Eeckaut [1993], Hugues and Mester [1993], Rezvanian, Mehdian and Elyasiani [Spring 1996] and Berger and Mester [1997]) we discriminate among five size categories.
- Since we use panel data, we decide upon the estimation procedure (fixed effect or random effect estimators) by performing a Hausman test Hausman [1978]. This test is essential when using panel to verify whether parameters should be drawn form a fixed effect estimator (unbiased but inefficient) or a random effect estimator (efficient buy potentially biased if $E[X \mid \epsilon.] \neq 0$, that is, if the X matrix of covariates is not independent of individual factors ϵ).[25]
- We do not include cost share equations, to reflect the fact that FC are not assumed to minimize their costs as a joint stock bank would. This is consistent with the study of German cooperative banks (Lang and Welzel [1996]).[26]

The model is defined as follows:

$$LnC = \alpha_0 + \mathbf{b}'\mathbf{x} + \frac{1}{2}\mathbf{x}'\mathbf{A}\mathbf{x} + \mathbf{F}\mathbf{F} + \epsilon + \varepsilon \tag{1}$$

Where:

given the huge range of economic and financial environments under which the systems considered here operate, and the relatively simple statistics of comparison we use, we are convinced that the refinement proposed by Mester does not add much in discriminatory power while complicating considerably the computation of efficiency measure, specially considering that the modified approach applies to *pairs* of systems for which priors suggest differences in EP. Given the exploratory character of the work we also use more primitive financial ratios that measure EP (such as salaries to loans and administrative expenses to total assets) and that are not subject to the Mester critique.

[25] If independence is verified the appropriate estimation procedure is one of random effect, and if it is not, the use of fixed effect estimation procedures becomes imperative to avoid bias in the key coefficients. As shown Hausman [1978], only one set of estimators is adequate for a specific sample, with one of them either inefficient, or biased.

[26] We note however that various authors imposed cost minimization for non-profit financial intermediaries (Murray and White [1983], Rezvanian, Mehdian and Elyasiani [Spring 1996] and Westley and Shaffer [1999]).

LnC= natural logarithm of costs;

α_0 = a constant;

b = a vector of coefficients;

x = a matrix of variables including 3 non-scaled log-input prices, 2 non-scaled log-output quantity, log of credit risk, and log of capitalization. As noted, we also include four dummy variables to separate into five size groups. The scaling process is consistent with earlier work (e.g. Mitchell and Onvural [1996]).

$\mathbf{A} = [A_{w1}, A_{w2}, A_{w3}, A_{x1}, A_{x2}, A_{x3}, A_y, A_T, GR1, ..., GR9]$, a matrix of 15 coefficients most of which are related to cross terms;

FF= a series of 60 Fourrier transform terms;

ϵ = individual efficiency component of error;

ε = random error;

The usual constraints to insure homogeneity in input prices and symmetry of second-order coefficients are imposed: $\sum_{i=1}^{3} b_{wi} = 1, \sum A_{ij} = 0$.

The dependent variable is total costs, including both operational expenses and interest expenses. The independent variables include three input prices : Interest rate on deposits, cost of personnel, and cost of fixed capital. We include two outputs, the quantity of loans and the quantity . All these variables are unscaled. The reader is again referred to D&F for further details on Fourrier transform terms, and error decomposition, respectively.

The error term is divided into an inefficiency (ϵ) and a random (ε) component. The first component is the core (or individual mean) inefficiency, estimated as the time average of each FC's residual, while the second component is the purely random component.

We consider X-efficiency as an indicator of performance. Our definition of efficiency Berger and Mester [1997] is:

$$EFF = \frac{\epsilon_i^{Min}}{\epsilon_i} \tag{2}$$

Where ϵ_i^{Min} is the minimal cost associated to the most efficient FC, approximated by the 1% fractile of our sample in order to avoid extreme observations. The interpretation of the ratio is that it represents the proportion of costs that is efficiently used. For example, if ϵ_i^{Min} is representing 70% of ϵ_i, 70% of costs of this FC is used efficiently, and 30% is wasted inefficiently. All FC having a cost below the 1% fractile receive a 100% efficiency score.

It is standard in banking performance studies–cited above– to perform so-called "correlate regressions" in which the values of x-efficiency are regressed against a set of macroeconomic, institutional and bank-specific characteristics to explain the sources of variation in x-efficiency. We abstain from performing these regressions for reasons of parsimony. We consider that, given the large variety of environments in which our sample of FC operate, at best we would be able to identify a very incomplete set of factors explaining variations, resulting in a badly specified statistical model. Thus we limit our analysis to simple non-parametric statistical procedures less dependent on distributional assumptions of the variables involved.

5 Results

First, some general characteristics of the sample. Table III shows that income per capita varies from US$35 500 in Japan to US$ 240 in Mali. The human development index (HDI) also presents important variations from one country to another: Canada ranks third, while Mali ranks 153rd. We also use governance quality indicators compiled by the World Bank. Table IV presents basic characteristics of our sample of FC. The United States, Canada, Colombia, and Germany dominate

the sample in terms of number of FC. Size of FC varies considerably between countries. Italian Banche Popolari control US$5.3 billions of assets on average, followed by Japanese Shinkin banks with US$4.4 billion. Among the smallest, Madagascar's FC average assets of US$29 000 and FC of Mali with US$109 000. The widest variation of size of assets is observed in less integrated networks: Colombia's standard deviation (SD) of assets reaches 10 times its mean, followed by United States (4,7), and Peru (4,1). On average SD of size for AS, CN and SN are 4.03, 2.36 and 1.78. These statistics provides support to H2.

