Social Networks and Labour Market Outcomes: The Non-Monetary Benefits of Social Capital

Axel Franzen and Dominik Hangartner

We contrast Granovetter's hypothesis (Granovetter, M. (1973). American Journal of Sociology, **78**, 1360–1380; Granovetter, M. (1974). Getting a Job: A Study of Contacts and Careers. University of Chicago Press; Granovetter, M. (1995). Getting a Job: A Study of Contacts and Careers. University of Chicago Press) that social networks help individuals to find better-paid jobs with a new model, which predicts that networks are helpful with respect to non-pecuniary job characteristics but not concerning the monetary pay-offs. Following Montgomery (Montgomery, J. D. (1992) American Sociological Review, **57**, 586–596), our model is a combination of classical job-search theory and the network hypothesis. First, concerning the monetary consequences, we test our hypotheses empirically by analysing the 2001 International Social Survey Programme on social relations and support systems. We show that using social ties is a common job-search strategy in all countries. However, using social networks does not increase the monetary pay-off. Second, we use a sample of 8,000 Swiss university graduates who recently entered the labour market to show that informal job-search channels are beneficial with respect to important non-monetary job characteristics. Thus, graduates who received their jobs through social contacts tended to get jobs that are linked to their educational degree and offer better career perspectives. Furthermore, using personal networks is related to lower search costs. Therefore, the results suggest overall that networks improve the non-pecuniary characteristics but not the monetary pay-offs.

Introduction

Since Granovetter's (1974) *Getting a Job*, the question of how individuals find jobs and what effect social contacts have on the labour market has emerged to be one of the most interesting and controversial research questions in labour market research. Granovetter's (1973, 1974) central ideas can be summarized as three hypotheses.

First, he proposed that many employees find their jobs through social contacts and not only through formal channels such as direct applications, employment agencies, or job advertisements. Second, according to Granovetter, the use of social networks allows job seekers to gather better information about the availability of jobs as well as job characteristics. This informational advantage should enable job seekers to select better

jobs. Hence a job found through the network should result in a better match, that is, higher wages and higher job satisfaction. Third, information about the labour market can best be generated through weak ties. The advantage of weak ties as opposed to strong ties lies in the fact that the information in close-friendship circles is rather redundant and similar and that more new information is generated by networks whose members are dispersed and dissimilar.

Granovetter's first proposition has been confirmed in many studies. Most empirical research shows that a substantial proportion of individuals find their jobs via their contacts with friends, relatives, colleagues, or acquaintances. However, hypotheses two and three are controversial. Extensive reviews by Granovetter (1995) himself as well as others (Lin, 1999) suggest that most empirical studies were not able to confirm the wage bonus. This conclusion is nurtured by recent results presented by Mouw (2003) who concludes that contacts have no causal effect on labour market outcomes.

These results raise the question whether the social embeddedness of individuals has any consequences at all on labour market outcomes. We argue that they have consequences and will present theoretical arguments as well as empirical evidence, which support the notion that contacts matter. Jobs found through social contacts have non-monetary benefits, particularly a better match between employees' education and the job requirements. Furthermore, social networks reduce the search costs of finding jobs.

The remainder of the article is organized into four sections. *Are Granovetter's Hypotheses Refuted?* starts with a brief review of existing findings, namely that most studies show that networks do not matter with respect to earnings. We then refer to job-search theory and to Montgomery (1992) in order to explain these non-findings. Moreover, we formulate an extension of his model and propose that job offers obtained through social networks are superior with respect to non-monetary characteristics. *The ISSP 2001* describes our first data source and the results obtained. We analyse the ISSP 2001 data and show that jobs found through social contacts are not superior with respect to payment. In *The Swiss Graduate Survey*, we refer to another data source, a survey of university graduates who entered the labour market in 2001 to show that search strategies are related to the non-monetary job characteristics. In particular, we evaluate the outcomes of different job-search strategies with respect to earnings, educational adequacy, and search costs. Finally, the last section concludes and discusses our findings and shortcomings.

Are Granovetter's Hypotheses Refuted?

Granovetter's (1974) original study is based on a sample of 282 professionals, technical, and managerial workers[1] living in Newton, Massachusetts, who were interviewed by him and partly surveyed by written questionnaires in 1969. Fifty-six per cent reported that they found their jobs through social contacts. This result has been reconfirmed repeatedly in many studies in the United States (U.S. Department of Labor, 1975; Corcoran *et al.*, 1980; Marsden and Campbell, 1990; Staiger, 1990) as well as in Great Britain, Japan, and The Netherlands (see Afterword in Granovetter, 1995). Some differences between studies appear from the fact that sometimes only active job seekers are taken into account. However, there is evidence that social contacts also play an important part in those matches in which respondents received an offer from an employer without prior search. These respondents are often excluded from the analyses, a procedure that results in some biases as Granovetter convincingly argues. Studies that also pay attention to the 'non-seekers' show that in about 80 per cent of these cases, a friend or relative was involved. Hence, Granovetter's proposal that networks are involved in about half of all job matches seems to be beyond doubt.

Granovetter's second and third hypotheses, that jobs found through social contacts are better paid and more satisfying for employees and that weak ties are better than strong ties, are very controversial. Granovetter (1974) found that 54 per cent of those who found their jobs through contacts reported to be very satisfied with their work compared to 30 per cent who found their work through formal methods. Similarly, a larger proportion (ten percentage points) of the former is found in the higher income group. However, these findings were only replicated by a few studies (Corcoran *et al.*, 1980; Staiger, 1990; Wegener 1991; Coverdill, 1994; Jann, 2003), while many others could not detect a wage differential (Lin *et al.*, 1981; Bridges and Villemez, 1986; Marsden and Hurlbert, 1988; Preisendörfer and Voss, 1988; Lin, 1999; Mau and Kopischke, 2001). Some studies (De Graaf and Flap, 1988; Flap and Boxmann, 2001) even find a negative wage effect for social contacts. Further evidence against Granovetter's hypothesis has also been presented recently by Lin (1999), and Mouw (2003) who concludes 'I believe the weight of anecdotal evidence und intuition suggests that being "well connected" is an advantage in the labor market (...). At the moment,

intuition und anecdote aside, we have little empirical evidence that contacts matter'.

