

MIKKO MATTILA (19.5.1999)
DEPARTMENT OF POLITICAL SCIENCE
UNIVERSITY OF HELSINKI
MMATTILA@VALT.HELSENKI.FI

The Structure of Policy Networks

An analysis of political decision making network in Finland

ABSTRACT

In this study the formation of policy networks is analysed. Theoretically the policy network is seen as a tool for actors to advance their goals in order to ensure that the policy decisions correspond as closely as possible with their own policy preferences. The possession of information has a major role in this process. The empirical analysis shows that the tendency towards mutual relations in the policy network is strong. Network ties are also more likely to be directed to those actors with similar overall policy preferences. Thus, relations in the policy network can be seen mainly as attempts to create a reasonable level of trust (or “political capital”) among pairs of actors. Once the trust relationship is established influence is used in specific instances when the two actors disagree. On the whole, political decision-makers are more willing to accept “one-sided” incoming information contacts. However, they are also likely to engage in “bolstering” i.e. listening mostly to information from actors sharing the decision-makers’ own preferences.

KEYWORDS: policy networks, network analysis, political decision making, p* model

INTRODUCTION

In this study the formation of the policy network in the field of Finnish social and health care policy-making is studied. The literature on policy networks gives several theoretical reasons and empirical determinants of how policy networks are formed and what are characteristics for certain types of networks. First these studies are shortly reviewed and then these ideas are used in the subsequent empirical analysis. The hypotheses concerning the formation of policy networks are derived from two different sources. First, the reasons for creating network ties are considered from the rational action view of political science. Then these ideas are supplemented from hypotheses based on the neo-institutional perspective of inter-organisational action.

In this paper the term "policy network" refers to the patterns of interaction among organisational actors in a policy domain. The main idea is that the policy network is seen as a tool for actors to convey information, preferred political stands, support or resources from actor to actor in the domain. Thus, the policy network is a social structure that is needed for the policy process to work effectively. The empirical network data is gathered from the domain of Finnish social and health care decision making. It consists of 45 organisational actors that take part in the policy process. The empirical analysis uses logistic regression that is based on the p^* model by Wasserman and Pattison (1996). With this model it is possible to combine structural (network) variables and dyadic attribute variables into same analysis to make the picture of policy network formation more complete.

In political science literature the term "policy network" is usually related to a specific strand of analysis, which uses mostly qualitative research approach. In this tradition the concept of "network" is used as a metaphoric device to convey the idea of complex and interrelated relations between various political actors (see e.g. Marsh 1998; for a critique of this tradition see Dowding 1995). In this analysis the approach is different. The empirical analysis is based on measured quantitative data gathered from the participants of the policy process. Thus, this study is closer to the sociological network analysis tradition than the political science "policy network" literature.

WHY POLICY NETWORKS?

Actors that are involved in the political decision-making process in a policy domain form a "policy network" that comprises these actors and the relations between them. In order to be able to analyse this network one has to clarify what are the goals of network actors and how is political influence used in the network. This clarification also helps us to understand the role of networks in the policy process, how networks are used as a tool for political influence or, to put it more bluntly, lobbying. The following treatment of public and private actors' goals is, of course, a simplification of the "real world" policy process. However, it can highlight the most important features of this process and, consequently, form a base for hypotheses, which can be tested with empirical data.

The actors in the policy network can be divided into two groups: political decision-makers and actors trying to influence the decisions these political decision-makers are contemplating. Political decision-makers have the final power to make authoritatively binding decisions i.e. decide on legislation. Thus, it is the parties represented in the national parliament that are political decision-makers in this case. These actors are called *public actors*. All other actors are considered to be *private actors* trying to lobby parties in order to ensure that the final legislation follows their own preferences as closely as possible.

Parties, when performing their role as producers of new legislation, have two main goals. First, they try to follow their intrinsic preferences and make decisions that are in agreement with their ideological beliefs. A politician who is interested exclusively in following his/her ideological beliefs is called "policy seeking politician". Second, they are also interested in probability that they or their party will win the next elections. In rational choice literature a politician who is only interested in winning the elections is called "office-seeking politician". It is the combination of these two goals that determine how parties act in the policy-making process.

The role of private actors is easier to analyse. They try to convince public actors to formulate policies that are as close as possible to their own policy preferences. Therefore, the basic requirement of their work is to demonstrate their preference intensities effectively (Dunleavy 1991, 20). As public actors private actors may also have

ideological goals that they pursue in their work or they may just want to use the political process to gain private benefits to themselves or their members. The latter activity is labelled as "rent-seeking" in the rational choice literature (e.g. Stevens 1993, 187 and 190). However, it doesn't matter whether it is ideological goals or private benefits that actors are pursuing, the only way for them to succeed is to communicate their wishes to public actors and try to convince them to pass laws that are in accordance with these goals. This is where the policy network is needed. Although the communication between public and private actors can and often happens through media, much of the day-to-day routine of preparation and discussion of the pros and cons of new legislation takes place through inter-organisational communication between public and private actors. The policy network is a tool for this communication. If private actors are able to create good channels 'to political parties they are more successful in conveying their opinions to parties and, consequently, probably more productive in their work as interest organisations. Furthermore, private actors need to maintain close ties to public actors to be able to receive information in the early stages of policy process. This ensures that private actors have time to form their own policy positions and prepare their strategies before the final decision making phase.

