

Speaking fluency, writing fluency and earnings of migrants

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Abstract. This paper analyzes the determinants of language abilities of migrant workers and the impact of language proficiency on their earnings position. The analysis is based on data for West Germany. The first part presents an ordered probit analysis of the determinants of German speaking and writing fluency for both male and female migrants. The data allow not only to consider personal characteristics of the migrant as explanatory variables, but to analyze additionally the effect of the family context and of illiteracy on the migrant's German language fluency. In the second part, the effect of language on the migrant's earnings position is analyzed. It is shown that language abilities, and especially writing proficiency, considerably improve the earnings position of migrants.

1. Introduction

In recent years the economic assimilation of migrant workers to the requirements of the foreign labor market has become a subject of intense empirical research. Starting with Chiswick's (1978) seminal article, research of this kind concentrates mainly on the estimation of earnings functions. Beside the standard human capital variables and control variables for socioeconomic characteristics, the estimated earnings functions for migrant workers include the time of residence in the host country as an additional regressor. This variable is meant to capture the effect of human capital acquired in the host country on the migrant's earnings position. Based on data for a variety of countries, as well as for male and female migrants, the results of these studies seem to indicate that migrants not only improve their absolute earnings position, but also their earnings position relative to native workers.¹ Dustmann (1993) shows, however, that these findings are not

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¹ See, for example, Borjas (1985, 1987, 1989), Beggs and Chapman (1989), Chiswick (1978), Chiswick and Miller (1985), Carliner (1980), Long (1980) and Meng (1987).

generally true for all migration situations. Analyzing earnings of migrant workers to West Germany, he finds that migrants do improve their absolute earnings position while being in the country. However, earnings do not increase sufficiently to close the initial earnings gap between migrant workers and natives.²

The type of skills migrant workers are likely to attain first in order to improve their earnings position abroad depends on the requirements of the host country's labor market as well as on the type of skills and the skill level the migrant worker has upon arrival. One important factor which is worthwhile for a migrant to acquire is the ability to communicate with the incumbent population. It is usually the case that the languages spoken in the migrants' home countries differ from the languages spoken in the host country. Deficiencies in the ability to communicate with natives are likely to be a major factor of constraining earnings of migrant workers for a variety of reasons. Not only is language proficiency likely to be used by employers as a screening device for employment decisions, but those who are more fluent in the host country language are more capable to communicate their qualifications to potential employers. Furthermore, many jobs require the ability to speak and to write in the host country language. Knowledge of the language provides therefore a broader spectrum of job opportunities, as well as a larger set of possibilities to occupy better paid positions inside a given firm. Migrants who manage the foreign language in an appropriate way have access to information about job opportunities and benefit entitlements they otherwise would not perceive. Language may further have an indirect impact on the migrant's economic position in the foreign labor market, as it is an important input into the production of human capital which is specific to the labor market of the host country.

Language proficiency is accordingly a very important skill factor and it is rational for the migrant to acquire it early in his migration history. Recently, some research has concentrated on the analysis of the determinants of language skills of migrants and the impact of language on migrants' earnings.³ The results of these studies provide some evidence that language proficiency is indeed a major factor to explain migrants' earnings positions. However, the quality and the availability of appropriate data limits the range of aspects that may be investigated.⁴ Furthermore, to date this kind of research has concentrated on migration to

² One explanation for these findings is the mainly temporary character of the type of migration analyzed. The shorter the intended duration abroad, the shorter is the pay off period on any investment into human capital and, accordingly, the lower the incentive to invest into human capital. Using the same data, Licht and Steiner (1992) and Pischke (1993) come to similar conclusions. Schmidt (1992) observes that the earnings gap slightly narrows if the analysis is restricted to blue collar workers. For a theoretical analysis of incentives for human capital investment of migrant workers, see Dustmann (1991).

³ See, for example, Carliner (1981), McManus et al. (1983), Grenier (1984), Tainer (1988), Kossoudji (1988), Rivera-Batiz (1990, 1992, 1993), Chiswick (1991), Chiswick and Miller (1992, 1993) and Beenstock (1993).

⁴ Most of the studies for the United States are based on the 1976 survey of Income and Education (SIE). Besides questions covering the usual demographic and economic items, the survey includes two direct measures of language proficiency: The ability to speak, and to understand English. Furthermore, the survey provides information about languages usually spoken to friends and the frequency of reading English newspapers. The 1971 Canadian census, used by Carliner (1981), reports on abilities of speaking English or French. Chiswick (1991) uses a 1986 survey of illegal migrants which includes, besides speaking abilities, information about abilities in reading English.

Australia, the United States, Canada and Israel. The data available allows for the analysis of speaking and comprehension, or of speaking and reading in the host country language, but not of writing abilities. In addition, previous research looked mainly at language proficiency of male immigrants. It seems, however, to be worth analyzing whether the impact of determinants of language proficiency, as well as the effect of language on earnings positions, differs between males and females. The family context is likely to have some impact on language proficiency. An eventual enrollment of children in schools of the host country, as well as the nationality and language abilities of the partner may well have an impact on language skills of a given migrant worker. Furthermore, since migrant workers are often unskilled and poorly educated, one could suppose that many of them are to some degree illiterate. But illiteracy is a serious constraint for learning a foreign language, and it is likely that it has some impact on language skills. It seems therefore appropriate to control for the degree of illiteracy when analyzing the determinants of fluency in a foreign language.

This study will try to add some additional insight to the analysis of migrants' language proficiency. Using data for migrants to West Germany, this paper will be concerned with the determinants of language skills as well as with the impact of language proficiency on the earnings position. The data allows for the analysis of language fluency not only for male, but also for female migrants, as well as for the inclusion of explanatory variables not available so far, like measures for the degree of illiteracy and the family context.

Section 2 describes the data and the variables. Section 3 introduces the econometric methods used for the analysis of determinants of language skills. Section 4 presents the respective empirical results for both men and women and decomposes the difference in probability between males and females to fall in some category. Section 5 is a regression analysis of earnings for male and female migrants, which concentrates on the effect of language skills for the determination of earnings positions. Section 6 will shortly summarize the results.

2. Data and variables

The data used for this study stem from the first wave of the German Socio-Economic Panel (SOEP) of 1984. The SOEP is organized on a household base and consists of 4500 households with a household head of German nationality and 1500 households with a household head of foreign nationality. It contains a wide range of household specific information, based on a household questionnaire, as well as information on all persons above the age of 16 who are living in a specific household, based on personal questionnaires. It further contains information about children who are below the age of 16.

