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POLICY CHANGE NETWORKS, 1945-2008

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In a large nation with a complex political system, significant changes in public policy rarely result from the solitary actions of a heroic individual. Instead, policy enactments typically involve multiple actors from many institutions inside and outside of government. Scholars of politics and policy have long studied combined efforts to achieve policy change under the labels of issue networks and advocacy coalitions. Yet nearly all efforts to change U.S. federal policy fail; the status quo bias in politics is strong and universal. Understanding the politics of public policy requires that we find out which actors are responsible for the exceptional cases: successful policy changes.

We know that broad policy communities develop proposals and that diverse coalitions often attempt to change policy; but what sets of actors actually produce policy enactments? Are Presidents and Members of Congress always the key drivers in policy change? Are interest groups or executive agencies sometimes responsible? Is there only one pattern of policymaking or do these questions have different answers across public policy issue domains? Scholars rarely address these broad questions, but we have theory that suggests that these patterns have changed over time. The U.S., the story goes, has moved from an era of “iron triangles” consisting of Congressional committees, bureaucracies, and constituent interest groups to an era of “issue networks” with broader participation. Has the policymaking process really undergone this transformation in all issue areas?

I take on all of these questions, looking at all significant policy changes enacted by the American federal government since 1945 in eight policy areas. I am able to address these questions because I trust the explanations for policy change offered by historians of particular policy areas. I argue that we can learn a lot by aggregating qualitative information about policy change offered by authors who look at policy development over a long historical period and identify the actors most responsible for policy change. In other words, I rely on compiling historical case studies of policy change. Thankfully, the post-war U.S. national government is easily the most studied policymaking system in the history of the world. There are now substantial scholarly literatures about the

policymaking process in many areas, including the eight areas that I analyze: civil rights & liberties, education, the environment, health, housing & community development, macroeconomics, science & technology, and transportation. I use historical accounts from these literatures as the raw materials for my analysis. I aggregate 726 explanations for specific U.S. federal policy enactments since 1945 found in 85 books and reports covering at least a decade of policymaking in one of these issue areas.

These explanations credit 676 different individuals and organizations with helping to achieve specific policy changes. I track relationships among these actors using social network analysis. I build what I call *Policy Change Networks*, affiliation networks connecting actors credited with the same policy enactments. With this technique, I am able to illustrate the actors and relationships that help produce policy change as well as visualize changes over time and differences across policy domains. I analyze the structural characteristics of the networks and the centrality of actors in each network. In all cases, I rely on aggregating historical qualitative accounts of policy change from experts in each policy area. I catalog the actors that are credited with policy changes in Congress, the administration, and the courts, building networks to illustrate their relationships.

Analyzing *Policy Change Networks* has two major advantages. First, we can see and analyze all of the major actors responsible for U.S. policy development using a single framework. For example, we can understand the relationships among President Lyndon B. Johnson, the AFL-CIO, Senator Edward M. Kennedy, and the House Committee on Education and Labor all in the same network. We can also empirically address claims about the relative centrality of Presidents, Members of Congress, interest groups, committees, executive departments, and independent activists in each policy domain. Second, we can focus on the key events in U.S. policy history: significant policy enactments in Congress, the administration and the courts. The actors analyzed here were not only involved in a policy community; they actually succeeded in changing public policy. We can therefore

investigate whether the idea of issue networks, and the historical transformation that it implies, accurately describes the actors and relationships that influence public policy change.

Issue Networks and Policy Change

In the classic textbook version of the policy process, policymaking occurs in stages: policymakers identify problems, set their agenda, formulate alternatives, adopt a policy, implement it, and then evaluate it. Contemporary theories of the policy process typically collapse the stages or argue that the order is flexible, but they focus primarily on the agenda setting stage. Punctuated-equilibrium accounts (Baumgartner and Jones 1993), for example, argue that limited policymaker attention means that policy change is unlikely absent a large increase in consideration of a problem. Other models emphasize the multiple, largely independent, streams of problem definition, politics, and policy development (Kingdon 2003). In this view, policy alternatives often come before a problem reaches the top of the agenda but are only adopted when the time is right. The advocacy coalition framework instead focuses on the ideas and beliefs developed by interest group and government proponents of policy change (Sabatier and Jenkins-Smith 1993). These theories from the policy process literature focus on the mechanisms by which actors bring issues to the forefront of public and elite debate, but they are all applied flexibly to many different types of actors in many issue domains.

These theories of the policy process, however, are not evaluated in most subject-specific literature on U.S. policy change. Literature on civil rights policy, for example, focuses on protest movements (Stetson 1997) and presidential leadership (Shull 1999). Literature on education policy emphasizes appropriations (Spring 1993) and bureaucracy (Cross 2003). Environmental policy histories are more closely tied to political science but tend to compare federal policy to an ideal type where technocrats utilize scientific research results to decide optimal policy (Portney and Stavens

2000; Graham 2000). Unlike the policy process literature, therefore, most of these accounts emphasize that a few important actors made policy change possible. They focus on the history of policy adoptions, pointing toward individuals and organizations that helped to set the agenda only when their actions are deemed critical to successful policy change. Yet like the policy process literature, subject-specific policy histories generally reject the textbook stages model. They recognize that policy change can come from administrative agency rulemaking, court decisions, and presidential actions, as well as legislation; they also point to instances in which policy change preceded comprehensive problem identification or a full consideration of alternatives.

The question of which actors are most involved in policymaking is typically addressed within a specific policy area. Yet the concept of “issue networks” has become the baseline perspective for observing communities of actors surrounding policymaking in each domain. In the classic formulation, Heclo (1978) famously argued that discussions of policy within each issue domain take place in networks of experts that come from both inside and outside of government. These individuals are associated with myriad institutions but they gain their place in the network from their reputations for issue knowledge, rather than their institutional role. Heclo, however, saw this as a substantial transformation from an earlier period in which policymaking occurred within institutions and policies were debated among a few prominent stakeholders. In applying Heclo, political scientists have typically interpreted this as a claim that U.S. federal policymaking went from a period of iron triangles to a period of issue networks (see Berry 1989).

Even though Heclo referred to networks, his analysis was not explicitly tied to any specific conception of network structure used in social network analysis. Other scholars, however, have sought to use network techniques to understand relationships among policymakers within policy areas. Heinz et al. (1993), for example, use surveys to find out who interest group leaders and lobbyists view as their allies and adversaries in four policy domains. They analyze the coalitions in

each area, as seen by participants. They investigate the shape and structure of interest group coalitions in these four policy areas and find that most policy conflicts feature a “hollow core,” with no one serving as a central player, arbitrating conflict. In some areas, government agencies are caught in the middle between opposing sides; in others, disconnected issue specialists are linked only to those who work on similar topics and share views. Recently, Grossmann and Dominguez (2009) reached a different conclusion by building networks of interest groups formed by coalitions behind legislation before Congress. They find a core-periphery structure to interest group coalitions, with some advocacy groups, unions, and business peak associations playing central roles. Yet these network analyses are based on endorsement lists or reported working relationships, rather than any credible indication that the actors or their relationships led to significant policy enactments.

We are thus left with a series of literatures that do not offer specific hypotheses for an investigation of which sets of actors produce policy enactments, in what issue areas, and at what time periods. To the extent that the issue networks perspective addresses the questions raised here, it would likely suggest that there has been a major change in the structure of relationships in most or all policy domains. The changes would include (1) a larger set of involved actors, (2) an increased role for actors outside of government, and (3) a separation of each issue area network from all the others. The theory of the policy process that comes closest to offering expectations of this analysis is the advocacy coalition framework. Yet which actors are involved is less important to the framework than how they produce and convey information, how they persuade others, and how previous policies affect the interests of various actors. Most advocacy coalitions studied in this literature, however, are made up of a diverse group of interest groups and activists with allies in government. The main expectation about who will be involved that the advocacy coalition framework offers is that the same set of actors is likely to pursue change over a long period; it expects little change in participants when advocacy coalitions produce policy change.

Here, I seek to aggregate the analyses of policy scholars that focus on specific issue areas. These scholars tend to assume that policymaking is likely to be distinct in each issue area. Most would likely expect to find large differences across policy domains. Subject-specific policy scholars also analyze changes in the policy process as it relates to the specific timeline of policy change in their own areas; most would likely be resistant to the idea that there was any general over time transformation in the policy process that could be applied to all policy areas.

I seek to combine their analyses in order to produce a comprehensive picture of how the actors involved in policymaking and their relationships vary across issue areas and time. In introducing *Policy Change Networks*, I hope to provide context for debates about the policy process and the evolution of issue networks. I acknowledge, however, that they cannot offer a direct test of previous theories. Yet the reason for this deficiency, that I focus on actors involved in policy enactments, might be viewed as a strength in comparison to ubiquitous analyses of policy communities. These networks offer a new view of the perennial question of who and what causes policy change. Like subject-specific policy scholars, I expect to find wide differences across policy areas. Different issue domains are likely to feature different populations of actors, different types of central actors, and different network structures. I have no strong a priori expectations about how the network associated with civil rights & liberties is likely to differ from the one associated with environmental policy, but I view the belief that the policy process and the actors involved in policymaking are likely to be similar in the two areas as quite a heroic assumption. Yet, like scholars of issue networks, I do expect to be able to discern similar over-time transformations in multiple policy domains. The last few decades have been associated with a tremendous expansion of the interest group universe and the size of government, for example, and both are likely to affect the pattern of participation in multiple policy domains. I am hopeful that *Policy Change Networks* can offer a new account of both differences across issue networks and their transformations.

A New Method

The first step in the project was to compile published accounts of federal policy change that cover a substantial period since 1945, including academic scholarship and other historical volumes. I used eight Policy Agendas Project policy domains: civil rights & liberties, education, the environment, health, housing & community development, macroeconomics, science & technology, and transportation. I used the topic lists, keywords and subcategories that the project makes available at policyagendas.org in order to find resources on specific policy topics in these areas. In this analysis, I use 85 books and articles covering at least 10 years of policy history. This includes 29 books and articles on civil rights and liberties (Alley 1994; Ashmore 1994; Bok 1992; Browne-Marshall 2007; Burstein 1985; Conway et al. 1999; D'Emilio et al. 2000; Edelman 1973; Foerstel 1999; Graham 1990; Graham 1992; Harrison 1988; Jenness 1999; Jenness and Grattet 2001; Koltowski 2005; Landsberg 1997; Laughlin 2000; Lawson 1976; Lawson 1997; Layton 2000; Lichtman 1969; Riddlesperger and Jackson 1995; Rimmerman et al. 2000; Schrecker 2002; Schull 1999; Skrentny 2002; Sollinger 1998; Stetson 1997; Switzer 2003), 16 books and articles on education policy (Anderson 2007; Brademas 1987; Cross 2003; Davies 2007; DeBray 2006; Fraser 1999; Hill 2000; Jaynes 2007; Moran 1988; Osgood 2008; Ravitch 1985; Rudy 2003; Spring 1993; Strach 2009; Thomas and Brady 2005; Vinovskis 2005), 7 books on environmental policy (Graham 2000; Hayes 2000; Kraft 2000; Kylza and Sousa 2008; Milazzo 2006; Porney and Stavins 2000; Tzoumis 2009), 12 resources on housing & community development (Cooper and Cooper 2002; Dreussi and Leahy 2002; Gelfand 1975; Gunther 1990; Hays 1995; James 2002; Mara 2009; Martin and Leone 1977; Mitchell 1985; Peters and Fisher 2002; Schwartz 2006; Snow 2002), 4 books on transportation (Dilger 2003; Jones 2008; Rose, Seely and Barrett 2006; Weiner 2008), 4 books on macroeconomics (Brownlee 2004; Frank and Glied 2006; Schick 2000; Steuerle 2004); 6 books on health (Kronenfeld

1997; Patel and Rushefsky 2006; Quadagno 2005; Stevens 2007; Studlar 2002; Strickland 1972); and 7 books on science & technology policy (Jasanoff 1990; Marcus and Bix 2007; Moore 2008; Savage 1999; Smith 1990; Sterling, Bernt, and Weiss 2006; Wang 2008).

To find these materials, I searched multiple book catalogs and article databases for every policy subtopic mentioned in the Policy Agendas Project description of each policy area. To find additional sources, I then used bibliographies from these initial sources as well as literature reviews. To locate the 85 sources used here, we reviewed more than 400 books and articles. Most of the original sources we found did not offer explanations for policy change or list the individuals and organizations responsible, even though their titles or descriptions suggested that they might. Books were far more likely than articles to contain lists of credited actors for multiple policy changes over a significant period. To decide on the texts for analysis, the criteria were coverage of a substantial historical period and whether the resource offered explanations of the policy process, rather than advocacy of particular policies. We obtained a larger number of resources for some areas than others, primarily because a substantial scholarly community has developed around the politics of some policy areas (such as civil rights & liberties) but not others (such as transportation). Yet I obtained what appear to be reasonable histories of policy change since 1945, including every significant policy enactment that I could find.

The second step in the project was to read each text and identify significant policy changes. I primarily used five research assistants, training them to identify policy changes. Other assistants coded individual books. We tracked enacted legislation, Presidential directives, administrative agency actions, and court rulings identified by each author as significant. We included policy changes when any author indicated that the change was important and attempted to explain why the change occurred. As a reliability check, two assistants assessed two of the same books and identified the same list of significant policy changes in both cases. We found 122 explanations for civil rights &

liberties policy enactments, 104 for education, 162 for the environment, 84 for housing & community development, 36 for transportation, 36 for macroeconomics, 131 for health, and 63 for science & technology. For most policy enactments, more than one author offered an explanation.

The third step was to compile lists of involved actors. For each policy enactment mentioned by each author, we catalogued all mentions of proponents of each policy change. Coders recorded every involved individual and organization that each author mentioned in their explanations. We then combined explanations for the same policy enactments, aggregating the actors we found across all authors. We found 217 actors partially credited with at least one policy enactment in civil rights & liberties, 184 actors in education, 81 in the environment, 82 in housing & community development, 57 in transportation, 30 in macroeconomics, 90 in health, and 71 in science & technology. We categorized these actors into one of five types: Members of Congress, Presidents, interest groups, government departments, or other individuals. Interest groups include corporations, trade associations, advocacy groups, or any other private sector organization. Government departments include agencies, committees, and states. Other individuals include administration officials, media elites, and independent activists.