The interaction and communication in policy networks can be conceptualised as a system of exchanges in which actors seek to realise their own goals (see e.g. Pappi & Henning 1998). There are several reasons for political decision-makers to listen to the opinions of private actors. Sometimes the best experts in a policy domain can be found in interest organisations or other private actors. Thus, if parties know the ideological goals they would like to fulfil with new legislation, they still need a lot of expert information about what kind of tools are needed to realise these goals, or what kind of consequences might result from certain legislative measures. Private actors can use these information resources to their advantage in the policy process. Private actors also have other kinds of resources that are demanded by political parties. As said before, parties are always to some extent interested in maximising the chances of re-election or in multiparty systems maximising their vote share in the upcoming elections. Private actors can also be helpful in realising these goals. They can give their support to certain parties in elections and ask their members to vote for a certain party. Furthermore, private actors can provide resources for parties' election campaigns in forms of monetary contributions, media coverage or election campaign workers.

Following from the discussion above, policy network relations should be seen as instrumental tools for both political decision-makers and private actors to advance their goals and network relations have no intrinsic value to actors as such. For private actors the main value from network relations is that they are used as instruments to gain influence in the final political decision outcomes. For political parties networks are instruments to gain information and support from private actors. Unfortunately, the reality is more complex. First, political parties can also act in a similar role as private actors when they try to convince other parties to vote according to their own wishes. Furthermore, parties may also lobby private actors to support their own positions and in this way gain more weight behind their opinions (Potters & Sloof 1996, 410). Similarly, the lobbying efforts of private actors are not restricted to influencing political decision-makers. At the same time they try to collect support from other private actors to their arguments. Thus, the lobbying in the policy network is not a one-way street from private actor to political decision-makers, but it can happen also in the opposite direction and also between private actors.

PREFERENCES, STATUS DIFFERENCES AND POLICY NETWORKS

The reasons that affect the structure of network relations can be varied. Stokman and Zeggelink (1996) propose several models for dynamic networks¹. Although their models are not directly applied to the data of this study, their assumptions can be used to formulate the dyadic regression model used in the empirical analysis. Stokman and Zeggelink make a distinction between *power oriented* and *policy oriented networks*. In power oriented networks actors try to establish relations to those actors they perceive most powerful in the network. In policy oriented networks it is the policy preferences that mostly determine the objects of actors' relation proposals. Actors evaluate the policy preferences of other actors and try to form network relations in such a way that the policy outcomes resulting from the policy network would be as close to their own policy preferences as possible.

The empirical results of Stokman and Zeggelink (1996) and Stokman and Berveling (1998) showed that the policy-driven models worked better than power-driven models. Thus, from their results one can conclude that policy preferences play an important part in defining the structure of the policy network. In policy-driven models actors try especially to exert influence on those actors that oppose their views. Thus, this leads to the assumption that network relations are formed mostly between actors with opposing policy preferences.

However, the effect and, especially, the direction of the effect of preferences are by no means clear. In a classic study of Washington lobbyists, Milbrath (1963, 217) noted that "most lobbyists do not bother to communicate with those they know are opposed". Thus, based on Milbrath's study one could expect that most of the network relations are concentrated between like-minded actors. More recent studies on lobbying networks in U.S.A. have mostly confirmed this result (Hojnacki & Kimball 1998). Lobbying seems to concentrate between actors that are already on the "same side" and for interest groups

¹ The validity of Stokman's and Zeggelink's (1996) model cannot be directly tested with the data set used in this study because in their model preferences are dynamic i.e. as a result of network relations actors change their preferences. This kind of effect can only be reliably estimated with a data that measures changes through time. The Finnish data set is only a cross sectional 'snapshot' of the structure of the policy network.

the aim is to expand and strengthen the existing coalition rather than to persuade those actor that are opposing the issue.

Austen-Smith and Wright (1994) offer a bridge between these two opposing views of the effect of policy preferences on network relations. They propose that actors try to influence friendly legislators to offset the lobbying efforts of opposing actors. They call this phenomena *counteractive* lobbying. The idea implies that actors direct their influence relations to both actors with similar and actors with dissimilar policy preferences. Their empirical data also supported their model.