For this analysis, only the foreign subsample will be used. The citizens of foreign nationality are nearly exclusively migrants who came to Germany mainly between the mid 50's and the early 70's.⁵ Accordingly, the analysis is performed on a stock of migrant workers in 1984, who, on average, have been in Germany

⁵ These migrants are often called "guest workers". Their stay in Germany was meant to be temporary and to help relieving the scarcity in labor supply, being a result of the strong economic development in West Germany after the second world war and the growing excess demand for labor.

for a considerable amount of time (see Table 1). The analysis will be restricted to migrants with Italian, Spanish, Yugoslavian, Turkish and Greek nationality. Questionnaires for these national groups were available in the respective language to enhance the reliability of the survey results. It is important to note that in none of these countries German is a spoken language, nor is it the first foreign language learned at school. Although abilities in spoken or written German at the point of entry to Germany are not known, it seems appropriate to assume that knowledge of the German language was not existent upon immigration.⁶

The questionnaires for foreigners are quite specific on language skills. Four questions on the following aspects of language proficiency are included: Speaking German, writing German, speaking the home country language, and writing the home country language. The respondent was asked to answer each of these questions on a scale with five levels: Very good, good, intermediate, quite bad, not at all.

The information about language skills are accordingly based on self assessment. Self assessed skills are naturally problematic when the information is used for statistical purposes. Interviewees may have different perceptions about the thresholds between, for instance, speaking a language good or very good. However, since test-based assessments of language abilities are very costly (and they have their own shortcomings), empirical research on migrants' language skills suffers, from this data deficiency.⁷ To reduce the number of thresholds, German language skills will be divided in three categories: good or very good (category 3), intermediate (category 2), and quite bad or not at all (category 1).

A useful information is the ability of the migrant worker to write in his home country language. This information may be used as a measure for the degree of illiteracy of the migrant. Illiteracy is very likely to have a strong effect on the efficiency of learning a foreign language. A systematic learning requires the ability to read and to write. Without these skills, the migrant is forced to learn the language only by communication. Not only does this require opportunities for communication, like German friends (and it is hard to make such friends without a common language), but it may also hinder a thorough understanding of the language structure. For the empirical analysis, a measure for writing abilities in the home country language will be used as a proxy for the degree of illiteracy. To get sharper results, this variable will be categorized in the following way: Very good (category 3), good, intermediate, quite bad (category 2) and not at all (category 1).

In the sample used for analytical purposes, all those individuals are included who have no missing values on language information and who moved to Germany after 1956.⁸ Furthermore, migrants who were at the point of entry older than 55 or younger than 15 were excluded. The final sample consists of 1030 female migrants and 1256 male migrants. A description of the variables used for the

⁶ The assumption is more problematic when analyzing data on migrants to the United States or Canada. English is a language of some importance in many emigration countries, like Asia or South America. It is therefore useful to control for language skills upon arrival when considering migration to the United States, as was pointed out by Chiswick (1991).

⁷ An exception is Rivera-Batiz (1990), who uses test-based measures on English reading proficiency from the 1985 National Assessment of Educational Progress.

⁸ Since (guest-worker) migration to Germany started only in the mid-fifties, it seems appropriate to exclude those who immigrated earlier (11 observations) to guarantee homogeneity of the sample.

Table 1. Description of variables and sample characteristics

Variable	Male subsample		Female subsample		Description
	Mean	SD	Mean	SD	
AGE	41.708	9.905	39.289	10.452	Age of the migrant
AGEENTRY	26.863	7.329	26.652	8.468	Age at immigration
YSM	14.845	5.417	12.637	5.610	Years of residence in Germany
EXP ^{a, b}	22.506	10.39	11.677	10.515	Years of being part-time or full-time employed (after the age of 14)
SCHOOL ^b	1.258	2.598	0.799	1.714	Years of schooling (after the age of 14)
TRAIN ^b	1.273	2.283	0.441	1.196	Years of job-specific education (after the age of 14)
SCHG	0.063		0.033		Dummy variable; equal to unity if some schooling in Germany
TRAING	0.086		0.023		Dummy variable; equal to unity if some training in Germany
WORK	0.897		0.489		Dummy variable; equal to unity if in the work force
WHITE	0.036		0.031		Dummy variable; equal to unity if white collar worker
SELF	0.047		0.026		Dummy variable; equal to unity if self employed
NEVERWF	0.007		0.276		Dummy variable; equal to unity if never been in the work force
CHILDSCH	0.450		0.505		Dummy variable; equal to unity if at least on child older than 6 years
PARTGERM	0.052		0.007		Dummy variable; equal to unity if partner of German nationality
MARRIED	0.897		0.896		Dummy variable; equal to unity if married
GSPKPART	0.207		0.310		Dummy variable; equal to unity if partner speaks German well or very well
GWRPART	0.082		0.126		Dummy variable; equal to unity if partner writes German well or very well
GEARN ^a	2701.2	655.12	1856.9	524.56	Monthly gross earnings (in DM)
HWORKED ^a	166.32	17.23	153.84	25.58	Reported average weekly hours of work in the month preceding the interview, multiplied by 4
SPA	0.137		0.123		Dummy; Spanish nationality
TUR	0.312		0.339		Dummy; Turkish nationality
JUG	0.197		0.214		Dummy; Jugoslavian nationality
ITA	0.214		0.171		Dummy; Italian nationality
GR	0.137		0.150		Dummy; Greek nationality

Source: Socio-Economic Panel, wave 1, 1984.

^aReported numbers refer to observations which are used for the earnings analysis.

^bNumbers are constructed from a biographical scheme which reports activities only after the age of 14.

analysis and sample characteristics for the male and the female subsample are given in Table 1. The age at entry to Germany for both subgroups is about 26 years. Males have been on average 2 years longer in Germany than females. This reflects a typical migration pattern: Female partners and eventually children follow after the migrant is certain to remain for a longer time in the host country and after having found a safe job and appropriate housing. Labor market experience, measured as years of full employment or part-time employment after the age of 14, is considerably lower for females than for males: 11.7 years, as compared with 22.5 years for male workers.⁹

Schooling and training, received after the age of 14, is considerably lower for females than it is for males. The percentage of those who undertook some schooling or job specific education in Germany is likewise lower for the female sample population. Female migrants have consequently a weaker educational background than their male counterparts. Less than 50% of the female migrant population, but more than 90% of the male population are in the work force. 27% of the female migrants never worked. More than 5% of the male population has a partner of German nationality, whilst this is the case for only 0.7% of the female migrant population. The statistics on the nationalities indicate that the largest group in the sample are migrants with Turkish nationality, followed by Italians and Yugoslavians.

