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Policy Networks and Institutional  
Collective Action: A Research Agenda

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# **POLICY NETWORKS AND INSTITUTIONAL COLLECTIVE ACTION: A RESEARCH AGENDA**

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*Policy fragmentation in the American federalist system leads to inefficiencies as decisions by one authority impose positive and negative externalities on other authorities and their constituencies. The Center for the Study of Federalism and Institutional Collective Action, will focus on the role of policy networks in shaping coordinated decisions that enhance the joint outcomes among governmental authorities. We develop and test two competing perspectives relating networks to collective action, one emphasizing the role of tightly-clustered “strong-tie” relationships capable of enhancing the credibility of commitments among network members, and the other emphasizing the role of extensive, “weak-tie” relationships linking diverse stakeholders in enhancing the shared information required to coordinate collective decisions.*

*Our previous projects established the importance of local policy networks in enhancing compliance with federal regulations and developing coordinated policy agreements in local watersheds. The research provides initial evidence that extensive weak-tie networks play the most critical role in establishing joint projects, at least among specialized authorities managing an estuary’s natural resources. The proposed inquiry focuses on two critical settings, one emphasizing horizontal fragmentation (the joint provision of local services by municipalities), and the other emphasizing vertical fragmentation (the development of joint projects among federal, state, and local resource management agencies). In each setting, we develop relevant formal models about the capabilities of different network structures and test them using an array of archival and survey data.*

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## Policy Networks and Institutional Collective Action

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The American federalist system offers multiple advantages by dispersing power, developing multiple channels of representation, and encouraging multiple centers of creativity, but fragmentation of authority can result in problems of cooperation across multiple policy arenas. Globalization and the growing interconnection between specialized geographic and functional economies have dramatically increased the impact of one policy arena's decisions in other arenas, leading to substantial positive and negative externalities. When positive externalities exist, the political authorities, agencies, and stakeholders in multiple policy arenas can increase their own and the broader public's benefits by *coordination* of decisions to maximize joint returns. When negative externalities exist, *cooperation* among the independent actors can again enhance joint returns.

Our research agenda focuses on the study of coordination and cooperative solutions to the problem of fragmentation, which Feiock (2004) labeled the study of *Institutional Collective Action (ICA)*. Federalist systems encounter ICA in two primary settings, one involving horizontal relationships (e.g., municipalities in a metropolitan area, specialized departments in the federal government), one involving vertical relationships (e.g., federal, state, and local water pollution authorities). Centralization remains an attractive option (as in the Homeland Security and more recently the Intelligence responses to coordination problems for countering terrorism), but imposes large costs, loses much of the advantages offered by federalism, and can only be imposed on a very limited number of issues. Privatization can reduce coordination problems in situations where markets can be created, but raises further problems of control and coordination. The role of centralization and privatization in ICA is already being extensively studied.

The role of policy networks in resolving ICA problems, on the other hand, has more recently attracted attention among scholars and policy makers alike (Bressers and O'Toole 1998, Provan and Milward 2001). Informal connections and ties among agencies and their relevant stakeholders can reduce the impediments to developing and implementing coordinated policy solutions. The polycentric nature of the American political system implies that many policy outcomes depend on cooperation and coordination among multiple actors. Any of these multiple interactions can be properly modeled as a game; the actors have goals, beliefs about others' goals and beliefs, and are constrained in resources and choice options; the agents try to achieve their desired outcomes while taking other actors' potential actions in mind. The interactions between regulating agencies and regulated firms, cooperation and conflict among stakeholders to a policy problem, contracts among multiple local governments for public service provisions are examples involving ICA that can be properly modeled and analyzed as games.

For the past several decades, major advances in the social sciences have been made as scholars analyzed the micro-level foundations to explain observed macro-level phenomena. Game theory and network analysis are two of the most important tools of such micro-level analysis. *Game theory* provides tools to model how preferences, beliefs, and constraints affect choices in strategic (or interactive) decision-making situations. Evolutionary game theory, while typically relaxing the strict rationality assumption of the standard, non-cooperative game theory, allows one to study how the choices and/or preferences evolve as the agents learn in repeated interactions. *Network analysis*, on the other hand, looks at the way multiple interactions of a certain kind are connected to each other and studies how the configuration of the interactions affect the outcomes for individuals and the group as a whole.

Though each had made significant contributions in isolation, we believe that the two approaches combined will provide a powerful new tool to better understand many important social interactions. At the theoretical level, what we propose is an analysis of *networked-games*. Specialized federal, state, and local agencies can dramatically impact each other's policies in a given ecosystem, and dozens of local governmental units in a metropolitan area form a web of contracts for public service delivery. The way in which these games are connected may have important consequences; the agents may be constrained in using different strategies for different games; the agents could observe actions and outcomes for several connected actors and learn from them.