However, this conclusion holds only with respect to the direct effect, that is, for wages of those jobs that were offered with the help of the social network. The literature on social resources (see Lin, 1999) also demonstrated that individuals in high job positions are found to have a large social network as well. Hence, the two findings that on the one hand high levels of social capital are correlated with high-income jobs, but that using the network on the other hand does not affect the wage level constitute a paradox. Mouw (2003) suspects that high job positions and size (and quality) of social networks are merely associated and that both depend on unobserved individual characteristics. Hence, he speaks of spurious social capital. However, an alternative interpretation is given by Montgomery (1992) who offers an interesting combination of economic job-search theory and Granovetter's network hypothesis.

The difficulty of choosing a job is that job offers do not arrive simultaneously but sequentially in time (e. g. Lippman and McCall, 1976). Thus, a job seeker is confronted with the following decision problem: either to accept an offer and stop searching or to reject the offer and continue searching. Since searching is costly (direct costs and opportunity costs), a worker who maximizes lifetime earnings will accept an offer of wage w_R (or higher) if this offer exceeds his value of leisure and if he does not expect to find a higher wage offer that compensates for the continued search costs (see Mortensen, 1986). w_R is called the reservation wage. Obviously, the higher an individual's reservation wage the longer his or her search time until he or she finds a wage offer that matches the reservation wage. Moreover, the reservation wage depends (among other things) on the arrival rate of job offers. The more offers an individual expects the higher is his or her reservation wage and the higher the probability of finding a better-paid job. Following Montgomery (1992), one way to interpret the effect of social capital on wages is via the reservation wage. Individuals with larger networks (or alternatively a higher proportion of weak ties) may expect to receive more job offers, which increases the reservation wage. This indirect effect of social networks on earnings is in line with empirical findings reported by Lin (1999) and Mouw (2003).[2]

Networks not only can affect the reservation wage but can also have direct implication via the job-search strategies. This is Granovetter's crucial hypothesis who does not consider the indirect effect via reservation wages. Montgomery (1992) interprets Granovetter in the way that weak ties elicit more job offers than strong ties and shows that the expected wage from weak-tie offers may be, counter-intuitively, lower than the wage expected from strong-tie offers. We extend Montgomery's argument by applying them to the difference between formal and informal search channels instead of the difference between weak and strong ties. First, we assume that most individuals use both formal (direct applications, answering job advertisements, placing an advertisement, using a labour office) and informal (social contacts) search channels. Second, we assume that the wage distributions of both channels are identical. Thus, at least in principle, most available jobs can be found by various search channels and are not exclusively restricted to one specific search method. Third, we assume that the offer rate of informal channels is higher than the one from formal search methods. This assumption basically follows Granovetter who asserts that information about new job opportunities is particularly efficiently (fast) transported through network ties as compared with formal search modes. In order to receive a formal offer, a job seeker first has to find a job advertisement and has to issue a formal application. This procedure takes more effort and is more costly than receiving the information from a network tie and applying with the help of the tie. Thus, we assume that almost every person receives one or more offers through the social network channel and only fewer offers through the formal channel. The problem now is that most of the time the number and quality of job offers are unobserved. Instead what researchers (and we) observe is only the accepted job and the search channel through which it was found. Thus, it could be the case that an individual who accepted an offer received through the formal channel passed on other offers from the social network. Hence, we infer that a seeker who accepted a formal offer had on average more offers to choose from and was therefore better able to select the best offer. Those who accepted an offer from the social network are on average likely to have had fewer offers to choose from, which results in a lower expected wage.

Wages are of course not the only characteristics of jobs. This notion is well known and accepted by many researchers. Particularly, we assume that in addition to wages, workers consider how well they fit into a job in terms of their interests and qualifications. One indicator concerning the quality of the match is how well a worker's education and qualifications fit the requirements of the job. Let us call this the educational adequacy (a) of a job. We propose that among the jobs offered that are above the reservation wage, workers choose the one that best meets their qualifications.

While we assume that the wage distributions of the formal and the informal offer distributions are identical, the job adequacy distributions of both search channels are not. Our fourth and new assumption is that the adequacy distribution of jobs offered through social networks should be stochastically superior concerning the first and third moment of the distribution (see Figure 1). More specifically, jobs from the formal offer distribution might be right skewed with respect to adequacy, because on average more jobs have low than high adequacy. However, the offer distribution from the social network should be skewed to the left side, since networks offer more adequate than inadequate jobs. The rationale behind this proposition is that the network is rather well informed about the job seekers' interest and qualifications and selects jobs with higher adequacy. Alternatively, it could be argued that networks are usually homogenous, which might also result in more adequate job offers. Of course, information about the educational requirements of jobs is usually also transferred via formal channels. However, it seems reasonable to assume that the information available through networks is more detailed and more specific than information received through formal channels.

With respect to wages, jobs that are offered through the network should not be superior to the formal channel-offer distribution. When members of a network transmit information about jobs to a seeker, they are probably not very well informed about the wage of the job nor do they know a worker's reservation wage. Wages are often the result of negotiations between employer and employee. However, the network is usually very well informed about the qualification and education of a worker, and it filters jobs in such a way that it offers what it believes to be a good match. Hence, our expectation is that jobs do not differ in wages depending on whether they were found with the help of the network or not.
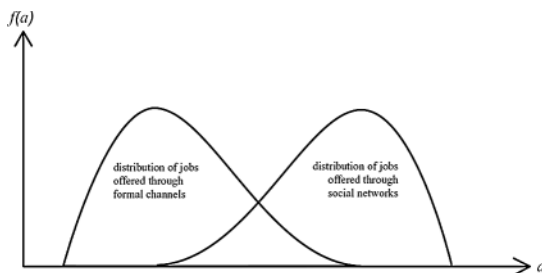
However, they differ in educational adequacy in such a way that workers who found their job through the network should have jobs that match their qualification better. Note that our argument that jobs found through the network have higher adequacy but no wage advantage implies that adequacy and wages are not positively correlated (*ceteris paribus*, particularly human capital). There is often a trade-off between initial wages when entering the labour market and adequacy. However, this counter-intuitive argument is in line with human capital theory (Becker, 1964; see also Acemoglu and Pischke, 1999). Thus, jobs that offer general on-the-job training should have relative low initial payment and steeper earning profiles since employees have to compensate employers for their training. Hence, the degree of general training and job adequacy should be positively correlated. As will be shown below, the first implication (the non-positive correlation between wages and adequacy) can be tested with our data. However, we have no data to test the second implication, that is, the positive correlation between adequacy and general training.