To sum up: based on theory and existing empirical research there are justified reasons to believe that the similarity in policy preferences can either increase or decrease the probability that there exists a relation between a pair of actors². However, there is no justified reason to believe that the preference similarities would *not* have an effect on the observed network relations. Because the theory can not give a clear direction for expectations, the question here is more an empirical one. Similarity of policy preferences may or may not have a significant effect on network relations in the logistic regression model, and the direction remains to be seen. Accordingly, two opposite hypotheses are formulated:

Hypothesis 1a. *Similarity of preferences increases the likelihood of a tie between a pair of actors.*

Hypothesis 1b. *Similarity of preferences decreases the likelihood of a tie between a pair of actors.*

If policy networks are seen as tools of exchange (information, favours etc.) the question of reciprocity of network relations arises. In a way the term “exchange” implies mutuality. If one actor is providing the other with important information it may expect to receive something in exchange. This expectancy of returned favours creates an obligation of reciprocity to the other actor (Coleman 1988, 102-104). Furthermore, if an actor is already receiving information from another, s/he already knows with whom s/he is dealing with. This increased knowledge may lower the costs of reciprocating the relationship. This leads to following hypothesis:

² König and Bräuninger (1998) include in their model measures of similarity and dissimilarity simultaneously. However, one could argue that similarity and dissimilarity are just opposite ends of one dimension and one measure should be enough.

Hypothesis 2. *Ties between actors tend to be reciprocated.*

Policy networks contain actors with various status and power differences. Thus, it is justified to believe that perceived power differences could have an effect on the structure of the network relations. Stokman and Zeggelink (1996) assume in their power oriented 'model that actors aim at access relations with the most powerful actors in the field. The task of calculating both the effects of access relations on shifts in target actors' policy positions and their subsequent effects on the final decisions is extremely difficult if not impossible. Thus, the actors choose a "bounded rationality" strategy and aim to optimise their own control by directing their influence relations to those target actors that are perceived as powerful in the domain. Accordingly the status differences between actors should contribute to the probability that there exists a relation between these two actors. It is assumed that actors with low status try to create ties to more powerful actors. Powerful actors are likely to accept information from less powerful actors for two reasons. First, it is usually advantageous for powerful actors to be (or at least seem to be) open for influences from wide variety of directions. This means that they can justify their own influence attempts more easily. Second, powerful actors have more resources in their use to accept more incoming relations even from less powerful actors. However, powerful actors are more likely to direct their own outgoing relations to even more powerful actors to maximise their own influence in the decision making process. To sum up, the information in the policy network flows "upwards". Thus, the third hypothesis is:

Hypothesis 3. *Actors with higher status are more likely to accept incoming relations from less powerful actors.*

INSTITUTIONAL VIEW ON POLICY NETWORKS

So far the possible effects affecting the likelihood of ties between actors that have been considered above have all been more or less based on the rational action perspective on policy networks. Another view on policy networks is provided by the neo-institutional school of thought. The essence of the neo-institutionalists' ideas is that societal

institutions affect the way actors behave. Institutions provide actors with increased certainty about the present and future behaviour of other actors (Hall & Taylor 1996). In this connection the term “institution” refers not only to formal requirements and rules of public decision making but also to informal “rules of conduct” in the policy domain (Rowlinson 1997, 82-89). Action that is repeated frequently may become cast in a pattern, and form an “institution” that guides to normal routine day-to-day behaviour of the domain actors. This kind of institutionalisation of interaction leads to lower transaction costs among the actors. For example, it is easier to exchange information with same actors as before, because of the increased predictability that follows from the accumulated knowledge of how these actors have behaved in the past.

One factor that increases the predictability of actor behaviour in a policy domain is the functional similarity of some of the actors. In a policy domain it is possible to divide the actors into groups of more or less similar organisations. For example labour organisations constitute a group of organisations that may disagree on several specific issues but usually share a common underlying ideological or political orientation. The same principal can be applied to other groups too. Municipal organisations try to protect the interests of local government against the state. Employer organisations maintain that private sector views should be taken into consideration in the legislative process. The knowledge of these shared interests and beliefs creates predictability in the behaviour of the actors. They know what to expect from other actors. This predictability lowers the transaction costs of information exchange between actors. They know that they are likely to find an ally from the same group of organisations that they themselves belong to. Thus, it is reasonable to assume that organisations belonging to the same group are more likely to have ties between them. Furthermore, one can also hypothesise that that same group membership increases the likelihood of mutuality among actors. This leads to the following two hypothesis:

Hypothesis 4. Membership in a same group of actors increases the likelihood of a tie between a pair of actors.

Hypothesis 5. Membership in a same group of actors increases the likelihood of a mutual tie between a pair of actors

Another institutional factor affecting the structure of the policy network is the “division of labour” i.e. the sub-sector specialisation of actors. Specialisation may lead to the situation where interaction occurs mainly between actors who share similar interest in specific sub-sector of policy domain (Laumann & Knoke 1987, 220). Some actors are mostly interest in one or a few of the specific policy areas (e.g. specialised hospital care or services for the disabled) while some of them are more generally interested in all issues in the field. It is assumed that actors that share similar “interest profiles” are more likely to have more ties between them than actors that are interested in totally different sub-sectors.