### **3. PRELIMINARY STUDIES THAT SHAPED OUR ANALYTIC FRAMEWORK**

John Scholz directed several recent NSF projects that empirically established the important role of policy networks in vertical ICA settings involving conflicts among specialized agencies. Partnerships, or formalized local policy networks, evolve to coordinate policies in watersheds that have greater problems and more social capital (Lubell et al 2002). Federal programs can successfully enhance the size and diversity of local policy networks (Schneider et al 2003). Local networks increase the Environmental Protection Agency's enforcement efforts and, more importantly, enhance compliance with clean water regulations by nurturing local cooperation (Scholz and Wang 2003). Finally, dispersed weak-tie networks appear to be more effective than clustered strong-tie networks in developing joint cooperative projects (Scholz, Berardo and Kile 2004). Our primary hypotheses elaborate this finding

Richard Feiock's research empirically investigates how institutional structures and policy interactions influence local government policy and performance in horizontal ICAs (Feiock

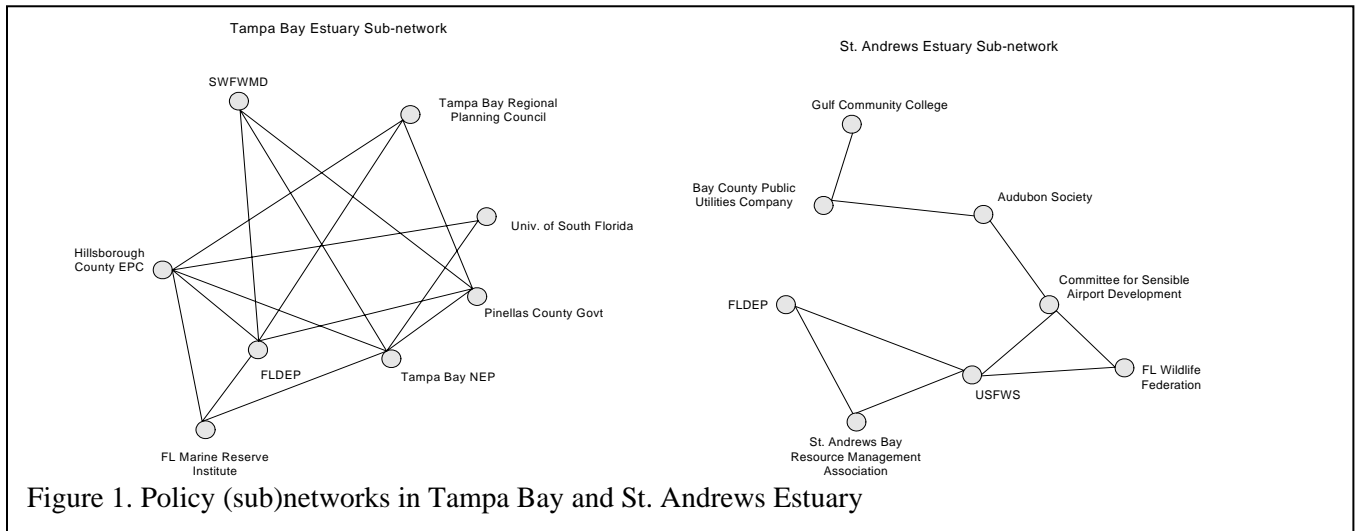
2002; 2004a). Products from Feiock's NSF supported study of local economic development have provided empirically support the importance of interlocal relations to collective policy choices. The frequency of interlocal service agreements in metropolitan areas reduced transaction costs and facilitated establishment of regional development agreements (Feiock, Johnson and Tao 2004). Social capital produced through interlocal relations increased the likelihood that a regional partnership would form to promote development (Park and Feiock 2003; 2005). The scope of a city development organization's ego network was strongly related to participation joint ventures with neighboring communities. Ongoing work sponsored by Aspen Institute demonstrates how transaction costs similarly influence service contracting by local governments (Feiock, Clingermayer and Dasse 2003; Feiock and Jang 2004). Finally, preliminary evidence from a recent NSF grant investigating land use decisions Florida's metropolitan areas confirms the mediating role of local institutions in mediating land use decisions (Feiock 2004b; Lubell, Feiock and Ramirez, 2005).

T.K. Ahn is trained in game theory, especially in behavioral, evolutionary, and experimental game theory that incorporates norms in explaining cooperation. He has collaborated with Elinor Ostrom, a pioneer in the study of institutions of collective action, on studies of environmental change (Gibson, Ahn, and Ostrom 2000), social capital (Ostrom and Ahn, 2001, 2004; Ahn and Ostrom 2002), and experimental social dilemmas (Ahn, Ostrom, and Walker 2003, Ahn et al. 2001, 2003; Schmidt et al., 2001). His extensive experience as a graduate student and post-doctoral fellow at the Workshop in Political Analysis and Policy at Indiana University will play a critical role in helping develop the proposed research into a cornerstone for the planned CSFICA.