The ISSP 2001

The ISSP 2001 was conducted on social relations and support systems in 28 countries.[3] Next to some socio-demographic information (earnings, education, and work experience), the surveys contain questions about the number of respondents' friends and how they found their present jobs. Thus, participants were asked to report the number of close friends at the work place and in their neighbourhood, and other close friends. Furthermore, they were asked 'Please indicate how you first found out about work at your present employer'. We grouped the answers into *strong ties* if participants named family members, other relatives, or close friends as contacts. Answers were grouped into the category *weak ties* if respondents said acquaintance. Table 1 displays the percentages of strong- and weak-network contacts as well as the number of valid cases for the participating nations of the ISSP 2001. Overall, we can observe a substantial degree of variance. Proportions of network contacts are comparatively high in the southern European countries (Italy, Hungary, and Cyprus) as well in some developing countries such as the Philippines and Brazil. Relatively low proportions are observable in the Scandinavian countries. The United States, Japan, and Germany are in the middle. With few exceptions (most eastern European countries) and contrary to expectation, the proportion of strong-tie contacts is

Figure 1 Job offer distributions from networks and formal channels. *Note: a* refers to job adequacy.

Table 1 Job placement via social networks

	Strong ties (%)	Weak ties (%)	All (%)	*N*
Finland	16.47	9.30	25.77	1269
Austria	26.35	NA	26.35	850
Denmark	16.68	11.38	28.06	1151
Norway	17.36	10.98	28.34	1457
Australia	20.33	10.58	30.91	1087
Great Britain	22.69	8.37	31.06	824
New Zealand	20.65	10.43	31.08	930
Northern Ireland	22.34	10.15	32.49	1025
Germany	21.17	12.68	33.85	1167
Canada	24.29	11.99	36.28	984
France	26.64	10.71	37.35	1186
Switzerland	21.68	17.42	39.10	752
Japan	25.95	15.34	41.29	1102
Poland	19.21	24.90	44.11	1036
USA	30.83	13.46	44.29	1077
Latvia	21.06	25.00	46.06	940
Slovenia	31.66	14.99	46.65	894
Czech Republic	22.69	24.38	47.07	1124
Spain	33.77	14.04	47.81	1140
Israel	37.13	11.88	49.01	1061
Russia	27.71	22.62	50.33	1061
Italy	32.51	18.53	51.04	966
Hungary	22.94	29.94	52.88	1286
Cyprus	44.27	17.51	61.78	811
Brazil	55.21	12.36	67.57	1699
Chile	44.50	23.71	68.21	1164
Philippines	69.39	13.46	82.85	1039

NA, not available.
Data source: ISSP 2001, own calculations.

larger than that of weak-tie contacts. However, this might be partly due to our coding of *other relatives* into the strong-tie category. Nonetheless, the descriptive impression presented in Table 1 confirms Granovetter's notion that on average a substantial amount of jobs are found through network contacts.

Next we analyse whether network size and job placement via social contacts are related to wages. Such analyses are presented in Table 2. The first model is a standard Mincer income OLS-regression model controlling for country-specific differences by country dummies. In order to compare the hourly incomes, we transformed the national wages into purchasing power parity (PPP) units. Since the transition from the original currencies into PPP units can be done much more reliably for OECD members, we restrict our analysis to these. Furthermore, some countries (e.g. Austria, Norway) have missing data with respect to some central variables (income, education, or network indicators).

We had to drop both countries from our analysis so that we end up with 15 remaining nations. The estimated coefficient for education in model 1 of Table 2 tells us that every additional year in education is rewarded on average by 7.9 per cent ((exp(0.076)–1) × 100) increase in hourly wages. Also, the other results, the positive but concave effect for work experience, confirm the well-known results of the standard income regressions. Next, in model 2, we introduce the network indicators and two dummy variables if respondents found their jobs through strong or weak ties as compared with formal methods (reference group). First, the more friends respondents have at work and the more other friends they report to have, the higher their hourly wage.

Thus, these results are in line with the hypothesis of Montgomery (1992) that those with more contacts on average expect more job offers, which raises their reservation wage and finally also their realized wage. Counter-intuitive is the negative effect of the number of friends in

Table 2 Extended Mincer-type wage regressions

	Model 1	Model 2	Model 3
Education	0.076** (0.000)	0.075** (0.000)	0.075** (0.000)
Experience	0.025** (0.000)	0.025** (0.000)	0.025** (0.000)
$(\text{Experience})^2/100$	−0.034** (0.000)	−0.034** (0.000)	−0.034** (0.000)
Sex (man = 1)	0.230** (0.000)	0.229** (0.000)	0.229** (0.000)
Marriage	0.127** (0.000)	0.129** (0.000)	0.129** (0.006)
Friends (other)		0.003** (0.001)	0.003* (0.022)
Friends (work)		0.012** (0.000)	0.012** (0.005)
Friends (neighbourhood)		−0.007** (0.002)	−0.007* (0.034)
Job (strong)		−0.036* (0.028)	−0.036* (0.017)
Job (weak)		−0.036* (0.049)	−0.037 (0.058)
GDP growth 95–01			0.162* (0.030)
GDP p.c.			0.052** (0.010)
LFP rate			0.051** (0.005)
Constant	1.178** (0.000)	1.179** (0.000)	0.846** (0.000)
Observations	7749	7749	7749
Adjusted R^2	0.604	0.606	
R^2 level 1			0.311
R^2 level 2	~	~	0.078
Countries	15	15	15

P-values in parentheses, computed with Huber–White-corrected standard errors.
*Significant at 0.05; **significant at 0.01.
~Under control of country dummies.
Models 1 and 2 are estimated by ordinary least squares, model 3 is estimated by maximum likelihood. In all three models, the following OECD countries are included: Australia, Canada, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Japan, New Zealand, Poland, Spain, Switzerland, and the United States.

the neighbourhood. However, more wealthy people might live further apart from each other in suburban neighbourhoods, which may reduce their neighbourhood contacts. The data also confirm the second part of Montgomery's (1992) argument, namely that respondents who accepted a job offered via a strong tie have on average a lower wage. This negative effect can also be observed for weak ties confirming our extension of Montgomery's (1992) model. Thus, respondents who accepted an offer through the network (weak or strong) either had a lower search time or did not receive as many formal job offers. Both causes lead to a lower number of total job offers, which has the consequence of reducing the realized wage. Finally, model 3 in Table 2 is a multilevel model in which the country dummies are replaced by country-specific covariates that should affect wages, such as GDP per capita, GDP growth, and the labour force participation of women (LFB). All three coefficients are positive and statistically significantly related to wages. We also tested two cross-level effects between GDP growth and placements via strong and weak ties. Both interaction effects are not significantly related to wages. Overall, the ISSP 2001 data

confirm former empirical findings (Mouw, 2003) that job placement through social contacts is not positively associated with higher wages. Furthermore, our analysis of the data confirms a hypothesis by Montgomery (1992) that the size of the social network is positively related to wages.

