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Consequences of Allocation Processes in the Labor Market: A Comparison of the United States and Germany

By Marc Szydlík*

Summary

This paper examines the extent of job qualification mismatch and its effects on wages. The empirical analyses are based on data from the German Socio-Economic Panel (GSOEP) and the Panel Study of Income Dynamics (PSID). The results indicate that in the United States, the former West Germany, and the former East Germany a considerable percentage of employees have a level of educational qualification different from their job requirements. The largest share of mismatched workers can be found in the United States, whereas the highest share of adequately qualified workers is in East Germany. The fit of acquired and required qualifications is found to have a sizeable impact on wages.

1. Introduction

The degree to which vocational qualifications match job requirements is an important research question. It has major implications for the economy, for single firms, and especially for employees. Furthermore, the study of this phenomenon combines research on educational attainment with research on labor market inequality. There are many theoretical and empirical studies which claim that labor market inequalities are mainly based on the supply side of the labor market. In contrast, a number of theories and many empirical studies concentrate on the demand side of the labor market. However, research which combines these two areas is quite rare, especially in the case of international comparisons.

The question to what extent different economic systems show similar or different mechanisms for allocating persons to jobs is of special interest. Thus, a comparison between the United States, the former West Germany, and the former East Germany is likely to be especially informative. In this comparison the educational and economic systems of the United States and that of East Germany occupy opposite ends of a wide continuum while West Germany is in-between¹. The American nonregulated labor market is clearly closer to the ideal of a *laissez-faire* economy than the highly institutionalized West German economy, and the East German economy comes closest to the ideal of a planned economy (see, for example, Deppe and Hoß 1989).

The paper is structured as follows: First some hypotheses regarding potential similarities and differences among the three countries are introduced. In section 3, the data sets used here, the selection of the respondents, and the operationalization of the fit variable are discussed. The empirical analyses consist of two parts: first, the extent of

underqualification, overqualification, and adequate qualification in the three countries will be determined. Second, the effects of a (non)fit between an individual's education and job requirements on wages are examined. Finally, the results of these analyses are briefly summarized in section 6.

2. Hypotheses

It can be assumed that there is a better fit between education and job requirements in a planned economy such as existed in East Germany, where individuals had less freedom in choosing the type and extent of education they received². It can theoretically be assumed that investments in education are made more efficiently in planned economies. The future value of these investments is rather unpredictable in a free-market system if individuals have limited information about demands for particular skills. That means that qualification redundancies caused by insufficient information should, in theory, have been infrequent in East Germany. At the same time, however, inefficient production structures may have led to a greater discrepancy between acquired and required qualifications than in market economies.

Furthermore, it can be assumed that due to the less regulated education system and the less formalized job requirements in the United States there is a greater difference between individual qualifications and job requirements in the United States than in either West or East Germany. On the one hand, there should be more overqualified employees in the United States, but on the other hand there also should be more people with lower formal qualifications. On-the-job training is of special importance there³.

Since overqualified employees can only partly use their acquired vocational knowledge and abilities, it can be assumed that they have lower incomes than if they were working on a job for which they are adequately qualified

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¹ The term "West Germany" means in this paper the "former" Federal Republic of Germany before October 3, 1990. "East Germany" refers to the German Democratic Republic. Corresponding analyses for the "new" Federal Republic of Germany can be found in Szydlík 1996.

² The number of participants in the various courses of training was centrally determined. In the case of incongruence of desired and offered occupations, individual decisions were determined by the supply constraint. For example, schools were known to "push" future trainees into specific fields (see Klier 1990; Winkler 1990).

³ For a discussion of a number of theories on the fit of acquired and required qualifications, see Szydlík (1996).