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Please insert Table III and Table IV here
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5.1 Integration and performance

Table V presents several ratios for the whole sample and for OECD and non-OECD countries. We include means and SD of several financial ratios (costs over assets, net income over salaries, salaries over loans, loans over deposits, deposits over capital, and capital over assets (leverage)), all determinants of ROA for FC operating under the three regimes, for the entire sample, for OECD and non-OECD countries and including and excluding the Unites States. The latter distinction was needed due to the relative importance of that country's sample. Strikingly, ratios that reflect cost structure and profitability, the mean (for cost ratios) and SD falls unambiguously as one moves from AS to CN to SN, and the differences are statistically significant, for both the mean and the SD. This is true for the entire, OECD and non-OECD sample (except one ratio in the latter case). From the point of view of a supervisor, the declining SD is important information, since it reveals that higher integration reduces the risk of extreme events (failure). Given its importance, we will study the characteristics of the distribution with more detail–using quintiles–later on. The ratios related to financing (loans/deposits, deposits/capital and capital/assets) present less uniformity. Excluding the United States accentuates the trend in the cost ratios. That is, the United States tends to improve performance of the consensual group. In some cases, exclusion of the United States makes performance of CN worse than that of AS. These statistics provide support to H1 and H2.

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Please insert Table V here
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In Table VI we focus on two cost ratios: x-efficiency (Panel A) and salaries/loans (Panel B), using quintiles. The latter is a ratio often used to measure FC administrative cost structure. Both ratios are expressed in %. In the table, to save space and provide better overview, we only present the first (5%), third (median, 50%) and last (95%) quintiles. In a fourth column we present the percentage change in the value of the ratio between the first and last quintile. In Table VI this is our measure of variation within the sample. At the bottom of each cell, we provide means of quintiles and variation between smallest and largest groups of FC. The table has been divided into the three groups (AS, CN and SN) and each into five size categories. We present results for OECD and non-OECD subsamples. The empty cells mean that there are no observations for that particular organization form and size. Typically absent are larger FC in non-OECD countries or AS in OECD countries.[27] The blocks of AS and SN for OECD with and without the United States have the same

[27] The two sizes available are those of the AICUL system in the UK.

values, those of CN change due to exclusion of the United States. Presenting and comparing data by quintiles and size categories is a non-parametric approach fruitfully used to study performances in the banking sector (e.g. Humphrey [1987]). The approach has two advantages, it eliminates consideration of the extreme–and thus less likely– observations, and allows to verify consistency across sizes. The numbers in Table VI do not contradict conclusions drawn on Table V, but allow a finer analysis. Statistics presented in Table V might have been influenced by extreme observations– beyond the 5% and 95% quintiles. Quintiles do not present the same unambiguous pattern observed in that Table. Another important observations is that, for a few exceptions, variations between sizes (for the same quintile) are much smaller than variations across quintiles (for the same size). This means that in-sample (quintile) variation is much larger than inter-sample (size) variation. This is typical of banking, notably in Humphrey [1987], the first to notice. It means that one should be cautious about inter-size comparisons. Using the same logic as Humphrey, we computed (last column of Table VI) the difference between the largest and smallest median for each size. By and large the variation of medians between systems is somewhat larger than between sizes. We can thus say that the way a FC system is organized has equal or more impact on the performance of its members than the size they have.[28] Scales economies are often seen as key factor in the performance of FC, while little attention has been paid to the way FC interact between them. The table suggests that there is more to be obtained in performance improvement by efficient integration strategies than by increase in size of individual FC. This berates the emphasis on mergers of many FC systems that seek to increase their competitive advantage in the modern market place.

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Please insert Table VI here

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With respect to x-efficiency we observe that, for non-OECD countries, average variation between extreme quintiles is the smallest for SN. However, variation is higher for CN than AS. For OECD countries variation decreases from AS to CN to SN, unambiguously, with and without the United States included in the sample. With respect to the AS (AICUL of UK), we note that x-efficiency is higher and variation about the same as the other two groups. Another interesting –and for us important–observation is that variation between extreme quintiles tends to increase with the size, reaching a peak and then falling again, almost for all groups, but somewhat less so for SN in non-OECD.[29] This is an observation that goes against established intuition that in small FC the likelihood of extreme events increases, but support our conjecture that EP are more difficult to control in larger FC. Larger FC are more prone to extreme events than smaller ones.

With respect to the salaries to loans ratio, for non-OECD countries the median increases from AS to CN to SN. That is, as integration increases, it becomes more expensive to produce loans. However, the change between extreme quintiles falls in the same direction. Networks structures are more expensive to manage, which is as expected, however, more integrated networks tend to better control deviations from the mean or median. In most cases the ratio tends to fall with the size of the FC. For OECD countries, the pattern of the median depends whether one includes the United States in the sample. With, the average ratio goes up from AS to CN and falls again from CN to SN. Without, the average ratio goes first down and then up again. There is, however an

[28] Humphrey, focusing on the United States banking systems, concluded that this pattern of variation suggests that the existence of economies of scale in banking should have little competitive impact relative to the competitive effects that exist already as a result of large differences in cost levels.

[29] The low variation in the largest size (>200 MM) is due mostly to the Japanese Shinkin (all), some Japanese credit unions and some German Raiffeisen FC. These three systems appear to present a particularly low variation in performance across quintiles.

unambiguous fall in the variability of the ratio from AS to CN to SN, with the United States, and an increase from AS to CN and a fall from CN to SN without. The lowest variability is always for SN. In general we can still say that integration tends to reduce variability (H2). However, we cannot unambiguously say that performance improves with integration (H1). While prudence should be exercised in comparing sizes, we note however the following. In non-OECD countries the average median and variability of salaries/loans is the highest in CN. Both the median and the variability is the lowest for AS, followed by SN. This suggests that in countries that have advanced integration, SN tend to control best variability. For OECD countries, variability across sizes decreases from AS to CN to SN. That is, expense preferences tend to be controlled best in SN.

In Table VII we pool once again the OECD and non-OECD countries and divide the entire pool into five size groups. The observations made about variation across quintile and across size, suggests that any interpretation should be taken with caution. It is, nonetheless, worth considering. We note that for almost every size category, the ratios of (other) administrative expenses to assets, salaries to loans ratios improve with integration. X-efficiency is somewhat erratic. Variability almost always decreases with integration except for x-efficiency in some cases. The effect is accentuated when excluding the United States. Comparing across sizes we observe the following. In the case of other expenses the trend is erratic. However, the highest values are not for the group of the smallest, but for one of the largest groups (25-200). In the case of salaries the ratio increased unambiguously with size for AS, and decreases somewhat with CN and SN. For x-efficiency, we observe a decrease for AS, no change for CN and an increase for SN. These statistics provide support for H3. Another observation that can be made with this table is the following. If the complex apex organization of a SN are by necessity more expensive to run than those of a CN or an AS, overall cost performance improves. Apex fees fall under non-salary administrative expenses, in Table VII the ratio is lower for SN than either CN or SN except for the 25-200 millions group. This is consistent with the notion that SN economize in bounded rationality by pooling strategic planning and asset management functions to the hub and reducing the competence scope of base nodes.