We tracked all references to individuals and organizations in author explanations for policy enactments. In addition, we copied narrative explanations that emphasized the factors each author judged as important. We used a formal spreadsheet-based content analysis to record the actors mentioned in each author's explanation for every significant change in public policy that they analyzed. The result is a database of which actors were judged important for, or partially credited with, each policy enactment. Inter-coder reliability tests of the codebook instructions confirmed that the method produces reliable results, with coders of the same volume reaching agreement on more than 95% of codes. Comparisons of author explanations for the same event showed that some

authors recorded more actors than others, though authors did not explicitly discount actors considered important by others.

The analysis produces lists of actors credited with policy changes. This method is related to the analysis performed by Kingdon (2003). He reports counts of which actors were most influential in driving changes in transportation and health policy, but his analysis relies on his own first-hand interviews. I aggregate across all explanations offered by many different authors. Most of these authors rely on their own qualitative research strategies to identify significant actors and circumstances. For example, the books that I use quote first-hand interviews, media reports, reviews by government agencies, and secondary sources. Yet I do not independently confirm their accounts, other than checking to see if explanations for the same events are the same across authors. I believe that it is far superior to rely on the judgments of experts in each policy area, who have already searched the most relevant available evidence, rather than to impose one standard of evidence across all cases and independently conduct my own analysis that is less sensitive to the context of each policy debate.

The narrative histories I use offer ideographic rather than nomothetic explanations. In other words, they seek to exhaust the plausible factors involved in each case, rather than to explain all policy change through one generalizable causal pattern. Yet authors rarely go through every potential actor that might have been involved in each policy change, eliminating all those considered irrelevant. The typical explanation credits a few actors that were partially responsible for a policy change. The authors appear to select these actors based on the plausibly relevant circumstances surrounding each policy enactment with attention to the involved actors that seemed different in successes than failures, though they rarely systematize their selection of causal factors across cases. For example, the authors do not list every Member of Congress that supported a bill that made it into law; they list those that seemed most responsible for its success.

The final step in my analysis was to create and analyze affiliation networks based on the participants involved in each policy enactment. To investigate the roles that actors play in policy change relative to other actors, I create networks based on actors involved in policy changes in different issue areas and time periods. In each case, the nodes are actors partially credited with a policy change and the links connect actors that were credited with the same policy change. This does not necessarily indicate that they actively worked together, but that they were both on the winning side of a significant policy enactment and that a policy historian thought they each deserved some credit. The network ties are undirected but they are integer counts of the number of shared policy enactments between every pair of actors.

For each network, I report the list of the ten most central actors using two measures of centrality: degree centrality and betweenness centrality. Degree centrality measures the total number of connections made with other actors, including multiple connections for actors that share credit for more than one policy enactment. Betweenness centrality, in contrast, measures the number of paths between other nodes that potentially pass through the actor (see Wasserman and Faust 1994). I also report the size of each network (the number of actors involved) and its density (the average number of connections between actors). I report centralization scores to assess how well the networks match ideal types of networks that are highly centralized. Degree centralization measures the degree to which a small number of actors have the preponderance of links to all other actors. Betweenness centralization measures how closely the networks resemble a system in which a small set of actors appears between all other actors in the network that are not connected to one another (see Wasserman and Faust 1994). I also report some qualitative characteristics of the networks that are visible in the network illustrations.

I also adopt several conventions in the display of all networks. In all diagrams, wider lines connecting two actors indicate that the actors were jointly credited with more policy changes. The

betweenness centrality score of each actor determines the size of each node. I use spring embedding to determine the layout. In all diagrams, pink nodes represent Members of Congress; grey nodes represent Presidents; blue nodes represent interest groups; green nodes represent government departments; and red nodes represent other individuals.

Policy Change Networks

I begin with the full network in Figure 1, incorporating all actors credited with any policy enactment in any of the eight policy areas over the complete time period (1945-2008). This network has a core-periphery structure with multiple central cliques. The structure does not appear to indicate that each issue area features a separable network; instead, the overall network is highly connected, though not very dense. Official policymakers are the most central actors, with presidents such as Lyndon B. Johnson, John F. Kennedy, and Richard Nixon joining Senator Edward M. Kennedy at the top of the list. Of course, this overall network pools a lot of information and conceals some division by time and issue domain.

[Insert Figure 1, Table 1, and Table 2]

Figures 2 & 3 divide the complete network into two time periods, one covering the 1940s, 1950s, 1960s, and 1970s and the other covering the 1980s, 1990s, and 2000s. All cut-off dates are somewhat arbitrary, but 1980 marks the beginning of the Reagan era and roughly matches the time when Hecló noticed the issue networks transformation. The earlier period network looks similar to the overall network, with Presidents taking an even more central role. We do see a major transformation in the later network, however. The main cliques of the network are now less connected with one another. This matches the assumed issue network transformation; separate policy communities may have developed. Yet the transformation does not comport with issue networks theory in other respects. First, policymakers are still central. Senator Kennedy is the most

central actor. The separate cliques are mostly caused by each president being surrounded by his own group of Congressional allies. Second, the network contains a smaller number of actors and no more prominent role for government outsiders. Collapsing all of these issue areas into a single network, however, may not pose the fairest test of changes in each policy community.

[Insert Figure 2 and Figure 3]

Figure 4 illustrates the policy change network associated with one policy domain: civil rights & liberties. The most frequently credited actors in this area were the NAACP, which was involved in 14 policy changes, President Johnson, who was partially credited with 10 policy changes, and the American Civil Liberties Union (ACLU), which was credited with 8 policy changes. The NAACP has the highest centrality score, largely because they were involved with most policy changes involving African-Americans and they have strong ties to President Johnson and the Department of Justice. The ACLU is also central; they are linked to actors that argue for civil rights, rights for the disabled, and civil liberties. The network is largely divided by policy subtopic, with two women's rights coalitions (a traditional and feminist grouping) linked by the National Organization for Women pictured on the left and a disabilities community pictured at the top. The networks involving abortion rights and religious rights are entirely separated from the main civil rights & liberties policy change network.

[Insert Figure 4 and Table 3]

Figures 5 & 6 separate this civil rights & liberties policy change network into the same two time periods discussed above, 1945-1979 and 1980-2008. Here we see a real transformation. The early network features a central clique with several satellite cliques, held together by multiple Presidents, Members of Congress, and the NAACP. The late period network is largely disconnected, with the largest component featuring Senator Kennedy and the NAACP and the rest of the network

filled with disparate coalitions. In this policy domain, the later period was characterized by different groups of actors involved in distinct sets of policy enactments.

[Insert Figure 5 and Figure 6]

We can see whether these same patterns and trends are present in the policy change networks associated with other issues. Figure 8 shows the policy change network for education. Many different actors were credited for their involvement in education policy change. Presidents Clinton, Nixon, and Johnson were each credited for their involvement in at least five policy changes. Members of Congress played the most central roles in the education policy change network. Senator Kennedy joined with many different sectors of the policymaking community to pass policy changes, from Pell Grants to Bilingual Education to No Child Left Behind. Representatives Dale Kildee and Edith Green were also both involved with many other actors in pressing for policy change. Interest groups did not play as prominent of a role, though the NAACP was active in the courts and the National Education Association was active in early policy changes such as the National Defense Education Act.

[Insert Figure 7]

Figures 8 & 9 divide the education policy change network into the same two time periods discussed above. We again see a dramatic transformation, but not necessarily one that matches the trends in civil rights & liberties. In the early network, House committees and executive departments play central roles, along with the National Education Association. In the later network, Members of Congress dominate the network. The structure again becomes more disconnected, with separate policy communities involved in multiple policy enactments together, though there is only one main component.

[Insert Figure 8 and Figure 9]

Figure 10 illustrates the environmental policy change network. The most commonly credited actors were the Environmental Protection Agency (EPA), Edmund Muskie, and John Blatnik. Representative Blatnik also plays the most central role in the network, partially credited with the Clean Water Act, the Endangered Species Act, the Pesticides Control Act, and the Clean Air Act. The EPA was most active in policy changes that the agency itself or a President brought about directly. President Clinton also plays a central role in the network, connected to significant changes in public lands policy that he directed as well as air, water and climate policy changes in Congress and at the EPA. The Wilderness Society and the Earth Island Institute are the interest groups that play the most central roles in the network, but they are less central and less commonly credited with policy change than Members of Congress like Henry Waxman and John Dingell as well as parts of the executive branch like the Department of Agriculture and the Department of Interior.

[Insert Figure 10]

Figures 11 & 12 again allow us to compare policy change networks across time. We again see dramatic differences. Members of Congress played the most central roles in the early period. There were fewer actors involved in the late period and no clear central group. Instead, government departments, a Member of Congress, and a President were each associated with weakly connected cliques, although the later period network is fully connected.

In all three issue areas, we noticed a transformation that resulted in more disparate or disconnected cliques. Yet each issue area featured a different transformation in central actors. Surprisingly, none of these transformations involved an increased role for outsiders to government. Instead, the relative positions of Members of Congress, Presidents, and government departments changed. The tighter connections among actors in the earlier era also appeared to stem from sustained interactions among policymakers, but not in the sense conveyed by the idea of iron triangles. Instead of subgovernments for each issue area consisting of Congressional committees,

administrative departments, and constituency interest groups, the earlier period featured multiple sustained ties among Members of Congress and even across Presidential administrations.

[Insert Figure 11 and Figure 12]

What about the patterns of policymaking in the other five issue areas? Tables 4, 5, and 6 describe each of the other policy change networks and list the most central actors in each. It is striking how diverse the policy networks are in size, density, centralization, and the most central types of actors. It appears the patterns of policymaking in each network are quite distinct.

[Insert Table 4, Table 5, & Table 6]

Figure 13 illustrates the health policy change network since 1945. This network has multiple disconnected cliques, with individual advocates like Mary Lasker playing central roles. Long-serving Members of Congress involved in Medicare, Medicaid, and the National Institutes of Health also play central roles, as do government departments and committees. There were not many post-1980 significant policy changes identified by health policy scholars, but those that were identified each featured coalitions with little cross-over.

[Insert Figure 13]

Figure 14 shows the policy change network for housing & community development. Here we see evidence of a single large and connected influential set of actors, with the U.S. Conference of Mayors, the American Municipal Association, and the Department of Housing & Urban Development playing central roles. This network looks interest group dominated, with even associations of home builders and real estate brokers playing central roles. These interest groups connect groups of policymakers that organized behind one or two policy enactments.

[Insert Figure 14]

Figure 15 illustrates the sparsest network, the policy change network associated with macroeconomics. This area primarily covers tax and budget issues. This issue area appears to be the

domain of government insiders; Congressional committees, party leaders, and Presidents play central roles. Almost no interest groups were credited with policy change. Whereas housing & community development appears to be the policy change network most open to interest groups, macroeconomic policy changes may be the least open to outsiders.

[Insert Figure 15]

Figure 16 shows the disconnected policy change network for science & technology. Science policy is split into many small components and cliques; most are made up of government units and individual activists such as scientists. This network features separate sets of actors for space policy, chemical policies, health-related drug policies, and scientific research funding. These small components are not interconnected across science policy areas. Policy domains like science & technology also appear to have been split into smaller issue networks from the beginning, rather than having to undergo any post-1980 transformation.

[Insert Figure 16]

Figure 17 shows the actors involved in transportation policy changes. The Department of Transportation and President Eisenhower were the actors involved in the most policy changes. Eisenhower not only built the Interstate Highway system, but also was credited with the Federal Aviation Act. President Nixon was credited with significant policy changes regulating trucking and railroads. Yet interest groups also play significant roles in the network; the transportation network, in fact, is the clearest case of corporate interests playing prominent roles. The American Trucking Association was the most central actor by one measure, reportedly involved in the creation of the Department of Transportation and in interstate highway system development, as well as its own regulation. The trade association for the airlines and Amtrak were also credited with policy changes in their areas. There were fewer significant policy changes reported after 1980 in transportation.

[Insert Figure 17]

These *Policy Change Networks* thus show several different structures of interaction with a great diversity of central actors. In fact, every different type of actor I tracked was central to at least one policy change network. In some policy areas, like transportation, interest groups are among the primary and central actors; in other areas, like education policy, they take a back seat to action driven by Members of Congress or agencies of government. Individual activists, Congressional committees, and Presidents can also play the most central roles. Most of the policy change networks are divided primarily by policy subtopic within the domain, though some are also divided by time, showing distinct policymaking eras. None of the networks have the “hollow core” structure found by Heinz et al. (1993); either outside groups or policymakers play central roles in each issue domain, though some networks like science & technology are completely divided by subtopic. Yet in some policy areas, like civil rights & liberties and the environment, we can visualize a transition from a more integrated network to more disconnected issue-specific networks.

Discussion

I have introduced *Policy Change Networks* in eight policy domains, noting some important differences across issue areas and some changes over time. Because these networks track individuals and organizations that were directly involved in successful policy enactments, they provide an illustration of the relationships among the influential actors in policymaking in each area. This provides a new view of the most important part of the policy process: actual changes in national public policy. It allows us to integrate the participation of actors inside of government, like Members of Congress, government departments, and Presidents, with actors outside of government like interest groups and individual activists. There was no clear separation between insiders and outsiders, suggesting that the general scholarly trend toward broadening our investigation of policy communities is likely to better match the true policy process.

The same unique feature of the *Policy Change Networks*, the exclusive focus on policy enactments, also makes the results less comparable with previous theories of the policy process. Yet it is striking that no theory appears to correctly capture either the important differences across policy domains or the diversity of transformations over time. The main supported expectation of issue networks theory was the over-time separation of each issue area network from the others; we even saw separation into smaller subtopic sectors within several policy domains. Yet the expectations for a larger set of actors and an increased role for actors outside of government were generally not supported. Instead, we saw more actors involved at the beginning of the period. The role of outsiders, such as interest groups, differed mostly across policy domains rather than across time.