Table 2 presents some summary statistics on fluency in reading and writing in German, as well as fluency in writing in the home country language, for both

Table 2. Language proficiency, male and female migrants, 1984

Variable	Code	Male subsample		Female subsample	
		Cases	Percent	Cases	Percent
<i>Speaking German</i>					
Good or very good	GSP3	488	38.85%	250	24.27%
Intermediate	GSP2	518	41.24%	391	37.96%
Bad or not at all	GSP1	250	19.91%	389	37.77%
	SUM	1256	100%	1030	100%
<i>Writing German</i>					
Good or very good	GWR3	203	16.16%	81	7.86%
Intermediate	GWR2	332	26.43%	166	16.12%
Bad or not at all	GWR1	721	57.41%	783	76.02%
	SUM	1256	100%	1030	100%
<i>Writing home language</i>					
Very good	HWR3	666	53.02%	434	42.13%
Good, intermediate, bad	HWR2	552	43.95%	505	49.03%
Not at all	HWR1	38	3.03%	91	8.84%
	SUM	1256	100%	1030	100%

Source: Socio-Economic Panel, wave 1, 1984.

⁹ The years of part-time or full-time employment and the years of schooling and job-specific education are constructed by using a biographical scheme which reports activities only after the age of 14.

males and females. The numbers indicate that knowledge in written and spoken German is considerably stronger developed among the male sample population. Furthermore, nearly 9% of the female migrant population is not able to write in the home language. This number reduces to 3% for males. Only about half of the total sample population reports being very good in writing in the home language.

3. Econometric modeling of language proficiency

The self-reported skills on language proficiency of migrant workers may be viewed as ordered responses. With the above categorization, the response of a migrant on his language skills may fall into one of three groups (1, 2, 3).

Consider a latent and continuous variable y_i^* which could be interpreted as representing language proficiency of some migrant i on a continuous scale. Suppose that y_i^* is a linear function of a weighted vector of variables X_i , with weights α :

$$y_i^* = X_i' \alpha + \varepsilon_i . \quad (1)$$

Assume that ε_i is normally distributed with mean zero and variance σ^2 : $\varepsilon_i \sim N(0, \sigma^2)$. The variable y_i^* is not observed, but it defines a variable y_i which represents the category into which y_i^* falls:

$$y_i = \begin{cases} 1 & \text{iff } y_i^* \leq \theta_1 \\ 2 & \text{iff } \theta_1 < y_i^* \leq \theta_2 \\ 3 & \text{iff } y_i^* > \theta_2 , \end{cases} \quad (2)$$

where θ_1 and θ_2 are unobserved thresholds.

Normalizing by setting $\sigma^2 = 1$ and combining (1) and (2), the probabilities that an individual falls in a respective category are given by:

$$\Pr [y_i = 1] = \Phi [\mu_1 - X_i' \beta] , \quad (3-a)$$

$$\Pr [y_i = 2] = \Phi [\mu_2 - X_i' \beta] - \Phi [\mu_1 - X_i' \beta] , \quad (3-b)$$

$$\Pr [y_i = 3] = \Phi [X_i' \beta - \mu_2] , \quad (3-c)$$

where $\Phi(\cdot)$ is the distribution function of a standard normal variate, $\beta = \alpha/\sigma$ and $\mu_j = \theta_j/\sigma$, $j = 1, 2$. Only the ratios α/σ and θ/σ are estimable. Given these probabilities, the likelihood function may be written as:

$$L = \prod_{y_i=1} [\Phi(\mu_1 - X_i' \beta)] \prod_{y_i=2} [\Phi(\mu_2 - X_i' \beta) - \Phi(\mu_1 - X_i' \beta)] \prod_{y_i=3} [\Phi(X_i' \beta - \mu_2)] . \quad (4)$$

Since the vector X_i' contains a constant term, the full set of parameters in (4) is not identified. A common normalization is to set μ_1 to zero: $\mu_1 = 0$. The log-likelihood function may then be re-written as:

$$\ln L = L^* = \sum_{y_i=1} \ln [\Phi(-X_i'\beta)] + \sum_{y_i=2} \ln [\Phi(\mu - X_i'\beta)] - \Phi(-X_i'\beta) + \sum_{y_i=3} \ln [\Phi(X_i'\beta - \mu)] . \quad (5)$$

All parameters in (5) are now identified. The estimable parameter μ is the difference in the thresholds μ_2 and μ_1 : $\mu = \mu_2 - \mu_1$. It can be shown (Pratt 1981) that the matrix of second partial derivatives of L^* is everywhere negative definite. Accordingly, L^* is globally concave, and standard algorithms like the Newton-Raphson method should converge to the maximum of the likelihood function.

One remark on the interpretation of the parameter estimates. A positive parameter estimate indicates that an increase in the respective variable shifts weight from category 1 into category 3. In other words, those for whom the respective variable has a larger value are more likely to be in category 3 and less likely to be in category 1, everything else equal. This can easily be seen by simple differentiation:

$$\frac{\delta \Pr [y_i = 1]}{\delta x} = -\phi(X_i'\beta)\beta_x < 0 , \quad (6-a)$$

$$\frac{\delta \Pr [y_i = 3]}{\delta x} = \phi(\mu - X_i'\beta)\beta_x > 0 , \quad (6-b)$$

where ϕ is the density function of the standard normal distribution. The parameter β_x corresponds to the variable x , with $\beta_x > 0$. However, the effect of a change in the respective variable on the probability that an individual will end up in the second category is ambiguous:

$$\frac{\delta \Pr [y_i = 2]}{\delta x} = [\phi(-X_i'\beta) - \phi(\mu - X_i'\beta)]\beta_x . \quad (6-c)$$

The evaluation of this expression requires some calculation and is not obvious from the sign of the parameter estimates. To assess the effect of dummy variables on the change in probability of being, for instance, in category 3, one simply evaluates expression (3-c) for the respective values the binary variable may assume and calculates the difference Δ :

$$\Pr [y_i = 3 | d_i = 1] - \Pr [y_i = 3 | d_i = 0] = \Delta , \quad (7)$$

where d_i is the binary variable of interest.

4. Determinants of language proficiency

This section will present estimation results of different specifications of ordered probit models. Dependent variable is the ability of speaking or writing German. The variables are categorized as outlined in Table 2. Accordingly, category 1 in-

cludes those with a poor or no knowledge, category 2 those with an intermediate knowledge, and category 3 those with good or very good knowledge of the German language.

Table 3 presents coefficient estimates on speaking fluency for the male and female subsample, respectively. Table 5 presents corresponding results for writing abilities. The dummy variable NEVERWF, which equals one when an individual has never been in the work force, is only used as a regressor in the female sample. The reason for this is the small number of male individuals who never joined the work force, which does not allow for robustly estimated coefficients. For the same reason, the dummy variable PARTGERM which equals one when the partner is of German nationality is only included in the male subsample.

To illustrate the impact of variables on language proficiency, the value of the derivative of the estimated probability to fall in category 3 (good or very good knowledge) will be reported when discussing the results (see Eq. (3-a)). For binary variables, the respective difference will be calculated (see Eq. (7)). If not indicated differently, the vector of regressors is evaluated at the sample means of all variables.