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Please insert Table VII here

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5.2 Strategic or consensual?

The step of ceding decision and supervision power to apex organizations–now the "hub"– over a designates segment of issues and products of strategic importance is a critical one. This converts a CN into a SN. It is a difficult decision that can easily result in a split of the movement, as more disciplined, willing to engage in deeper integration–often smaller– FC will encourage the step, and less disciplined and willing to integrate –often larger– FC will resist. At the same time, a SN requires an organizational kernel that is larger and more expensive to run as the hub adds numerous functions to that of a CN apex. These are governance structures designed to facilitate cooperative adaptation under conditions of high AH which tend to be more expensive to run, affecting cost performance at the level of the FC, positively if AH is high, negatively if AH is low. However the centralization should relieve the need for capacities in multiple member FC with an overall gain in bureaucratic efficiency and cost, provided that AH is sufficiently high. It is thus of interest to ask the question: under what conditions is this strategic step beneficial? One particular feature we used in formulating our taxonomy was the fact that, in SN, the network defines a "designated segment" of joint production or contracting of services under the hub's control, whose use is mandatory for member FC.

Thus, in Table VIII we asked the question: do SN outperform AS and CN taken together?[30] We pose this question for two reasons: i) the theoretical framework suggests that for lower AH high integration may not be optimal; ii) it is a common prescription for movements of FC in developing countries to adopt practices of network governance common among SN (delegated monitoring, unified image, internal solidarity mechanisms, etc.). However, for this analysis we considered the division of the sample into OECD and non-OECD countries too crude. Instead we used the second proxy, the three level scale based on the ratio of claims on private sector by bank and non-bank financial intermediaries over GDP. In Panel A we present levels and variations (SD) for the three ratios used before, and in Panel B we test for differences. Observing Panel A one immediately notices that for countries with low AH, performance indicators of non-SN are superior to those of SN, and interestingly, variability is also lower –except for x-efficiency in the first period. For high AH exactly the opposite is true. Both level and variability of ratios is better in SN. When we test for differences we observe that most differences are highly significant. For medium AH we have no observations in the first period.[31] However, for the second period the pattern is one of improved performance of SN–except in salaries– and reduced variability. This supports the theory derived hypothesis of networks formation we are evaluating, particularly H3. In countries with low level of AH high integration might be suboptimal. As AH increases higher integration becomes optimal. However, despite this support we are reluctant to unambiguously support the proposition that the low AH countries that adopted advance forms of integration and organization (in our case Senegal) have done wrong. We explain this reluctance below. The statistics in this table also support the conclusion drawn for Table VII that despite more expensive apex structures, cost performance is superior in SN that in CN and AS for medium to higher levels of AH.

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Please insert Table VIII here

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6 Limitations of the study and results

Like most multi country studies covering a wide range of economic, institutional and cultural environment, this study is subject to limitations. First, the huge variation in size, number and levels of efficiency between FC and in the economic, legal and social environments under which they operate suggest that any conclusion should be stated very cautiously. Indeed there might be sources of variations which we do not measure or even consider –due to lack of data or theory– that could influence the outcome. One particular weakness is the variability in the number of observations for different systems. The panel is *very* unbalanced, although we controlled for this to a limited extent. Quality of data is often a concern in multinational studies. However, prudence did not tie us down. The data used was subject to very rigorous filters by us and other agents before us. Further, we intentionally limited ourselves to use entries that present lower measurement error (e.g. total assets, salaries, deposits, net income,etc.).

The results tend to support the hypothesis consistent with theory that for very low levels of AH, high integration is suboptimal from the point of view of costs. While pleasing from a pure research point of views, we are ambiguous about this result.[32] This would suggest that poor-country FC

[30] We present aggregated results to save space, but country-specific results are also available upon request. They are supportive of the same evidence on relative strength of particular networks.

[31] This is the COFAC federation of Uruguay.

[32] TCE, as a branch of economics, has over the years grown in confidence because its predictions tend to find remarkable in the data (Williamson [1996]: 372-374). This is once again the case.

cannot benefit from advanced integration and should not be encouraged to do so. This may indeed be the unavoidable policy consequence. But such policy recommendations are also problematic for several reasons: i) they imply low inter-FC reducing their ability to face increased complexities in the demand of financial services by its members. ii) low integrations also reduces their ability to perform successful regulatory advocacy in the face of unfriendly or unwitting –about the particularities of FC regulatory needs–banking authorities; iii) often, advanced integration with inclusion of private ordering mechanisms is the only way to protect member savings from the consequences of EP inclined managers, as our results appear to confirm. When Willhelm Raiffeisen–back in the late 19th century when German financial markets were far from sophisticated– introduced ambulatory auditors visiting the rural *Kassen* on horse or donkey backs offering both prudential supervision and management advisory services, he introduced a qualitative jump in the functioning of those FC with enormous long-term consequences–the development of today's successful auditing federation model that characterizes systems that emulate the Raiffeisen model. The same applies to a number of other integration initiatives proposed then by Raiffeisen and followed worldwide since. The model of FC network creation lacks the details to take all these elements into consideration. However, overcoming this limitation in the modeling exercise is far from obvious. Needless to say, these are questions we intend to address in future research.

However, we consider the study a worthwhile exploratory exercise to assess the usefulness of a theoretical framework that generates distinct predictions explaining the old habit of FC to integrate themselves into networks of varying complexity and the influence these networks have on relatively simple efficiency measures. We can draw two sufficiently solid conclusions that we believe justify the work. First, that there is a strong interaction between efficiency and level of integration–and not always in a single direction. Higher (lower) integration tends to improve efficiency of FC in markets with higher (lower) levels of maturity of the financial sector. Stated differently, the challenges of an increasingly sophisticated financial market are best faced through networks of advanced functionality that imply higher (lower) cooperative (autonomous) adaptation. Second, integration definitively appears to play a role in controlling EP and variability in individual FC performance, and this in an almost unambiguous way. For wide ranges of FC size, higher integration–that generally involve the adoption by the network of private ordering mechanisms–appears to limit EP and variability of performance.

