CHAPTER 4.

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EFFECTS OF NONREDUNDANT FRIENDS ON INCOME CHANGE: A TEST OF THE SOCIAL CAPITAL HYPOTHESIS*

In this chapter, we argue that having a large number of nonredundant friends—that is, friends who do not know each other—is conducive to income attainment. We define friendship patterns using two quantities: the number of all friends and the density of ties among friends. Applying a job-mobility model, based on the utility anticipated from a possible new job, we expect that social capital in the form of sparse networks, also known as networks with structural holes, will positively stimulate income attainment—above and beyond social characteristics traditionally used in status attainment research. We test the null hypothesis that nonredundant ties have no effect on income mobility.

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Friendship Patterns and Individuals' Resources for Income Change: A Theoretical Argument

Friendship is an important asset in the status attainment process because it provides, through its intrinsic relational nature, the opportunity to learn about and access resources that could be instrumental in social mobility, such as finding a (better) job or seeking a promotion. Thus, friends represent a notion of social capital that is explainable in a relatively definite manner: friends are "social," an aspect usually agreed upon, and friends are "capital." With regard to the latter, however, opinions are divided: some researchers forcefully dispute the capital aspect of friendships, while others emphasize the benefits that individuals can gain from them.[1] In this debate, we follow Nan Lin's (2001) position that informal networks produce benefits because they facilitate the flow of information, exert influence on the agents, provide certification of credentials, and reinforce identity and recognition. We argue that friendship networks, through the resources embedded in them, represent an important asset for upward mobility, such that "better connected" individuals will enjoy higher returns. We consider this to be the case particularly in transforming societies, where economic restructuring heightens the dynamics around job loss and job creation. Not only the greater risks but also the greater opportunities that followed the breakdown of communism in Central and Eastern Europe impel people to put all available resources into play to secure their position in the new social structure. From a rational behavior perspective then, using one's networks to seek out and access information becomes an obvious choice.

The following quotation, with reference to individuals' well-being, highlights the distinction between strangers and friends: "If people are strangers to one another, they are indifferent to each other's well-being. Analytically this means that they have independent utility functions. They do not care whether others are better off or not and are indifferent [about] whether their own actions help or harm others. . . . Friends, by contrast, are persons whose utility functions are positively interdependent, which means that they attach some value to each other's well-being. They consider themselves better off when their friends are wealthier, happier, more secure, and more respected." (Uphoff 2000: 222)

[1] In particular, Kenneth Arrow (2000) undermines the usage of the word "capital" together with networks; see also Ostrom (2000) and Dasgupta and Serageldin (2000); for a generally critical assessment of the social capital concept, see Baron, Field, and Schuller (2000), and Field (2003). Nan Lin (2001), in contrast, argues for the capital aspect of networks, given the benefits that individuals gain from their informal ties.

We argue that individuals gain from networking, but recognize that friendship patterns can be characterized in various manners.[2] In this chapter, we focus on two simple properties of friendship networks—the number of all friends and the density of ties among friends—and claim that a specific combination of these variables is crucial for social mobility. Ronald Burt's (2001) concepts of *network constraints* and *structural holes* in networks are key to understanding why only in some particular combination will the number of all friends and the density of ties among friends influence the social attainment process.

The essence of the notion of network constraints is that an individual is involved in a network in which his or her contacts are redundant (Burt 1992). Cohesive contacts and structurally equivalent contacts have this property. In contrast, the weaker connections have holes, conceptualized as a lack of ties between subsets of actors. For an individual whose relationships span the holes, this type of network creates a competitive advantage. This distinction is important because "closed networks—more specifically, networks of densely interconnected contacts—are systematically associated with substandard performance. For individuals and groups, networks that span structural holes are associated with creativity and innovation, positive evaluations, early promotion, high compensation and profits" (Burt 2001: 45).

Following this rationale, we advance the hypothesis that social capital in the form of sparse networks, also known as networks with structural holes (Burt 2001), positively stimulates upward mobility—above and beyond social characteristics traditionally used in status attainment research. The main theoretical argument pertains to the opportunity structure. If a person's friends do not know each other, that person can benefit from connecting them. By providing a bridge for otherwise nonconnected clusters, a liaison has access to new information, influence, social credentials, and identity reinforcement. All these factors, in turn, have the potential to influence upward mobility (for specific arguments pertaining to the link between sparse networks and mobility, see Granovetter 1973; Polodny and Baron 1997).

Within a social capital framework, we can treat the friendship ties of a person's network as an investment. For simplicity, assume that for a given person the cost of ties with his or her friends is the same as the cost of ties among his or her friends. In terms of systemic properties, under this assumption, having a small number of well-connected friends costs the same as having a large number of weakly connected friends.