The Swiss Graduate Survey

Our second data source is a survey of all Swiss university graduates, which has been conducted biannually by the Swiss statistical office since 1977. This data is collected from university graduates one year after graduation via written questionnaires and is concerned with respondents' entrance (first job) into the labour market. We analyse the newest available data of respondents who graduated in 2000.[4] In this year, 12,447 graduates left the universities. They were contacted about 12 months later via a written questionnaire. A total of 8,151 graduates returned the questionnaire, constituting a response rate of 65 per cent.[5]

The data have some advantages that make them particularly suitable for an analysis of our propositions.

Since all respondents are labour market entrances, they are at the start of their career, and the sample is homogeneous with respect to their working biography. Many other investigations into the effects of network contacts on job characteristics, such as our own of the ISSP, use cross-sectional data from the entire working population and have to control for career-specific effects, such as the last position before the present job was entered, the segment of the labour market, the level of on-the-job training, whether respondents changed employer, and so forth. Such heterogeneity of individual working biographies makes it more difficult to isolate the effect of network contacts on the job in question. Also, Granovetter (1995: 154) discusses that past positions may have been found by network contacts but not necessarily the present one. However, since the past position influences the characteristics of the present job, networks can have an indirect effect on present positions. This indirect effect of networks is usually not taken into account so that the network effect is underestimated.

Another advantage of our data is that the survey took place 12 months or less (the median is 3 months) after respondents entered the labour market. Hence, biases due to memory problems that are usually present in retrospective questioning should be less of a problem in this data. Information about job searching can be inaccurate in representative surveys that contain a cross-section of the entire labour force for those respondents who have not experienced a job shift for a longer time period.

A further difficulty of analysing the effects of social capital is the dependence of the labour market on economic cycles. Granovetter (1995) supposes that strong ties are more important during economic recessions than weak ties because strong ties feel more obliged to help their friends or relatives in difficult times. Another possibility mentioned in Granovetter (1995) is that employers have more bargaining power during economic recessions than workers and may determine the job match weakening the influence of networks. Theories of labour market segmentation suggest that 'social closure' is stronger during recessive cycles, which would increase the importance of personal contacts (Preisendörfer and Voss, 1988). Some evidence of the dependence between the economic situation and the shape of the labour market was presented by Osberg (1993) with Canadian data. He found that more unemployed used social networks during times of higher unemployment. However, at the same time, the proportion who found a job through the network decreased, possibly because a larger proportion of the network was also unemployed.

The results we present here concern the sample that entered the labour market in the second half of 2000 (which was a prosperous economic year in Switzerland). However, we also analysed the interviews from 1995, 1997, and 1999 of graduates entering the labour market during more recessive periods. We did not find substantial differences, which suggests that our results do not seem to depend on the specific economic situation in 2000.

The survey contains information on respondents' search strategies, search costs, labour market outcome, and educational adequacy. Each of these variables is measured by several indicators. The labour market outcome is measured by wages and additionally by the occupational position (with managing responsibilities as opposed to without). Search costs are measured by the search time, the number of job applications, and the number of job interviews, and by a subjective measure of how difficult respondents perceived the job search to have been. Educational adequacy is measured by four indicators, most importantly by the specificity of the degree that the employer required. Additionally, the questionnaire contains a few subjective measures, that is, whether respondents believe that the job is a long-term engagement, which offers career perspectives, the extent to which respondents can use their ability, how they perceive the possibility to exert influence, and how well the wages correspond to their qualifications. Hence, the data allow for an analysis of the effects of search strategies on the labour market outcome, the search costs, and the non-monetary job qualities.

For the analysis of wages, we restrict the analysis to those graduates who received their first university degree in 2000 and had entered the labour market by the time of the interview.[6] The questionnaire distinguishes 12 different job-search strategies: for example, graduates may have applied directly, asked different employment agencies (official employment office or one from the university), responded to job advertisements in the media, or placed an advertisement themselves. Graduates may also have contacted friends, relatives, or colleagues or have looked for jobs by asking professors and former employers they know personally.

In 2001, 25.2 per cent of the graduates reported that they received a job offer without prior search. The most common job-search strategy among the graduates in Switzerland is direct application (50.2 per cent) followed by formal search strategies (46.9 per cent) and the help of personal networks (40.5 per cent).[7] More important than the question which strategies were employed is the question which ones were successful. Figure 2 shows that about a quarter of the graduates found a job through
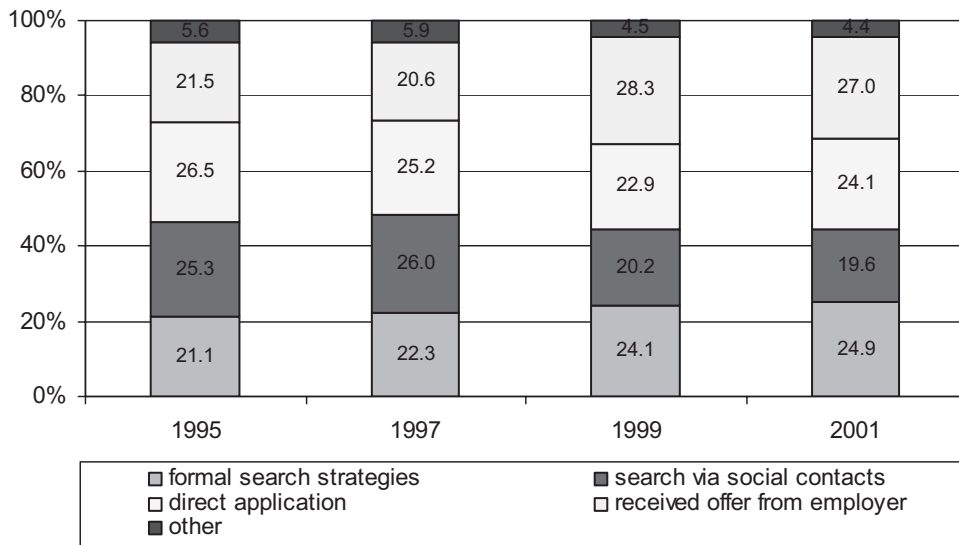
Figure 2 Proportion of successful search strategies, 1995–2001.

each of the search channels, that is, formal, informal, and direct applications. Moreover, these proportions remain fairly constant over time. Comparing 1995 with 1999, the importance of social contacts decreased a little. However, in 2001, the search via social networks was the decisive route into the labour market for 19.6 per cent of the graduates. Calculating the success ratio by dividing the number of individuals who found a job by the number who used a given strategy reveals no substantial differences (direct application 44.8 per cent, formal search 49.5 per cent, and social contacts 45.3 per cent). Summarizing the first part of our descriptive analysis again confirms Granovetter's (1974, 1995) first hypothesis. A substantial proportion of individuals find their jobs due to the help of their personal networks. This result replicates that of studies conducted in the United States (Young, 1974; Sagen et al., 1999).