German speaking fluency

Columns 1 in Table 3 report results of the basic specification, which includes human capital variables and indicators for the labor market status. The years since migration (YSM) have the expected positive effect on language proficiency for both males and females. The effect of this variable is larger for females than for males: Evaluated at sample means, each additional year of residence increases the probability to fall in category 3 by 0.87 percentage points for males, but by 1.70 percentage points for females. The number of years of schooling and training, SCHOOL and TRAIN, influence language proficiency of males and females positively. The marginal effects of both variables are again stronger for females than for males. While each additional year of schooling increases the probability to fall in category 3 by 1.3 percentage points for males, it increases this probability by 4.3 percentage points for females. The respective numbers for training are 1.4 and 2.5. The fact that some schooling or training took place in the host country, as reflected by the dummy variables SCHG and TRAING, has a significant and positive effect on the ability to speak German for males. For females, only the effect of schooling in Germany is significant. These results are in line with results of other studies.

Women who never joined the work force (NEVERWF = 1) are less likely to have a high proficiency in spoken German. This difference is considerable: The probability to speak the German language good or very good is 14.92% for those who never joined the work force, but 21.77% for those who did. This suggests that the acquisition of speaking fluency is correlated with opportunities to speak the language, which are often provided at the workplace. It may, however, also indicate that those who do not intend to ever participate in the labor market have lower incentives to learn the German language.

The coefficient of the variable WORK, indicating whether an individual is in the work force at the time of the interview, is positively significant for both males and females. Being out of the work force decreases the probability to fall in category 3 from 37.9% to 29.5% for males and from 24.8% to 16.3% for females.

Table 3. Parameter estimates, ordinal probit, speaking abilities. Male and female subsample

Variable	Male subsample			Female subsample		
	(1)	(2)	(3)	(1)	(2)	(3)
CONST	1.377 (7.234)	1.356 (6.170)	0.946 (4.141)	0.376 (2.203)	0.508 (2.368)	0.569 (2.221)
YSM	0.023 (3.579)	0.020 (3.008)	0.017 (2.411)	0.061 (8.755)	0.057 (7.525)	0.059 (7.548)
SCHOOL	0.034 (2.767)	0.033 (2.681)	0.021 (1.581)	0.157 (7.252)	0.138 (6.472)	0.106 (4.439)
SCHG	0.296 (1.773)	0.411 (2.465)	0.478 (2.801)	0.390 (1.851)	0.618 (2.829)	0.624 (2.723)
TRAIN	0.036 (2.984)	0.025 (1.806)	0.015 (1.001)	0.089 (3.360)	0.069 (2.279)	0.051 (1.660)
TRAING	0.295 (2.128)	0.353 (2.527)	0.363 (2.580)	0.161 (0.611)	0.207 (0.689)	0.151 (0.477)
NEVERWF	*	*	*	-0.269 (2.496)	-0.195 (1.756)	-0.214 (1.855)
WORK	0.233 (2.206)	0.164 (1.541)	0.208 (1.895)	0.273 (2.930)	0.237 (2.471)	0.247 (2.520)
SELF	0.615 (3.407)	0.574 (3.217)	0.467 (2.495)	0.715 (2.385)	0.709 (2.306)	0.628 (1.913)
WHITE	0.976 (4.420)	1.032 (4.227)	0.814 (3.467)	-0.020 (0.095)	-0.075 (0.325)	-0.149 (0.620)
AGEENTRY	-0.044 (9.879)	0.043 (9.681)	-0.033 (6.922)	-0.039 (8.783)	-0.040 (9.050)	-0.035 (7.290)
TUR		0.162 (1.489)	-0.087 (0.777)		-0.416 (3.332)	-0.395 (2.998)

JUG		0.636 (5.062)	0.612 (4.763)	0.476 (3.511)
GR		0.221 (1.705)	-0.032 (0.247)	-0.018 (0.137)
ITA		0.209 (1.801)	0.039 (0.293)	0.016 (0.119)
HWR3		0.335 (4.776)		0.338 (4.037)
HWR1		-0.438 (2.491)		-0.036 (0.277)
MARRIED		-0.205 (1.678)		-0.522 (3.775)
PARTGERM		0.848 (4.442)	*	*
GWRPART		-0.173 (1.152)		0.096 (0.743)
GSPKPART		0.611 (6.064)		0.557 (5.670)
CHILDSCH		0.138 (1.855)		0.022 (0.277)
μ	1.250 (26.606)	1.300 (26.429)	1.291 (23.639)	1.364 (22.501)
No. of Obs.	1256	1256	1030	1030
Log-Likelihood	-1220.8	-1183.9	-958.0	-876.2
restr. Log-Likelihood	-1323.7	-1323.7	-1111.5	1111.5

Source: Socio-Economic Panel, wave 1, 1984. Note: Absolute *t*-ratios in parenthesis.
 Dependent variable: Proficiency in spoken German.

The parameter estimates on the variables for labor market status indicate that self-employed individuals (SELF) are more likely to have a high proficiency in spoken German. Being a white collar worker (WHITE), however, is only significantly associated with language proficiency of male migrants.¹⁰

The age at the point of entry (AGEENTRY) to Germany has a negative and significant effect on fluency in spoken German for individuals in both subsamples. This finding is in line with other studies (see, for example, Veltman 1988). Being 10 years older upon entry to Germany reduces the probability to fall in category 3 by 16.7 percentage points for males and by 10.8 percentage points for females. The negative effect of age at entry may be explained along the lines of the human capital theory: For a fixed lifetime horizon, the older a person is at the point of immigration, the lower is the payoff on any investment into human capital. However, it may also reflect that learning a new language is more difficult at later stages in life.

Specifications in columns 2 include dummy variables for nationalities. The probabilities for migrants with different nationalities to fall in category 3 (good or very good knowledge) are given in Table 4. Probabilities are calculated at average sample characteristics. The numbers indicate that male and female migrants from Yugoslavia are most likely to be highly proficient in spoken German, keeping educational achievements, years of residence and labor market status constant. The probability to fall in category 3 is 56.97% for males and 38.99% for females. For both the male and female sample the national group with the lowest probability to fall in category 3 are Turkish migrants. There are several possible explanations for these results. Migrants from various nations may differ in their tendency to live in enclaves and, thus, have a different *exposure* to the German language. The results may also reflect underlying selection processes which depend on economic factors in the home countries. A further explanation are different *distances* between the German language and the language spoken in one of the respective countries.