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[2] The network approach provides a rich set of tools for analyzing friendship patterns (cf., Marsden 1990; Scott 1991; and Wasserman and Faust 1994).

Nonetheless, this raises a question regarding which of the two situations brings higher returns. Coleman's (1988, 1990) approach of network closure answers this question differently from Burt's (1992, 2001) approach of structural holes.[3] Without considering the former invalid or less useful in general, in studying social mobility processes we opt for the structural-holes approach because nonredundant ties seem especially important in obtaining new information, exercising stronger influence, attaining diversified social acceptance, or achieving stronger identity reinforcement.[4]

The literature reveals that social ties increase salary negotiation outcomes (Seidel, Polzer, and Stewart 2000). Weak ties and structural holes in the career advice network are related to social resources, which in turn influence salary (Seibert, Kraimer, and Liden 2001). Burt (2005) shows how sparse networks facilitate managers' advancement. Moreover, the importance of heterogeneity in networks for positive mobility outcomes is stressed (Dominguez and Watkins 2003).

In addition, recent studies in the economic literature indicate that appropriate networks of people represent a major facilitator in starting and maintaining a private business (Johannisson 2000; Renzulli, Aldrich, and Moody 2000). Drawing from these studies, we consider the research expectation pertaining to the positive effect of structural holes on individuals' further income attainment in the framework of a general model of upward mobility, which we discuss in the next section.

A General Model of Upward Mobility

In the context of career choice, our model postulates that an individual expects to gain some utility from income derived from a given job. In practical terms, this utility may be equated with the value of the goods and services that the individual can buy with his or her job income. Generally, we can expect the following form of the relationship:

$$U_j = F(V_j) \tag{1}$$

[3] Recently Burt (2005) has tried to bridge the two approaches insofar as brokerage across structural holes is the source of added value while close relationships can be important to realizing this value.

[4] We believe that social closure may operate strongly in realms of social life other than social mobility—especially in situations where interpersonal trust is a substitute for more formalized rules of the game.

where U_j represents the utility anticipated from the jth job; V_j represents the income anticipated from the jth job; and $j = 1, ..., M$ represents the different jobs available. An individual "surveys" the different jobs that are available and subsequently selects the job that promises to maximize utility in the near future. These jobs might be either employment situations or the creation of one's own business.

Setting the cost of changing jobs at zero, individuals who are maximizing their expected utility will switch from one job to another if the expected utility of the latter is greater than the expected utility of the former. Consequently, we assume a simple model of the individual's behavior:

$$D_i = AV_i + BN_i + CX_i + e_i \quad (2)$$

for persons $i = 1, \ldots, K$. In this model D_i is the *expected utility differential* between the utility of being in a position at time $t - 1$, and in the position at time t; V_i denotes the *anticipated income from a new job*; N_i denotes a vector of variables related to the network of person i, while X_i denotes a vector of specific variables characterizing person i; A, B, and C are weights for V, N, and X types of variables, respectively; and e_i is a disturbance term that includes unobserved variables. Before explaining the meaning of our independent variables, we should note some formal properties of the proposed model.

The individual will choose to change jobs if $D_i > 0$. Although we cannot observe D_i, we have information on individuals who at time $t - 1$ occupied a considerably lower position than at time t. We apply the following approach to defining D_i in relation to relative income gains.

We assume that D_i, as the expected utility differential, is proportional to relative income gains. In this case, we equate the anticipated income from a new job, V_i, with actual earnings—that is, $V_i(t)$—and introduce a new variable $V_i(t - 1)$, past earnings. Thus, we assume that movement on the income scale approximates D_i.

We discuss the independent variables as the analyses progress. We focus on specific friendship patterns and present our models in most parsimonious ways. The results presented in this chapter illustrate general theses rather than elaborate extensively on income attainment.

Data and Measurement

Analyses in this chapter are based solely on the POLPAN panel participants. Moreover, the sample has been restricted to respondents who were working in 1998 and in 2003. This resulted in a sample size $n = 584$ observations.

Friendship patterns were among the important topics of the POLPAN questionnaire. One set of questions aimed at recovering some important features of *ego-centered networks*. Each respondent, termed *ego*, reported on *alters* and on the ties among them. In Table 4.1, we provide basic information on network variables used in this chapter. The first variable refers to the *number of friends*. In all waves of the POLPAN study the respondents were asked: "How many friends do you have?" In the 1988 wave, this question was asked after several specific items pertaining to the characteristics of the best friend. The context of the question on number of friends clearly suggested close friends. In other waves there was no such suggestion—the definition of friends was left to the respondent. This difference in context might explain the relatively small mean number of friends in 1988 in comparison with the analogous numbers for 1993, 1998, and 2003. For the end of the communist era the mean number of friends is 10.1, while in the period of 1993–2003 it varies from 16.2 to 19.4. It should be noted that for all waves the standard deviation is close to the mean, sometimes exceeding it, indicating the significant variability of this network characteristic.