7 Conclusions

This paper analyzes in an international context hypotheses derived from a theory of organization of financial cooperatives (FC). This theory proposes two central ideas. First, that the imperative to control uncertainty and exploit economies of scales when procuring inputs needed to perform the intermediation process, is the driving force behind the creation of networks of FC. Second, that the severity of contractual hazard results from those lateral agreements between FC, which in turn depends on specific characteristics of products object of lateral contracting, determines the organizational complexity of these networks. Thus, classical inter-FC organizations –such as leagues, federation and confederations– are just organizations known in the theory of *transaction costs economics* (TCE) as hybrids, that present governance structures whose complexity depends upon the relative level of autonomous or cooperative adaptations to disturbances intended in their design. Systems–or groups–of FC tend to adopt the type of organization that economizes in bounded rationality and the combination of governance and input procurement costs, while conforming to traditions–or path dependence–and legal supporting environment. Among hypotheses resulting from that theoretical framework we focused on three: i) over ranges of low (high) AH, low (high)

integration will be related to higher FC performance resulting from reduced governance costs; ii) variability of FC performance (and size) and thus the likelihood of low performance events falls with integration, particularly in strategic networks; and iii) expense preferences increases with the size of the institution but less so in networks.

We then proceed to analyze these hypothesis on individual FC financial data for a sample of 23 systems with a total of 17,000 institutions with observations for up to five years in countries as diverse as the United States and Mali. We focused on measures of standard *x-efficiency* –often used in the banking literature– and on more primitive ratios that measure performance and expense preferences. The sheer size and diversity of the sample makes high variability in data quality unavoidable. Thus we chose to perform all comparisons employing rudimentary and non-parametric statistics avoiding inferences on more complex tools that dependent on restrictive distributional assumptions and data refinement. Overall, results suggest a weak support for the first hypothesis, a strong support for the second hypothesis and a weak support for the third hypothesis. With respect to the first we cannot unambiguously state that in high (low) AH environments, high (low) integration yield unambiguously higher performance in all measures used. However, by and large, the trend is one of higher performance with higher integration. However, unambiguously, higher integration reduces cross sectional volatility in measure of performance and size. In other words, the likelihood of low performance events tends to fall, a result that is of definitive interest to regulators and supervisor. With respect to the third hypothesis, our data–and within the limits of the methodology employed– support the proposition that EP tends to increase with size of the institution -at least over a wide range of sizes–but that this is less the case in more integrated systems. Another important conclusion is that except for systems presenting low levels of AH, despite the higher costs of running a strategic network hub organization, the overall cost of running the network falls with integration. This is consistent with the notion that strategic networks economize in bounded rationality by pooling strategic planning and asset management functions to the hub and reducing the competence scope of base nodes. The study is subject to a number of limitations that we state in the text. Finally, we hope that we have made the point that the study of the *causes*, *modalities* and *consequences* of alliances and networks of systems of FC is a fertile territory of research with important implications for FC performances.

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Table I: Characteristics of networks

Representation	The central node represents the system in issues of common concern (regulation, taxation, other cooperative movements, etc.).	**Atomized system**
Cooperative Education	The central node provides or supports cooperative education among members of first tier nodes.	
Advisory and prudential services	The central node provides business and/or prudential management services for the first tier nodes.	
Voluntary pooling of resources and standardization	The first tier node is made responsible for the management of common resources and to support standardization of operating procedures across the system.	**Consensual networks**
Market sharing	The network has rules by which inter-nodes competition is eliminated.	
Unique image	The network assumes a unique trade mark and image to which all first-tier node adhere.	
Delegation of strategic planning function	The central node is given the function to perform strategic planning for the system, although there is no mandatory compliance of strategic plans approved by the system.	
Separation of strategic and operational decision management	There is separation of strategic and operational decision management between central nodes (strategic) and first-tier nodes (operational). First- and second tier nodes are bound by network decisions. This includes mandatory pooling of resources and standardizations of operations in areas chosen by the network.	**Strategic networks**
Prudential supervision role	The central node assumes the role of prudential supervisor (or auxiliary supervisor) of first tier nodes	
Contractual solidarity	The networks introduces mechanisms of collective insurance designed to assist first or second tier nodes in difficulties	

Note: These characteristics determine the main traits that we use to categorize the systems of FC.

Table II: Categorization of networks

		Atomized network			Consensual network				Strategic network			
Country	Type / Network	Representation	Cooperative education	Prudential and management training	Voluntary pooling of resources / standardization	Market sharing	Unique image	Delegation of strategic planning responsibilities	Separation of strategic and operational planning function	Internal governance - Auto control	Subsidiarity	Contractual solidarity
OECD Members												
Canada	Strategic / Desjardins	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Consensual / Ontario's Credit Unions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
United States	Consensual - NCUA	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes
Japan	Consensual / Japan's Credit Unions	Yes	Yes		Yes *	Yes *	No *	No *	No *	No *	Yes *	No *
	Strategic / Shinkin banks	Yes	Yes	Yes *	Yes *	Yes	Yes	Yes *	Yes	Yes	Yes *	Yes
United Kingdom	Consensual / ABCUL	Yes	Yes	Yes	Yes	No *	No	No	No	No	No	No
	Atomized / Remaining Credit Unions	Yes	Yes / No	Yes / No	No	No	No	No	No	No	NA	No
Germany	Strategic / Raiffeisen	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ireland	Strategic / ILCU	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Italy	Strategic / Cassa Raiffeisen and Banca Cooperativa	Yes	Yes	Yes *	Yes *	Yes	Yes	Yes *	Yes	Yes	Yes *	Yes
	Consensual / Banca Popolare	Yes	Yes *	Yes *	Yes *	No	No	No *	No	No	Yes *	No
Spain	Consensual / Cajas Espanolas	Yes	No	No	Yes	Yes	No	Yes	No	No	Yes	Yes
Non-OECD Members												
Uruguay	Strategic / Cofac		Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes
LCU - Lithuania	Consensual / LCU	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Colombia	Atomized / Confecoop	Yes	Yes	No	No	No	No	No	No	No	NA	No
Philippines	Atomized / Cooperative rural banks	No	No	No	No	No	No	No	No	No	NA	No
Peru	Consensual / Fenacrep	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Bolivia	Atomized / Bolivian's Credit Unions	Yes	Yes	No *	No *	No	No	No	No	No	NA	No
Madagascar	Consensual / Otiv	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Senegal	Strategic / Pamecas	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Benin	Consensual / Fenacrep	Yes	Yes	Yes *	Yes *	No *	No	Yes *	No	Yes	Yes *	Yes
Mali	Consensual / Nyesigiso	Yes	Yes	Yes	Yes	No	Yes	No	No	Yes	No	Yes