Specifications in columns 3 include additionally dummy variables which measure the competence of writing in the home country language. The variable HWR3 is one for those who report very good abilities in writing in the home language, and HWR1 is one for those who report to be not able to write in the

Table 4. National probabilities of good or very good language proficiency

	Speaking		Writing	
	Male	Female	Male	Female
Spanish	31.80	8.61	7.01	1.80
Turkish	26.24	9.53	10.73	2.57
Jugoslavian	56.97	38.99	24.47	10.83
Greek	40.07	17.74	17.56	5.11
Italian	39.61	19.68	7.88	1.08

Source: Socio-Economic Panel, wave 1, 1984.

¹⁰ One referee correctly pointed out that employment variables are potentially endogenous in the language equation. Eliminating these variables from the estimation equations, however, has only marginal effects on the coefficients of the other regressors.

home language. The base group are migrants who report their writing abilities as being good, all right or quite bad. The variables HWR1 and HWR3 could be viewed as measures of the degree of illiteracy. As outlined above, a high degree of illiteracy is likely to constrain the migrant in learning a new language. The estimation results support this hypothesis. The positive and significant coefficients on the variable HWR3 indicates that literacy increases the probability of being fluent in German. This is true for males and females. Evaluated at average sample characteristics, the results indicate that very good abilities in writing the home country language increases the probability to fall in category 3 from 31.0% to 47.7% for males and from 13.9% to 22.7% for females. Furthermore, being completely illiterate, as indicated by the variable HWR1, reduces this probability to 17.5% for the male subsample. For both subsamples, the inclusion of these variables slightly reduces size and significance level of the educational variables.

Columns 3 report further results when adding regressors which capture the family context of the migrant. Being married (MARRIED) has a significantly negative effect on language proficiency of female workers. It reduces the probability to fall in category 3 from 31.8% to 15.9%. The probability of speaking German well or very well decreases for male migrants from 42.47% (non-married reference group) to 36.64% if they are married with a partner of foreign nationality, but it increases to 67.48% if the partner has the German nationality (PARTGERM).

Proficiency in German is considerably higher for both male and female migrants when the partner reports to speak the German language well or very well (GSPKPART). The respective probabilities increase from 32.7% to 56.36% for males and from 13.4% to 21.1% for females. This indicates that speaking abilities of the partner are an important determinant for being fluent in spoken German. The variable which captures German writing fluency of the partner (GWRPART) is insignificant in both samples.

Having children who attend a school in Germany should be expected to have a positive effect on language abilities of the parents, since it provides the opportunity to learn the language with, and from family members. The results, however, indicate that having children above the age of 6 years who live in the household, and consequently attend a school in Germany (CHILDSCH), has only a slightly significant and positive impact on language proficiency of male migrants.

To summarize, the results support the findings of other studies that the time of residency and the educational background positively influence migrant's fluency in speaking the host country language, while the age at immigration has a negative effect. The speaking abilities of migrants with different nationalities were found to differ quite considerably, keeping educational variables, years of residence and labor market status constant. Furthermore, speaking abilities are correlated with being in the work force and with labor market status. In addition, the analysis reveals that literacy has a strong and positive impact on speaking fluency. Language fluency of the partner is a further important determinant for speaking abilities.

German writing fluency

Results of ordered probit estimates on writing abilities for male and female migrants are given in Table 5. The specifications correspond to those for speaking abilities. The results show that time of residency has a positive and significant im-

Table 5. Parameter estimates, ordinal probit, writing abilities. Male and female subsample

Variable	Male subsample			Female subsample		
	(1)	(2)	(3)	(1)	(2)	(3)
CONST	-0.044 (0.226)	-0.232 (1.021)	-0.574 (2.322)	-0.846 (4.306)	-1.131 (4.152)	-1.167 (3.640)
YSM	0.017 (2.680)	0.022 (3.197)	0.021 (2.914)	0.036 (4.158)	0.040 (4.286)	0.040 (4.011)
SCHOOL	0.092 (12.156)	0.088 (11.156)	0.076 (8.677)	0.234 (11.513)	0.225 (11.315)	0.193 (8.790)
SCHG	0.615 (3.703)	0.664 (3.861)	0.712 (4.057)	0.512 (2.423)	0.723 (3.281)	0.736 (3.256)
TRAIN	0.043 (3.012)	0.040 (2.304)	0.034 (1.860)	0.116 (3.695)	0.099 (2.705)	0.073 (1.970)
TRAING	0.378 (2.866)	0.414 (3.030)	0.424 (3.154)	0.939 (2.982)	0.972 (2.985)	0.985 (2.865)
NEVERWF	*	*	*	-0.099 (0.723)	-0.041 (0.278)	-0.051 (0.331)
WORK	0.113 (0.967)	0.050 (0.419)	0.068 (0.572)	0.181 (1.564)	0.076 (0.614)	0.095 (0.768)
SELF	0.447 (2.654)	0.447 (2.642)	0.361 (2.142)	0.504 (2.069)	0.539 (2.486)	0.405 (1.837)
WHITE	1.134 (5.545)	1.211 (5.736)	1.029 (4.757)	0.335 (1.426)	0.350 (1.265)	0.282 (0.979)
AGEENTRY	-0.030 (6.090)	-0.035 (7.157)	-0.026 (4.943)	-0.029 (5.157)	-0.031 (5.248)	-0.027 (4.062)
TUR		0.234 (1.911)	0.312 (2.482)	0.156 (0.905)	0.156 (0.905)	0.154 (0.851)

JUG	0.783 (6.091)	0.758 (5.762)	0.868 (5.177)	0.748 (4.231)
GR	0.543 (3.787)	0.565 (3.857)	0.469 (2.656)	0.462 (2.487)
ITA	0.062 (0.484)	0.074 (0.550)	-0.191 (0.943)	-0.201 (0.925)
HWR3		0.212 (2.808)	0.263 (2.557)	0.263 (2.557)
HWR1		-0.596 (2.671)	-0.240 (1.010)	-0.240 (1.010)
MARRIED		-0.203 (1.593)	-0.289 (1.713)	-0.289 (1.713)
PARTGERM		0.571 (3.667)		
GWRPART		0.442 (3.022)		0.553 (3.642)
GSPKPART		0.274 (2.612)		0.201 (1.552)
CHILDSCH		0.096 (1.238)		-0.013 (0.135)
μ	0.932 (20.675)	1.005 (20.426)	0.965 (14.002)	1.017 (13.546)
No. of Obs.	1256	1256	1030	1030
Log-Likelihood	-1085.8	-1022.4	-520.3	-549.1
Restr. Log-Likelihood	-1211.9	-1211.9	-723.6	-723.6

Source: Socio-Economic Panel, wave 1, 1984. Note: Absolute *t*-ratios in parenthesis.
Dependent variable: Proficiency in written German.

pact on writing abilities for both subsamples. Evaluated at sample means, each year of residency raises the probability to fall in category 3 by 0.38 percentage points for males and by 0.33 percentage points for females. As for speaking fluency, years of schooling and years of job-specific education affect writing proficiency positively. The effect of these variables on writing fluency, however, is stronger than on speaking fluency. This can be easily seen by calculating and comparing the elasticity of the probability to fall in category 3 with respect to a change in educational variables.¹¹ For speaking fluency this elasticity, if evaluated at sample means of the educational variables, amounts for males to 0.043 for the schooling variable and to 0.047 for the training variable. The respective elasticities for writing fluency are considerably larger: 0.188 for the schooling variable and 0.085 for the training variable. For females, elasticities of the schooling and training variables are 0.177 and 0.055 for speaking fluency and 0.38 and 0.10 for writing fluency, respectively. The relative effect of schooling or job-specific education in Germany, as indicated by the dummy variables SCHG and TRAING, is likewise considerably stronger on writing abilities than on speaking abilities for both the female and the male sample. This finding indicates that education is more advantageous for the development of writing skills than for the development of speaking fluency. Learning to write in a foreign language may require a more systematic acquisition of knowledge than learning to speak in a foreign language.