The second variable is the *density of ties among friends*. Respondents provided information about how many of their friends knew each other, using precategorized answers: "all friends know each other," "some friends know each other," "only a few friends know each other," and "almost nobody knows each other." The first impression is that the questionnaire item "How many of your friends know each other?" pertains to the actors, that is, nodes or vertices in graphs. However, the phrase "know each other" refers to the relations—represented by lines or edges in graphs. Thus, is this question about actors or relations?

An example illustrates the problem of interpretation. Assume that networks A and B have the same number of friends, let us say twenty. In network A one friend knows (reciprocally) the remaining nineteen friends; in network B four friends know each other. Obviously, the answer to the question in terms of actors (the number for A is smaller than the number for B) is different from the answer in terms of relations (the number for A is larger than the number for B). Because of this inconsistency, we investigated how respondents understood the question. From intensive interviews it became apparent that when respondents estimated the number of friends that "know each other" they thought about the number of relations rather than the number of actors.

Table 4.1. Basic Information on Friendship Patterns, 1988–2003

	Years			
Variables	1988	1993	1998	2003
Number of friends (N)				
Mean	10.1	18.0	19.4	16.2
Standard deviation	13.1	19.0	21.1	17.2
Density of ties (K)				
Mean	0.76	—[a]	0.72	0.71
Standard deviation	0.29	—[a]	0.24	0.26
Average network size (S)				
$S = 1/2[(N \times N) - N]$[b]	46	153	178	123
Average number of existing ties (T)				
$T = K \times S$[b]	35	—[a]	128	87
Average number of structural holes (H)				
$H = S - T$[b]	11	—[a]	50	36
Number of cases	1,886	2,247	2,128	1,693

[a] Data unavailable in that the item on density of ties among friends was not included in the 1993 wave of POLPAN.
[b] Formulas are for an average individual.

We assigned arbitrary proportions to respondents' answers: 1.000 for "all friends know each other," 0.666 for "some friends know each other," 0.333 for "a few friends know each other," and 0.165 for "almost nobody knows each other."[5] We assume that these numbers reflect the density of ties among respondents' friends expressed as a proportion of all possible ties for a given set of friends. The density calculated in this manner is stable over time, ranging on average between 0.71 and 0.76, with the highest number in 1988.

Actually, there is a weak inverse relationship between number of friends and density of ties. This is in agreement with the notion that if one has many friends, then they are likely to be recruited from different milieus and therefore some of them would not know each other. In the case of our data the number of friends explains around 5 percent of the variance in network density.

[5] For precategorized answers about the density of friendship ties, we experimented with sets of monotonically decreasing numbers for these categories. In particular, assigning equal intervals for answers (e.g., 0.8, 0.6, 0.4, and 0.2) does not alter the results. The results appear to be robust, indicating that our conclusions hold.

In Table 4.1 we provide the average *network size*, understood as the number of all possible ties among friends. It is assumed that each friend could be connected with any other, and no friend has a tie with himself or herself. An interaction of density of ties among friends and the network size provides the number of already established ties, which are considered *network constraints*.

The last variable in Table 4.1 is central to this chapter. It is the number of ties that the respondent could exploit as a broker. It is calculated by subtracting the number of network constraints from the number of all ties that might connect friends. For short, we call it *the number of structural holes*, or *the number of potential bridges*. Assuming that a person's friends also have friends, this concept corresponds to Burt's (1992) original concept of structural holes since holes are among clusters.

Following the network analysis literature on the advantages that result from linking otherwise disconnected clusters, we argue that a large number of potential bridges in a person's network should have various benefits for him or her, including economic well-being. We test the null hypothesis that these ties have no effect on income mobility.

Figure 4.1. Example of Existing Ties and Structural Holes

	A	B	C	D	E	F	G	H	I	J
A	—	0	0	0	0	0	0	0	0	0
B		—	1	1	1	1	1	1	1	1
C			—	0	1	1	1	0	0	1
D				—	0	1	0	1	1	1
E					—	1	0	1	1	1
F						—	1	1	1	1
G							—	1	1	1
H								—	1	1
I									—	1
J										—

A, …, J friends of a person X.
1—existing ties (network constraints), 0—nonexisting ties (structural holes).

