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Productivity Effects of Overeducation in West Germany: First Results

By Felix Büchel*

Summary

Several firm-related productivity dimensions of employees are analyzed using GSOEP data. The assumption is that overeducated employees are less productive than their correctly allocated colleagues. However, the results obtained here contradict the few available empirical findings, all based on data from the United States. When comparing employees working in jobs with similar demand levels (and this approach seems to be the only useful one), overqualified employees show better health status, longer firm tenure, and higher rates of participation in on-the-job training than their correctly allocated colleagues. With respect to job satisfaction and absenteeism, no significant differences could be found. The overall results make hiring overqualified persons understandable and could, therefore, explain an employer's motivation to accept the continuing overeducation in the labor force.

1. Introduction

In all industrialized countries, overeducation in the labor market is a persistent problem (for an overview on this topic see, e.g., Freeman 1976; Rumberger 1981). The fact that many people in the labor force have higher qualifications than are required to perform their jobs causes various negative outcomes. One major effect is that the overall economic productivity is below the limit set by the overall educational level of the employed population.

In a microeconomic framework, there are two ways to measure the effects of overeducation on productivity.

The first approach focuses on individuals. The lower productivity of overqualified employees can be detected in the form of wage penalties. The standard research design is based on human capital theory. After splitting the human capital of the employees into one component which is needed to perform the job (required education) and an "unused" one (surplus education), the returns for both components can be compared. Results from this approach are available for several countries. Almost all researchers report lower returns for surplus than for required education. Nevertheless, the returns for surplus education are positive (see, e.g., Duncan and Hoffman 1981; Daly, Büchel, and Duncan 1997).

The second approach to measuring the effects of overeducation on productivity focuses on firms. In the literature, four main indicators are discussed. The expectation is that overqualified employees have — as a consequence of frustration — higher levels of job dissatisfaction, more health problems, and higher absenteeism rates than correctly allocated employees (see section 2). In addition,

they are expected to have higher turnover rates due to frustration and the receipt of job offers that better match their formal qualifications and job requirements. In general, studies analyzing the dimensions of productivity confirm these hypotheses (see section 2). All of these productivity effects measured on an individual level naturally reduce the overall productivity of the firm employing overeducated workers. Therefore, the expectation is that firms will tend to avoid hiring overeducated applicants.

If the patterns of results obtained from these two different approaches are compared, a somewhat confusing picture emerges. On the one hand, overeducated employees get a (small) premium for the surplus component of their human capital. From the viewpoint of classical production theory, this signals that this component has at least some minor positive effects on productivity. On the other hand, firm-focused studies find that overeducated employees show deficits in various productivity-related dimensions of work behavior. Therefore, the need for further research is obvious.

2. Background

Up until now, empirical evidence about productivity effects of overeducation from firm-focused designs has only been available for the United States (with one exception, see below). The main specific analyses in the context of overeducation research were by Tsang (1987), Tsang, Rumberger, and Levin (1991), and Hersch (1991; for a general overview see Rumberger 1981, pp. 101ff; and especially Tsang and Levin 1985, pp. 96ff).

For Germany, representative analyses with a firm-oriented design have not been available until now. German research on the topic of overeducation focuses strictly on the negative outcome for individuals (see, e.g., Büchel 1994; Daly, Büchel, and Duncan 1997; Büchel and Weißhuhn 1997, 1998). The only study that deals partly with firm-specific effects of overeducation on productivity is by Haugrund (1990). However, the fact that this work is a case study for a single firm and only focuses on specific occupational groups (i.e., technicians and engineers) makes it problematic to apply its findings to the general situation in Germany.

Nonetheless, the negative effects of overeducation on productivity presented by United States authors are also assumed for Germany. Overqualification is considered to be a major reason for the rejection of job applicants. Consistent with this, Franz (1991) writes in his standard work for German labor economists: "Firms hesitate for good reason to hire overqualified employees, for example, because the expected dissatisfaction of such an employee could negatively affect his/her productivity (...) and it is more likely that he/she might intend to quit" (pp. 211 ff.; translation by F.B.).