The advocacy coalition framework also did not serve as a useful guide to analyzing *Policy Change Networks*. Though it does not make specific predictions for an analysis of this type, it should lead us to expect that the same set of activists is likely to enact changes over a long period in each area. Instead, we saw considerable changes in the most involved actors across time. In some areas, such as transportation, health, and housing & community development, we did see consistent roles played by interest groups or activists. Yet the central roles played by a few prominent actors like the trucking trade association in transportation policy and the U.S. Conference of Mayors in housing policy seem to be envisioned more by classic interest group theories than by ideas about advocacy coalitions.

The analysis also raises questions about our view of the golden era of policy enactments in the 1950s, 1960s, and 1970s. First, this does not appear to be an era of iron triangles in any issue area. No policy area featured patterns that matched this ideal typical concept. All issue areas featured diverse participation but most were dominated by individual Members of Congress, Presidents, or large interest groups. Second, the productive era of policy enactments appears to extend beyond President Johnson's great society. Strikingly, Presidents Eisenhower, Truman, Kennedy, Johnson,

and Nixon are often jointly credited with the same policy changes. Sometimes this is due to the participation of these presidents in Congress prior to their administrations; on other occasions, it is because policy took considerable time to develop. We do not observe the same patterns of cooperation among Presidents Reagan, H. W. Bush, Clinton, and W. Bush. Third, policymaking was quite integrated across policy domains in this earlier era. The overall network goes from highly integrated to separated by issue domain after the 1980s.

Since many prominent political scientists and policy scholars came of age in this era of policymaking, scholarship often uses this era as the baseline, wondering why the policy process has transformed since this era. It is difficult to know, however, whether the current era is the outlier or whether this post-war period of productive national policymaking was a unique aberration in American history. Perhaps networks from the 19th century would look more like those in the current era; it is difficult to know but we should not necessarily jump to the conclusion that the current era is the most distinct. After all, many of the trends expected to change the policy process, especially the expansion of the interest group universe and government, did not appear to have discernable effects in the *Policy Change Networks*.

The most difficult finding from this analysis for policy process theory to accept is that policy issue domains vary considerably, over extended periods, in almost all important features. There may be no generalizable theory of the policy process if the most important aspects of policy communities differ by issue area. In other words, if policymaking in transportation primarily involves interest group alliances with Presidents, policymaking in education involves cooperation across Congressional committees, and policymaking in science & technology policy involves small separate communities around smaller subtopics, we may not be able to make many coherent broad claims about a generic policy process. Subject-specific policy scholars, of course, will not be as surprised by these important differences across issue domains. Since I used data originally from their analysis, it is

perhaps unsurprising that I reached a similar conclusion. Yet most policy process studies articulate a generic theory and then test it on a specific policy area. This type of investigation is in danger of becoming a search for confirming evidence. Even absent this motive, policy process scholars might reach different conclusions because their theories are each applicable to a few policy areas but inapplicable to the others.

Conclusion

We have a lot to learn about the politics of the policy process, especially as it concerns the most important step: the enactment of policy changes. Even though the U.S. federal government is the most studied policymaking system in the world, we still have conflicting theories about how it operates. Our theories also highlight assumed transformations that are not confirmed by an aggregation of disinterested historical reviews. Current theories of policymaking may also ignore some actors and relationships that are referenced repeatedly in qualitative accounts. Aggregating qualitative analyses of policy change offers a new picture of the policymaking process that should encourage us to reevaluate existing theories.

The *Policy Change Networks* that I created from these qualitative accounts allow a new view of the policy process. Matching previous theory, I observed a general transformation toward policymaking occurring within more specific issue areas. Yet this happened despite a smaller group of actors credited with policy change in the 1980s, 1990s, and 2000s. There is also substantial diversity across the eight policy areas analyzed here. Civil rights & liberties, housing & community development, and transportation involved alliances between interest groups and policymakers whereas policy changes in education, the environment, and macroeconomics were mostly achieved by policymakers alone. Science & technology and health featured unique structures and uncommon sets of central actors that did not match either of these patterns.

Policy process scholars may have to be comfortable with a policymaking system that differs markedly across issue domains. Each issue area may also witness some unique transformations over time, many of which involve changes in the relative involvement of policymakers like Members of Congress and Presidents rather than any general opening of the policymaking system to outsiders.

I hope that there is also a lesson in these findings about methodology. Every form of policy research involves many judgment calls with implications for what scholars look for and what they find. If we are to take advantage of the close analysis that comes with qualitative research, we may have to sacrifice standardization of procedure. Aggregation of explanations for policy change in historical narratives is one method of comparing accounts sensitive to context with those aiming for generality of theory. I would not claim that atheoretical recitations of the people and organizations surrounding policy change is the best method of inquiry, only that it offers something valuable and different than other types of research. Implementing their findings in a network analysis also shows that qualitative accounts can be analyzed quantitatively and systematically. In attempting to address a question as broad as who and what determines policy outcomes, we will inevitably be facing incomplete knowledge. Aggregating what we think we know so far about policymaking in different issue areas is a potentially useful technique for building knowledge in the face of this uncertainty.

Table 1: Characteristics of Policy Change Networks

		Size	Density	Centralization		Central Actors	Structure
				Degree	Betweenness		
Full Network	Overall	676	.02	3.5%	17.9%	Presidents, Members of Congress	Multiple Cliques but Connected
	Pre-1980	497	.03	4.8%	17.1%	Presidents	Multiple Cliques but Connected
	Post-1980	231	.04	6.9%	26.5%	Members of Congress	Multiple Cliques
Civil Rights	Overall	216	.07	6.2%	12.2%	Interest Groups, Presidents, Congress	Central Clique with Satellites
	Pre-1980	152	.11	7%	16%	Interest Groups, Presidents, Congress	Central Clique with Satellites
	Post-1980	80	.12	7.4%	9.7%	Interest Groups, Members of Congress	Disconnected
Education	Overall	181	.09	7.7%	29%	Members of Congress, Gov. Departments	Multiple Cliques but Connected
	Pre-1980	129	.13	8.3%	9.7%	Gov. Departments	Multiple Cliques but Connected
	Post-1980	59	.21	13.1%	37.3%	Members of Congress	Disconnected
Environment	Overall	80	.18	12%	21.6%	Members of Congress, Gov. Departments	Central Clique with Satellites
	Pre-1980	53	.34	17.5%	28.45%	Gov. Departments, President	Sparse & Disconnected
	Post-1980	33	.21	10.3%	53.3%	Members of Congress	Sparse but Dense

Table 2: Most Central Actors in Full Policy Change Network

	Overall	1945-1979	1980-2008
Degree Centrality	Lyndon B. Johnson	Lyndon B. Johnson	Edward M. Kennedy
	John F. Kennedy	John F. Kennedy	Bill Clinton
	Edward M. Kennedy	Dwight D. Eisenhower	Major Owens
	NAACP	NAACP	George H. W. Bush
	Dwight D. Eisenhower	Edith Green	George W. Bush
	Richard Nixon	Richard Nixon	Dale Kildee
	Edith Green	John Blatnik	John Dingell
	House Committee on Education and Labor	Adam Clayton Powell	Ronald Reagan
	John Blatnik	Edward M. Kennedy	Environmental Protection Agency
	Adam Clayton Powell	Wayne Morse	Orrin Hatch
Betweenness Centrality	Edward M. Kennedy	Lyndon B. Johnson	Edward M. Kennedy
	Lyndon B. Johnson	Richard Nixon	George H. W. Bush
	Richard Nixon	John F. Kennedy	Bill Clinton
	John F. Kennedy	Dwight D. Eisenhower	Dale Kildee
	Dwight D. Eisenhower	Edward M. Kennedy	Major Owens
	John Dingell	Lister Hill	Norman Mineta
	NAACP	Department of Health, Education & Welfare	Bob Dole
	Lister Hill	Mary Lasker	Ronald Reagan
	Mary Lasker	Harry Truman	Henry Waxman
	Department of Health, Education & Welfare	U.S. Conference of Mayors	American Civil Liberties Union

Table 3: Most Central Actors in Policy Change Networks by Issue Domain

	Civil Rights & Liberties	Education	Environment
Degree Centrality	NAACP	House Committee on Education and Labor	John Blatnik
	Lyndon B. Johnson	Edith Green	Edmund Muskie
	John F. Kennedy	National Education Association	Henry Jackson
	Department of Justice	Lyndon B. Johnson	John Saylor
	Martin Luther King Jr.	Adam Clayton Powell	Paul Rogers
	Everett Dirksen	Edward M. Kennedy	Gaylord Nelson
	Edward M. Kennedy	Wayne Morse	Morris Udall
	AFL-CIO	Department of Health, Education & Welfare	Environmental Protection Agency
	National Urban League	John Brademas	Senate Labor & Public Welfare Committee
Nicholas Katzenbach	Carl Perkins	Department of Agriculture	
Betweenness Centrality	NAACP	Edward M. Kennedy	John Blatnik
	John F. Kennedy	House Committee on Education and Labor	Bill Clinton
	Edward M. Kennedy	Dale Kildee	Environmental Protection Agency
	Lyndon B. Johnson	Department of Health, Education & Welfare	John Dingell
	Richard Nixon	NAACP	Henry Waxman
	American Civil Liberties Union	Edith Green	House Subcomm. on Fisheries & Wildlife
	John Dingell	Ford Foundation	Department of Interior
	National Organization for Women	Albert Quie	Department of Agriculture
	Emanuel Celler	Walter Mondale	Wilderness Society
	AFL-CIO	National Education Association	Henry Jackson

Table 4: Characteristics of Policy Change Networks in Other Issue Domains

	Size	Density	Centralization		Central Actors	Structure
			Degree	Betweenness		
Health	89	.09	9.7%	50.2%	Individual Activists	Multiple Cliques
Housing & Community Development	82	.08	16.2%	24.8%	Interest Groups	Single Large Group
Macroeconomics	30	.17	14.9%	24.8%	Gov. Departments	Sparse & Disconnected
Science & Technology	70	.06	3.5%	3.2%	Gov. Departments, Individual Activists	Many Separated Small Cliques
Transportation	56	.14	12.1%	35.4%	Interest Groups, Presidents	Multiple Cliques

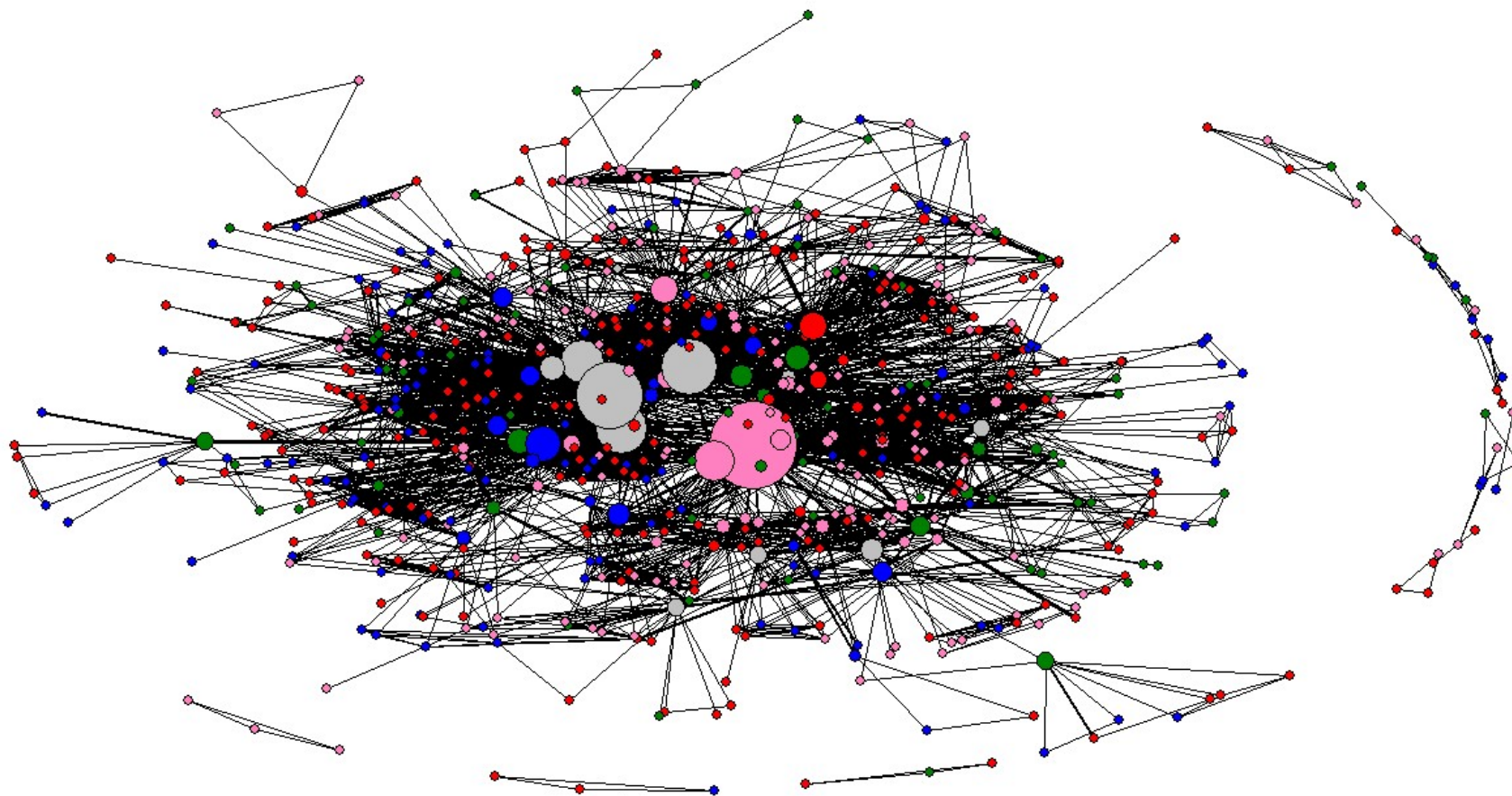
Table 5: Most Central Actors in Policy Change Networks by Issue Domain