Before we turn to this test, it is helpful to explain the relationship between the number of friends and the density of ties among friends, on the one hand, and the number of structural holes, on the other. Analytically, a product of the number of friends and the density of ties among friends defines all actually existing ties—network constraints. For a given person, subtracting this

number from the number of all possible ties among this person's friends results in the number of structural holes of that person. For example, as shown in Figure 4.1, for ten friends of person *X* we have forty-five possible ties [(10 × 10) – 10] / 2; for this number, the actual density of 0.66 results in fifteen ties for which a given person could be a broker. Of course, in Figure 4.1 structural holes are assigned arbitrarily; based on the available information, we do not know between which friends there is a lack of ties. However, the number of calculated potential ties is the correct one.[6]

Friends and Income Mobility, 1998–2003

The number of potential network ties proves to be a powerful variable in explaining income mobility. We measured income mobility as the difference between respondents' earnings in 2003 and their earnings in 1998. For each year, earnings are expressed on the same scale, the percentage of the mean value. Thus, the mobility metric is the percentage shift.

As the results presented in Table 4.2 indicate, the null hypothesis that the number of structural holes in one's network of friends has no effect on income attainment is rejected. The relationship between the two variables is linear and positive. Clearly, the larger the number of potential bridges the greater the income mobility. Although the relationship is not very strong in terms of correlation, it is substantively and statistically significant. To our knowledge this is the first evidence that structural holes induce income mobility.

Table 4.2. Regression of the Five-Year Change in Earnings on the Number of Potential Bridges (structural holes), Controlling for Other Variables, for 1998–2003

Independent variables	B	SE	Beta	*t*	*p*
	Model for 1998–2003[a]				
Number of structural holes	0.010	0.003	0.128	3.146	0.002
Education—years of schooling	0.825	0.323	0.107	2.556	0.011
Gender—male = 1	–3.847	2.208	–0.073	–1.742	0.082
Age (years)	0.854	0.755	0.310	1.102	0.271
Age squared / 10	–1.285	0.844	–0.428	–1.522	0.129
Constant	–25.455	17.873		–1.424	0.155

[a] $N = 584$; $F = 5.973$ with $df = 5$; $p = 0.000$; $R^2 = 0.041$.

[6] Our measure of numbers of holes is a recalibrated measure of the network effective size (Burt 1992).

In this model, gender and age are treated as control variables. The coefficient for gender is significant, one-tailed, and negative. This result can be explained in the following way: during the initial phase of systemic transformation women were particularly hardly hit by economic restructuring (Domański 1990; Pollert 2003), and their possibility for upward mobility was very much suppressed. The second phase of transition in Poland was characterized by increased economic stability, and under the new circumstances, women were able to take advantage of economic opportunities. However, the negative effect of being male on income change needs to be interpreted in the context of prior structural location. With regard to age, the two coefficients for age (age in years and age in years squared) have very high standard errors and we cannot assume that they differ from 0.

Conclusion and Discussion

In this chapter, we argued that having a large number of nonredundant friends—that is, friends who do not know each other—is conducive to income change. We defined friendship patterns using two quantities: the number of all friends and the density of ties among friends. On the basis of survey data gathered in Poland, we tested the null hypotheses that nonredundant friendship ties have no effect on change in earnings during a five-year period, 1998–2003. Empirical findings demonstrate that the null hypothesis needs to be rejected. A large number of potential bridges between friends is conducive to income attainment, indicating that sparse networks, also known as networks with structural holes (Burt 2001), positively stimulate income mobility, net of social characteristics traditionally used in status attainment research.

A possible criticism of this chapter involves the method of data collection typical for network analysis (Marsden 1990). Our data may be biased because of inaccuracies in respondents' reports. In particular, it is plausible that prosperous people report more friends and weaker connections among them than people who are not upwardly mobile. Moreover, some personality traits could cause both biased reporting and successful behavior on the labor market, producing spurious correlations. To examine empirical evidence for and against these arguments one would need new data and new analysis. Our existing data reveal some interesting psychological correlates of reporting large numbers of friends and weak interfriend connections, but do not allow for causal interpretation.

This latter, however, is definitely, at the center of our chapter. The panel data we employ in the analyses allow us to introduce the variables in

a sequence adequate for establishing causal ordering, and we argue that having a large number of structural holes in one's network of friends leads to positive outcomes. Nonetheless, the problem of endogenous features of the models presented here should not be overlooked. Future research should examine the extent to which the process of upward mobility creates special friendship patterns. We do not exclude the possibility that the relationship between the two structural variables is reciprocal.