The interesting question is whether job matches through social networks are beneficial as compared with other strategies. Table 3 shows the results of an OLS regression of the logarithm of the hourly wages. Presented are the effects of different search strategies controlling for other mostly socio-demographic influences such as respondents' age, sex, or nationality. The analysis also controls for the effects of different universities and subjects of study. However, we do not show the latter effects to keep the table readable. As is usual, wages for subjects such as

business administration or economics are higher than the ones from social sciences, history, or language. Furthermore, the highest wages are observed among graduates from universities in the German-speaking part as compared with the French and Italian part, which depends on the shape of the regional labour markets and has little to do with the quality of the universities.[8]

First of all, the results reveal that searching is rewarded. Respondents who searched for a job receive a 4 per cent wage bonus as compared with those who accepted an offer by an employer without prior search (see Table 3, model 1). However, wages do not increase with increasing search time. This finding is not consistent with job-search theory, which assumes that individuals with a higher reservation wage should search longer and realize a higher wage. However, job-search theory makes the (highly unrealistic) assumption that job searchers know the offer distribution (see Mortensen, 1986). The zero effect could be the result of the mixture of two types of individuals in our sample: those who search and find the better-paid jobs and those whose reservation wage is higher than what the market is willing to offer and who, therefore, have difficulties finding a job that meets their reservation wage. More important with respect to our hypothesis is the negative effect on wages if the job was found with the help of social networks. Jobs that were found through social contacts pay

Table 3 The influence of social networks on hourly wages, occupational position, and educational adequacy

	Model 1 Income regression	Model 2 Managing position	Model 3 Educational adequacy
Constant	3.30** (0.07)	−5.91** (0.78)	—
Search (0 = no, 1 = yes)	0.04** (0.02)	−0.14 (0.18)	0.16** (0.07)
Duration of search (in months)	−0.001 (0.002)	−0.01 (0.02)	0.004 (0.01)
Social network contact (0 = no, 1 = yes)	−0.05** (0.01)	−0.14 (0.15)	0.20** (0.06)
Direct application (0 = no, 1 = yes)	−0.01 (0.01)	−0.40** (0.15)	0.14** (0.05)
Number of different search strategies (if searched)	−0.003 (0.004)	−0.04 (0.04)	−0.07** (0.02)
Adequacy (0 = no specific degree, 1 = specific degree)	−0.05** (0.01)	—	—
Gender (0 = male, 1 = female)	−0.04** (0.01)	−0.14 (0.12)	0.03 (0.04)
Age (in years)	0.02** (0.002)	0.16** (0.02)	−0.01 (0.01)
Nationality (0 = Swiss, 1 = non-Swiss)	−0.001 (0.02)	0.32 (0.18)	0.05 (0.07)
Work experience (0 = no, 1 = yes)	0.03** (0.01)	0.18 (0.11)	0.13** (0.05)
Children (0 = none, 1 = one or more)	0.07** (0.02)	−0.11 (0.24)	−0.02 (0.10)
Education of father (in years)	−0.001 (0.001)	0.001 (0.02)	0.01 (0.01)
Education of mother (in years)	−0.003 (0.002)	−0.001 (0.02)	−0.03** (0.01)
Part-time employed (0 = no, 1 = yes)	0.02 (0.01)	−0.53** (0.13)	0.38** (0l.05)
N	3120	3556	3501
Adjusted R^2/pseudo R^2	0.15	0.07	0.10

*Significant at the 5% level; **significant at the 1% level.

Depicted in model 1 are the unstandardized coefficients from OLS regression. Numbers in parenthesis denote the standard errors of the estimates.

Model 1 is an OLS regression with the logarithm of hourly wages as the dependent variable. The model controls for university dummies and for subject dummies, which are not displayed due to place restrictions. The university dummies consist of Basel, Berne, Fribourg, Geneva, Lausanne, Neuchâtel, St. Gallen, Ticino, ETH Zurich, EPF Lausanne with the University of Zurich as the reference. Subjects are distinguished into Theology, Language, History, Social Sciences, Law, Natural Science, Medicine, and technical subjects. Economics is used as the reference category.

Model 2 is a logistic regression. The dependent variable is coded as 1, if graduates received a job with management responsibilities, and 0 otherwise.

Model 3 is an ordered-probit model. The dependent variable is the educational adequacy coded as 1 if employer did not require any university degree, 2 with only a general university degree, 3 if a university degree from similar subjects were also accepted, and 4 if the employer required a specific degree.

on average 5 per cent less as compared with jobs found through formal search channels. Thus, also our results show that searching via social contacts has no monetary advantage (Mouw, 2003) and, moreover, might even have negative effects (see De Graaf and Flap, 1988; Flap and Boxmann, 2001).[9]

Also, the number of different strategies people use to find a job does not affect wages. This finding is also inconsistent with job-search theory. A more intensive search should increase the number of job offers, which in turn should increase the chance of finding a better-paid job. However, this again might be due to the mixture of two groups of individuals, namely, those who find well-paid jobs by searching and those whose chances are worse to begin with and who are therefore forced to use all channels.

In addition to the effects of search strategies, model 1 also controls for educational adequacy and certain socio-demographic effects. First, as hypothesized, job adequacy is negatively correlated with wages. Hence,

jobs for which the employer demands a specific degree as compared with more general university degrees are on average paid 5 per cent less. The results also show that women have a 4 per cent wage disadvantage in the labour market.[10] Children increase the wage by 7 per cent, which can be explained with social benefit payments employers have to make. A small positive effect of 2 per cent can also be observed for the graduates' age and a 3 per cent income advantage for work experience acquired during university enrolment. The education of a respondent's father or mother does not affect a graduate's wage level at labour market entrance. Hourly wages are also not affected if respondents work only part-time as compared with full-time.