Hypothesis 6. *Actors with similar specialised interest profiles are more likely to have ties between them.*

The final hypothesis is linked to the position of actors in the formal institutional decision making structure. It can be assumed that those actors who use public power are willing to accept more incoming relations. Stokman and Zeggelink (1996, 88-89) note that in “a democratic society it is a drawback for a powerful actor to be seen to be unwilling to accept influence from other actors”. This applies especially well to public actors who has to justify their actions publicly and one way to do this is to be (or at least appear to be) open to various influence from interest groups with different backgrounds. One can also assume that public actors have more outgoing ties (e.g. Laumann & Knoke 1987, 220). Public actors are more willing to inform other actors about the decisions and the justification behind their proposals. These assumption lead to the last hypothesis:

Hypothesis 7. *Public actors are more likely to have more incoming and outgoing ties.*

These seven hypotheses will be tested in the empirical part with logistic regression analysis. Before that the empirical data used is introduced.

DESCRIPTION OF DATA

TABLE 1. TYPES OF ORGANISATIONS IN THE ANALYSIS.

Type of organisation	NR. of organisations included
Governmental organisations	4
Municipal organisations	6
Labour organisations	13
Employer associations	2
Parties	8
Social & health care interest groups	12
Total	45

The selection of the actors included in this analysis was made using three different methods: Firstly, by preliminary interviews with informants participating in the policy-making process who were asked to list the important actors in the domain. Secondly, the official records of the Social and Health Committee of the Finnish Parliament were used. From the records (spanning from 1985 to 1994) all the organisations that were used as experts in the Committee hearings were coded in a database. Thirdly, results from an earlier study (Mattila 1994) were used. In this study power reputation indices for the organisations were gathered from 28 experts working in the domain of social and health legislation. Using these three methods a list of 45 most important organisations were identified.

The organisations selected for the analysis were mainly private or semiprivate organisations, but also important governmental organisations such as ministries and central agencies were included. The types of these organisations are listed in Table 1. Because of the fragmented unionisation of the Finnish labour movement the largest group of organisations is the group of labour organisations that are involved in the sector. These unions range from professional unions like the Finnish Medical Association or the Union of Health and Social Care Services TEHY to unions representing workers in more varied settings like the Trade Union for the Municipal Sector. The second largest group of organisations is various interest groups working in the field of social and health services. These organisations are either general organisations like the Finnish Federation for Social Welfare which is an interest organisation aiming to promote and develop various reforms in the Finnish welfare system, or more narrowly focused groups like the Central Union for the Welfare of the Aged.

The research design also included a number of policy events to be selected before interviews were conducted. Altogether 20 events were chosen. These events are legislative proposals given by the government to parliament. The proposals were selected so that they covered various sub-sectors of social and health care reasonably evenly. Furthermore, some kind of social relevance was required so that the proposals were significant new laws or major changes in the old laws.

After the identification of the main organisational actors and the policy events, interviews with representatives from each organisation were conducted in May - July of 1995. The interviewees were selected so that they usually represented managers responsible for the affairs in the social and health services sector. They were first approached with a telephone call and explained the aim of the study and then a date for the interview was decided. Data was collected from 45 interviews altogether, usually lasting from 45 minutes to 1.5 hours. The interviews were primarily based on questionnaires with close-ended multiple-choice questions. Many of the questions asked are reproduced from to a certain extent similar studies by Laumann and Knoke (1987) and Pappi et al. (1995). Among other things, the following questions were asked:

- *Network data:* to which organisations does your organisation give important information on social and health matters; from which organisations does your organisation receive such information? These responds are used to create the empirical network data.
- *Policy preferences:* was your organisation against or for these legislative proposals? How important were these proposals to your organisation? These answers are used to measure the preference similarity.

Because the interviews were targeted so that the respondents were responsible for affairs in the social and health services sectors the reliability of the data should be on a reasonably good level.

Because each of the respondents were asked to indicate from which organisations they receive and to which organisations they send information, the resulting network matrix is asymmetric information exchange matrix. Usually, there are two ways to handle the unconfirmed relations (i.e. actor a says that it send information to actor b but b does not confirm this). One way is to code a 1 to the network matrix if either one of the

respondents indicates a tie. The resulting data is called “weakly symmetrised data” in the following empirical part. The alternative way to code the network matrix is to use only confirmed ties. This data is called “strongly symmetrised data”. Using either way of coding entails a risk of biased data. The weakly symmetrised data may include too much ties resulting from the “social dynamic effect” (where less prominent actors exaggerate the number of ties they have to more prominent actors) (König & Bräuninger 1998, 454). Likewise, the strongly symmetrised data may include too few ties because powerful actor may be tempted to neglect some of ties coming from less powerful actors to boost their own position. Because of this trade-off situation both weakly symmetrised and strongly symmetrised data are used in the empirical analysis to ensure as reliable results as possible.