In contrast to speaking proficiency, being in the work force (WORK) or having never been in the work force (NEVERWF, female sample) has no effect on writing proficiency in both samples. This again suggests that writing abilities are not developed “by doing”, but rather by a systematic way of learning. Obviously, communication at the workplace promotes speaking fluency, but not writing abilities.

As one should expect, the self-employed (SELF) have a higher probability of being proficient in writing in German. For the male sample, being a white collar worker (WHITE) is positively associated with language proficiency, and this effect is of considerable size: It increases the probability to be good or very good in German writing from 12.5% to 49.2%. Both types of occupation require to some degree the ability to write in German and may thus force the migrant to develop writing skills. Again, a higher age at the point of immigration lowers the propensity of the migrant to write in the German language, as indicated by the coefficients on the variable AGEENTRY.

The specifications in columns 2 include dummy variables for different nationalities. Marginal effects are given in Table 4. Yugoslavian migrants are most proficient in writing in German, as they were in speaking in German. They are followed by Greek migrants. The weakest group are migrants of Italian nationality.

As for speaking proficiency, the degree of illiteracy is captured by the variables HWR1 and HWR3. The coefficient estimates in columns 3 show that the degree of illiteracy is an important determinant for proficiency in writing the German language. The probability to fall into category 3 increases from 9.78% to 13.96% for those who have very good skills in writing in their home language, compared with those who report to have writing skills in the home language which are good, intermediate or poor. The respective numbers for females are 2.3% and 4.2%, respectively.

¹¹ Reported numbers are then $(\delta \ln \Pr [y = 3] / \delta \ln x) = (\delta \Pr [y = 3] / \delta x) \bar{x} / \Pr [y = 3]$.

The specification in columns 3 includes also regressors which capture the family context of the migrant. Being married reduces the probability to fall in category 3 from 4.98% to 2.65% for the female sample and from 14.75% to 10.55% for the male sample, respectively. However, for the male sample the fact to have a partner of German nationality strongly and significantly increases proficiency in writing in the German language: The probability to be in category 3 increases from 14.75% (non-married reference group) to 24.86%. The ability of the partner to speak and to write in the German language well or very well (GSPKPART, GWRPART) has likewise a positive and significant effect on writing abilities for the male sample, while for females only the effect of GWRPART is significant. Writing abilities of the partner increase the probability of being in category 3 from 10.9% to 21.5% for males and from 2.4% to 8.1% for females. Writing abilities of both male and female migrants are not significantly affected by having children who attend a school in Germany (CHILDSCH).

To summarize, the results indicate that, unlike for speaking fluency, variables which represent contacts with the incumbent population, like WORK and NEVERWF, are not significant determinants for writing fluency. This indicates that writing in a foreign language requires a systematic learning. Contacts with individuals from the host country do not enhance writing skills. However, the educational background is more important for the acquisition of writing skills than for the acquisition of speaking skills. Those who have a stronger educational background seem to be more efficient in acquiring writing skills. Furthermore, the degree of illiteracy is a significant and important factor for writing proficiency. Strong language skills of the partner are important to promote writing abilities of the migrant, while having children who attend a school seems not to affect writing abilities.

Comparing males and females

The numbers in Table 2 show that the sample probability for a female migrant to be in the upper part of the distribution of language skills is considerably lower than for a male migrant. This is true for written German as well as for spoken German. The numbers in Table 1 show further that the mean values of variables which positively affect language proficiency are likewise lower for the female sample than for the male sample. Whether differences in average characteristics alone are sufficient to explain the relatively low language performance of female migrants will be investigated in this section.

For this purpose, consider the average predicted probabilities of a migrant from the male and the female sample to be in a respective category. The difference between average predicted probabilities can be decomposed in the following way (for category 3):

$$\Pr(y = 3)_{\text{Male}} - \Pr(y = 3)_{\text{Female}} = \Delta P = \Delta^1 P + \Delta^2 P, \quad (8)$$

with

$$\Delta P = \frac{1}{n^M} \sum_{i=1}^{n^M} \Phi(X_i^{M'} \hat{\beta}^M - \hat{\mu}_i^M) - \frac{1}{n^F} \sum_{i=1}^{n^F} \Phi(X_i^{F'} \hat{\beta}^F - \hat{\mu}_i^F),$$

$$\Delta^1 P = \frac{1}{n^M} \sum_{i=1}^{n^M} \Phi(X_i^{M'} \hat{\beta}^F - \hat{\mu}_i^F) - \frac{1}{n^F} \sum_{i=1}^{n^F} \Phi(X_i^{F'} \hat{\beta}^F - \hat{\mu}_i^F) ,$$

$$\Delta^2 P = \frac{1}{n^M} \sum_{i=1}^{n^M} \Phi(X_i^{M'} \hat{\beta}^M - \hat{\mu}_i^M) - \frac{1}{n^M} \sum_{i=1}^{n^M} \Phi(X_i^{M'} \hat{\beta}^F - \hat{\mu}_i^F) ,$$

where $\hat{\beta}^F$ and $\hat{\beta}^M$ are the estimated parameter vectors and $X_i^{F'}$ and $X_i^{M'}$ are vectors of characteristics of the i^{th} female or male individual, respectively. The number of observations in the female and male subsample are given by n^F and n^M . The term ΔP in (8) is the difference in the average probability to fall in category 3 between a male and a female migrant. This overall difference can be decomposed into two components: $\Delta^1 P$, which is due to differences in characteristics, and $\Delta^2 P$, which is due to differences in estimated coefficients across samples. If differences in language proficiency between a male and a female migrant are mainly due to differences in characteristics, then the second term on the right hand side of (8) should be very small, relative to the first term. The respective decompositions for differences to fall in category 2 or 1 follow straightforward from (3-a) and (3-b).