(that is a job with higher qualification requirements). "Since this allocation is based on available supplies of both individuals and jobs, workers may possess more education and skills than their jobs require. In other words, employers may be unable or unwilling to fully utilize the education and skills of their workers" (Rumberger 1987, p. 26)⁴. This, however, does not mean that the acquired qualifications are totally useless. For example, employing Thurow's (1975) job competition model, qualified people may have better chances to be hired for better jobs even though they end up being overqualified. Thus, for example, employees with a college or university degree who are working on a job that "only" requires a vocational qualification should earn more than employees with a vocational qualification who are adequately employed. Income analyses, which explicitly include measures of overqualification, find that the additional qualification still yields a positive return, but one smaller than the return to required qualification (see Duncan and Hoffman 1981; Rumberger 1987; Hartog and Oosterbeek 1988; Shockey 1989; Schwarze 1993; Witte and Kalleberg 1995).

Though these assumptions can basically be made for all three countries, one can also assume some differences. If it is true that the allocation of employees is less dependent on formal qualification certificates in the United States, then actual productivity should be of greater importance in income determination. Thus, in the United States a greater loss of income due to overqualification can be expected.

3. Data Base, Sample, and Fit Variable

The empirical analyses are based on data from the German Socio-Economic Panel (GSOEP; see Wagner, Burkhauser, and Behringer 1993) and the Panel Study of Income Dynamics (PSID; see Hill 1991)⁵. Due to availability of data on job requirements, the analyses for the United States are based on the year 1985, which is Wave 18 of the PSID. For East and West Germany the analyses are based on the year 1990, which is Wave 7 of the GSOEP-West and the first wave of the GSOEP-East.

The empirical analyses are based on individuals who were employed at the time of the survey. Self-employed persons are excluded because they represent a special group regarding the match of their acquired and required qualifications. Apprentices are also excluded to avoid overstating the number of underqualified people by counting people who are currently working on jobs they are in fact training for. Furthermore, only white and black Americans and only East and West Germans are included in the study. Although the number of Latino and Asian Americans in the United States has been increasing steadily over the last few years, neither of these groups could be included here due to the insufficient number of cases in the PSID (see Hill 1991, p. 3).

Previous operationalizations of the fit between employees and jobs can be divided into two groups. One

approach determines the job requirements by looking at the occupation of the respondent and matching the mean qualification requirements from an outside source. Investigations for the United States often employ the Dictionary of Occupational Titles (DOT)⁶ or the mean qualification level of the employees within each occupation (e.g., Clogg and Shockey 1984; Shockey 1989). One disadvantage of this approach is that there are discrepancies between the mean requirements for the occupation and the specific requirements for the respondent's job (see Sicherman 1991; Halaby 1994).

The other approach uses information on job requirements reported by the respondents themselves. Using this measure, the different job requirements of employees in the same occupation can be identified and the researcher need not rely on aggregated data. It can be argued, of course, that the disadvantage of this approach is the reliance on the information provided by the respondents. The same argument, however, applies to all other variables (such as respondent's qualifications).

The operationalization of a fit variable is difficult enough, but even more problems arise in a comparative cross-national analysis. Two questions are of special importance: a) do the specific situations of the different countries allow a comparison at all, and b) are the data sets and questionnaires which are available from these countries compatible with one another? Thus, in comparing the United States, West Germany, and East Germany, not only the different education systems but also the different labor market regulations and structures must be taken into account. Thus, in this paper often the terms "lower," "medium," and "higher" (acquired or required) qualifications have to be used since, for example, a vocational education (which can be identified as a medium qualification in West and East Germany) hardly exists in the United States.

Another issue is the operationalization of acquired and required qualifications. Acquired qualifications might refer to either actual knowledge and abilities or to the certified qualification. Required qualifications might refer to either formal requirements necessary to get the job or to qualifi-

³ For a discussion of a number of theories on the fit of acquired and required qualifications, see Szydlak (1996).

⁴ Jovanovic (1979); see Petersen and Spilerman (1990) speculate that in order to get employees who cannot be fired easily (because of their working contract or because of strong unions) to leave the firm "voluntarily", the employer might assign them to jobs for which they are overqualified.

⁵ The first wave of the GSOEP-East, which was done before the currency, economic, and social union on July 1, 1990, does not represent a perfect baseline in the sense of being administered in a stable planned-economy system. But Schwarze (1991, p. 205) concludes: "the income generating process had not changed significantly in the first three-quarters of the year after the fall of the Wall."