METHOD AND MEASUREMENT

The formation of policy network is studied with logistic regression analysis where units of analysis are the ordered pairs (dyads) that network actors form. There are 45 actors in the network and consequently the number of observations is 1980 ($=45 \times 44$). The dependent variable the existence of a tie in each dyad. A tie is coded 1 and the lack of a tie is coded 0.

Network data poses problems to the “normal” logistic regression analysis because the assumption of independence of observations is clearly violated. Wasserman and Pattison (1996) propose a remedy to these problems with their p^* model (p -star). The fitting of the p^* model can be done using the logit p^* formulation and assuming that the relational variables are actually statistically independent. In practical terms this means that the model can be fitted via logistic regression using any standard logistic regression model package. The p^* model makes it possible to include in the model both (structural) network variables (e.g. tendency for reciprocity in dyadic relations) and dyad attributes (e.g. the similarity of preferences). A pragmatic guide to fitting these models is given by Crouch and Wasserman (1998).

There are almost infinite number of different network statistics that can be applied with p^* model. Thus, it is not surprising Wasserman and Pattison (1996, 418) caution that the

choice of these statistics should be based on substantive forethought. The inclusion of network statistics (or variables) in this analysis is based on theoretical considerations from the preceding discussion. First, the mutuality (or reciprocity) parameter is included (Hypothesis 2). This variable test for the possible tendency towards mutual relations. This is a dummy variable that has value 1 if the number of mutual ties decreases when the tie is present versus when it is absent (for details see Crouch & Wasserman 1998, 95-96). The second network variable is the hypothesised tendency to have more ties inside a group of similar organisations (hypothesis 4). This is a dummy variable that has value 1 if both organisations in a dyad belong to the same group (the classification is shown in Table 1). A further variable test for the assumption that actors are more likely to have mutual ties inside groups (hypothesis 5). This is yet another dummy variable that is formed in the similar way as the general mutuality variable but applies only for actor belonging in the same groups.

Other variables are dyad attribute variables i.e. they describe the characteristics of the dyad. First one of these is the similarity of policy preferences (hypotheses 1a and 1b). Policy preferences are formed of two components: salience and policy positions (see e.g. Stokman & van Oosten 1994). Accordingly, the measurement of preference similarity requires that both of these components are combined into same measure. Here a modification of the preference similarity measure used by König and Bräuninger (1998) is applied. The basic idea is that the similarity of a pair of actors is the sum of their differences in their policy positions weighted with the salience that the two actors attach to these decisions. The preference similarity is measured as follows:

$$S_{ih} = \frac{1}{20} \sum_j (x_{ij} + x_{hj}) \left(1 - \frac{|y_{ij} - y_{hj}|}{2}\right) d_{hj}$$

where S_{ih} is the similarity between actors i and h , x_{ij} is actors i 's salience in decision j and y_{ij} is i 's policy position with regards to decision j (coded +1 if actor is 'for', -1 if actor is 'against' the decision and 0 for undecided). The salience ranges from no interest (0) to very high salience (0.5). d_{hj} is an indicator variable that has value 0 if both actors i and h are indifferent of the possible outcome. Otherwise, this indicator variable is coded to 1. The idea is that if both of the two actors are indifferent, their similarity with regards to this specific decision is zero (there is no incentive for them to engage in communication). Finally, the total sum is divided by 20 (=number of decisions) to scale the similarity measure to vary between 0 (total dissimilarity) to 1 (total similarity).

The hypothesised effect of status difference on likelihood of a tie is measured as the difference between sender's and receiver's power reputation score (hypothesis 3). The power reputation of an actor is simple the number of "nominations" this actor has received from other actors as being "an especially important" actor in the policy domain. Dividing the raw reputation score by its theoretical maximum (number of organisations) rescales this variable to range from 0 to 1. Thus, the status difference variable ranges from -1 to 1 where positive values indicate that the sender is more powerful than the receiver. The idea is that relation attempts coming from less powerful actors are more easily accepted by the receiver³.

To control for the hypothesised effect of public actors having more incoming and outgoing relations two dummy variables that are coded to 1 when the sender or receiver is a public actor were included in the model (hypothesis 7). Finally the possible effect of actors' specialisation into various social and health care sub-sectors is controlled with a variable that measures the Euclidean distance between every pair of actors (hypothesis 6). In the interviews representants from each organisation estimated their organisation's overall level of interest in eight sub-sectors⁴. These answers were used to calculate the distance. This variable is called "dissimilarity of sub-sector interests profiles" in the following analysis.

EMPIRICAL RESULTS

Empirical analysis starts with a comparison of different models to see how they contribute to the overall goodness of fit of the full model⁵. These results are in Table 2.

