Research on Welfare State Based on Social Network Analysis

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Abstract

The development of the modern welfare state is not isolated; their welfare policy implementation depends on the advanced economy, extensive coverage, the perfect system, the diversification and welfare system mandatory. Social network analysis is just taking this dependence into account, and develops corresponding method to deal with the relationship between variables. This paper, based on the p* model analysis, takes Sweden and Finland, two typical Nordic welfare state, as the examples, and finds the differences in disease disability insurance, unemployment insurance and etc. To understand these differences is of great importance to think about whether to conduct the reform of the welfare state, and how to combine the concrete national conditions with the reform.

Keywords: Social Network Analysis, p* Model, Sweden, Finland, Welfare State Development

1. Introduction

Social Network Analysis (SNA) is an important branch of modern Western sociology, produced in the 1930s. It has been developing rapidly in the past 20 years, and became the latest methods and technology of social structure study, and a whole new paradigm of social sciences research [1-3].

Social network analysis can be divided into two parts, the concept and model construction and empirical application. If there is no research of the network concept and model, there will not be a solid foundation for the empirical analysis of the social network [4]. And this is also the importance of the research of the network mode. The social network data differs from the usual sociological data. The variables of those traditional statistical methods satisfy the “mutual independence”. Social network analysis, however, is precisely study the relationship data, which is a structure variable, this is what opened up new areas of data analysis and modeling. [5-7]

The statistical model of social network has experienced three developmental periods. The first period (1930s-1970s), graph theory in mathematics was introduced in social science research, and the sociogram was produced, providing a series of concepts used in the study of features of the social network. The second period (1970s-1980s), on the application of statistics and probability theory, researchers studied on the equilibrium and reciprocity, transitivity between relationship, and P1 model was established [8-10]. Social network analysis came into third periods in 1986, based on the P1 model, p* model was established and generalized. Now, the social network has been widely introduced into social development study. [11, 12]

Figure 1. The Development of Social Network Model (According to Scott, 1991:8 modification) [3]
In this paper, by comparing the welfare paradigms of Sweden and Finland, analyses the similarities and differences between them, so as to realize that even in the same welfare state types, under the analysis of p* model, will find differences in extent or the conten, and the formation of different levels in the same type. The comparative analysis will also attempt to let us see the welfare state in its conditions and is how to move forward in the background of information. [13-15]

2. The Convergence of the Welfare Mode in Sweden and Finland

Sweden and Finland are geographically close to each other, and both of them are the “social democracy” welfare states. As the typical example of the social democracy welfare mode, they share some common traits, [16] such as, the comprehensive social policy, broad public interference rights, wider coverage of social needs than other counties, citizens holing the basic right to enjoy the public service, and state country serving the whole population, instead of separated groups, etc.

2.1. The Developed Economy Providing the Welfare with the Solid Foundation

Although the northern European countries were severely hit by the economy crisis in the initial stage of information age in 1990s, the two countries took some measures to reactivate economy. In 1999, the GDP per head in Finland reached $23,096, ranking 15th in the world, and the GDP per head in Sweden reached $22,636, ranking 17th in the world. [17, 18] The growth in the economic strength guaranteed the welfare expense. The marked character in the northern European welfare mode is that the government supplies the citizen with various kinds of income security, like cash and allowance. For example, in 1999, the social insurance in Finland accounted for 53% of total. (see table 1)
plays the dominating role in the citizen’s insurance funds, which is in line with the value concept of ensuring the citizen the safety of basic living and the policy of reallocating the national income. Moreover, undoubtedly, the economy strength of Finland enables the state to raise and operate the funds effectively.

<table>
<thead>
<tr>
<th>Sources of social insurance funds</th>
<th>Paying rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>employer</td>
<td>24%</td>
</tr>
<tr>
<td>employee</td>
<td>13%</td>
</tr>
<tr>
<td>state</td>
<td>53%</td>
</tr>
<tr>
<td>local government</td>
<td>4%</td>
</tr>
<tr>
<td>others</td>
<td>6%</td>
</tr>
</tbody>
</table>

Source: Pocket Statistics 2000, the Social Insurance institution, Finland

2.2. Wide Coverage of Insurance, Comparatively Perfect System

The earliest welfare in northern European countries succeeding to the Poor Law, with the inherent value of “sharing fortunes together and meeting the challenge together”, the allocation of funds displays the cultural tradition of fairness, equity and justice. The equality was reflected by not only the amount of people involved in the insurance, but also the amount of people on employment. Furthermore, the system satisfied the basic need of the people from different levels and different groups. These two countries implemented the multi-dimension social security mode: vertically, it offered the low-income group the ration supplies and the high-income group the security fund relative to income. Horizontally, the welfare securities cover the pension, unemployment allowance, health insurance, education welfare, childbirth welfare, children welfare, and disable people welfare. The specific welfares are given to the particular group of people. And the concerning systems have been gradually amended and perfected. The high welfare system has played an active role, which guaranteed every citizen the materials to live on, effectively eradicated the poverty and inequity, enhanced women’s status and promoted the stability of society. [8]