⁶ See Rumberger (1987) and the U.S. Department of Labor (1972, p. 652).

cations actually used on the job⁷. The required level of qualifications used here is based on the following GSOEP question: "What kind of education does one usually need for the job you are doing?" The possible answers are "no special qualification necessary"; "only a short instruction on the job"; "a longer period of training in the firm"; "attending special courses"; "a completed vocational training"; or "a university degree." The first four answers are combined when generating the fit variable. For the PSID sample required qualification is measured as the response to this question: "How much formal education is required these days to get a job like yours?" The possible answers are "0 to 5 grades," "6 to 8 grades," "9 to 11 grades," "12 grades (high school)," "12 grades plus nonacademic training," "some college or associate's degree," "BA or BS," and "advanced or professional degree." These responses are collapsed into three broader categories: a) no special qualification (first four categories for GSOEP, first four categories for PSID); b) vocational training (West and East Germany) or high school diploma plus nonacademic training, some college, or associate's degree (United States); and, c) university or college degree⁸. The individual's actual level of qualification is similarly coded and then compared to the required qualification. Respondents are then assigned into one of these groups:

- Unqualified persons are neither vocationally trained nor did they attend a college or university, and their job does not require either of the two.
- Qualified persons have a special qualification, and they also work on jobs where they need such training.
- Overqualified persons have special qualifications, but they do not use all of them on their jobs.
- Underqualified persons have a lower level of qualification than their job requires.

4. The Extent of Under-, Over-, and Adequate Qualification

Table 1 shows that the largest share of workers with an adequate fit between acquired and required qualifications could be found in East Germany. This is evidence of the hypothesis that the planned economy that existed in East Germany produced a greater fit between education and job. If the available qualifications are centrally matched with job demands, then there should be fewer redundant qualifications due to information deficits or miscalculations by pupils or parents (Szydlík 1994).

The American samples show the smallest fit between education and labor market⁹. Of all qualified white employees, about 40 percent are overqualified for their jobs; the corresponding figure for blacks is nearly 60 percent. The German countries show a significantly better use of the available qualifications; only 36 (26) percent of all qualified employees in West (East) Germany are over-

⁷ The PSID question aims at the formal requirements whereas the GSOEP aims at the qualifications that are actually used on the job. It is more likely — at least in a signaling theory framework — that formal qualifications for a job are not actually used on the job than it is that a qualified person without a formal certificate is actually hired. This should lead to fewer "simple" jobs in the United States and, thus, a lower percentage of overqualified employees in the PSID compared to the GSOEP. In other words, if one could use the same question for the international comparison, one would expect to see a higher number of overqualified employees in the United States and a lower number of overqualified employees in West Germany than shown in Table 1.

⁸ For a discussion of different operationalizations of the fit variable, see Szydlík (1996).

⁹ For empirical analyses of corresponding developments in the United States, see, for example, Rumberger (1981) and Cappelli (1993).

Table 1

**Extent of Over-, Under-, and Adequate Qualification
among Women and Men in the United States,
West Germany, and East Germany
in percent**

	United States					
	Whites			Blacks		
	All	Women	Men	All	Women	Men
Underqualified	10.7	10.9	10.5	4.3	4.5	4.1
Overqualified	26.1	26.1	26.2	30.9	31.7	29.6
Qualified	33.5	31.3	35.6	19.9	21.9	17.0
Unqualified	29.6	31.7	27.7	44.9	41.9	49.3
	West Germany			East Germany		
	All	Women	Men	All	Women	Men
	Underqualified	1.9	1.4	2.3	0.9	1.0
Overqualified	33.8	36.3	32.0	25.2	27.2	23.6
Qualified	59.4	54.5	62.9	70.6	67.7	73.2
Unqualified	4.9	7.8	2.8	3.2	4.1	2.4

Source: Author's calculations using PSID (1985 wave) and GSOEP (1990 wave), weighted results.

qualified (see Büchtemann, Schupp, and Soloff 1993; Büchel 1994). There are no clear differences between women and men. Compared to their male counterparts, qualified white American women and qualified women in both East and West Germany are more likely to be overqualified than are men¹⁰. The mismatch might be due to employment interruptions which lead to dequalification because of depreciation of skills or increases in required skills, the shift of jobs into „low wage countries” (for example, tailoring industry), vocational segregation, or labor market discrimination. The situation is reversed for qualified black American women, however; they are more likely than qualified black men to be in jobs that match their level of education.