³ Also an alternative hypothesis stating that it is the "distance" in status between actors that determines the probability of tie between them. The idea is that actors who are approximately similar in their status engage in relations. This variable was also tested but it was not statistically significant in the analysis.

⁴ These sub-sectors were children's care, services for the elderly, services for the disabled, income support, public health work, specialised hospital care, pharmaceutical services and municipal state grants.

⁵ Crouch and Wasserman (1998, 95) caution that the likelihood ratio statistic does not carry a strict statistical interpretation because the assumption that logits in model are independent of one another is clearly violated. However, this measure can be used as a liberal guide for evaluating model goodness-of-fit.

Model 1 is a basic model that includes only a constant. The likelihood ratio measure is simply the difference in -2log-likelihood values between two successive models. This measure is distributed χ^2_q where q is the difference in number of parameters between the two successive models. The larger the likelihood ratio is the better is the model fit when compared to the previous model.

From Table 2 it is easy to see that the inclusion of the mutuality variable in the model (Model 2) increases the overall fit considerably both in the case of weakly symmetrised and strongly symmetrised data. The drop in log-likelihood is highly significant. In Model 3 the two variables controlling for tendency to have more ties and more mutual ties inside of groups of actors are included and again there is drop in log-likelihood but not as large as between Models 1 and 2. In last step (model 4) all hypothesised (non-network) dyad attribute variables are included. Again the likelihood ratio is significant displaying further increase in the model fit. The general conclusion from Table 2 is that the inclusion of mutuality parameters is necessary to have a correctly specified model. Omitting them would lead to seriously biased results.

TABLE 2. COMPARISON OF DIFFERENT MODELS

	Number of Parameters	Weakly symmetrised data		Strongly symmetrised data	
		-2Log-likelihood	Likelihood ratio	-2Log-likelihood	Likelihood ratio
Model 1. Constant	1	2600.1	-	2213.6	-
Model 2. Constant + Mutuality	2	2119.0	481.1	1442.2	771.4
Model 3. Constant + Mutuality + Groups	4	2070.5	48.5	1385.3	56.9
Model 4. Constant + Mutuality + Groups + Dyad attributes	9	1823.7	246.8	1155.5	229.8

Table 2 does not show the direction or the size of the effects of individual variables on the network formation. Full results from both the weakly symmetrised and the strongly symmetrised data are displayed in Table 3. Several measures of the overall fit of the two logistic regressions are shown. They indicated that the analysis with strongly symmetrised data seems to produce better overall fit. Likelihood ratio index is a measure of fit that (analogously to R^2 measure in standard regression) ranges from 0 to 1 and larger the value the better the model fit (Greene 1993, 651). For strongly symmetrised

data this measure is 0.45 which indicates a fairly good fit. Also the reduction of error statistic and the percentage of cases predicted correctly show that the logistic regressions produced clearly better results than one would anticipate with simple random assignment of cases into modal groups. Thus, the overall conclusion is that the model fit is on such a level that it warrants a closer look at the effects of the independent variables.

When looking at the individual variables, the first observation is that the mutuality variable is clearly significant and also large in magnitude. There seems to be very strong tendency to have reciprocated relations in the policy network. This is strong support for Hypothesis 2. The variable measuring same group membership is not statistically significant indicating that there are no more relations inside groups of actors than across groups. However, there seems to be even more mutuality inside groups. Thus, the institutional hypothesis that a shared group membership increases the likelihood of a tie (Hypothesis 4) is not supported. Nevertheless, when there are ties inside a group they are more likely to be reciprocated than in the network generally lending support to Hypothesis 5.

Also the similarity of preferences seems to increase the probability of a tie between actors. This supports the Hypotheses 1a. Communication in policy networks is all other things being equal more likely to be directed to those actors that already agree with the sender. The idea that actors lobby those actors that have opposite preferences and try to convince them to change their minds seems at least partly exaggerated. However, one must bear in mind that this result does not refute the idea of exchange models where actors with opposite opinions make exchanges to mutually improve their utility. In fact, “lobbying” may be most profitable in a case where two actors agree on most of the issues but disagree on one (or a few) specific decision. The existence of already established ties may facilitate discussion and use of influence on this specific controversial issue.

Of the other dyad attributes, especially the fact that either (or both) of the dyad members are public actors affects the formation of ties. The Hypothesis 7 assumed that all other things being equal public actors have more incoming and outgoing relations than other actors. This hypothesis is only partially upheld. Public actors do have more incoming ties but on the other hand they send less information outward. Public actors

seem to be more targets of relations than sources. This result is probably connected to the status of public actors as exercisers of public power. In a democratic society public decision-makers need to be open for influences coming from variety of sources. Of course, it is totally a different question whether they also put equal weight to all of these influences.