2.3. Compulsion and Diversity

Be compulsory means that due to the history factor, the state intervened into every welfare domain and the legal system of the welfare security is comparatively perfect. One character of the compulsion in the social security of Sweden and Finland is the high rate of employment in government and other public department, where 90% of the employers are hired by the government. Another character is the high tax, which is the precondition of high welfare. In Finland, the top grade of the capital income tax is 29% and the graduated tax adopted in labor income stipulates that the low-income group is free of tax or pay a little, while the high-income group may pay tax as high as 56%. In Sweden, the capital income tax is 30%, and the labor income is also taxed in accordance with the theory of graduated tax. The average income should be taxed 30 %, and the exceeding part of the high income should be taxed another 25% more, with the total tax more than 70%. [9]

Diversity means the social security funds have been gathered from diversified sources, as showed in Table 1. In addition to 53% of funds from state, the rest of funds come from the enterprises, individuals and local government. For recent years, there appears a tendency that state invites the whole societies to share the responsibility to provide the social service. The competitive system was introduced to reform the former practice that the government exclusively offered the public products and service. In this way, more market can be opened and more social institutions can take part in the social service and compete against the state-owned enterprises. The diversity of the providers of social welfare was achieved.
2.4. Facing the Same Challenge

The welfare state with the characteristics of the high benefit, high income and “from the cradle to grave” is not perfect. It bears some problems and challenges also. Firstly, high welfare brings about the high tax, huge social expense and colossal social burden. The second problem is the pressure from the aging of population, the most important challenge in Finland, which impose the heavy pressure on maintaining the current retirement welfare level and the current medical system as well. This is because the elderly need more medical service. Finland has realized this problem and taken series of countermeasures such as inspiring people to work longer, adjusting pension system and encouraging emigration. But in the following 15-20 years, this might be the long-term challenge; thirdly, to some extent, the generous welfare policy encourages the laziness. The high unemployment subsidy results in jobless’ inactiveness in looking for new job. They can survive with the unemployment subsidy and social relief. The income of the jobless is higher than the young men who work hard. So Sweden and Finland need to reform the social welfare system to find the way out.

3. Analysis of Different Principles Based on P* Model

Markov random is also called p* model. In order to elicit the p * model, you need to give a description of some of the symbols. For a single, binary of the relational data, we defined and gives rise to three new matrixes from the original matrix:

\[ x_{ij} = \{x_{ij}, x_{ij} = 1\} \]  \hspace{1cm} (1)

Formula 1.1, in the relationship between i and j, there must exist a matrix

\[ x_{ij} = \{x_{ij}, x_{ij} = 0\} \]  \hspace{1cm} (2)

Formula 1.2, the relationship between the i and j, the matrix must not exist

\[ x_{ij} = \{x_{ij}, k \neq i, j\} \]  \hspace{1cm} (3)

Equation 1.3, the relationship between i and j, "missing" matrix (called complement matrix) exists

Now we give a general p * log-linear form, and then given its Logit form.

\[ p_r(X = x) = \frac{k(\theta) z(x)}{k(\theta)} \hspace{1cm} (4) \]

The left side of the equation is the probability of a relationship exists between individuals, \( \theta \), on the right side, is the model parameter vector; \( z(x) \) is a series of network statistics vector, which can include individual's attributes parameters and structure parameters of all levels. K is constant, to ensure that the probability distribution is normal. [10]

The difficulty of the above forms lies in the standardization of constant. In order to make the probability can be calculated, must calculated K. For most networks, the calculation of K is very
difficult. This hindered the estimation of the maximum likelihood of the model parameters. However, you can take advantage of duality nature of the random variable $X_i$, and convert the log-linear model to the logit model. First consider the conditions remain unchanged in the $X_i$ complement matrix, the probability relationship existed between $I$ and $j$:

$$p_i \left( X_i = 1 | x_i^j \right) = \frac{\exp \left\{ \theta z \left( x_i^j \right) \right\}}{\exp \left\{ \theta z \left( x_i^j \right) \right\} + \exp \left\{ \theta z \left( x_i^j \right) \right\}}$$  \hspace{1cm} (5)

The advantage of this model lies in getting rid of the dependence on the normalization constant. Then, gives opportunities of "exist " to " does not exist" on the relationship between $I$ and $j$, thus further logit $p^*$ model:

$$\sigma_x = \log \left\{ \frac{p_i \left( x_i = 1 | x_i^j \right)}{p_i \left( x_i = 0 | x_i^j \right)} \right\} = \theta \left[ z \left( x_i^j \right) - z \left( x_i^j \right) \right] = \theta \delta \left( x_i \right)$$  \hspace{1cm} (6)

For concrete the above model, we can first select some important statistics which can affect the ratio of network opportunities. The model depends on the nature of the network structure with prior assumptions. For each assumed the nature of the network structure, the amount of correspondingly network statistics and corresponding explanatory variables in logit model exist. The explanatory variable is the changes of the amount of network statistics when the relationship between $i$ and $j$ changes from exit to not exit. \cite{11}

4. The Results of the Analysis

4.1. Disability and Sickness Allowance

In Sweden and Finland, the disability allowance is important both for the employers’ and employee’s behaviors. But there exist some differences: first, in Sweden, there is the conditioned upper limit in sickness allowance, while in Finland, the allowance can be paid within one year; second, in Sweden, sickness allowance and disability subsidy is given to the insurant equally, while in Finland, the sickness allowance is not given to the insurant unequally, and the it is also true for the disability subsidy.