Table 6 presents the decompositions for writing and speaking abilities. The estimated parameter vectors stem from the basic specifications (columns 1 in Tables 3 and 5), where the variable NEVERWF was not included for the female sample. The first three rows in Table 6 report decompositions for speaking abilities, where the numbers indicate the respective categories. The overall predicted difference in the average probability to fall in category 3 between the male and the female sample is 14.58% where 13.13% are due to different endowments and only 1.45% to different parameter estimates.

The last three rows in Table 6 refer to writing abilities. Again, the relative contribution of $\Delta^2 P$ to explain the overall predicted difference ΔP to fall in category 3 is very large: Of the total difference of 8.30%, 7.81% are explained by differences in characteristics.

For the probabilities to fall in the other two categories, results of the decomposition indicate that differences in parameters explain more of the overall difference than for category 3. This is true for both writing and speaking proficiency. However, the major part of the total difference is still explained by differences in average characteristics.

Table 6. Decomposition of differences in language skills

	Probabilities			Decomposition		
	Category j	$\Pr(y = j)^M$	$\Pr(y = j)^F$	ΔP	$\Delta^1 P$	$\Delta^2 P$
Speaking	3	38.85	24.27	14.58	13.15	1.45
	2	41.24	37.96	3.28	0.82	2.46
	1	19.91	37.77	-17.86	-13.93	-3.93
Writing	3	16.16	7.86	8.30	7.81	0.49
	2	26.43	16.12	10.31	4.77	5.54
	1	57.41	76.02	-18.61	-12.59	-6.02

Source: Socio-Economic Panel, wave 1, 1984.

These simple calculations show that the considerable differences in language abilities between the male and the female sample population are mainly due to differences in characteristics and only to a small extent due to differences in parameters. If female migrants exhibited the same endowments than male migrants, their distribution of language abilities would be similar to that of the male population.

5. Language and earnings

This section analyzes the effect of writing and speaking proficiency on the earnings position of male and female migrants. As above, the sample is restricted to those who are between 15 and 55 years old upon entry to Germany. After excluding all those who have missing values in relevant variables, the female sample reduces to 975 observations, of whose 420 are employed. To avoid biased estimates due to selective sampling into the group of employed women, the appropriate selection variable will be constructed from parameter estimates of a reduced form participation probit and added as an additional regressor to the wage equations. The male sample reduces to 956 observations, where 143 had to be deleted because they were not employed or unemployed at the time of the interview and 160 because they had missing values in relevant variables.

The specified earnings equations include the standard human capital variables and control for marital status and for hours worked. The variable LHWORKED is the natural logarithm of the variable HWORKED.¹² The variable EXPSQ is the square of years of labor market experience EXP, calculated as years of part-time or full-time employment after the age of 14. The dependent variable is the logarithm of monthly gross earnings. Additionally, dummy variables for speaking and writing abilities are introduced. Since a migrant who is fluent or very fluent in German writing should also be quite fluent in spoken German, both indicators for language proficiency are likely to interact with each other, so that results of the OLS regression analysis for the male sample (Table 7) and selectivity corrected regression results for the female sample (Table 8) are reported sequentially. Estimations in the male sample suffer from heteroscedasticity. Standard errors are therefore calculated by using a consistent estimator as suggested by White (1980). For the female sample, *t*-statistics are based on consistent standard errors which are calculated as suggested by Heckman (1979).¹³

¹² The variable HWORKED is constructed as follows: Individuals report average normal weekly hours of work and actual hours of work (including overtime work, but excluding irregularities in hours worked due to illness etc.) for the month preceding the interview. Additionally, informations are provided about whether individuals are paid for overtime work. Since reported monthly earnings include overtime payments, the *effective* number of hours worked which matters for the earnings calculation (HWORKED) is calculated as follows: If the individual's actual number of hours worked is lower or equal to the normal number of hours worked, hours worked per month are simply normal hours worked, multiplied by 4. If, on the other hand, actual hours of work are higher than normal hours of work, and if additionally the individual reports that overtime work is paid for, then hours worked per month equal actual number of hours worked multiplied by 4.

¹³ Regressors in the reduced form participation equation for female migrants are as follows: years since migration, age, age squared, experience, experience squared, years of schooling and job-specific education, a dummy variable for marital status and dummy variables for children above and below the age of 6. A referee pointed out that selection may be affected by language ability; corresponding to the specification of the wage regressions, respective variables on language proficiency are therefore included in the participation equation.

Table 7. Earnings equations, male migrant workers, 1984

Variable	(1)	(2)	(3)	(4)
CONST	5.813 (10.392)	5.747 (10.288)	5.751 (10.190)	5.702 (10.155)
YSM	0.0080 (3.917)	0.0071 (3.481)	0.0076 (3.757)	0.0071 (3.501)
EXP	0.0176 (5.078)	0.0172 (4.830)	0.0172 (4.921)	0.0171 (4.817)
EXPSQ	-0.0004 (6.037)	-0.0003 (5.491)	-0.0003 (5.738)	-0.00032 (5.478)
SCHOOL	0.0093 (2.394)	0.0086 (2.230)	0.0070 (1.850)	0.0072 (1.899)
TRAIN	0.0113 (2.811)	0.0110 (2.814)	0.0108 (2.760)	0.0109 (2.807)
MARRIED	0.1004 (3.595)	0.1029 (3.682)	0.1016 (3.593)	0.1029 (3.670)
LHWORKED	0.3280 (2.921)	0.3339 (2.981)	0.3389 (2.993)	0.3429 (3.050)
GSPK3		0.0689 (2.979)		0.0527 (2.009)
GSPK2		0.0385 (1.801)		0.0400 (1.832)
GWR3			0.0736 (3.156)	0.0534 (1.984)
GWR2			0.0105 (0.627)	-0.0045 (0.249)
No. of Obs.	956	956	956	956
\bar{R}^2	0.12	0.13	0.13	0.14

Source: Socio-Economic Panel, wave 1, 1984.

Note: Absolute *t*-ratios in parenthesis. Reported *t*-statistics are based on standard errors which are corrected for heteroscedasticity.

The estimated coefficients of the inverse mills ratios in Table 8 are all not significantly different from zero, indicating that those female migrants who participate in the labor market are not a self selected sample from the overall population. The coefficient on the logarithm of hours worked is substantially smaller than 1 in the regressions for male migrants. This depressing effect of more hours, however, is also found in other studies (see, for instance, Hartog and Oosterbeck 1993). The discussion will now concentrate on the dummy variables for language abilities. Columns 2 include dummy variables for speaking German well or very well (GSPK3) and speaking German on an intermediate level (GSPK2). The base group consists of those who speak German badly or not at all. For both subsamples, those who report to speak German well or very well have earnings which are considerably higher than earnings of the base group (7.1% for females and 6.9% for males). This advantage disappears for female workers whose fluency in German is only intermediate, as indicated by the dummy variable GSPK2. The earnings advantage reduces in size to 3.85% for male workers, but it is still significantly different from zero at the 10% level.