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3. Data and Methods

Database and Case Selection

The empirical analysis is based on representative data from the German Socio-Economic Panel (GSOEP), subsamples A and B (for details see Wagner, Burkhauser, and Behringer 1993). The analysis of job satisfaction and health status is done with cross-sectional data from 1995; the one for absenteeism uses retrospective information about the year 1994 gained in interviews carried out in 1995; the analysis of participation in on-the-job training uses retrospective data from the periods of 1987 to 1989 or 1991 to 1993 obtained in the interview years 1989 or 1993 respectively; the analysis of firm tenure uses longitudinal data from 1984 to 1995. The study is restricted to employees aged 16 to 65. Trainees and persons undergoing full-time or formal training are excluded.

The Operationalization of Overeducation

To identify overeducation, a subjective approach is chosen. The GSOEP contains information about the formal vocational education of jobholders as well as a question on formal education usually needed to perform the job. These two variables are used to create an overeducation dummy variable. If the formal qualification is substantially higher than the qualification requirements of the job, the value of this variable is "yes," otherwise the value is "no." Of course, the question arises what is understood by the term "substantially." In the design of this study, this problem is greatly reduced, because only holders of low-skilled jobs are analyzed (see below). These jobs are defined in this analysis by the fact that no formal vocational training or any comparable qualification is needed. Therefore, persons with formal vocational training or a higher degree, such as an academic degree, who are performing low-skilled jobs can easily be classified as overeducated. The construction of the overeducation dummy is validated by the additional information about the occupational position (*berufliche Stellung*). The very few people with inconsistent combinations of these three source variables are excluded from this analysis (see Büchel and Weißhuhn 1997, for more details).

Dimensions of Productivity/Types of Jobs

In this analysis, the main dimensions of productivity observable with standard microeconomic data sets are analyzed: job satisfaction, health status, absenteeism, and leaving the firm. In addition, participation in on-the-job training measures is analyzed because this also affects the productivity potential of workers from the viewpoint of firms.

To identify the effects of overeducation on productivity as precisely as possible, it is important to keep the jobs, or the job demand levels, of the observed persons as similar as possible. Therefore, only people working in low-skilled jobs requiring no formal vocational qualification are analyzed.

This case selection is not too restrictive for an overeducation analysis, because 89 percent of all West German overeducated employees in 1995 were working in the low-skilled job range (own calculations from GSOEP, results not shown).

All five dimensions of productivity are analyzed separately as dependent variables within a consistent framework. For this purpose, a standard set of socio-economic status (SES) measures is entered as covariates in the models: sex, age, nationality, family status, state of health, schooling, importance of occupational success, regional unemployment rate, and population density of place of residence. Our main interest is how the overeducation status of employees influences the different indicators of work productivity. OLS and Probit estimation models are used. Job characteristics are considered to be endogenous and therefore remain uncontrolled.

Dependent Variables

Answers to questions about *job satisfaction* in the GSOEP are scaled from 0 to 10. Answers ranging from 0 to 5 on the scale are taken as indicators for low job satisfaction (6 to 10: high job satisfaction).

Information about the state of *health* of respondents is available in different forms. Previous research has shown that there are some validity problems with the question about how the person currently feels, because the answers may be influenced by a current temporary condition. More valid information is gained by the following question: "Apart from short-term illnesses, does your health status hinder you in performing daily activities, for example, household work, paid work, or educational activities? If so, how much?" Response categories are: (1) not at all, (2) somewhat, (3) considerably (translation by F.B.). The pretest of construct validity showed that the effects of values (2) and (3) are somewhat similar, but show a large difference from value (1). To create a (dependent) dummy variable for a binary Probit model, values (2) and (3) are combined to identify a poor health condition in the mid- or long-term.

Absenteeism is never observable in survey data. In this paper, a proxy construction was applied. The information analyzed consists of the number of working days lost due to illness in the year preceding the interview. It is obvious that this variable could not be a valid indicator for absenteeism if analyzed in an isolated form. People have different states of health, and therefore, the risk of their staying home due to illness varies. Therefore, a long period of illness cannot be taken as an indicator for shirking. However, this fact can be taken into account by controlling the state of health in the Probit model. It is evident that this solution still remains unsatisfactory, because the actual health at the time of the interview is just a proxy for the state of health during the one-year period preceding the interview. Therefore, the results should be interpreted with some reservation. To enhance

the validity of this approach, people who have had a work accident in the preceding year are excluded. Also, only people who were working over the full observation period are included in this step of analysis.