	Health	Housing & Community Development	Macroeconomics
Degree Centrality	Mary Lasker	U.S. Conference of Mayors	Bob Dole
	Florence Mahoney	American Municipal Association	Joint Committee on Taxation
	Lister Hill	National Association of Real Estate Brokers	Senate Finance Committee
	Intergovernmental Relations Subcommittee	Lyndon B. Johnson	House Ways and Means Committee
	American Cancer Society	AFL-CIO	Dick Darman
	Melvin Laird	National Association of Home Builders	Barber Conable
	Edward M. Kennedy	Housing & Home Finance Administration	David Stockman
	Paul Rogers	National Housing Conference	Alan Greenspan
	Association of American Medical Colleges	Dept. of Housing & Urban Development	Daniel Moynihan
	Paul Douglas	Dwight D. Eisenhower	Jim Barker
Betweenness Centrality	Mary Lasker	U.S. Conference of Mayors	Senate Finance Committee
	Dwight D. Eisenhower	Dept. of Housing & Urban Development	House Ways and Means Committee
	Wilbur Mills	National Association of Home Builders	Bob Dole
	Lister Hill	Housing & Home Finance Administration	Joint Committee on Taxation
	Department of Health, Education & Welfare	Lyndon B. Johnson	Ronald Reagan
	Intergovernmental Relations Subcommittee	American Municipal Association	Dan Rostenkowski
	Norris Cotton	Richard Nixon	George H. W. Bush
	American Cancer Society	Department of Justice	Committee for Economic Development
	Edward M. Kennedy	Senator Charles Percy	Barber Conable
	Blue Cross/Blue Shield	National Association of Real Estate Brokers	David Stockman

Table 6: Most Central Actors in Policy Change Networks by Issue Domain

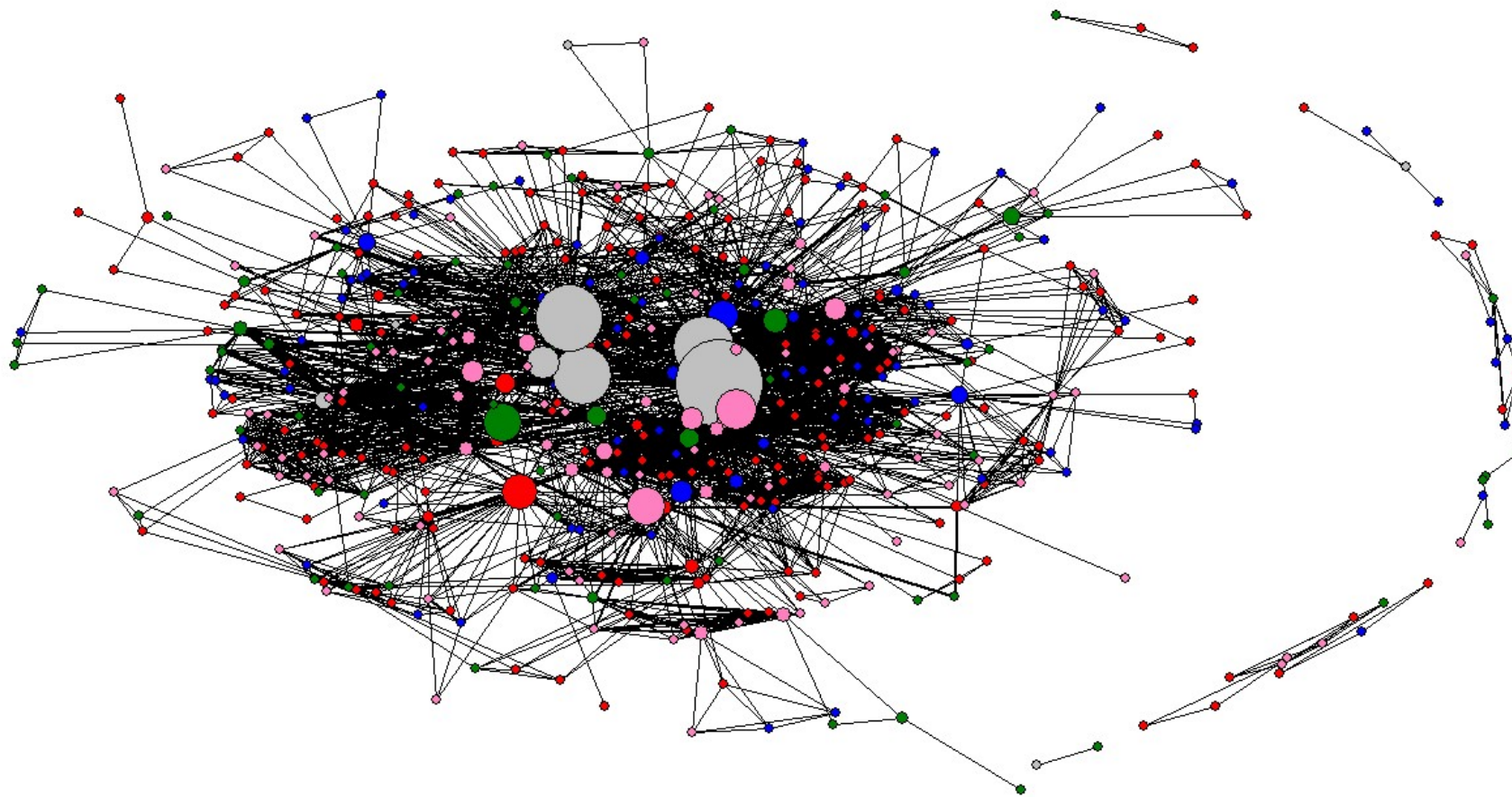
	Science & Technology	Transportation
Degree Centrality	Richard Nixon	Department of Transportation
	James Killian	American Trucking Association
	Food and Drug Administration	Stuart Eizenstat
	Federal Communications Commission	Mary Schuman
	Advisory Comm. on Gov. Operations	Jimmy Carter
	Hugh Dryden	Richard Neustadt
	Herber York	John F. Kennedy
	Dwight D. Eisenhower	Alfred Kahn
	Science Advisory Council	Dwight D. Eisenhower
	Bureau of the Budget	President Ford
Betweenness Centrality	Food and Drug Administration	American Trucking Association
	Natural Resources Defense Council	Dwight D. Eisenhower
	Environmental Protection Agency	Air Transport Association of America
	James Killian	Richard Nixon
	Richard Nixon	Department of Transportation
	Federal Communications Commission	Civilian Aeronautics Board
	William Golden	John F. Kennedy
	Lyndon B. Johnson	Amtrak
	Senate Subcom. National Policy Machinery	Bureau of Public Roads
	John F. Kennedy	Civil Aeronautics Administration

Figure 1: 1945-2008 Full Policy Change Network



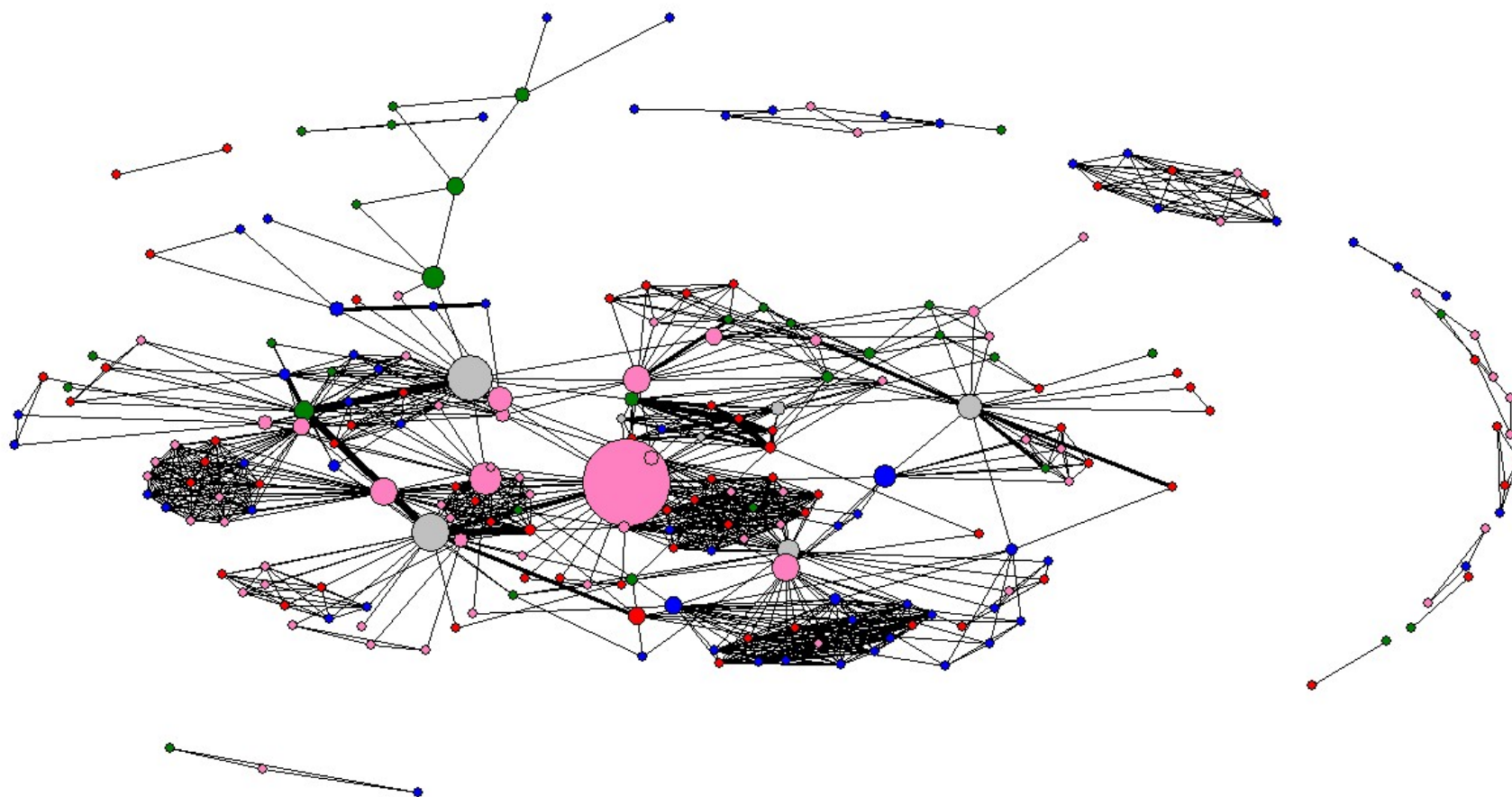
The nodes represent organizations or individuals credited with policy enactments. The links connect actors that were jointly credited with the same policy change (with the width representing the number of shared policy changes). The layout is spring embedding and the size of the nodes measures betweenness centrality. Pink nodes represent Members of Congress; grey nodes represent Presidents; blue nodes represent interest groups; green nodes represent government departments; and red nodes represent other individuals.

Figure 2: 1945-1979 Policy Change Network



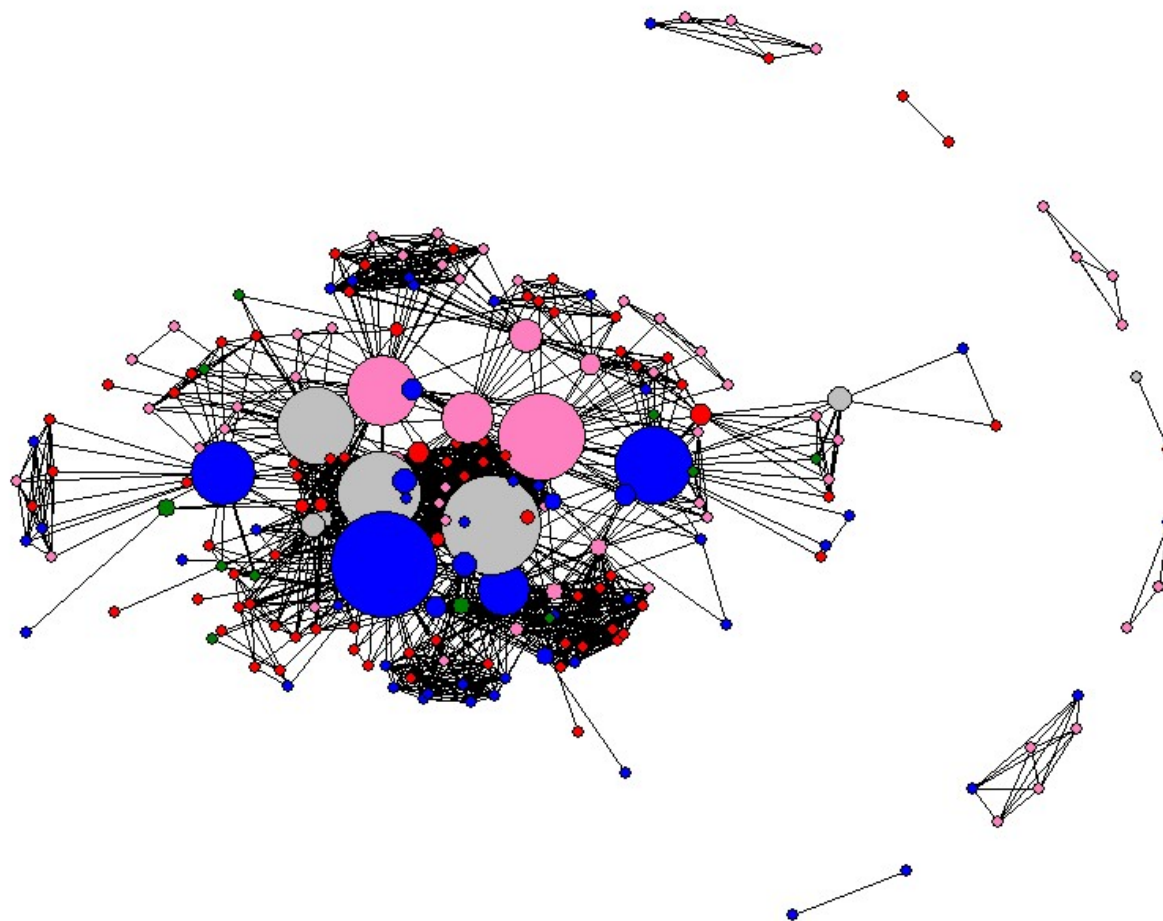
The nodes represent organizations or individuals credited with policy enactments. The links connect actors that were jointly credited with the same policy change (with the width representing the number of shared policy changes). The layout is spring embedding and the size of the nodes measures betweenness centrality. Pink nodes represent Members of Congress; grey nodes represent Presidents; blue nodes represent interest groups; green nodes represent government departments; and red nodes represent other individuals. This network only includes data from policy changes enacted from 1945-1979.