Columns 3 include dummy variables for writing abilities. Again, the base group are those with bad or no skills in writing in German. The earnings advan-

Table 8. Earnings equations, female migrant workers, 1984

Variable	(1)	(2)	(3)	(4)
CONST	3.8388 (10.494)	3.8200 (10.308)	3.7790 (10.397)	3.7841 (10.317)
YSM	0.00869 (2.048)	0.00725 (1.649)	0.00848 (1.990)	0.00760 (1.748)
EXP ^a	-0.35844 (0.282)	0.08811 (0.067)	0.00343 (0.003)	0.20941 (0.162)
EXPSQ ^a	0.00776 (0.324)	0.00054 (0.022)	0.00158 (0.066)	-0.00148 (0.062)
SCHOOL	0.03519 (4.469)	0.03245 (4.151)	0.02565 (3.057)	0.02574 (3.085)
TRAIN	-0.01838 (1.746)	-0.01825 (1.774)	-0.01722 (1.683)	-0.01683 (1.654)
MARRIED	0.01473 (0.357)	0.01429 (0.356)	0.01825 (0.456)	0.01847 (0.467)
LHWORKED	0.71637 (11.057)	0.70398 (10.863)	0.71505 (11.166)	0.70480 (10.956)
GSPK3		0.07107 (1.753)		0.05832 (1.346)
GSPK2		0.01446 (0.399)		0.02387 (0.673)
GWR3			0.15350 (2.922)	0.12242 (2.109)
GWR2			-0.01452 (0.395)	-0.03157 (0.825)
INVERSE MILLS	-0.12039 (1.346)	-0.77803 (0.811)	-0.08189 (0.896)	-0.06134 (0.651)
No. of Obs.	420	420	420	420
R ²	0.26	0.27	0.28	0.28

Source: Socio-Economic Panel, wave 1, 1984.

Note: Absolute *t*-ratios in parenthesis. Reported *t*-statistics are based on consistent standard errors.

^aCoefficients multiplied by 100.

tage of migrants who report to have good or very good writing abilities in German is quite large: 15.3% for females and 7.3% for males. For both subgroups, high or very high proficiency in writing German seems to be a more important determinant for a favorable earnings position than high or very high proficiency in speaking German. The effect of being good or very good in writing German is particularly strong for females. The coefficients of GWR2 are insignificant for both samples. This indicates that only intermediate skills in writing in German are not sufficient to improve the earnings situation of a migrant worker, relative to a migrant with poor or no skills in writing in German.

Columns 4 report results when including dummies for both speaking abilities and writing abilities. For female migrants, only earnings of those who report good or very good abilities in writing German (GWR3) are significantly higher (12.2 percentage points) than earnings of the base group (bad knowledge or no knowledge at all). The coefficients for both indicators of speaking fluency become insignificant. Accordingly, controlling additionally for writing abilities reveals that fluency in spoken German is not sufficient for female migrants to im-

prove their earnings position in the German labor market. These results suggest that, if only information about speaking ability is available, one may wrongly conclude that migrants who are more fluent in speaking have more favorable earnings positions, although this effect is actually due to writing proficiency. Consequently, conclusions of empirical studies concerning the impact of spoken language on earnings of migrant workers may be misleading and have to be evaluated with caution, if other aspects of language ability are not controlled for.

For males, the inclusion of indicators for writing abilities slightly reduces size and significance levels of the variable which represents speaking abilities at a high level (GSPK3). The variable GSPK2 still explains significantly earnings differences (at the 10% level of significance). The coefficient of the variable GWR3 reduces likewise in sign and significance level. The results imply that a migrant with good or very good speaking abilities and good or very good writing abilities receives earnings which are 10.5 percentage points higher than those of a migrant with poor abilities in both aspects of language proficiency.

To summarize, the above analysis shows that language proficiency is an important human capital factor which has some considerable impact on the earnings position of a migrant worker. The results show quite clearly that writing proficiency is more important for a favorable economic position than speaking proficiency.¹⁴

6. Summary and conclusions

This paper studies the determinants of language proficiency and the effect of language on earnings of migrant workers in Germany. Two features of language proficiency are analyzed: Speaking fluency and writing fluency. Both writing and speaking abilities are investigated by estimating ordered probit models, where the dependent variable may fall in one of three categories: Good or very good, intermediate, quite bad or very bad.

The results support findings of other studies that years of residence in the host country have a positive impact on language abilities. A higher age at the point of entry reduces the probability of a migrant to be highly proficient in the foreign language. Furthermore, the educational background of a migrant is an important determinant for both writing and speaking fluency. However, the effect of educational variables is more important for writing fluency than for speaking fluency. Writing fluency is not advanced by the fact that the migrant is participating in the labor market. This suggests that the acquisition of writing skills requires a systematic way of learning, which is promoted by a higher educational level, while speaking fluency is rather acquired by communication.

Indicators for the degree of illiteracy are found to be important for the determination of both speaking and writing abilities. Being illiterate is a major constraint for the acquisition of foreign language skills. Language abilities are further found to be correlated with the family context. Being married seems to constrain women to acquire skills in speaking German. This may reflect a stronger isolation of married women, hindering social contacts with German native speakers. For males, the propensity to speak the German language well or very well is positively

¹⁴ Language variables may, however, partly capture the effect of other qualifications on the earnings position which are not observed. Rivera-Batiz (1993) points out that language proficiency may be a proxy for the effect of quantitative skills on earnings.

correlated with having a partner of German nationality. For both samples, those who have a partner who is fluent in German are more likely to exhibit stronger skills in the German language.

Female migrants are considerably weaker in both forms of language fluency. To investigate how much of this difference is due to different sample characteristics, the overall difference in average predicted probabilities to fall in a respective category between a male and a female migrant is decomposed into two components, one measuring the difference due to different characteristics and one measuring the difference due to different parameters. It is shown that the major part of the difference in language ability between the male and the female sample can be explained by differences in characteristics.

The estimation of earnings equations reveals that language proficiency is an important determinant for the earnings position of migrant workers in Germany. The results show that for female workers speaking fluency alone is not sufficient for having an earnings advantage in the German labor market. For males, writing fluency is likewise more important as a determinant for a favorable earnings position than speaking proficiency. Here speaking fluency alone suffices to improve the earnings position significantly. The results support those of other studies which show that language has quite an important impact on the earnings of migrant workers. However, as shown in this study, one has to be cautious if interpreting the results. Parameter estimates of variables which represent abilities in speaking may lead to wrong conclusions about the impact of spoken language on earnings if not controlling for other aspects of language proficiency, like writing fluency.

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