<table>
<thead>
<tr>
<th>Content</th>
<th>Sweden</th>
<th>Finland</th>
</tr>
</thead>
<tbody>
<tr>
<td>the upper limit of subsidy</td>
<td>yes</td>
<td>no (within one year)</td>
</tr>
<tr>
<td>the standard of subsidy</td>
<td>equality</td>
<td>inequality</td>
</tr>
<tr>
<td>Time limit</td>
<td>no</td>
<td>One year</td>
</tr>
<tr>
<td>Leave system</td>
<td>Not strict</td>
<td>strict</td>
</tr>
</tbody>
</table>

Table 2. The Comparison of the Disability and Illness Subsidy in Finland and Sweden
As seen in figure 5 the percentage of the people receiving allowance in Sweden is higher than that in Finland. In the end of 2002, 10% of the work-age people received the sickness and disability allowance, while only 9% in Finland. The people in illness constantly are more than that in Finland. figure 6. Figure 6 reflects the subsidy was allocated differently according to age in Sweden and Finland. In Sweden, women receiving sickness and disability subsidy are obviously more than men, while in Finland, with the basis of the strict medical security system, there is no clear line. This is because women in Sweden can receive the subsidy when having the part-time job while with the strict standard and historical tradition, women in Finland can receive the subsidy when they work full-time. Therefore, when reforming the welfare system, Sweden emphasizes the sickness allowance more than Finland.

4.2. Employment insurance

Figure 7 and figure 8 show that Sweden and Finland took the different countermeasures to cope the economic crisis in 1990s. In Sweden, the economical crisis and its recovery cause the instability in the number of people in unemployment and in illness, while in Finland, although the number of the people
in unemployment greatly changed, the number of people in illness remained the same. In 1990, the jobless counts for only 1% in Sweden, while 3% in Finland. And after 1990, the percentage of the jobless in Finland is higher than Sweden all the time, with the highest record of 8% in Sweden and 15% in Finland. In Finland, the strict system and policy doesn’t encourage the people to obtain employment flexibly, instead, it encourages the people to develop in the long –term and stably, while in Sweden, the employment system is flexible, which can grant more people the rights to enjoy the unemployment subsidy. So in employment, the big difference in the social security system in Finland and Sweden is the different social protection and stimulation methods. The unemployment phenomenon in Finland is more noticeable. [12]

![Figure 7](image7.png)

**Figure 7.** People receiving disability and sickness allowance and unemployed people in Sweden in 1990-2002 [13] (source: RFV 2002a; RFV 2002b; RFV 2002c; AMS; SCB 1992-2002)

![Figure 8](image8.png)

**Figure 8.** People receiving disability and sickness allowance and unemployed people in Finland in 1990-2002 [14] (source: Statistics from SII (The Social Insurance Institution); SII and Central Pension Security Institute, Ministry of labour and Statistics Finland.)

### 4.3. People’s Attitude towards the Welfare Reform

Many people are still arguing about in what direction the welfare state should develop in the context of the informationization. Should the current welfare system be remained or reformed? The people in Sweden and Finland hold the different attitude. In northern European countries, the welfare systems are firstly negotiated and discussed by the groups standing for different interests and finally affirmed by the laws. Therefore, relatively speaking, the welfare system is widely supported by the people across the counties. According to the poll in Finland, 80% of Finlanders support the current welfare system. But, the Swede seems to have the strong sense of crisis partly because of the culture, and partly because of the different emphasis in the process of development. Swede is not confident about whether
or not maintaining the current welfare system. Although it is hard to fundamentally change the effective and long-used social policy within the short period of time, people in these two countries hold the different attitude towards reforming. Knowing this, we are clear that each county should choose the right way for it to develop the welfare, with the consideration of its own situation, rather than take the same step to reform or rush to reform.

5. Conclusions

To sum up, Sweden and Finland are the typical welfare states in northern Europe, with the characteristics of “social democracy” and are confronted with the similar challenge. However, we used to take it granted to parallel these two counties and emphasize the similarities. It is not wrong to do so, but if we notice only the similarities and ignore the difference, we must fail to see the different features and ways of development of these two countries.

As sated above, the welfare mode of northern European countries are in different levels, with different emphasis. Comparatively, the disability and sickness allowance system in Sweden is not perfect enough, while the unemployment allowance in Finland is week. With this knowing in mind, we can know what kind of problem we should concentrate to solve on the road of developing the welfare system and make some remedy and complement.

6. References