In addition to wages, we also analysed the occupational position at which graduates entered the labour market. The questionnaire contains a dichotomous variable that indicates whether individuals received a position with or without management responsibilities. Assuming that management positions have more occupational

prestige, it is expected that offers from the network should lead to management positions more often. Since we deal with a dichotomous variable, model 2 in Table 3 shows the logistic-regression coefficients. However, only direct applications lead to jobs that start in a managing position significantly less often. Apart from this, two further significant effects emerge from the model: managing positions are more often obtained by older graduates and less often open for part-time employment. Thus, model 2 in Table 3 echoes the results obtained for the wages regression.

Finally, in model 3 in Table 3, we attend to the question whether network contacts increase the probability of receiving a job with higher educational adequacy. Graduates were asked whether their current employer required no university degree at all, only a general degree, one from a related subject, or a specific university degree. We assume that jobs that do not require a university degree or only an unspecific one are less adequate for graduates and less preferred by them. Since the dependent variable has four categories that can be ordered, model 3 in Table 3 presents the results of an ordered-probit model. The results suggest that search strategies matter. Respondents who searched (coefficient of 0.16), received a job through social networks (coefficient of 0.20), or applied directly (coefficient of 0.14) report to have jobs that more often required an adequate degree as compared with respondents who found jobs through formal search channels.[11] This result confirms our hypothesis that friends, relatives, and colleagues seem to pay attention to a graduate's educational qualifications when informing about job opportunities.

The adequacy of jobs that were found through social networks is also better in the respondents' own perception. The participants of the survey were asked whether they view their current job as a temporary means to earn money or as a long-term career investment, as well as how well they are able to exert influence and apply their abilities on the job. Clearly, jobs that are more adequate to individuals' interest and education should be viewed more often as long-term investments and should offer better opportunities for personal influence and ability. The results of the analysis are displayed in Table 4. The logistic regression (model 1 in Table 4) shows that graduates who found their job through the network (as well as direct applicants) have a higher chance of finding jobs with a long-term career perspective (the odds increase by $\exp(0.43) = 1.54$). Models 2 and 3 contain the results of exerting influence and using their abilities at the work place. In both models, the non-standardized OLS-regression coefficients are significantly positive (0.17 and 0.07 on a

0.05 and 0.10 significance level), indicating that jobs found via the network are perceived to offer more opportunities for personal influence and ability.[12]

Network jobs, however, are negatively associated with the perceived adequacy of payment (model 4 in Table 4). Thus, this finding corresponds rather well to the comparatively lower hourly wages reported in Table 3. Also, noteworthy are the positive effects of the work experience graduates acquired during their study. Graduates who worked while still enrolled at the university have a better chance of finding a job that is related to their subject of study. Obviously, this work experience also increases graduates' knowledge of where to find adequate jobs.

Finally, we will take a look at the search costs. If Granovetter's (1974, 1995) and our models are correct, graduates who use networks for job searching should receive job offers more often and sooner. Thus, the search time should be reduced for all those who use their networks. This hypothesis is supported by our analysis of the search time. We analysed the search time until respondents found a job by event-history analysis (more particularly we use a Weibull model), which takes right-censored cases (respondents who were still looking for a job at the time of the interview) into account. Model 1 in Table 5 shows the effects on the hazard rate of leaving the stage of search and entering employment. Thus, graduates using the network have an increased hazard rate of 17 per cent $((\exp(0.16)-1) \times 100)$ as opposed to those who use formal job-search strategies. Moreover, we analysed two more indicators of the search costs, namely, the number of applications and the number of job interviews individuals went through before accepting a job. Since these variables are count data, we analyse them using negative-binomial models (see Cameron and Trivedi, 1998).[13] The estimation results suggest that graduates who used the network wrote 11 per cent fewer applications and went through 11 per cent fewer job interviews. Thus, models 2 and 3 confirm the results we obtained through our analysis of the search time.

Our fourth model (in Table 5) contains the analysis of respondents' perception whether they encountered difficulty during the job search. This indicator also reflects the results we already obtained from models 1 through 3 of Table 5. Respondents who used the network have a lower chance (the odds are reduced by 0.66) to report difficulties. Models 1 through 4 in Table 5 also control for a number of socio-demographic effects that are possibly associated with the search costs. A few systematic and crucial results emerge from the control variables. Thus, women and academics who are looking for part-time

Table 4 Social networks and subjective indicators of job adequacy

	Model 1 Career investment	Model 2 Apply ability	Model 3 Exert influence	Model 4 Perceived payment
Constant	3.04** (0.97)	2.46** (0.21)	2.72** (0.22)	2.36** (0.26)
Search (0 = no, 1 = yes)	0.33 (0.22)	0.03 (0.05)	−0.04 (0.05)	0.18** (0.06)
Search duration (in months)	−0.01** (0.003)	−0.001 (0.001)	0.00 (0.001)	−0.01 (0.01)
Social contacts (0 = no, 1 = yes)	0.43** (0.17)	0.17** (0.04)	0.07† (0.04)	−0.16** (0.05)
Direct application (0 = no, 1 = yes)	0.57** (0.19)	0.10** (0.04)	−0.06 (0.04)	−0.02 (0.04)
Number of search strategies	−0.19** (0.04)	−0.05** (0.01)	−0.04** (0.01)	−0.01 (0.01)
Gender (0 = male, 1 = female)	0.04 (0.14)	−0.01 (0.03)	−0.02 (0.03)	0.04 (0.04)
Age (in years)	−0.004 (0.03)	−0.001 (0.01)	−0.02* (0.01)	−0.01 (0.01)
Nationality (0 = Swiss, non-Swiss = 1)	0.59* (0.29)	0.04 (0.05)	−0.07 (0.05)	0.01 (0.06)
Work experience (0 = no, 1 = yes)	0.18 (0.15)	0.11** (0.03)	0.10** (0.03)	0.09* (0.04)
Children (0 = no, 1 = yes)	0.27 (0.31)	0.05 (0.06)	0.03 (0.07)	0.25** (0.08)
Education of father (in years)	0.01 (0.02)	0.00 (0.00)	0.00 (0.01)	0.00 (0.01)
Education of mother (in years)	−0.04 (0.03)	0.00 (0.01)	−0.01 (0.01)	0.00 (0.01)
Part-time employed (0 = no, 1 = yes)	−0.54** (0.14)	0.07* (0.03)	0.03 (0.03)	−0.24** (0.04)
N	3513	3557	3522	3527
Pseudo R^2/adjusted R^2	0.08	0.05	0.03	0.05

†Significant at the 10% level; *significant at the 5% level; **significant at the 1% level.

Numbers in parenthesis denote the standard errors. The regressions contain but do not show dummies for universities and dummies for the subject of study.