The research agenda described here enables us to integrate these three important strands, combining the empirical strengths demonstrated in Scholz’s focus on vertical problems and Feiock’s on horizontal problems with the theoretical strengths and formal modeling skills of Ahn.

#### 4. RESEARCH PLANS

As an introduction to our research, Figure 1 compares networks in two estuaries identified by asking policy makers in each estuary which other organizations they contact on a regular basis. The survey instrument for Tampa Bay is included in the appendix. Several concepts from network theories can be used to characterize the difference between the two networks, but the most conspicuous is the



greater density of the Tampa Bay network on the left. Empirically, we have found that larger, interconnected networks (such as Tampa Bay) lead to greater agreement and more positive assessments of environmental policies (Schneider 2003). We can also show with formal models of networked games (Ahn, 2004; Esarey 2004) that the denser Tampa Bay sub-network is more resistant to the invasion of defection strategy than the St. Andrews network, and hence should

support more cooperation. On the other hand, we also found that stakeholders who participated in more joint projects actually had low density networks with many bridging contacts of stakeholders who did not know each other

These findings reflect a major dispute about whether dense or bridging networks are best able to resolve collective action problems (Burt 1992, 2000). We propose to develop and test two primary hypotheses that we believe can resolve this dispute. First, strong-tie networks are best at enhancing credibility and trust required to resolve cooperation problem (Coleman 1988), as encountered in the implementation of joint projects where defection by other participants poses considerable risks. Second, weak-tie bridging networks are best at obtaining and distributing information (Granovetter 1973) required to resolve coordination problems, a major concern in the planning and development stages of joint undertakings. Thus we expect stakeholders with larger bridging networks to dominate in planning, but stakeholders with denser networks to do better in implementation stages of joint undertakings.

We can test these hypotheses by observing three nested layers of network relationships. *Resource Networks* correspond to the usual perspective in which information or other resources flow from one “node” to other nodes, and can be identified through surveys of self-reported contacts. *Contract Networks* are patterns of membership in joint projects observed from available lists, which reflect some level of coordination in joint planning process. *Performance Networks* record the pattern of payoffs each stakeholder gains and strategies (cooperate or defect) each stakeholder pursues with each of the stakeholders in the full set of joint projects in the estuary. These networks reflect the problem of maintaining cooperation even after initial agreements have been established (Ostrom 1990, 1992). The pattern of performance can be measured objectively for projects from milestones achieved or efficiency of service delivery, and subjectively for each

pair of stakeholders through surveys in which stakeholders assess the contribution by others and the ratio of costs and benefits the stakeholder's organization gains from the project.

To the extent that contract networks reflect primarily informational problems, hypothesis two implies that those stakeholders with bridging resource networks will be involved in greater numbers of joint projects. To the extent that performance networks reflect primarily credibility problems associated with maintaining cooperation, hypothesis one above implies that stakeholders with dense resource networks will gain greater rewards as reflected in the performance networks. Given the hypothesized advantage of bridges for planning and dense networks for implementation, we anticipate that the overall pattern of resource networks will evolve toward "small world" networks (Watts 1999) capable of developing bridges while maintaining high density for most stakeholders.

**Formal Analysis:** The theoretical component of our research program will focus on developing models of networked games using analytical and computational methods. In general, a networked game can be represented by a set of agents, links among agents, and the learning rules of the agents. Agents are defined by their strategies and/or preferences, the links represent a game (in game theoretic sense), and the learning rules specifies the changes in agents strategies/preferences as functions of their payoffs, payoffs of other agents, and the links among agents. In the aforementioned example of the two networks, we used a finitely repeated game, Tit-for-Tat and Always Defect as two types of agents, and the localized imitation of the most successful as the learning rule. But of course, this is the simplest example. The framework of networked, evolutionary game can accommodate a wide range of game forms, strategies, and learning rules. We will explore diverse combinations of these assumptions, from the simplest to

more sophisticated strategies and learning rules, to reflect the choice situations found in our empirical research.

**Empirical Analysis: Vertical ICAs and Tampa Bay** Our first research site involves an exemplary site of polycentric order (Ostrom, Tiebout, and Warren, 1961): Tampa Bay's multiple specialized agencies at local, state, and federal levels have conflicting, overlapping authority over natural resources. We investigate how resource networks among these agencies, their political overseers, and other non-governmental actors affect the likelihood that they will enter into successful joint environmental projects (contract network), and how both the resource and contract networks affect performance in joint projects.