Figure 3: 1980-2008 Policy Change Network



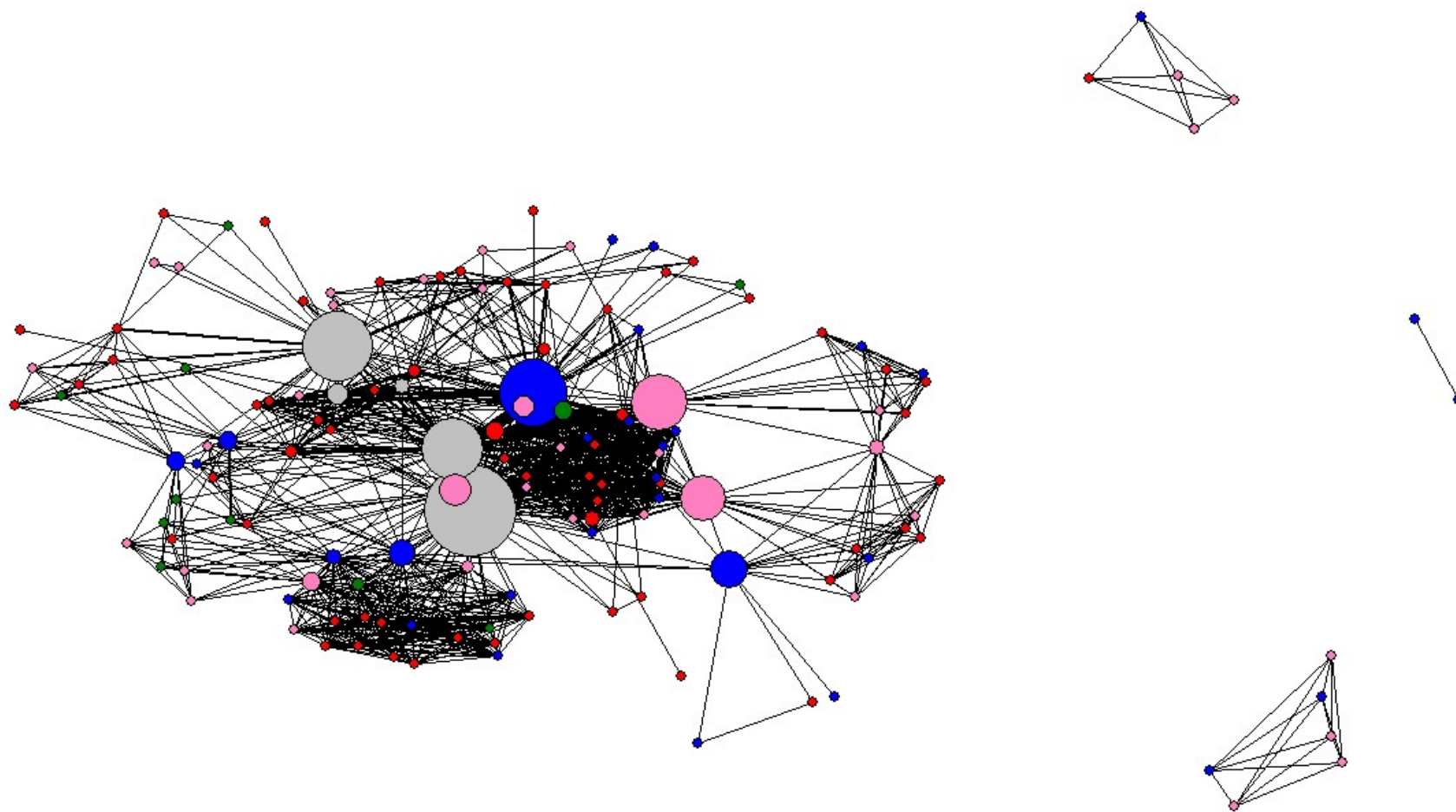
The nodes represent organizations or individuals credited with policy enactments. The links connect actors that were jointly credited with the same policy change (with the width representing the number of shared policy changes). The layout is spring embedding and the size of the nodes measures betweenness centrality. Pink nodes represent Members of Congress; grey nodes represent Presidents; blue nodes represent interest groups; green nodes represent government departments; and red nodes represent other individuals. This network only includes data from policy changes enacted from 1980-2008.

Figure 4: Full Civil Rights & Liberties Policy Change Network



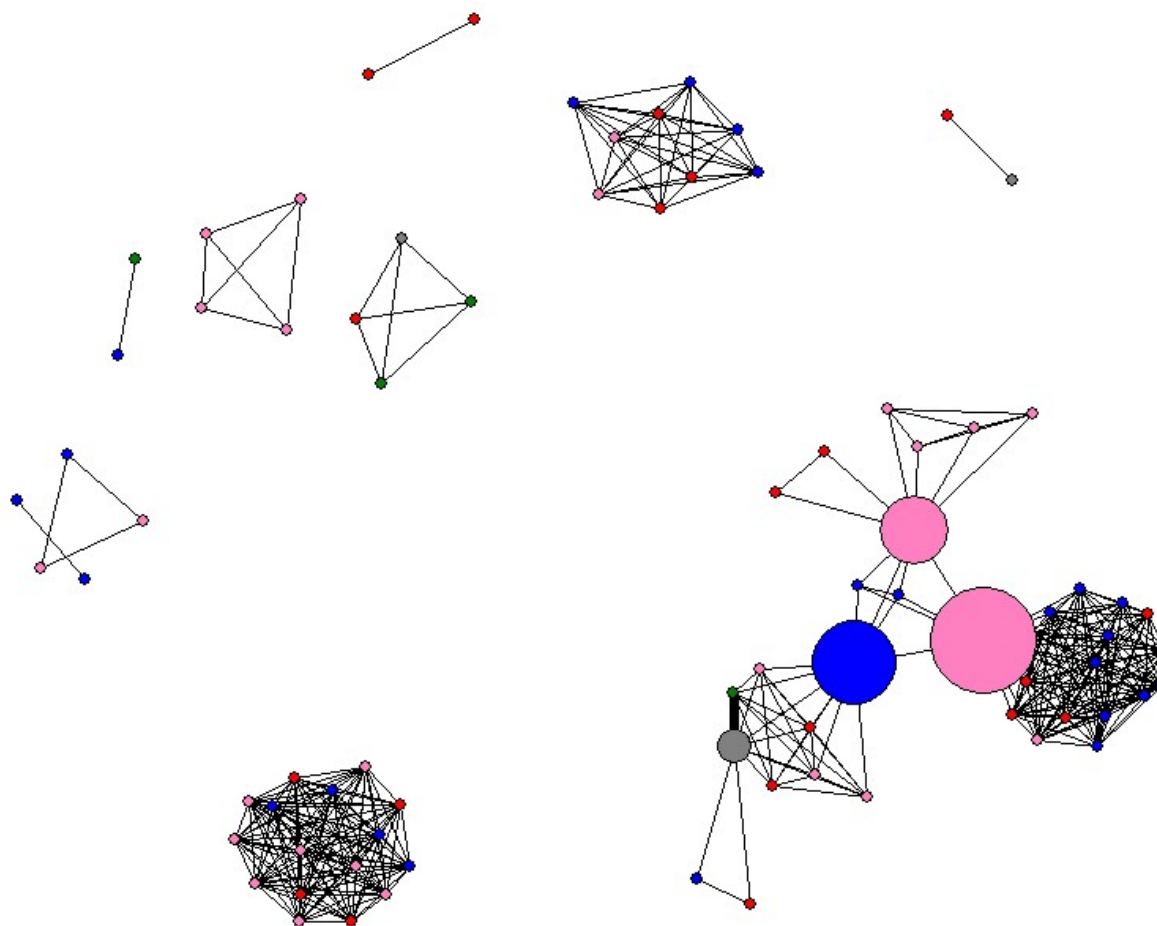
The nodes represent organizations or individuals credited with civil rights & liberties policy enactments. The links connect actors that were jointly credited with the same policy change (with the width representing the number of shared policy changes). The layout is spring embedding and the size of the nodes measures betweenness centrality. Pink nodes represent Members of Congress; grey nodes represent Presidents; blue nodes represent interest groups; green nodes represent government departments; and red nodes represent other individuals.

Figure 5: Civil Rights & Liberties Policy Change Network, 1945-1979



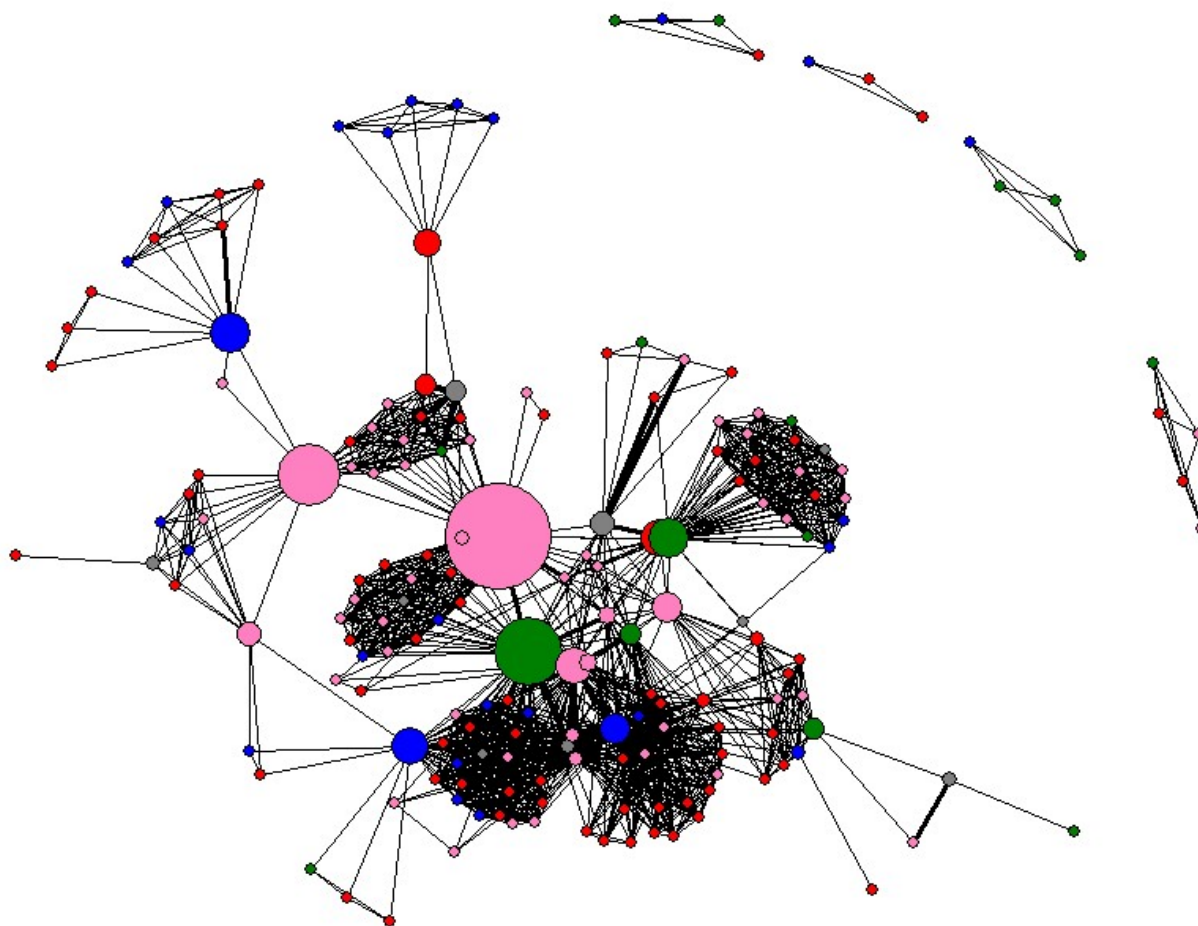
The nodes represent organizations or individuals credited with civil rights & liberties policy enactments. The links connect actors that were jointly credited with the same policy change (with the width representing the number of shared policy changes). The layout is spring embedding and the size of the nodes measures betweenness centrality. Pink nodes represent Members of Congress; grey nodes represent Presidents; blue nodes represent interest groups; green nodes represent government departments; and red nodes represent other individuals. This network only includes data from policy changes enacted from 1945-1979.