The two remaining variables give inconclusive results. The effect of status difference is statistically significant only in the strongly symmetrised data. Also its sign is correct indicating that actors with more status are more willing to accept information from actors with lower status. However, an actor with higher status is less likely to send information to less powerful receiver. Hence, the policy network seems to be to some extent hierarchically structured.⁶ Also the variable measuring the sub-sectoral specialisation of actors is statistically significant only in the weakly symmetrised data, although its sign is correct also in the strongly symmetrised data. Thus, conclusions regarding Hypotheses 3 and 6 remain inconclusive.

⁶ One must use caution to interpret this effect, because it is only significant in the strongly symmetrised data. It may be that the effect is simply an artefact resulting from the tendency of powerful actors reporting that they receive lots of information from less powerful actors but do not reciprocate these ties i.e. powerful actors emphasise their own position as a “target” of lobbying efforts.

TABLE 3. RESULTS FROM THE LOGISTIC REGRESSION ANALYSIS.

	WEAKLY SYMMETRISED DATA	STRONGLY SYMMETRISED DATA
Constant	-1.04** (0.00)	-3.50** (0.00)
Mutuality	2.66** (0.00)	4.19** (0.00)
Shared group membership	-0.18 (0.53)	0.47 (0.13)
Mutuality inside group	1.08** (0.00)	0.70* (0.12)
Preference similarity	1.69** (0.00)	2.06** (0.00)
Dissimilarity of sub-sector interest profiles	-0.14** (0.01)	-0.04 (0.50)
Status difference	0.20 (0.17)	-0.51** (0.00)
Sender public actor	-1.48** (0.00)	-1.99** (0.00)
Receiver public actor	1.81** (0.00)	2.02** (0.00)
-2log-likelihood	1823.0	1155.5
Likelihood ratio index	0.30	0.48
% of all cases predicted correctly	79.3%	89.3%
Reduction of error ^a	43.4%	56.7%
Number of cases	1980	1980

^aReduction of error (ROE) statistic indicates the extent to which the model improves on prediction that each observation will fall into the modal category of the dependent variable (%ROE = (% correctly classified - % in modal category) / (100% - % in modal category)).

The real magnitudes of the individual effects the independent variables have on the probability of a tie are hard to deduce directly from Table 3. Figure 1 shows a chart in which the effects of preference similarity and some other factors are presented. The curves in the figure are calculated from the model predictions in Table 3. The results with the strongly symmetrised data are used, because it had a better overall fit of the two models. On the horizontal axis of the figure is the preference similarity ranging from 0 (total dissimilarity) to 1 (total similarity). The vertical axis shows the predicted probability of a tie given the level of similarity in policy preferences. Also the mutuality

and the classification of senders and receivers to public and private actors is included in the chart.

[FIGURE 1 APPROXIMATELY HERE]

The two uppermost curves (1 and 2) in Figure 1 show the probability of a tie in the case of mutuality i.e. the case where the tie completes a reciprocal tie between actors. The other two curves (3 and 4) show a situation in which a tie is asymmetric. Curves 1 and 2 are clearly on a higher level indicating the strong overall tendency towards mutuality. In practical terms this means that if actor A sends information to actor B the probability that also B sends information to A is over 60% despite the level of similarity or dissimilarity of A's and B's preferences. On the other hand when one looks at curves 3 and 4 the overall probability of non-reciprocated tie is below 65% even if the actors are totally similar in their policy preferences.

Curve 1 shows the probability of a mutual tie between two public actors. This probability is over 90% through the whole range of preference similarity. The conclusion is that policy preferences do not matter much to the relations between public actors. They are likely to have mutual ties between them anyway. However, the case is different for two private actors (curve 2). If there is already a one-sided tie between them the probability of accepting a tie that completes the mutuality is approximately 65% for actors with total dissimilarity of preferences and over 90% if they agree completely. Thus, in this case the policy preferences are starting clearly to matter. The difference is even bigger when a private actor tries to send asymmetric information to a public actor. The likelihood of public actor to "accept" this tie is less than 20% if actors disagree but over 60% if they have similar preferences. This shows that although public actors are open to information from variety of sources they are much more likely to "listen" information from like-minded private actors. The last curve (4) shows that the probability of non-reciprocated ties between two private actors is low, especially if they are of opposite opinions (less than 5% in the case of total dissimilarity).

CONCLUSIONS

In this paper the formation of policy networks was analysed. The empirical data was collected from the policy domain of Finnish social and health care legislation. Theoretically the policy network was seen as a tool for actors to advance their goals in order to ensure that the policy decisions correspond as closely as possible with actors' own policy preferences. The possession of information has a major role in this process. Public actors need specialised information from private actors in order to make decisions and private actors need to be informed of expected future policy decision as early as possible. This mutual dependence relation between public and private actors guides the structuration of the policy network.