Note: 15214 financial cooperatives of OEDC countries and 1813 financial cooperatives of Non-OEDC countries were included into our sample. Size of assets vary widely from one network to another (Mean value varies

Table III: Country statistics (ordered by HDI)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Country	**Income per Capita**	**HDI rank**	**Voice and Accountability**	**Political Stability**	**Government Effectiveness**	**Regulatory Quality**	**Rule of Law**	**Control of Corruption**	strategic and operational planning function
					OECD Members				
Canada	US$ 21040	3	1,36	1,11	1,89	1,32	1,89	2,21	1,36
United States	US$ 34680	6	1,34	0,91	1,73	1,46	1,77	1,77	1,18
Japan	US$ 35500	9	1,02	1,16	1,10	0,76	1,62	1,26	2,44
United Kingdom	US$ 24430	14	1,40	0,98	2,06	1,64	1,91	2,06	3,48
Germany	US$ 25120	17	1,43	1,24	1,76	1,36	1,83	1,85	0,97
Ireland	US$ 22960	18	1,40	1,33	1,72	1,55	1,77	1,77	0,90
Italy	US$ 20160	20	1,11	0,87	0,87	0,86	0,92	0,78	0,65
Spain	US$ 15080	21	1,18	0,81	1,66	1,22	1,26	1,36	1,13
Uruguay	US$ 6000	37	0,85	0,79	0,60	0,83	0,55	0,59	0,88
Lithuania	US$ 2770	47	0,85	0,58	0,30	0,49	0,20	0,12	0,30
Colombia	US$ 2020	62	-0,36	-1,47	-0,15	0,24	-0,63	-0,47	1,01
Philippines	US$ 1040	70	0,30	-0,19	0,09	0,38	-0,29	-0,43	1,18
Peru	US$ 2080	74	-0,31	-0,59	-0,18	0,56	-0,43	-0,15	0,47
Bolivia	US$ 990	104	0,17	-0,23	-0,37	0,53	-0,52	-0,69	0,94
Madagascar	US$ 250	135	0,21	0,00	-0,47	-0,23	-0,66	-0,28	0,29
Senegal	US$ 490	145	-0,15	-0,76	-0,04	-0,27	-0,23	-0,35	0,40
Benin	US$ 370	147	0,45	0,50	-0,25	-0,10	-0,32	-0,59	0,25
Mali	US$ 240	153	0,28	0,19	-0,68	-0,04	-0,63	-0,44	0,27

Note: Our sample includes financial cooperatives from 18 countries which have reached very different levels of development (from 3rd HDI rank to 153th), very different levels of quality of State governance, and different levels of development of the financial sector (from 3.48 times GDP to 0.25 time GDP).

Source: Governance Research Indicators Project, World Bank (http://www.worldbank.org/wbi/governance)

Table IV: Total assets of financial cooperatives considered in each country, ordered by HDI rank

Country	Type / Network	(1) # of institutions	(2) Period	(3) Obs	(4) Mean	(5) Std Dev	(6) Median	(7) Max	(5)/(4) Std Dev /Mean
OECD Members									
Canada	Strategic / Desjardins	1316	1996-2000	5 991	28 829	48 009	17 540	1 517 380	1,7
	Consensual / Ontario's Credit Unions	466	1996-2000	2 796	18 465	54 663	2 401	694 923	3,0
United States	Consensual - NCUA	10107	1996-2001	60 642	34 746	163 626	6 337	13 000 500	4,7
Japan	Consensual / Japan's Credit Unions	268	1996-2001	979	587 721	911 968	325 419	10 731 400	1,6
	Strategic / Shinkin banks	404	1996-2001	1 568	4 360 500	16 004 400	1 438 020	198 958 000	3,7
United Kingdom	Strategic / ABCUL	447	1996-1998	1 156	368	1 329	58	18 095	3,6
	Atomized / Remaining Credit Unions	258	1996-1998	671	243	508	48	4 198	2,1
Germany	Strategic / Raiffeisen	1200	1996-2001	5 653	405 719	765 843	252 424	18 014 700	1,9
Ireland	Strategic / ILCU	106	1996-1998	318	3 854	6 388	2 107	57 524	1,7
Italy	Strategic / Cassa Raiffeisen	47	1996-2001	282	64 600	78 677	46 914	401 549	1,2
	Strategic / Banca Cooperativa	430	1996-2001	1 986	124 000	337 000	53 000	7 334 382	2,7
	Consensual / Banca Popolare	65	1996-2001	390	5 304 411	8 071 747	1 534 706	40 152 084	1,5
Spain	Consensual / Cajas Espanolas	100	1996-2001	553	293 372	647 549	83 393	6 477 810	2,2
Non-OECD Members									
Uruguay	Strategic / Cofac	29	2000-2002	90	8 370	3 882	7 451	22 597	0,5
LCU - Lithuania	Consensual / LCU	44	1999-2002	134	159	206	87	1 342	1,3
Colombia	Atomized / Confecoop	1225	1996-2000	7 315	461	4 627	7	188 385	10,0
Philippines	Atomized / Cooperative rural banks	50	1995-1999	213	1 206	2 046	579	16 229	1,7
Peru	Consensual / Fenacrep	207	1997-2001	873	954	3 872	117	38 179	4,1
Bolivia	Atomized / Bolivian's Credit Unions	63	1996-2001	237	9 500	21 494	2 378	155 375	2,3
Madagascar	Strategic / Otiv	16	1997-2002	72	29	39	17	190	1,3
Senegal	Strategic / Pamecas	28	1998-2001	102	196	154	152	785	0,8
Benin	Consensual / Fececam	97	1995-2000	482	329	252	266	2 752	0,8
Mali	Consensual / Nyesigiso	54	1997-2002	277	109	83	89	465	0,8

widely from one network to another (Mean value varies between US$4361 millions and US$29000), and within each network.