Figure 6: Civil Rights & Liberties Policy Change Network, 1979-2008



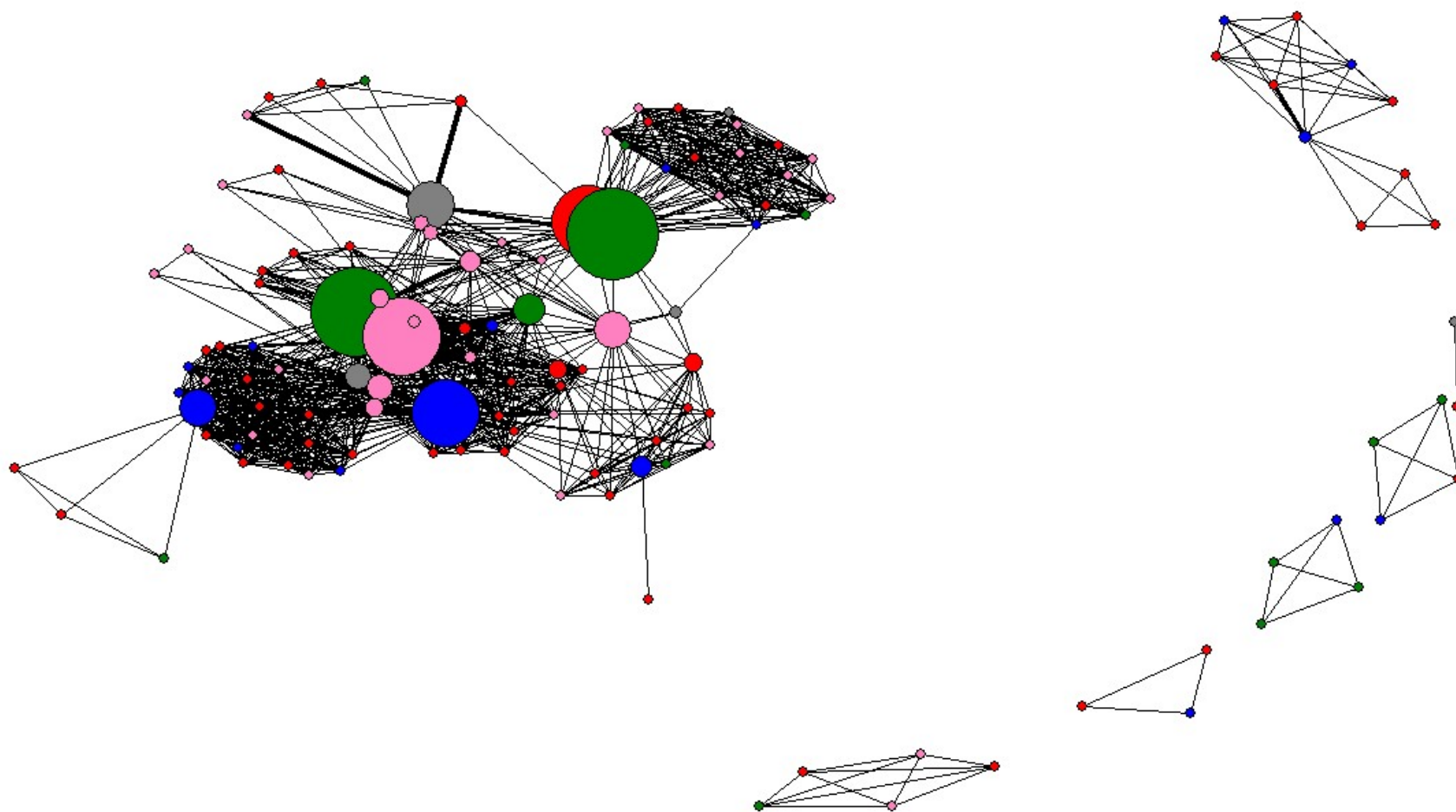
The nodes represent organizations or individuals credited with civil rights & liberties policy enactments. The links connect actors that were jointly credited with the same policy change (with the width representing the number of shared policy changes). The layout is spring embedding and the size of the nodes measures betweenness centrality. Pink nodes represent Members of Congress; grey nodes represent Presidents; blue nodes represent interest groups; green nodes represent government departments; and red nodes represent other individuals. This network only includes data from policy changes enacted from 1980-2008.

Figure 7: Full Education Policy Change Network



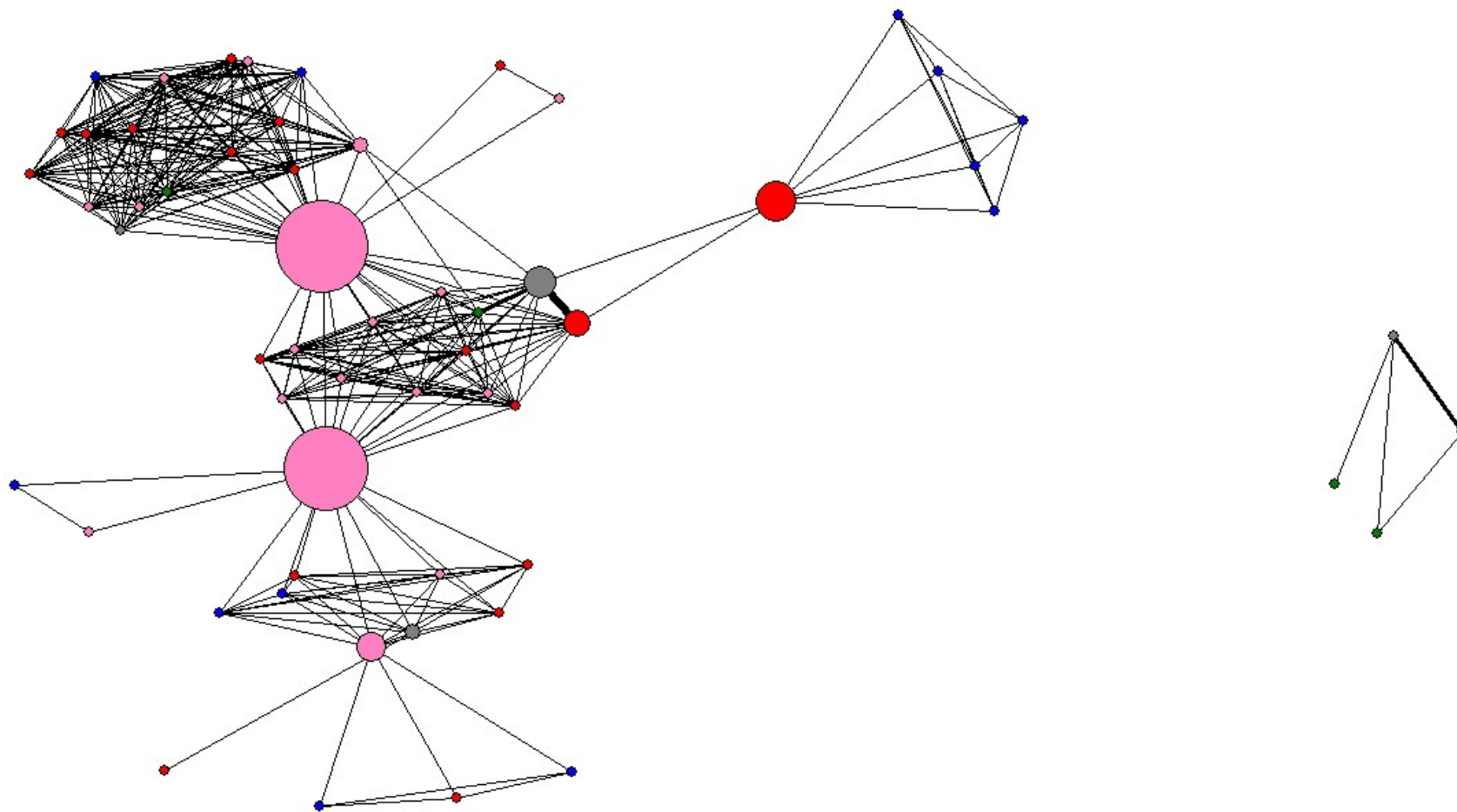
The nodes represent organizations or individuals credited with federal education policy enactments. The links connect actors that were jointly credited with the same policy change (with the width representing the number of shared policy changes). The layout is spring embedding and the size of the nodes measures betweenness centrality. Pink nodes represent Members of Congress; grey nodes represent Presidents; blue nodes represent interest groups; green nodes represent government departments; and red nodes represent other individuals.

Figure 8: Education Policy Change Network, 1945-1979



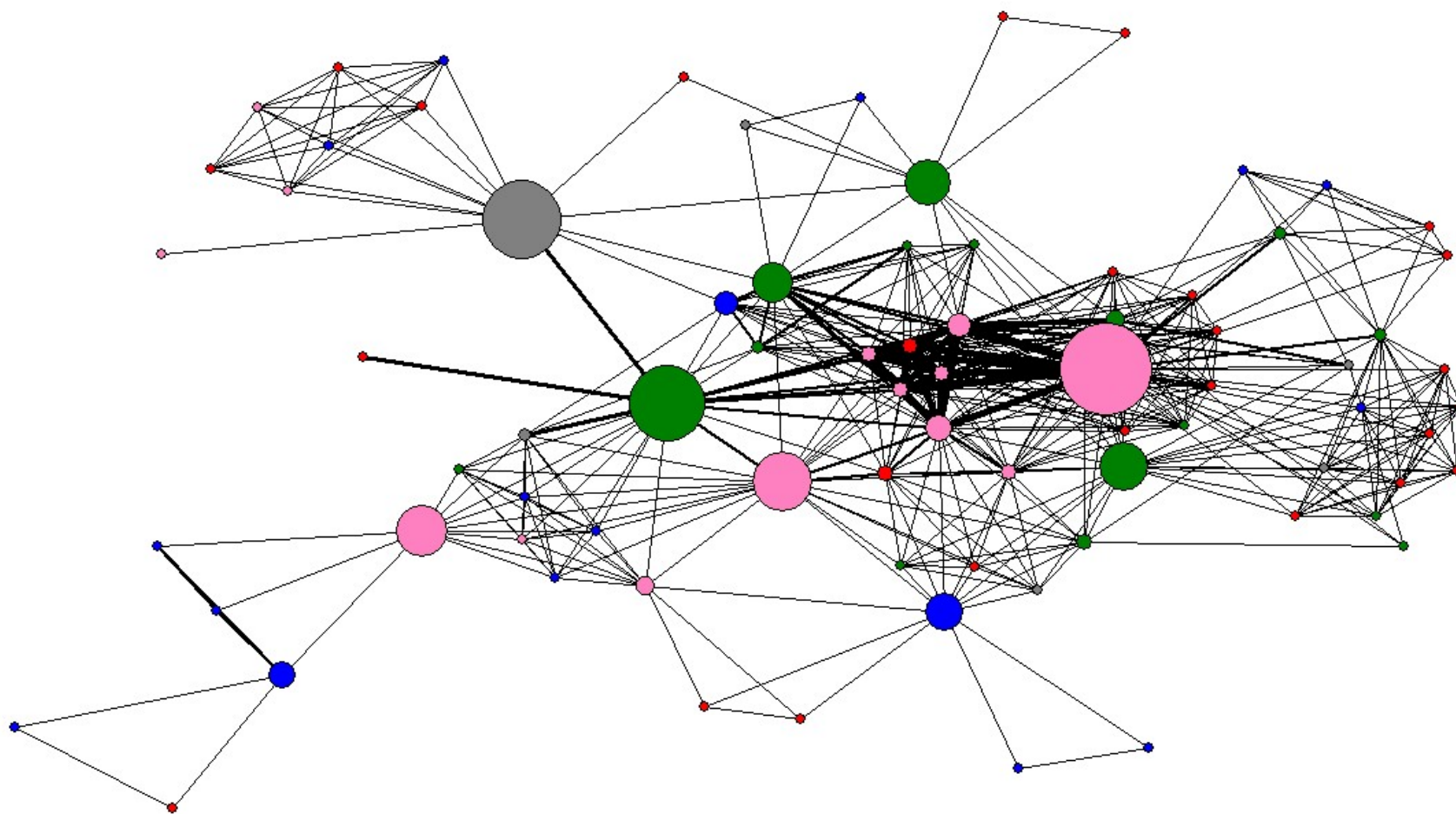
The nodes represent organizations or individuals credited with federal education policy enactments. The links connect actors that were jointly credited with the same policy change (with the width representing the number of shared policy changes). The layout is spring embedding and the size of the nodes measures betweenness centrality. Pink nodes represent Members of Congress; grey nodes represent Presidents; blue nodes represent interest groups; green nodes represent government departments; and red nodes represent other individuals. This network only includes data from policy changes enacted from 1945-1979.

Figure 9: Education Policy Change Network, 1980-2008



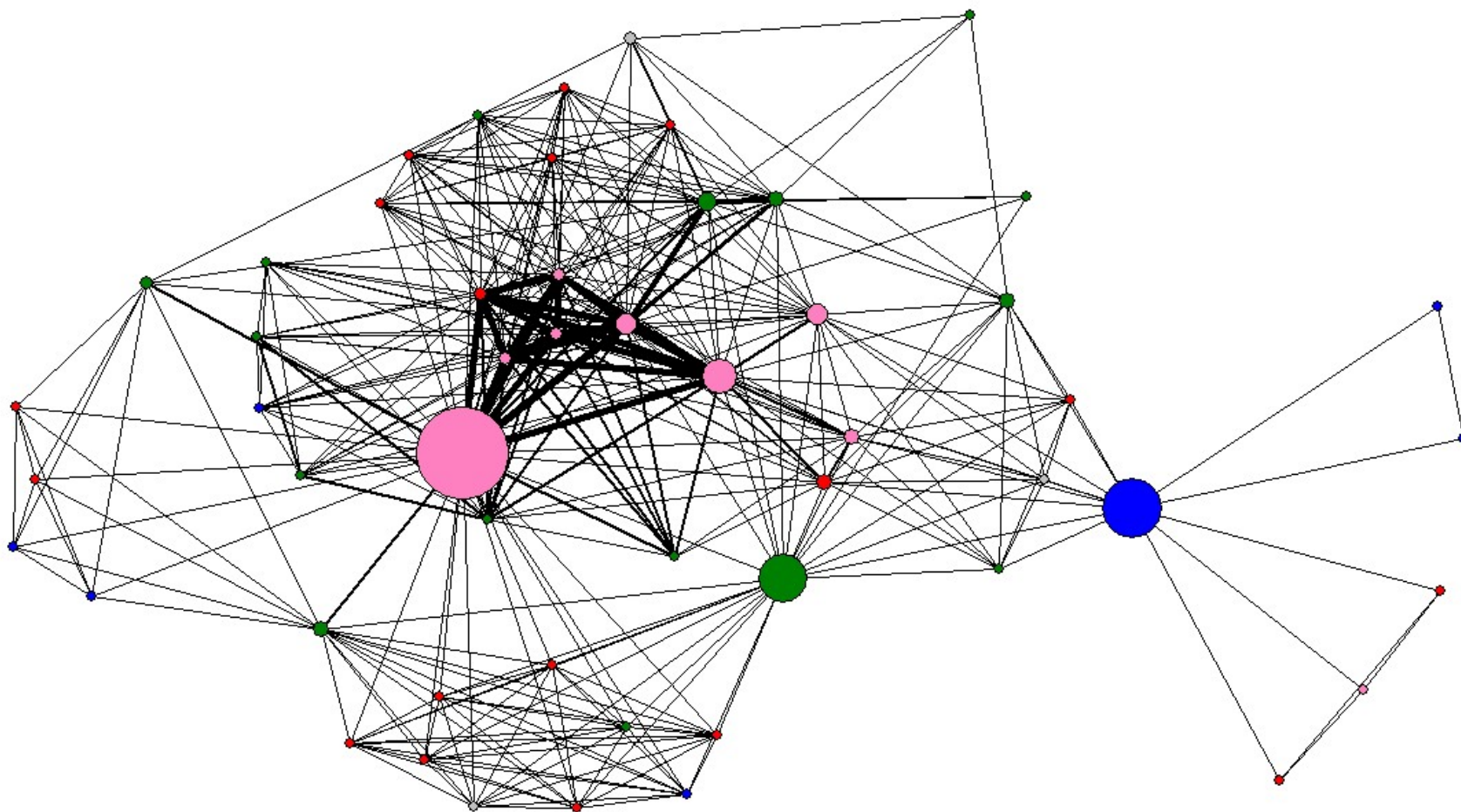
The nodes represent organizations or individuals credited with federal education policy enactments. The links connect actors that were jointly credited with the same policy change (with the width representing the number of shared policy changes). The layout is spring embedding and the size of the nodes measures betweenness centrality. Pink nodes represent Members of Congress; grey nodes represent Presidents; blue nodes represent interest groups; green nodes represent government departments; and red nodes represent other individuals. This network only includes data from policy changes enacted from 1980-2008.