Model 1 is a logistic regression. The dependent variable is coded with 1 = long-term employment intention with possibility of upward mobility and 0 = short-term employment with no upward mobility.

Model 2 is an OLS regression. The dependent variable measures respondents' rating of the adequacy of job concerning the possibility of using their knowledge and ability.

Model 3 is an OLS regression. The dependent variable is the perceived adequacy concerning the possibility of having an impact on the job.

Model 4 is an OLS regression; the dependent variable contains the rating of the perceived adequacy of payment. Same results were obtained for models 2 through 4 if an ordered-probit was applied instead of an OLS regression.

employment seem to encounter higher search costs. Obviously, the number of search strategies respondents used increases the number of applications and job interviews.

Summary and Discussion

This article tries to demonstrate that social networks matter for finding a job. First, we test some implications of Granovetter's (1974, 1995) and Montgomery's (1992) hypotheses by analysing the ISSP 2001 data. Three basic findings emerge from this analysis. First, a substantial proportion of individuals report that they found their job through network contacts. Second, individuals with a larger number of friends (particularly friends at the work place) indeed report to have a higher income. The effect can be explained by Montgomery's (1992) assumption that a larger network increases respondents' reservation wage and consequentially their income. Third, however, jobs that are directly found with the help of a network tie are not better paid. This result,

which may at first seem counter-intuitive, might stem from the fact that those who accepted an offer through network contacts could have overall received less offers or, alternatively, had a shorter search time, which consequentially results in a lower realized wage.

Furthermore, we extended Montgomery's (1992) model by assuming that the distribution of job offers from networks is superior to the distribution of job offers due to formal channels with respect to educational adequacy. We tested our hypotheses by using the Swiss Graduate Survey. Overall, four results emerge from this analysis: First, also in this survey, a substantial proportion of individuals report that they found their first job by network contacts. Second, we analysed the hourly wages and were not able to discover a wage bonus for individuals who had accepted an offer through the network. More specifically, controlling for the search time those who accepted an offer through the network had even a monetary disadvantage. Thus, our analysis confirms other findings (De Graaf and Flap, 1988; Flap and Boxmann, 2001).

Table 5 Search strategies and the cost of job search

	Model 1 Duration of search		Model 2 Number of applications		Model 3 Number of job interviews		Model 4 Difficulties in job search	
Constant	0.45	(0.28)	0.66**	(0.24)	0.37	(0.26)	−4.29**	(0.84)
Social contacts (0/1)	0.16**	(0.04)	−0.11**	(0.04)	−0.11**	(0.05)	−0.42**	(0.14)
Direct application (0/1)	0.02	(0.04)	0.70**	(0.04)	0.44**	(0.04)	0.03	(0.15)
Number of strategies	−0.18**	(0.01)	0.53**	(0.01)	0.41**	(0.01)	0.82**	(0.04)
Gender (0/1)	0.02	(0.04)	0.10**	(0.04)	−0.18**	(0.04)	0.38**	(0.13)
Age (in years)	−0.01	(0.01)	0.00	(0.01)	−0.01	(0.01)	−0.01	(0.03)
Nationality (0/1)	−0.06	(0.06)	0.02	(0.06)	0.01	(0.06)	0.21	(0.20)
Work experience (0/1)	0.03	(0.04)	−0.07*	(0.04)	−0.13**	(0.04)	−0.25†	(0.14)
Children (0/1)	−0.07	(0.07)	0.05	(0.07)	−0.20**	(0.08)	0.33	(0.23)
Education of father	0.001	(0.01)	−0.00	(0.01)	0.01	(0.01)	0.02	(0.02)
Education of mother	0.0021	(0.01)	−0.02*	(0.01)	−0.01	(0.01)	−0.06*	(0.03)
Part-time employed (0/1)	−0.27**	(0.04)	−0.12**	(0.04)	−0.02**	(0.04)	0.26*	(0.13)
N	3511		3819		3834		3801	
Chi-square/pseudo R^2	433.81		0.09		0.09		0.26	

†Significant at the 10% level; *significant at the 5% level; **significant at the 1% level.
Numbers in brackets denote the standard errors. The regressions contain but do not show dummies for universities and dummies for the subject of study.
Model 1 is a Weibull model of the hazard rate to enter employment.
Models 2 and 3 are negative-binomial models with the number of applications and the number of job interviews as dependent variables.
Model 4 is a logistic regression analysis, the dependent variable indicating whether respondents report difficulties in finding a job.

Third, our results suggest that jobs found with the help of friends, colleagues, or relatives have a higher educational adequacy. Thus, employers more often require a specific university degree for jobs that are found by network contacts. Moreover, respondents more often view jobs found over the network as long-term engagements compatible with their career plans versus short-term employment that has little or no relation to career plans. The notion that educational job adequacy is higher is also supported by respondents' evaluation of job characteristics. Thus, network jobs are more often perceived as offering the opportunity to exert influence and apply ability.

Fourth, the analyses show that searching via the network saves search costs. Hence, respondents who found their job through the network did so faster, applied less often, and went through a lower number of job interviews. Therefore, searching via the network has some monetary benefits regarding individual's lifetime earnings. However, these benefits are small (on average search time is about two weeks shorter) given an individual's lifetime of work.

As discussed above, labour market outcomes may depend on the business cycle. Some research suggests that networks become more important during recessions since the market is more closed towards new

entrances. Other results suggest that the influence of networks should decrease, since during recessions a larger proportion of an individual's network should be unemployed as well. In order to exclude the possibility that our results depend on the good health of the economy in 2000, we also analysed the data of graduates who entered the job market during recessive times in 1995, 1997, and 1999. However, we obtained almost identical results from the other three data sets as well.

To summarize, the acceptance of a job offer through the network seems to have non-monetary advantages for labour market entrances. The help of the network increases the chance of an appropriate match concerning respondents' education and the type of work. At the same time, our results replicate that finding a job through the network has no monetary benefit. Thus, the results support Montgomery's (1992) model as well as our extension of it that the distribution of job offers from the network is stochastically dominant with respect to educational adequacy. Our results also suggest that graduates face a trade-off between adequacy and wages. Higher adequacy is associated with lower entrance wages. Employers who look for specific university degrees seem to provide general on-the-job training more often, which is associated with a steeper wage–age profile.