5. Fit and Income

This section presents estimates of the effects of job fit on workers' log hourly wages for each of the three countries. Table 2 shows multivariate income estimations of the form:

$$\ln(Y) = \beta_0 + \beta_1 S + \beta_2 E + \beta_3 E + \beta_4 T + \beta_5 F + \mu$$

where *S* represents years of education and vocational training, *E* measures years of experience, *T* measures years of tenure, *H* is hours worked, and *F* is the fit variable. The dependent variable is the logarithm of the hourly gross income. Schooling and work experience measures are intended to capture the effects of human capital on wages.

Table 2 shows a wage penalty for overqualification for both women and men in all three countries. The impact of overqualification is strongest for white men in the United States. They earn about 23 percent less than their adequately qualified counterparts. Black men earn about 16 percent less and German men earn about 6 percent less. Overqualified German women earn 12 to 14 percent less, while for American women the wage penalty is about 18 percent.

Underqualification enters with a positive coefficient in nearly all regressions, but its coefficient is statistically significant only for German men. These men earn 21 percent and 14 percent more, respectively, than adequately qualified men. Keep in mind that very few Germans are underqualified for their jobs, as shown in Table 1.

Unsurprisingly, there are large wage reductions associated with being unqualified. In the United States these workers earn wages on average 25 percent lower than qualified workers, while in Germany the difference is smaller, between 8 and 15 percent. The returns to schooling are similar in all samples, between 4 and 7 percent per year. There are differences in the effects of tenure and experience, but they are not focused on here. These analyses prove that the claim that there were rarely income inequalities in East Germany was wrong. Even though according to socialist ideology income differentials were to be kept as small as possible, higher incomes were in fact awarded as incentives for greater work effort. It should also

be noted that the actual income differences understate the degree of social inequality, compared to West Germany (Szydlik 1994, p. 210).

Although there are similarities across the three countries, there are also very interesting differences. In general, job fit has a greater influence on wages in the United States than in Germany. One explanation might be that in a labor market where the allocation of employees is less dependent on formal qualification certificates, actual productivity, which may be weakly related to qualifications, is of greater importance. Or it might be that in a market with a stricter dichotomy between the primary and the secondary sector, between good jobs and bad jobs or between “simple” and “difficult” jobs, an overqualified employee stuck in the secondary sector may have relatively high qualifications relative to the required qualifications.

With the exception of white Americans, overqualification has a larger effect on women's wages than on men's. German women also see a larger penalty for being unqualified than German men. Compounding this bad news is the fact, illustrated in Table 1, that women are generally more likely than men to be found in jobs that require qualifications different from those they possess.

Is it worthwhile to have a higher qualification if one is not employed in an adequate job? Are there any benefits from human capital investments even if the corresponding qualifications can hardly be used? Or, to put it another way, are the actual benefits of adequately employed people underestimated if one neglects the (non-) fit between education and job?

According to further analyses, which are not shown here but are available from the author on request, the answer is “yes.” Separate estimations of the specification in Table 2 for adequately and inadequately employed persons show that a higher qualification leads to a higher income even if the employee is overqualified for her or his job. However, the analyses also show that the return to education is considerably lower than for adequately employed people. For every year of education, white Americans with appropriate qualification enjoy a return double that of their overqualified counterparts. In the case of black Americans this discrepancy is even greater. This suggests that qualified employees get the highest return to their skills if they actually use them on their job. This also confirms the results of other analyses (see, for example, Duncan and Hoffman 1981; Rumberger 1987; Hartog and Oosterbeek 1988; Shockey 1989.) As in Table 1, this difference is significantly greater in the United States than in either East or West Germany.