Information about *firm tenure*, which is usually obtained by retrospective questioning, is derived in this step of analysis from longitudinal data. This is because with a retrospective design the overeducation status at the beginning of a period of employment, which is crucial for this analysis, is not available. All the people who started a new (low-skilled) job in the time period from 1984 to 1993 are part of the subsample in this step. Using the longitudinal information of the panel, a distinction was made between people with a "short" firm tenure (less than two years) and those with a longer one. The reason for resigning from a job, that is, whether the employee or the firm influenced the decision, is not analyzed, as it has no effect on the creation of transaction costs for firms.

Information about participation in *on-the-job training* measures was collected retrospectively for a three-year period in the waves of 1989 and 1993. People were asked to report information about the three most important training measures. To keep the training measures more homogenous, training activities that lasted just a single day are not taken into consideration. The variable analyzed in this step is again a dummy variable as to whether a person performing a low-skilled job was selected for on-the-job training during the observed three-year period. The interview information from the waves of 1989 and 1993 is pooled. If a person was interviewed at both time points, the 1989 information is used. Again, only people who worked over the whole observation period are selected.

4. Empirical Results

If one controls for the major SES measures (sex, age, nationality, family status, health, schooling, subjective importance of occupational success, measures of labor market conditions, e.g., regional unemployment rate, and population density of place of residence) and considers job characteristics to be endogenous, then overeducated employees working in the low-skilled job range show a similar or an even higher productivity than their correctly allocated colleagues. No significant differences could be found in job satisfaction and absenteeism. With respect to health, firm tenure, and participation in on-the-job training, overeducated employees even perform significantly better (i.e., are more productive) than their correctly allocated colleagues in similar jobs.¹

5. Conclusions

The findings in this paper show that overeducated employees in low-skilled jobs (where almost all overeducated workers appear) in West Germany tend to be more productive than their correctly allocated colleagues. This result is inconsistent with that of various United States studies that seemed to identify severe productivity losses

resulting from overeducation. The reason for this incongruence could be found in the differences between the approaches. Tsang (1987), for example, analyzes job satisfaction as a function of years of acquired education, years of surplus education, and other covariates. Because of the well-known positive correlation between acquired education and job satisfaction, the result reported by Tsang (negative effects for surplus education) is not very surprising: the higher the surplus education, the lower the job demand level (when controlling for acquired education); the lower the job demand level, the lower the job satisfaction. These relations are well-known, but they do not answer the interesting question as to whether overeducation *per se* lowers job satisfaction. It is evident that a sociologist working at McDonald's has a lower job satisfaction than a sociologist working at a research institute. The firm-relevant question is whether a sociologist working at McDonald's has a lower job satisfaction (and lower productivity measures in other firm-relevant indicators) than an unqualified person working at McDonald's.

For that reason, the main focus of this analysis was on keeping the job demand levels comparable. The result reached through this approach, that is, an overall positive productivity effect of overeducation from the viewpoint of firms, is not only consistent with findings from most earnings analyses, which evaluate a (small) positive income effect of surplus education on the individuals' levels (see section 1). The result also shows a convincing inner consistency: when the job demand level is kept constant, overeducated persons show (by definition) a higher level of formal education than their correctly allocated colleagues. Therefore, it is not surprising that they have a better state of health — the positive correlation between education and health is well-known — or that they show higher participation rates in on-the-job training (it is also well-known that better educated employees have higher chances to be selected for firm-related training). And taking into account the result found for training participation, it is again not surprising that overeducated employees show longer firm tenures, since it is well-known that participation in on-the-job training enhances the chances for promotion within the firm.