Figure 10: Full Environmental Policy Change Network



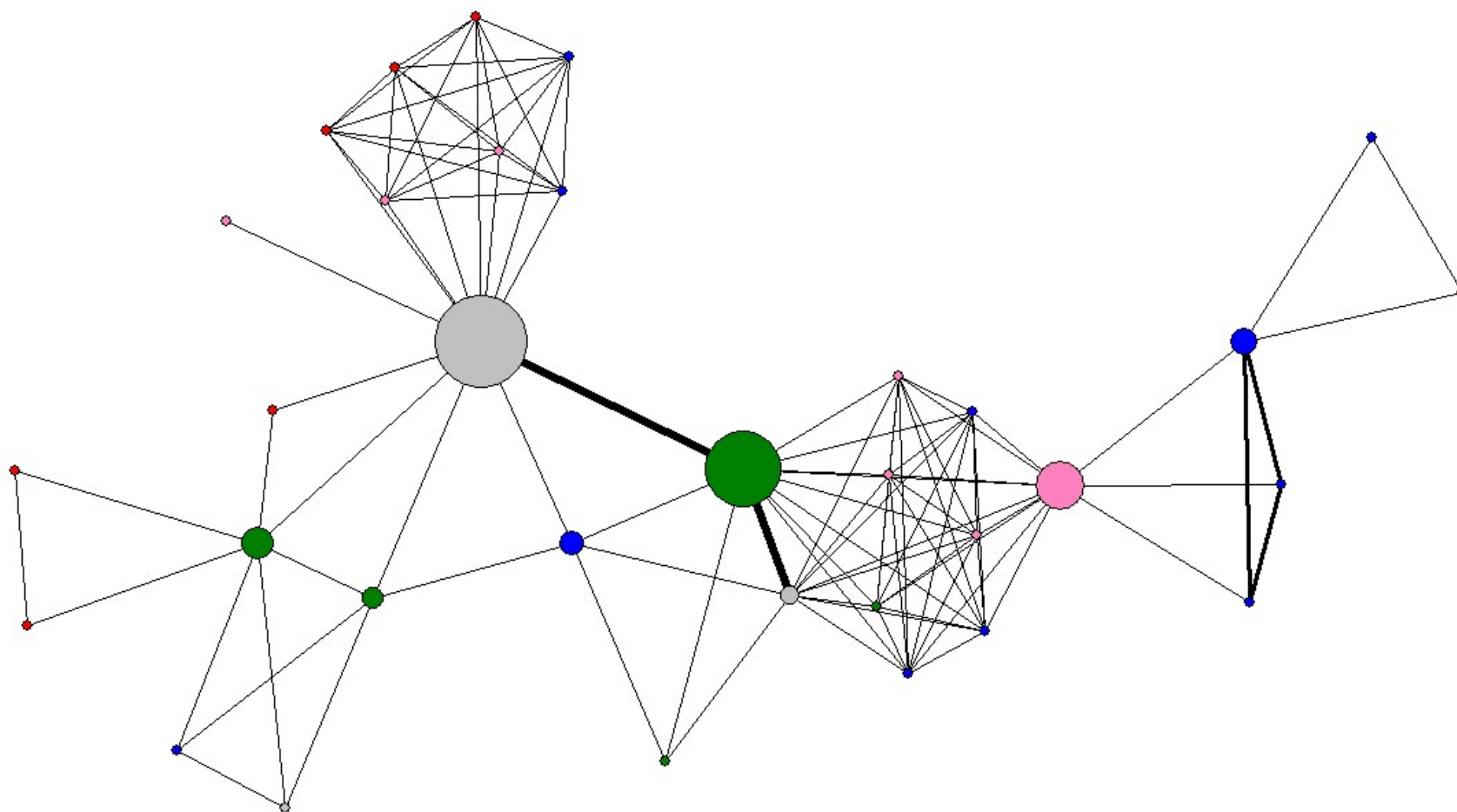
The nodes represent organizations or individuals credited with environmental policy enactments. The links connect actors that were jointly credited with the same policy change (with the width representing the number of shared policy changes). The layout is spring embedding and the size of the nodes measures betweenness centrality. Pink nodes represent Members of Congress; grey nodes represent Presidents; blue nodes represent interest groups; green nodes represent government departments; and red nodes represent other individuals.

Figure 11: Environmental Policy Change Network, 1945-1979



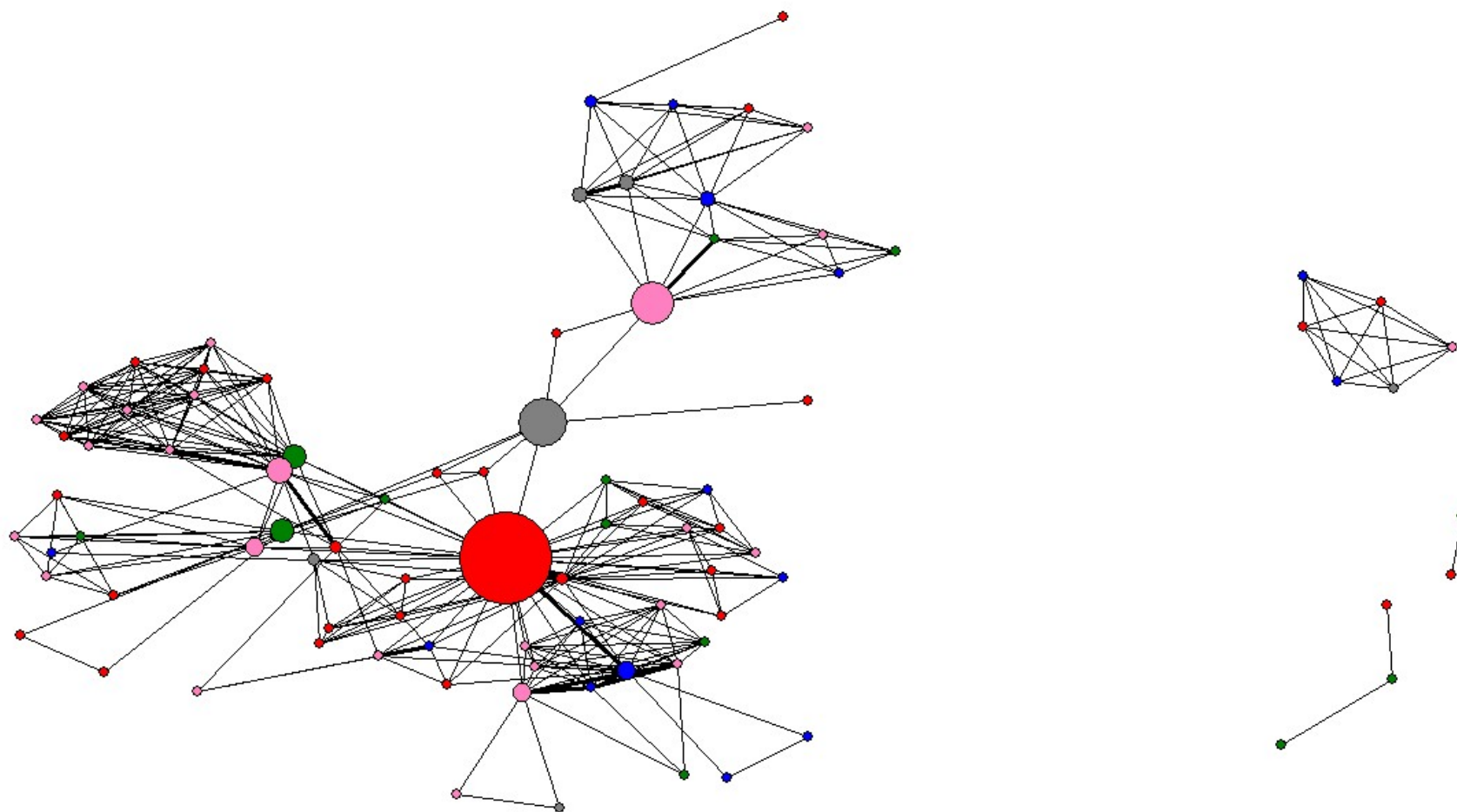
The nodes represent organizations or individuals credited with environmental policy enactments. The links connect actors that were jointly credited with the same policy change (with the width representing the number of shared policy changes). The layout is spring embedding and the size of the nodes measures betweenness centrality. Pink nodes represent Members of Congress; grey nodes represent Presidents; blue nodes represent interest groups; green nodes represent government departments; and red nodes represent other individuals. This network only includes data from policy changes enacted from 1945-1979.

Figure 12: Environmental Policy Change Network, 1980-2008



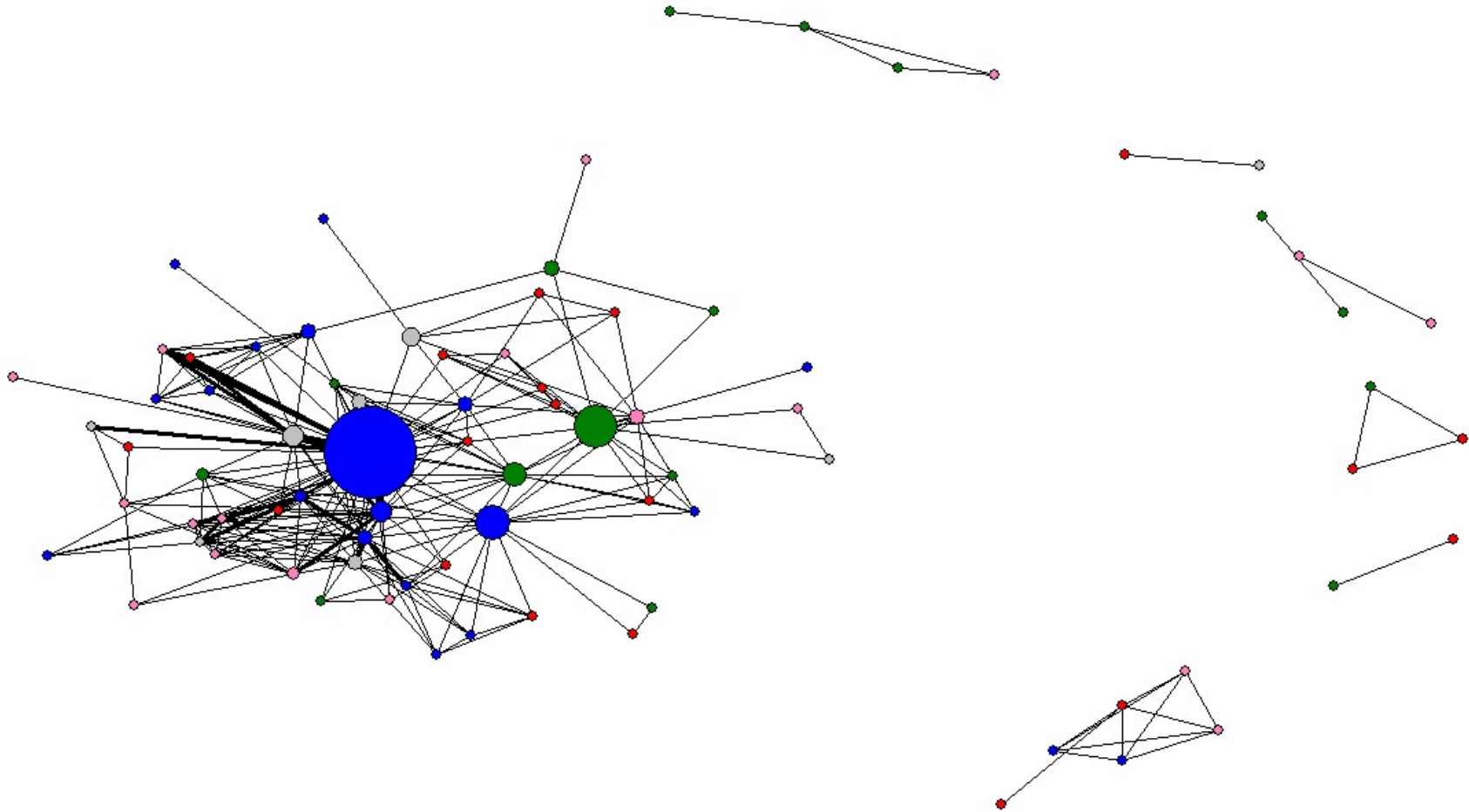
The nodes represent organizations or individuals credited with environmental policy enactments. The links connect actors that were jointly credited with the same policy change (with the width representing the number of shared policy changes). The layout is spring embedding and the size of the nodes measures betweenness centrality. Pink nodes represent Members of Congress; grey nodes represent Presidents; blue nodes represent interest groups; green nodes represent government departments; and red nodes represent other individuals. This network only includes data from policy changes enacted from 1980-2008.