We build on two prior rounds of quasi-panel surveys in 1999 and 2001 directed by Scholz. The 2005 survey will map all networks in Tampa Bay, overcoming the major measurement problems due to the partial mapping in the earlier studies (Scholz, Berardo and Kile 2004). In addition, the new survey will measure the contract and performance networks based on all joint projects identified by the Tampa Bay National Estuary Program, which has an extensive data base with evaluations of each project. Finally, the panel of surveys over a 6-year period will allow us to analyze the dynamic development of networks over time.

**Empirical Analysis: Three Studies of Horizontal ICAs in Metropolitan Areas.** We extend research by Feiock on agreements among multiple local governments for three policy issues: public service provision, developments of regional impact, and regional developmental cooperation among multiple local governmental units in the metropolitan areas. Network relationships revealed through surveys of city and county government officials as well as archival data will measure resource, contract, and performance networks for each issue in the 334 Florida cities in counties with populations over 100,000.

*Interlocal Agreements (ILAs)*. ILAs are legal agreements that establish specific roles and responsibilities of two or more jurisdictions providing a common service. ILAs are extensive in metropolitan areas and most cities report more than one agreement. Positive externalities from realization of specialization or scale economies in services like sanitary sewer, solid waste, drainage, and potable water present opportunities for coordination of decisions to maximize joint returns. Feiock is currently engaged in a national study of service contracts with support from the Aspen Institute, but networks are not being investigated in that study. Our proposal will fund a follow up study of Florida governments to investigate how resource networks influence service contracts among neighboring governments, how the position of governments in contractual networks influence ILAs, and how resource and contract networks affect the resulting performance network. We generally expect bridging networks to enhance the ability of decentralized actors to overcome coordination problems by providing access to opportunities, information and legitimacy. The exception is services that require players to make investments in specific assets or other long-term commitments, which creates a greater risk and therefore defines a cooperation rather than coordination game. For example a sanitary sewerage agreement in which one jurisdiction treats another's waste water can be very risky for the primary jurisdiction. For those services, denser "strong tie" networks may best facilitate agreement and performance.

*Developments of Regional Impact (DRIs)* are developments which "because of their character, magnitude, or location, would have a substantial effect of the health, safety, or welfare of citizens in more than one county" This project will add a network component to extend Feiock and Lubell's ongoing NSF-supported investigation of comprehensive plan land use amendments. The extensiveness of the resource network among local governments and other

local actors is expected to influence the outcomes and the length of the DRI review process. Extensive networks increase the availability of information about other jurisdictions experience and provide better quality information on the specific circumstances that may can reduce the time to process a DRIs. Cooperation in maintaining and enforcing the standards is critical to the success of DRIs. Tightly clustered strong tie networks are expected to be linked to the maintenance and enforcement of standards and to enhance the positive effect of DRIs. Particular attention will be directed to the position and role of regional planning councils (RPCs). Although RPCs are required to analyze the effect of a proposed DRI on the region and issue reports, the recommendations are not binding on the local government. Nevertheless, they may be used by the local government in development order negotiations with the developer.

*A Development Partnership* is an alliance of local governments, often with the help of private firms and nonprofit organizations, that has a mission of enhancing the economy of a multi-jurisdictional area. The scope of actions these partnerships take on varies tremendously. Almost all engage in regional promotion and information provision to prospective business. Some coordinate other local development activities and a few restrict incentives and include non-competition provisions. An NSF supported national survey of economic development by Feiock and Steinacker identified the frequency of contacts with various categories of development actors and city participation in development partnerships, but did not provide the more detailed information required to map contact, contract, or performance networks. A survey of local officials in Florida will extend this work to address these limitations and allow us to test networked games hypotheses for development partnerships.

Extensive resource network relationships among local officials can provide resources to facilitate partnership, reinforce cooperative norms, and promote a collective identity. Tightly

clustered strong tie networks are expected to increase the likelihood of partnership formation (particularly partnerships that impose constraints on development competition), the level of cooperative activities by members, and economic development performance. A survey of local government leaders and development officers will identify specific government units for which contacts occur and participation in partnerships. Cooperation within a partnership will be evidenced by resource commitments to the partnership by members and survey assessments of their contributions to the collective efforts. Performance can be examined based on employment and new investments measured for the partnership collectively and individual members and by survey based assessments of partnership members.

**Research Stages:** Our proposed research integrates our independent studies in the following stages: The first stage uses qualitative studies to define the components of games in our four selected research sites, then develop theories and models of the relevant networked games; the second stage develops and implements a set of surveys and gathers archival data for quantitative analysis; The final stage employs game theory analyses to guide the development of econometric tests.

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