Table V: Diverse performance measures

ROA = R1*R2*R3*R4*R5

	Complete Sample							OECD Countries							Non OECD Countries				
	(1)	(2)		(3)		(4)		(5)	(6)		(7)		(8)		(9)	(10)		(11)	
	Atomized	Consensual		Consensual w/o United States		Strategic		Atomized	Consensual		Consensual w/o United States		Strategic		Atomized	Consensual		Strategic	
Total costs / Total assets	0,767	0,045	**	0,058	**	0,040	**	0,074	0,041	**	0,058		0,040	**	0,871	0,202	**	0,124	**
Standard Deviation	13,625	0,104	**	0,327	**	0,065	**	0,241	0,096	**	0,327	**	0,065	**	14,610	0,209	**	0,042	**
N	5 137	66 793		5 205		16 637		671	64 990		5 205		16 637		4 466	1 803		191	
R1: Net result / Salaries	2,057	0,371	**	2,211		0,245	**	18,735	0,376	**	2,211	**	0,245	**	0,279	0,204		-1,557	
Standard Deviation	18,328	6,764	**	25,741		4,184	**	54,375	6,844	**	25,741		4,184	**	4,933	2,520	**	13,810	
N	4 619	65 931		4 498		16 557		445	64 148		4 498		16 557		4 174	1 783		191	
	0,638	5,8%	**	2,4%	**	0,036	**	0,024	0,045	**	0,024		0,036	**	0,737	0,584		0,125	**
	7,260	50,9%	**	5,3%	**	0,028	**	0,127	0,308	**	0,053	**	0,028	**	7,816	2,625	**	0,073	**
N	4 752	66 408		5 150		16 635		657	64 861		5 150		16 635		4 095	1 547		191	
R3: Loans / Deposits	11,230	0,874	**	0,705	**	0,834	**	0,672	0,745	**	0,705	**	0,834	**	13,648	6,531	**	1,080	**
	54,440	6,275	**	0,231	**	0,274	**	0,288	0,306	**	0,231	**	0,274	**	60,093	41,610		0,848	**
N	3 591	8		5 196		16 632		669	64 978		5 196		16 632		2 922	1 481		191	
R4: Deposits / Capital	1,942	7,121	**	10,392	**	7,846	**	11,118	7,245	**	10,392		7,846	**	0,568	2,644	**	2,827	**
	10,526	6,165	**	12,965		7,152	*	27,244	6,021	**	12,965		7,152	*	1,361	8,987		6,497	**
N	5 135	66 772		5 196		16 632		669	64 972		5 196		16 632		4 466	1 800		191	
R5: Capital / Assets	0,641	0,154	**	0,123	**	0,171	**	0,143	0,144		0,123	**	0,171	**	0,716	0,513	**	0,287	**
	1,900	0,112	**	0,125	**	0,135	**	0,117	0,072	**	0,125	**	0,135	**	2,027	0,386	**	0,380	**
N	5 137	66 793		5 205		16 637		671	64 990		5 205		16 637		4 466	1 803		191	
R6: ROA	0,000	0,006	**	0,008	**	0,002		0,033	0,000	**	0,008	**	0,002	**	-0,005	-0,008		-0,017	
	0,143	0,025	**	0,036	**	0,066	**	0,030	0,143		0,036	**	0,066	**	0,153	0,122		0,528	
N	4 766	63 543		4 801		12 251		671	4 766		4 801		12 251		4 095	1 798		190	

Note: The level of significance reported in the "mean" line, in column (2) is related to T-Test of mean differences between column (1) and (2); in column (3) for T-Test of mean differences between (1) and (3); in column (4) between (1) and (4), and similar

Note: The level of significance reported in the "Standard Deviation" line, in column (2) is related to F-Test of comparison of variances between column (1) and (2); in column (3) for F-Test of comparison of variances between (1) and (3); in column (4) bet

Note: * significant at the 5% level; ** at the 1% level.

Note: We observe that the proportion of wages over loans reduces with a greater level of integration. We also observe that leverage increases with integration, resulting into a greater ROA ratio.

Table VI: Comparisson of Systems Based on Quintiles

Panel A: Efficiency

Non-OECD

	AS				CN				SN				Ch. max and min
	5-ile	50-ile	95-ile	**Ch.**	5-ile	50-ile	95-ile	**Ch.**	5-ile	50-ile	95-ile	**Ch.**	**median**
<1M	85,9%	91,6%	95,3%	**0,11**	84,4%	90,7%	95,6%	**0,13**	90,7%	91,9%	93,3%	**0,03**	**0,01**
1-5M	85,4%	90,8%	94,3%	**0,10**	86,4%	91,0%	95,5%	**0,11**	88,8%	93,3%	94,2%	**0,06**	**0,03**
5-25M	83,2%	90,2%	95,8%	**0,15**	78,8%	87,6%	97,9%	**0,24**	88,4%	92,5%	95,3%	**0,08**	**0,06**
25-200M	85,2%	90,7%	99,9%	**0,17**	85,7%	90,5%	96,0%	**0,12**	n.a.	n.a.	n.a.	**n.a.**	**n.a.**
>200M	n.a.	n.a.	n.a.	**n.a.**	n.a.	n.a.	n.a.	**n.a.**	n.a.	n.a.	n.a.	**n.a.**	**n.a.**
Change	**-0,01**	**-0,01**	**0,05**		**0,02**	**0,00**	**0,00**		**-0,03**	**0,01**	**0,02**		
Mean	84,9%	90,8%	96,3%	**0,13**	83,8%	90,0%	96,2%	**0,15**	89,3%	92,5%	94,2%	**0,06**	**0,03**