Both of our data sources have particular advantages but also some disadvantages. Thus, our analysis of the Graduate Survey does not allow for a test of the weak-tie versus strong-tie hypothesis. The Graduate Survey has no information concerning what type of contacts are best with respect to finding adequate jobs. Furthermore, it contains no information on the size or other features of individuals' networks. We can also not exclude the possibility that individuals using the network for their job search have some unobserved characteristics that determine the outcome of the search instead of the used search strategy. However, the data at hand do not support this possibility. Thus, none of the graduates reported to have only used a single strategy, and estimating one's chance to use the network was only significantly related to the number of strategies used, as well as to gender (men use networks more often than women). However, overall the McFadden R^2 of a probit model was too low (0.04) to corroborate the obtained estimate into a treatment-effect model (Greene, 2000: 933). Thus, clarification of the problem of possible unobserved heterogeneity as well as the question to which extent the results can be generalized to a larger proportion of the labour market has to be left to further research. However, we believe that the analyses presented here draw attention to the non-monetary benefit of social networks on the labour market.

Notes

1. Most of the people interviewed did have a university degree.
2. Note that Mouw (2003) calls this 'spurious social capital'. This term implies that it cannot be interpreted causally. However, the argument via the reservation wage implies a causal explanation. It does not need to be either the one or the other but may well be a mixture of a spurious relation and a causal effect via wage expectations. Networks could also increase the reservation wage by increasing the value of leisure.
3. The data are available from the Swiss Information and Data Archive Services for the Social Sciences (SIDOS) in Neuchâtel (http://www.sidos.ch).
4. Switzerland has 12 universities, 6 in the German-speaking part (Universities of Basel, Berne, St. Gallen, Lucerne, Zurich, and the Swiss Federal Institute of Technology in Zurich), 5 in the French-speaking part (Universities of Fribourg, Geneva, Lausanne, Neuchâtel, and the Swiss Federal Institute of Technology in Lausanne), and 1 in the Italian-speaking part (University of Ticino).

5. The data are available from the Swiss Statistical Office in Neuchâtel, Switzerland (http://www.admin.bfs.ch).
6. This excludes graduates who received a second degree (e.g. a dissertation) and those 4.1 per cent graduates who were still looking for a job at the time of the interviews in Spring 2001.
7. These proportions correspond closely to those reported by Young (1974), which are based on a survey of 750,000 university graduates in the United States. For a similar result concerning direct application, see also Ports (1993).
8. The detailed results of universities and subjects' hourly wages can be obtained from the authors.
9. Note that the estimated effect of the use of social networks on wage might be biased if those who found their jobs via social networks are different in some characteristics not controlled for in the regression equation from individuals who did not use social contacts. One possible procedure to correct for this possible bias is the estimation of a switching regression model (Wooldridge, 2002). However, in our case, the estimation of the selection equation (probit model) did not show any fundamental differences between the two groups. The detailed results can be obtained from the authors.
10. If women have a lower labour market participation than men, the analysis needs a correction (Heckit corrections; Heckman, 1979) to obtain an unbiased estimator. However, female participation in our sample is about 90 per cent, so that such a correction is of lesser concern here.
11. The calculation of the exact change in probabilities would require further transformations of the coefficient, which we do not report here.
12. The extent to which respondents believe that they can apply their ability or exert influence on the job was measured on a four-point-rating scale varying from very much to not at all. Our OLS regression assumes interval measurement. However, the results remain robust even if we apply ordered-probit models to those variables as well.
13. Usually count data require the analysis via Poisson regressions. In our case, the so-called assumption of equidispersion is not fulfilled so that we apply the negative-binomial model. The assumption of equidispersion is fulfilled if $\alpha = \mathrm{Var}(y|x)/\mathrm{E}(y|x)$ does not significantly deviate from 1. In model 2 $\alpha = 1.5$ and in model 3 $\alpha = 1.2$ indicating over-dispersion. However, the estimation results do not differ substantially between the Poisson model and the negative-binomial model used here.

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Authors' Addresses

Axel Franzen (to whom correspondence should be addressed), Institute of Sociology, RWTH Aachen, Eilfschornsteinstr. 7, D-52062 Aachen, Germany. Email: axel.franzen@soziologie.rwth-aachen.de.

Dominik Hangartner, Institute of Sociology, University of Bern, Lerchenweg 36, CH-3012 Bern, Switzerland. Email: hangartner@soz.unibe.ch

Appendix 1

Table A1 Measurement of variables, means, and proportions of the Swiss Graduate Survey

	Minimum	Maximum	Mean
Job found via social network	0	1	0.20
Search for a job	0	1	0.75
Job found via direct application	0	1	0.24
Number of used search strategies	0	10	2.15
University of Basel	0	1	0.07
University of Berne	0	1	0.12
University of Fribourg	0	1	0.07
University of Geneva	0	1	0.11
University of Lausanne	0	1	0.09
University of Neuchâtel	0	1	0.04
University of St. Gallen	0	1	0.05
University of Ticino	0	1	0.01
Swiss Institute of Technology in Zurich	0	1	0.17
Swiss Institute of Technology in Lausanne	0	1	0.06
University of Zurich	0	1	0.21
Theology	0	1	0.01
Language	0	1	0.11
History	0	1	0.09
Social Sciences	0	1	0.15
Other subjects of study	0	1	0.03
Law	0	1	0.08
Natural Science	0	1	0.12
Medicine	0	1	0.08
Technical subjects	0	1	0.15
Economics	0	1	0.18
Gender (1 = female)	0	1	0.45
Age (in years)	22	55	28.57
Nationality (1 = foreigner)	0	1	0.08
Work participation during study	0	1	0.28
Children (1 = yes)	0	1	0.08
Education of father	9	17.5	13.18
Education of mother	9	17.5	11.55
Part-time employed	0	1	0.36
Search duration (in months)	0	18	2.68
Position with managing responsibilities	0	1	0.17
Adequacy of university degree concerning job	1	4	2.86
Long-term employment vs. short-term job	0	1	0.89
Opportunity to apply abilities	0	3	2.30
Opportunity to exert influence	0	3	2.19

Table A1 *(continued)*

	Minimum	Maximum	Mean
Perception of payment	0	3	2.00
Number of applications	0	50	8.54
Number of job interviews	0	40	2.84
Perception of difficulties during the search	0	1	0.16
Logarithm of hourly wage	2.82	4.38	3.68

The category History also includes Philosophy, Archaeology, History of Art, Ethnology, Music, Theatre, and Film. Social Sciences include Psychology, Pedagogic, Sociology, Social Work, Political Science, and Media Science. Other subjects include Ecology, Sport, and Military Science. Natural Sciences include Mathematics, Astronomy, Physics, Computer Science, Geography, Chemistry, and Biology. Economics also includes Business Administration.