These results can help to answer one major open question in overeducation research, namely, why firms hire overeducated workers in large numbers. If overeducated employees are, in general, more productive than others, it does make sense to hire them. Therefore, the overall results of this analysis suit the expectations of the familiar job-competition model (Thurow 1975): better educated people are expected to be more productive (and this paper suggests they really are) and, therefore, acquire positions at the upper end of the labor queue.

¹ Due to strict space limitation, these results are not fully documented in this paper (see Appendix). A longer version of this paper with full results including specifications of used variables and descriptives is available from the author on request (buechel@mpib-berlin.mpg.de).

Appendix Table

Effects of Overeducation on Various Firm-Related Productivity Indicators
(employed persons in low-skill jobs, West Germany, schematic presentation)

Covariates	Model 1: Job Satisfaction (high)	Model 2: Health Status (good)	Model 3: Absenteeism (low)	Model 4: Participation in On-the-Job Training (yes)	Model 5: Firm Tenure (long)
Constant	0	0	—	—	—
Male	0	0	0	0	0
Age (years)	0	—	0	0	+
Age**2/(100)	+	0	0	—	—
Foreigner	0	0	—	—	0
Married ^{a)}	0	0	0	0	0
Poor health status ^{b)}	—	—	—	0	0
Hauptschule degree ^{c)} (Realschule degree ^{d)})	0	0	0	0	0
Abitur ^{e)}	0	0	+	+	—
Occupational success not important ^{f)}	—	0	0	0	0
Regional unemployment rate ^{g)}	0	0	0	0	0
Rural area ^{h)}	+	0	0	0	0
(period: 1987-1989)					
period: 1991-1993				+	
Overeducated ⁱ⁾	0	+	0	+	+
N	1,263	1,306	872	1,923	1,569
Dependent Mean by Overeducated Status:					
Correctly allocated	0.71	0.63	—11.8	0.035	0.61
Overeducated	0.70	0.69	—9.8	0.065	0.74

Note: Legend: 0 = no significant effect; — = significant negative effect ($p < 0.10$); + = significant positive effect ($p < 0.10$); blank = variable not in model. — ^{a)} Including living together with partner. — ^{b)} Health status hinders "somewhat" or "strongly" in performing daily activities. — ^{c)} Lower secondary school-leaving certificate. — ^{d)} Intermediate school-leaving certificate; including Fachabitur. — ^{e)} Upper secondary leaving certificate, allows access to higher education. — ^{f)} Occupational success is "less important" or "not important at all." Term interacted with German nationality (item was not asked among foreigners). — ^{g)} On the level of Raumordnungsregion, supplied by BFLR, based on place of residence. — ^{h)} City size < 50,000 inhabitants. — ⁱ⁾ For example, persons with vocational degree or academic degree (in low-skill jobs). Alternative status: correctly allocated workers (i.e., persons without any formal vocational or academic degree).

The Models in Appendix Table Are As Follows

Model Number	Dependent Variable	Period of Observation and Case Selection	Model Type
1	1 = high job satisfaction (value between 6 and 10 on a scale from 0 ("absolutely dissatisfied") to 10 ("absolutely satisfied")); 0 = value from 0 to 5.	1995, all employed	Binary Probit
2	1 = health status hinders "not at all" in performing daily activities; 0 = ... "somewhat" or "strongly."	1995, all employed	Binary Probit
3	-Log (working days lost due to illness in the preceding year of interview + 1). Original question: "How many working days did you miss at your working place last year due to illness?"	January - December 1994, all employed 1995 who worked through whole year 1994; no persons with work accidents during this period	OLS
4	1 = person participated in a three-year period preceding to interview in an on-the-job training measure which took at least one week; 0 = no participation.	1987-1989, 1991-1993, respectively.	Binary Probit
5	1 = firm tenure two years; 0 = firm change within a period of two years.	1984-1995, all employed who started a new job in period 1984-1993.	Binary Probit

Note: "Low skill jobs," are defined as those requiring no formal vocational training (or higher) needed to perform the job. Only working people aged 16 to 65 are included. Persons in training programs and education are excluded as are immigrants from East Germany and immigrants from subsample "D" of the GSOEP.

Source: Author's calculations using the GSOEP.

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