OECD (w. United States)

	87,0%	91,3%	95,4%	**0,10**	89,3%	91,0%	92,5%	**0,04**	86,8%	91,0%	95,1%	**0,10**	**0,00**
1-5M	89,1%	91,7%	94,5%	**0,06**	89,3%	91,0%	92,5%	**0,04**	87,1%	91,0%	94,7%	**0,09**	**0,01**
5-25M	n.a.	n.a.	n.a.	**n.a.**	89,4%	90,8%	92,8%	**0,04**	87,2%	91,4%	98,6%	**0,13**	**0,01**
25-200M	n.a.	n.a.	n.a.	**n.a.**	89,0%	90,6%	94,0%	**0,06**	85,6%	90,6%	100,0%	**0,17**	**0,00**
>200M	n.a.	n.a.	n.a.	**n.a.**	88,8%	91,1%	95,2%	**0,07**	88,4%	90,8%	92,7%	**0,05**	**0,00**
Change	**0,02**	**0,00**	**-0,01**		**-0,01**	**0,00**	**0,03**		**0,02**	**0,00**	**-0,03**		
Mean	0,88	0,91	0,95	**0,08**	89,1%	90,9%	93,4%	**0,05**	87,0%	91,0%	96,2%	**0,11**	**0,00**

OECD (w/o United States)

<1M	87,0%	91,3%	95,4%	**0,10**	86,4%	89,3%	93,0%	**0,08**	86,8%	91,0%	95,1%	**0,10**	**0,02**
1-5M	89,1%	91,7%	94,5%	**0,06**	86,6%	89,3%	92,9%	**0,07**	87,1%	91,0%	94,7%	**0,09**	**0,03**
5-25M	n.a.	n.a.	n.a.	**n.a.**	86,9%	90,8%	100,0%	**0,15**	87,2%	91,4%	98,6%	**0,13**	**0,01**
25-200M	n.a.	n.a.	n.a.	**n.a.**	85,9%	91,0%	100,0%	**0,16**	85,6%	90,6%	100,0%	**0,17**	**0,00**
>200M	n.a.	n.a.	n.a.	**n.a.**	88,1%	91,2%	98,9%	**0,12**	88,4%	90,8%	92,7%	**0,05**	**0,00**
Change	**0,02**	**0,00**	**-0,01**		**-0,01**	**0,02**	**0,08**		**0,02**	**0,00**	**-0,03**		
Mean	0,88	0,91	0,95	**0,08**	86,8%	90,3%	97,0%	**0,12**	87,0%	91,0%	96,2%	**0,11**	**0,01**

Table VI (Continued) Panel B: Salaries/Loans (%)(*)

Non-OECD													
	AS				CN				SN				Ch. max and min median
	5-ile	50-ile	95-ile		5-ile	50-ile	95-ile	Ratio	5-ile	50-ile	95-ile		
<1M	0,26%	2,00%	12,13%	**45,65**	1,56%	6,87%	28,29%	**17,13**	3,76%	7,20%	40,00%	**9,64**	**2,60**
1-5M	0,17%	2,00%	21,01%	**122,59**	1,58%	7,62%	20,45%	**11,94**	5,78%	8,07%	12,74%	**1,20**	**3,04**
5-25M	0,15%	2,00%	34,84%	**231,27**	2,20%	15,28%	29,67%	**12,49**	2,73%	4,69%	8,02%	**1,94**	**6,64**
25-200M	1,23%	2,56%	40,00%	**31,52**	1,41%	1,97%	2,46%	**0,74**	n.a.	n.a.	n.a.	n.a.	**n.a.**
>200M	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	**n.a.**	n.a.	n.a.	n.a.	n.a.	**n.a.**
Change	**3,73**	**0,28**	**2,30**		**-0,10**	**-0,71**	**-0,91**		**-0,27**	**-0,35**	**-0,80**		
Mean	0,45%	2,14%	27,00%	**107,76**	1,69%	7,94%	20,22%	**10,58**	4,09%	6,65%	20,25%	**4,26**	**4,09**
OECD (w. United States)													
<1M	0,26%	2,00%	12,13%	**45,65**	0,01%	2,20%	7,72%	**2,5**	0,01%	0,01%	3,85%	**n.a.**	**n.a.**
1-5M	0,17%	2,00%	21,01%	**122,6**	0,25%	2,83%	6,02%	**23,08**	0,62%	2,33%	4,03%	**5,50**	**-0,18**
5-25M	n.a.	n.a.	n.a.	n.a.	0,99%	2,73%	4,92%	**3,97**	1,30%	2,06%	3,21%	**1,47**	**-0,25**
25-200M	n.a.	n.a.	n.a.	n.a.	0,75%	2,57%	4,13%	**4,51**	1,32%	2,08%	3,68%	**1,79**	**-0,19**
>200M	n.a.	n.a.	n.a.	n.a.	1,31%	2,59%	5,65%	**3,31**	1,17%	2,06%	3,32%	**1,84**	**-0,20**
Change	**-0,35**	**0,00**	**0,73**		**4,24**	**0,18**	**-0,27**		**0,89**	**-0,12**	**-0,14**		
Mean	0,22%	2,00%	16,57%	**84,12**	0,66%	2,58%	5,69%	**7,5**	0,88%	1,71%	3,62%	**2,65**	**-0,20**
OECD (w/o United States)													
<1M	0,26%	2,00%	12,13%	**45,65**	0,01%	0,09%	1,19%	**12,2**	0,01%	0,01%	3,85%	**n.a.**	**n.a.**
1-5M	0,17%	2,00%	21,01%	**122,6**	0,01%	0,24%	1,63%	**5,8**	0,62%	2,33%	4,03%	**5,50**	**8,71**
5-25M	n.a.	n.a.	n.a.	n.a.	0,01%	0,43%	5,21%	**11,1**	1,30%	2,06%	3,21%	**1,47**	**3,79**
25-200M	n.a.	n.a.	n.a.	n.a.	0,04%	0,94%	5,49%	**136,3**	1,32%	2,08%	3,68%	**1,79**	**1,21**
>200M	n.a.	n.a.	n.a.	n.a.	1,33%	3,06%	6,26%	**3,71**	1,17%	2,06%	3,32%	**1,84**	**-0,33**
Change	**-0,35**	**0,00**	**0,73**		**32,3**	**33,0**	**4,26**		**0,89**	**-0,12**	**-0,14**		
Mean	0,22%	2,00%	16,57%	**84,12**	0,28%	0,95%	3,96%	**33,8**	0,88%	1,71%	3,62%	**2,65**	**3,35**

Notes: (*) In this table the value of 0.01% is an absolute minimum value. Actual values are lower. These values were ignored when computing changes, thus the next neighbor value was used.