If the policy network is conceptualised as a social system of information (and other resources) exchanges one can expect the network ties to be reciprocal. Indeed, the empirical analysis showed that at least in the Finnish social and health care policy domain the tendency towards mutual network relations is strong. However, there are also other factors with a role in the network formation process. All other things being equal network ties are more likely directed to those actors with similar overall policy preferences. This observation would indicate that the "lobbying" in the policy network is mostly directed to ensuring a large enough coalition of like-minded actors to pass (or to prevent from passing) a legislative proposal. Nevertheless, it is probable that influencing other actors is likely to be most successful if both actors share a common ideological or political orientation (i.e. their similarity of policy preferences is relatively strong) but disagree on a specific issue or issues. Thus, relations in the policy network can be interpreted mainly as attempts to create a reasonable level of trust (or "political capital") among pairs of actors. Once the trust relationship is established influence is used only in specific instances when the two actors disagree.

Because political decision making and the accompanying policy network is about making collectively binding decision, the question of democracy arises almost inevitably. These results show that public actors are relatively willing to accept information from other actors. This openness for a variety of influences is important for a democratic decision making process. However, what is more worrying is that public actors are more open to accept information from actors that share similar views with them and thus "bolstering"

their own position. In a truly democratic process it is not enough that public actors “listen” to various actors, they should also give attention to views that differ from their own opinions.

REFERENCES

- Austen-Smith, David & Wright, John R. (1994): Counteractive Lobbying. *American Journal of Political Science* 38: 25-44.
- Coleman, James S. (1988): Social Capital in the Creation of Human Capital. *American Journal of Sociology* 94: 121-153.
- Crouch, Bradley & Wasserman, Stanley (1998): A Practical Guide to Fitting p* Social Network Models. *Connections* 21: 87-101.
- Dowding, Keith (1995): Model or Metaphor? A Critical Review of the Policy Network Approach. *Political Studies* 18: 136-158.
- Dunleavy, Patrick (1991): *Democracy, Bureaucracy & Public Choice*. Harvester Wheatsheaf, Exeter.
- Greene, William (1993): *Econometric Analysis*. 2nd ed. Macmillan, New York.
- Hojnacki, Marie & Kimball, David C. (1998): Organized Interests and the Decision of Whom to Lobby in Congress. *American Political Science Review* 92: 775-790.
- Hall, Peter A. & Taylor, Rosemary C.R. (1996): Political Science and the Three New Institutionalisms. *Political Studies* XLIV: 936-957.
- König, Thomas & Bräuninger, Thomas (1998): The Formation of Policy Networks. Preferences, Institutions and Actors' Choice of Information and Exchange Relations. *Journal of Theoretical Politics* 10: 445-471.
- Laumann, Edward O. & Knoke, David (1987): *The Organizational State. Social Choice in National Policy Domains*. University of Wisconsin Press, Madison.
- Marsh, David ed. (1998): *Comparing Policy Networks*. Open University Press, Buckingham.
- Mattila, Mikko (1994): Hierarchy or Competition? The Interest Representation Network of Organized Labour in Finnish Social and Health Policy Making. *Acta Sociologica* 37: 371-381.
- Milbrath, Lester W. (1963): *The Washington Lobbyists*. Rand MacNally & Co. Chicago.
- Pappi, Franz Urban & Henning, Christian H.C.A. (1998): Policy Networks: More than a Metaphor? *Journal of Theoretical Politics* 10: 553-575.
- Pappi, Franz Urban & König, Thomas & Knoke, David (1995): *Entscheidungsprozesse in der Arbeits- und Sozialpolitik. Der Zugang der Interessengruppen zum Regierungssystem über Politikfeldnetze: Ein deutsch-amerikanischer Vergleich*. Campus Verlag, Frankfurt.
- Potters, Jan & Sloof, Randolph (1996): Interest Groups: A Survey of Empirical Models that Try to Assess Their Influence. *European Journal of Political Economy* 12: 403-442.
- Rowlinson, Michael (1997): *Organisations and Institutions*. MacMillan, Basingstoke.
- Stevens, Joe B. (1993): *The Economics of Collective Choice*. Westview Press, Boulder.
- Stokman, Frans N. & Berveling, Jaco (1998): Dynamic Modeling of Policy Networks in Amsterdam. *Journal of Theoretical Politics* 10: 577-601.
- Stokman, Frans N. & Zeggelink, Evelien P.H. (1996): Is Politics Power or Policy Oriented? A Comparative Analysis of Dynamic Access Models in Policy Networks. *Journal of Mathematical Sociology* 21: 77-111.

- Stokman, Frans N. & van Oosten, Reinier (1994): The Exchange of Voting Positions: An Object-Oriented Model of Policy Networks. In Bueno de Mesquita, Bruce & Stokman, Frans N. (eds.): *European Community Decision Making. Model Applications and Comparisons*. Yale University Press, New Haven.
- Wasserman, Stanley & Pattison, Philippa (1996): Logit Models and Logistic Regression for Social Networks: I. An Introduction to Markov Graphs and p^* . *Psychometrika* 61: 401-425.