Figure 13: Health Policy Change Network



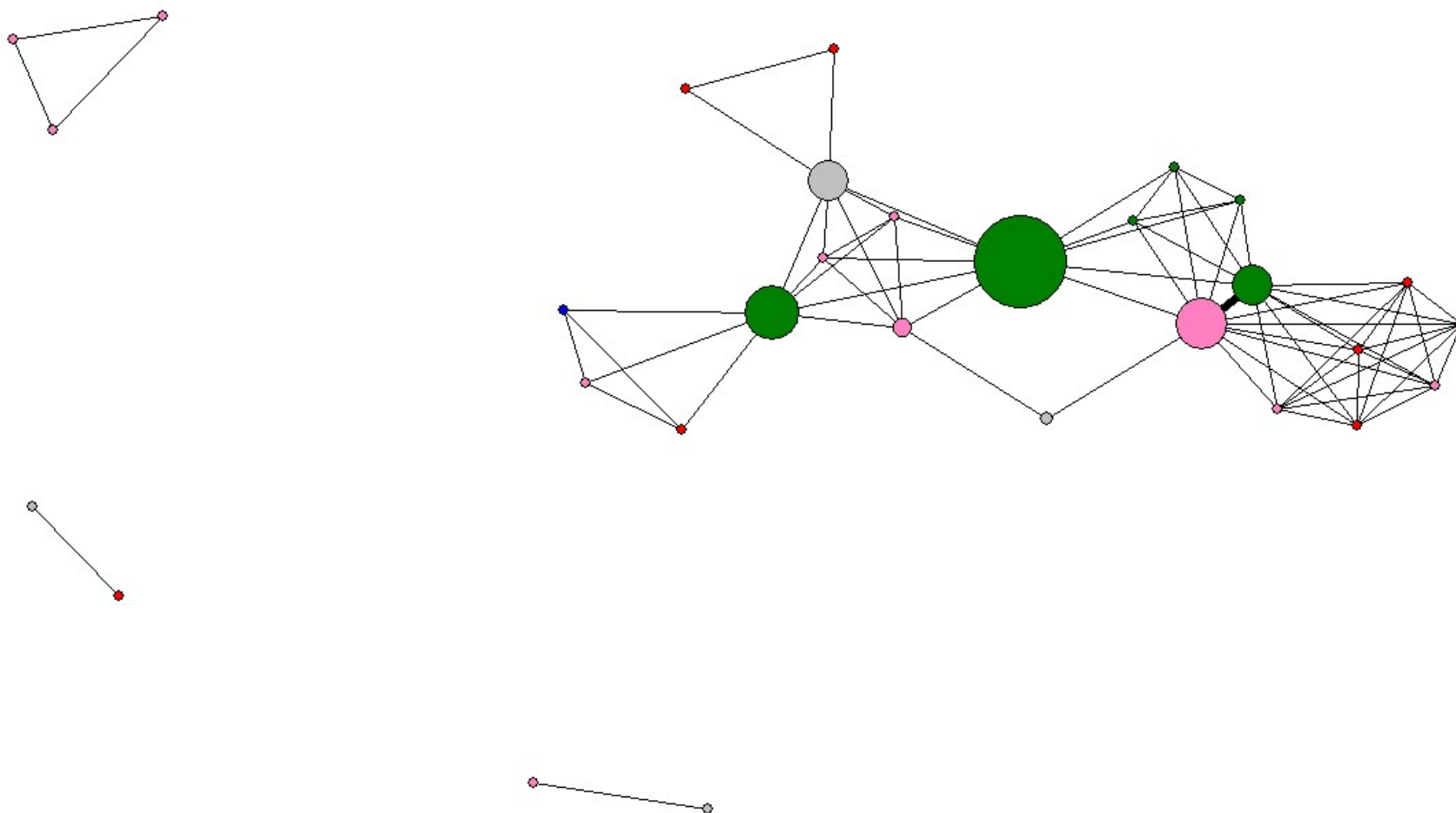
The nodes represent organizations or individuals credited with health policy enactments. The links connect actors that were jointly credited with the same policy change (with the width representing the number of shared policy changes). The layout is spring embedding and the size of the nodes measures betweenness centrality. Pink nodes represent Members of Congress; grey nodes represent Presidents; blue nodes represent interest groups; green nodes represent government departments; and red nodes represent other individuals.

Figure 14: Housing & Community Development Policy Change Network



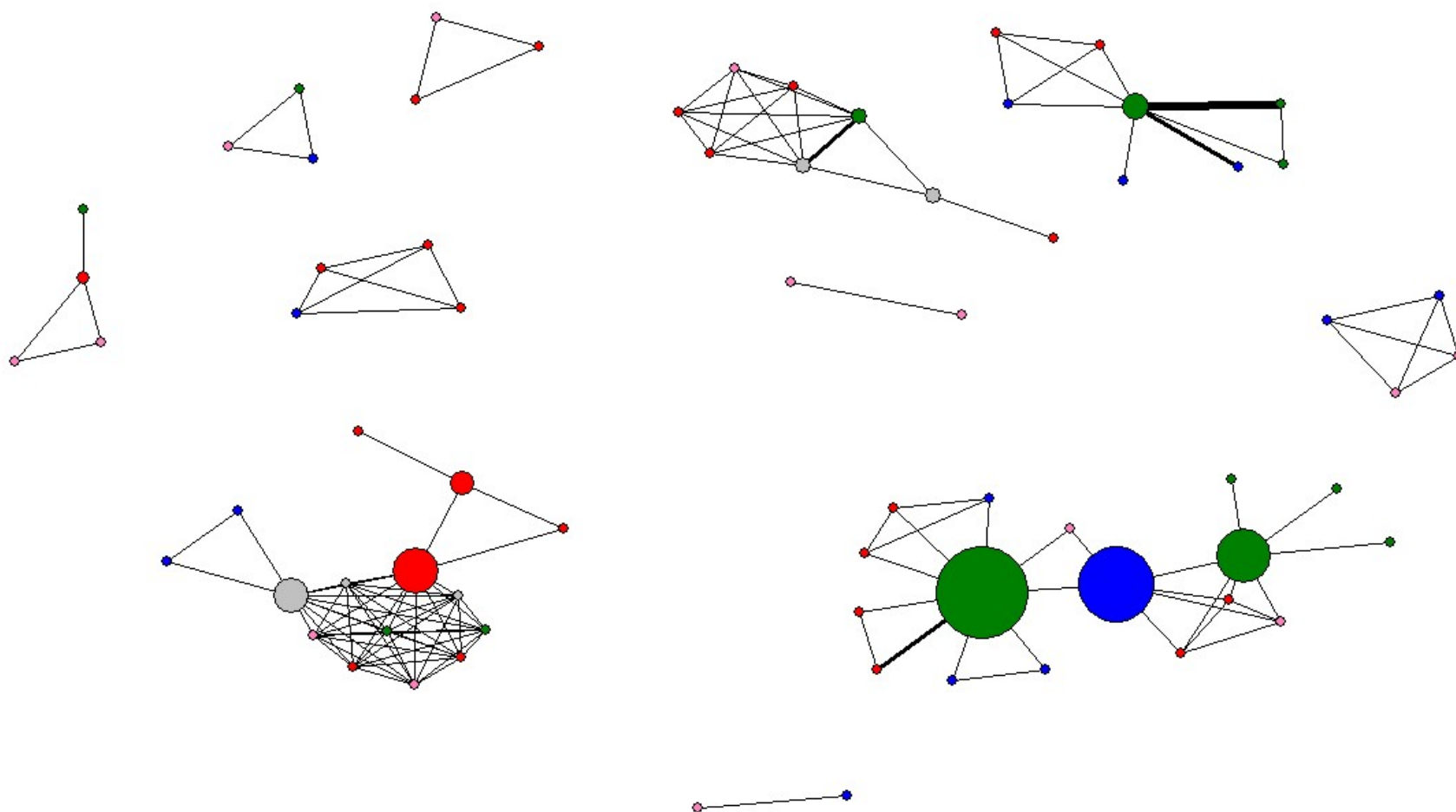
The nodes represent organizations or individuals credited with housing & community development policy enactments. The links connect actors that were jointly credited with the same policy change (with the width representing the number of shared policy changes). The layout is spring embedding and the size of the nodes measures betweenness centrality. Pink nodes represent Members of Congress; grey nodes represent Presidents; blue nodes represent interest groups; green nodes represent government departments; and red nodes represent other individuals.

Figure 15: Macroeconomics Policy Change Network



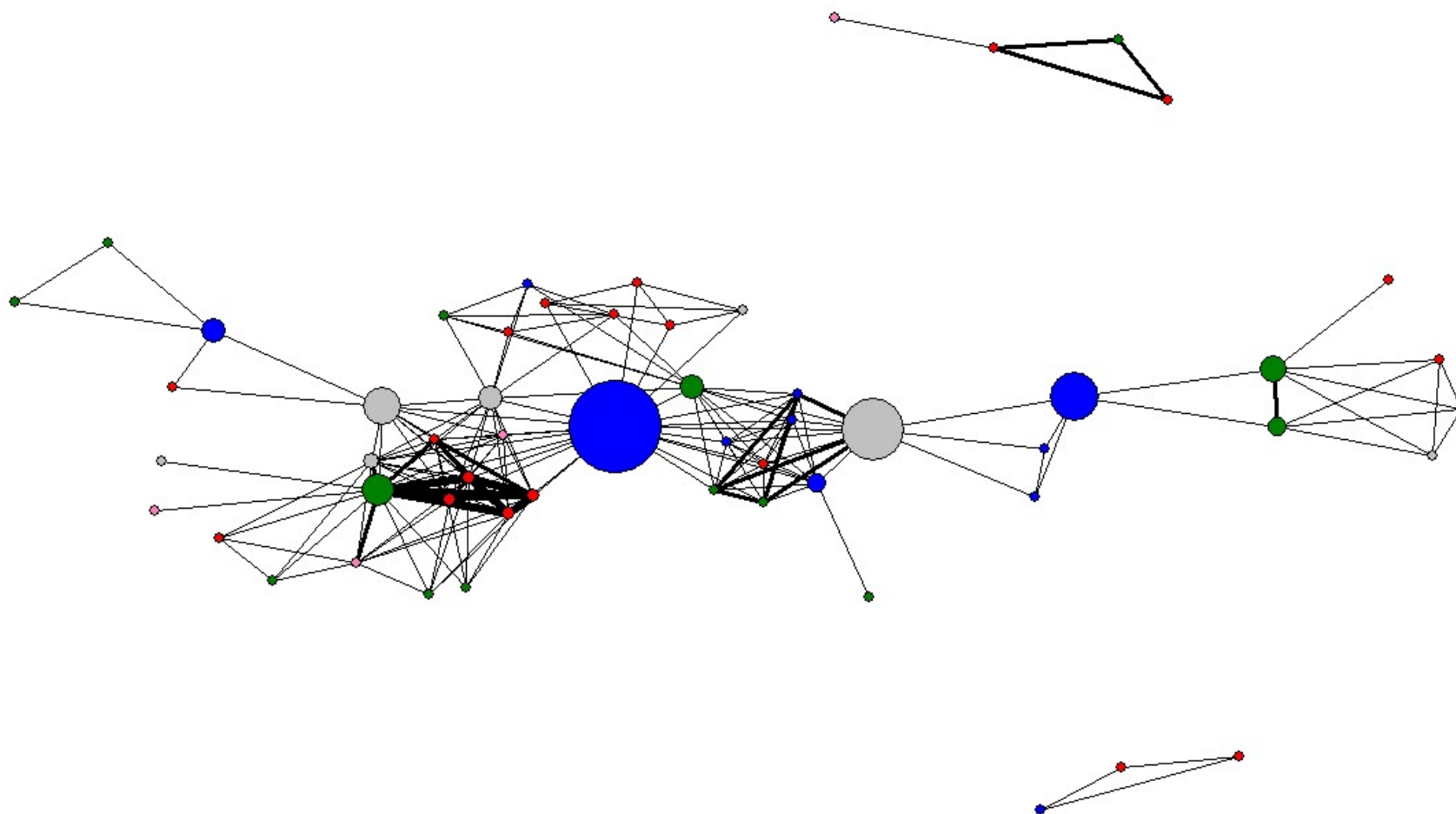
The nodes represent organizations or individuals credited with macroeconomics policy enactments. The links connect actors that were jointly credited with the same policy change (with the width representing the number of shared policy changes). The layout is spring embedding and the size of the nodes measures betweenness centrality. Pink nodes represent Members of Congress; grey nodes represent Presidents; blue nodes represent interest groups; green nodes represent government departments; and red nodes represent other individuals.

Figure 16: Science & Technology Policy Change Network



The nodes represent organizations or individuals credited with science & technology policy enactments. The links connect actors that were jointly credited with the same policy change (with the width representing the number of shared policy changes). The layout is spring embedding and the size of the nodes measures betweenness centrality. Pink nodes represent Members of Congress; grey nodes represent Presidents; blue nodes represent interest groups; green nodes represent government departments; and red nodes represent other individuals.

Figure 17: Transportation Change Network



The nodes represent organizations or individuals credited with transportation policy enactments. The links connect actors that were jointly credited with the same policy change (with the width representing the number of shared policy changes). The layout is spring embedding and the size of the nodes measures betweenness centrality. Pink nodes represent Members of Congress; grey nodes represent Presidents; blue nodes represent interest groups; green nodes represent government departments; and red nodes represent other individuals.

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