Table VII: Integration and control of Expense Preference

< US$1M

		Other expenses		Salaries		X-Efficiency	
Category	**N**	**Mean**	**Std Dev**	**Mean**	**Std Dev**	**Mean**	**Std Dev**
Atomized	#	14,90%	12,40%	4,25%	7,17%	81,85%	4,54%
Consensual	#	3,15%	4,83%	4,45%	4,71%	90,85%	2,26%
Strategic	#	3,01%	4,64%	4,32%	5,33%	90,98%	2,87%

US$1M - US$5M

		Other expenses		Salaries		X-Efficiency	
Category	**N**	**Mean**	**Std Dev**	**Mean**	**Std Dev**	**Mean**	**Std Dev**
Atomized	#	8,01%	9,52%	5,91%	7,97%	81,48%	4,08%
Consensual	#	1,25%	1,35%	3,18%	2,10%	90,97%	1,19%
Strategic	#	0,53%	0,79%	2,53%	1,34%	90,88%	2,70%

US$5M - US$25M

		Other expenses		Salaries		X-Efficiency	
Category	**N**	**Mean**	**Std Dev**	**Mean**	**Std Dev**	**Mean**	**Std Dev**
Atomized	#	6,89%	8,50%	6,84%	11,44%	81,55%	6,12%
Consensual	#	1,24%	0,90%	2,89%	1,42%	90,89%	1,57%
Strategic	#	0,67%	0,95%	2,34%	1,12%	91,43%	3,96%

US$25M - US$200M

		Other expenses		Salaries		X-Efficiency	
Category	**N**	**Mean**	**Std Dev**	**Mean**	**Std Dev**	**Mean**	**Std Dev**
Atomized	#	18,27%	15,78%	17,62%	15,55%	80,64%	3,69%
Consensual	#	1,40%	0,94%	2,74%	1,11%	90,91%	2,02%
Strategic	#	1,43%	1,29%	2,65%	1,23%	91,00%	3,48%

> US$200M

		Other expenses		Salaries		X-Efficiency	
Category	**N**	**Mean**	**Std Dev**	**Mean**	**Std Dev**	**Mean**	**Std Dev**
Consensual	#	1,38%	0,83%	2,47%	1,08%	91,45%	2,62%
Strategic	#	1,29%	0,66%	2,30%	0,90%	90,59%	1,57%

Table VIII: Strategic networks, when should we switch?

Panel A: Efficiency ratios for SN and non-SN networks

1996-1998

	SN							non-SN						
		Other expenses		Salaries		Efficiency			Other expenses		Salaries		Efficiency	
AH	N	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	N	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Low	24	11,31%	11,40%	14,03%	12,17%	93,56%	3,42%	189	5,87%	6,03%	4,39%	5,33%	91,19%	3,64%
Medium								1 553	12,03%	12,13%	3,93%	6,95%	90,83%	4,34%
High	12 559	1,05%	1,09%	2,46%	1,22%	90,98%	2,80%	22 947	1,38%	1,86%	2,79%	1,90%	90,89%	1,93%

1999-2001

	SN							non-SN						
		Other expenses		Salaries		Efficiency			Other expenses		Salaries		Efficiency	
AH	N	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	N	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Low	106	12,21%	10,27%	9,17%	8,65%	91,18%	2,94%	509	6,87%	6,03%	6,79%	5,33%	89,57%	3,92%
Medium	60	2,66%	1,43%	5,62%	2,37%	92,43%	2,00%	2 205	14,03%	13,45%	3,57%	5,69%	90,97%	3,53%
High	7 033	1,24%	0,94%	2,39%	0,97%	90,94%	3,23%	34 919	1,47%	2,06%	3,06%	2,19%	90,97%	2,03%

Panel B: Differences between strategic and non strategic networks

1996-1998

	Net advantage of SN							Significance of difference of means and variances						
		Other expenses		Salaries		Efficiency			Other expenses		Salaries		Efficiency	
AH	N	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	N	Alfa	F	Alfa	F	Alfa	F
Low	24	-5,45%	-5,37%	-9,65%	-6,84%	-2,37%	0,22%	352	5,87%	0,00%	4,39%	0,00%	86,33%	62,15%
Medium														
High	12 559	0,32%	0,77%	0,32%	0,68%	-0,09%	-0,87%	33 367	1,38%	0,00%	2,79%	0,00%	82,20%	0,00%

1999-2001

	Net advantage of SN							Significance of difference of means and variances						
		Other expenses		Salaries		Efficiency			Other expenses		Salaries		Efficiency	
AH	N	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	N	Alfa	F	Alfa	F	Alfa	F
Low	106	-5,34%	-4,24%	-2,38%	-3,32%	1,61%	-0,98%	352	5,27%	0,00%	21,63%	0,00%	80,38%	0,00%
Medium	60	11,37%	12,02%	-2,06%	3,32%	1,46%	-1,53%	3 026	0,00%	0,00%	84,18%	0,00%	21,74%	0,00%
High	7 033	0,23%	1,12%	0,66%	1,23%	-0,03%	1,20%	31 993	4,85%	0,00%	0,00%	0,00%	55,25%	0,00%

Note: Panel B presents, on the left hand side, the net advantage of SN, defined as the difference between SN figures and non-SN, while the right hand side of Panel B presents the statistical significance of difference of means and variances, with a T-test of difference of means and a F-test of difference of variances, defined in Table V.