¹⁰ When the fit variable is operationalized using vocational degrees and not vocational knowledge and abilities, and when, additionally, some cases are excluded due to a comparison with the answers of the GSOEP participants regarding their vocational training in the year 1993 is reduced to below 29 or 26 percent (see Szydlik 1996).

Table 2

Wage Regressions¹⁾

	United States						West Germany		East Germany	
	Blacks		Whites		Women	Men	Women	Men	Women	Men
Constant	5.5902 (0.1212)	6.0068 (0.1131)	5.4510 (0.1311)	5.4482 (0.2036)	2.1118 (0.0906)	2.4863 (0.0586)	1.0905 (0.0702)	1.7910 (0.0581)		
Education	0.0523*** (0.0072)	0.0454*** (0.0058)	0.0521*** (0.0078)	0.0701*** (0.0109)	0.0561*** (0.0053)	0.0629*** (0.0026)	0.0598*** (0.0037)	0.0402*** (0.0024)		
Experience	0.0255*** (0.0045)	0.0384*** (0.0040)	0.0100*** (0.0031)	0.0474*** (0.0072)	0.0128*** (0.0044)	0.0377*** (0.0029)	0.0074*** (0.0027)	0.0147*** (0.0023)		
Experience ²⁾	-0.0007*** (0.0001)	-0.0008*** (0.0001)	-0.0002*** (0.0001)	-0.0009*** (0.0002)	-0.0003*** (0.0001)	-0.0007*** (0.0001)	-0.0001** (0.0001)	-0.0003*** (0.0001)		
Tenure	0.0200*** (0.0023)	0.0157*** (0.0015)	0.0143*** (0.0024)	0.0175*** (0.0034)	0.0095*** (0.0018)	0.0040*** (0.0009)	0.0037*** (0.0010)	0.0025*** (0.0008)		
Hours worked	0.0028** (0.0012)	-0.0004 (0.0012)	0.0075*** (0.0016)	-0.0025 (0.0024)	-0.0048*** (0.0011)	-0.0149*** (0.0009)	-0.0055*** (0.0010)	-0.0133*** (0.0009)		
Unqualified	-0.2429*** (0.0400)	-0.2774*** (0.0390)	-0.2378*** (0.0444)	-0.2319*** (0.0768)	-0.1217** (0.0497)	-0.0846* (0.0463)	-0.1526*** (0.0444)	-0.0870* (0.0521)		
Overqualified	-0.1817*** (0.0345)	-0.2327*** (0.0318)	-0.1844*** (0.0402)	-0.1595** (0.0687)	-0.1234*** (0.0281)	-0.0603*** (0.0163)	-0.1379*** (0.0187)	-0.0598*** (0.0166)		
Underqualified	0.0877* (0.0468)	0.0611 (0.0436)	0.0540 (0.0658)	0.0308 (0.1255)	0.1303 (0.1088)	0.2051*** (0.0507)	-0.0613 (0.0766)	0.1439** (0.0691)		
R ²	0.35	0.43	0.29	0.32	0.19	0.44	0.31	0.33		
n	1075	1169	691	539	1085	1610	1206	1348		

1) Dependent variable: Logarithm of the hourly gross income. Standard errors are in parentheses. Reference group: Qualified employees. Regressions are not weighted. — * Regression coefficient significant at the 0.10 percent level. — ** Regression coefficient significant at the 0.05 percent level. — *** Regression coefficient significant at the 0.01 percent level.

Source: Author's calculations using PSID (1985 wave) and GSOEP (1990 wave).

6. Conclusion

The results indicate that both in the United States and in Germany a considerable percentage of employees have to deal with a mismatch between their qualifications and the requirements of their jobs. The analyses show that the highest share of mismatched workers can be found in the United States, whereas the highest share of adequately matched workers could be found in East Germany. African Americans have the highest risk of a mismatch.

The fit of acquired and required qualification has a noticeable impact on wages for Germans and Americans. Multivariate analyses indicate that investments in qualification are still worthwhile, but to a lesser degree when the employee is overqualified for the job. These results also imply that the usual return of 6 percent per year of education actually represents a combination of the significantly higher benefits for adequately employed and the considerably lower benefits for overqualified people.

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