

# Discussion Paper

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# **Re-Migration Behaviour and Expected Duration of Stay of Guest-Workers in Germany**

by  
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## **Abstract**

We analyze guest-workers' expected duration of stay in Germany within an econometric model taking into account the important distinction between permanent and temporary stayers, where the expected duration of stay for the latter is differentiated in short-term, medium-term and long-term stayers. The model is estimated for household heads on the first six waves of the German Socio-Economic Panel taking advantage of the panel structure of our data base to obtain efficient parameter estimates.

## **Acknowledgement**

We thank Christoph Schmidt and Jörn-Steffen Pischke for helpful comments. The usual caveats apply.

## 1. Introduction

Compared to other immigration countries the German guest-worker system is peculiar in various respects. The great majority of guest-workers has migrated to Germany from Turkey, (the former) Yugoslavia, Italy, Greece and Spain in the late sixties and early seventies when the federal labour office was actively hiring guest-workers by recruitment treaties with these countries. At that time it was expected both by the German authorities and the guest-workers themselves that they would stay only temporarily in Germany. The dominating factor for temporary migration was seen in the so-called "savings motive" implying that guest-workers will return to their home countries after they have saved enough money either to set up a small own business or to live on retirement back home. However, a considerable number of them became permanent stayers because economic and/or political developments in the source countries often rendered return migration rather unattractive, or simply because of successful integration in Germany society. Guest-workers have similar earnings/experience profiles as natives, although they differ somewhat with respect to expected duration of stay in Germany, which can be interpreted as strong evidence for their successful integration into the German labour market (Licht/Steiner, 1992).

There are only a few theoretical studies addressing the issue of return migration in a guest-worker system from the perspective of the migrant worker. In the model of Djajic/Milbourne (1988) an individual's migration decision as well as the rate of saving while abroad and the optimal length of a migrant's stay in the host country are derived as solutions to an intertemporal optimization problem. In their model the optimal length of stay is determined by the wage differential between the host and home countries and the costs of migration. *Ceteris paribus*, it depends negatively on the wage in the home country and positively on the costs of migration. The qualitative effect of a wage increase in the host country depends on the degree of the migrant's relative risk aversion. For very risk averse individuals the optimal length of stay decreases with an increase of the wage in the host country. Dustmann (1992) adds to this model the important point that changes in the optimal length of stay in the host country may also be affected by an "environmental factor" assumed to be complementary to consumption. This factor in turn is assumed to be affected by the migrant's social integration in the host country. As a migrant becomes more integrated in the host country the optimal duration of stay may change and eventually become permanent.

There are some studies on guest-workers' expectations or realisations of return migration in Germany based on survey data. For Turkish guest-workers Werth (1983) found that only a minority planned to stay permanently in Germany. For those who planned to re-migrate, important factors influencing their decision to return were age and duration of stay in Germany, marital status, the level of earnings and an individual's labour market status (unemployment). Münzenmaier/Walter (1983) found, *inter alia*, that the proportion of guest-workers intending to stay permanently increases with the time elapsed since their arrival in Germany. They also observed considerable differences in intended durations of stay between the various nationalities. Brecht (1990) analyzed the re-migration behaviour of Turkish guest-workers in Germany and found that older workers

have a higher return probability. Although these studies shed some light on important determinants of individual re-migration decisions, they do not attempt to isolate the various factors and therefore remain somewhat agnostic on their relative importance. Based on a sample of Turkish re-migrants Hönckopp (1987) analyzed the determinants of re-migration behaviour, and the effects of the "return promotion act" of 1983 in particular.

A more quantitative approach is pursued in the study by Dustmann (1992) which is based on an econometric model of return migration estimated on a single cross-section of guest-workers in Germany. In this study individual re-migration decisions are differentiated according to whether or not a guest-worker intends to stay permanently in the host country and for the temporary stayers according to their expected duration of stay. It turns out that the determinants of both decisions are qualitatively rather similar. According to this study, important determinants of a guest-worker's expected duration of stay in Germany are age, spouse living in the home country, years since migration, individual earnings and an individual's employment status at the date of interview. The estimated effects of these variables are more or less in accordance with the qualitative implications of the model.

In the present paper we try to extend existing empirical work on re-migration behaviour of guest-workers in Germany where we focus on an individual's expected duration of stay. Given the factors determining re-migration behaviour remain constant, this variable should be a good predictor of an individual's actual re-migration decision and thus contribute to an understanding of the determinants of observed outflows of migrants, which seems important for the implementation of an effective migration policy. To this end we include several important variables missing in the Dustmann study to account for the effect of social integration in German society on individual re-migration behaviour of household heads. The observation period covers the years 1984 to 1989 for which we have panel data for guest-workers available. So far, there seems to have been no related studies based on panel data for Germany and, indeed, for other countries as well. An important advantage of the use of panel data is that more efficient parameter estimates can be obtained than in previous studies based on cross-section data. Our approach also differs in the chosen statistical model which seems more appropriate given the data at hand.

The remainder of the paper proceeds as follows. In the next section we give a brief description of our data base and define the variables used in the study. The econometric model is described in some detail in section 3. The estimation results are presented and discussed in section 4, and section 5 concludes.

## **2. Data and Variables Description**

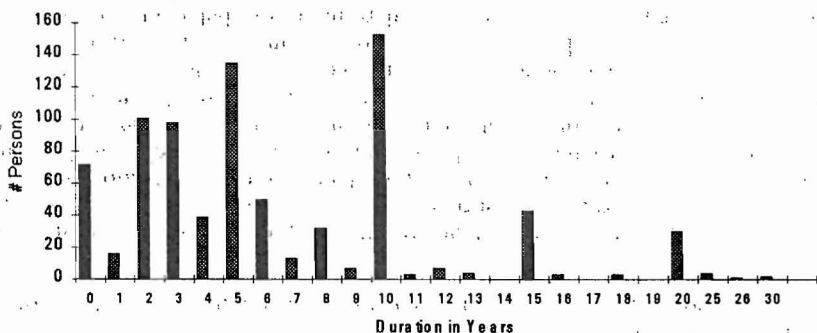
The empirical analysis is based on the first six waves of the Socio-Economic Panel (SOEP) for West Germany. In the first wave some 12,000 individuals in about 6,000 households were interviewed on a large number of personal and household characteristics as well as on education, training and labour market experience (for a description of the SOEP see Wagner/Schupp/Rendtel, 1991). Foreigners from the main source countries for guest-workers, i.e. Turkey, Yugoslavia, Italy,

Greece and Spain, have deliberately been oversampled in the SOEP. This provides an unique opportunity to analyse the return migration decision of citizens from these countries in some detail.

The analysis is restricted to household heads, either male or female, because the assumption that family re-migration decisions are taken by them seems plausible. The variable we want to explain is an individual's *expected duration of stay* in Germany at the date of interview in each wave. In the SOEP guest-workers are asked whether they intend to stay temporarily or permanently, and for temporary stayers their expected duration of stay is also recorded. Although this variable is recorded in years, we prefer to split it up into intervals because responses to this question are heavily bunched at certain years, thus contaminating this variable with large measurement errors. As expected, not all guest-workers had an opinion on their expected duration of stay, and had therefore be excluded from the analysis (in the first wave, e.g., there were some 11 percent non-respondents).

For temporary stayers (at the date of the first interview, i.e. in 1984), Figure 1 shows strong ties at one, three, five, ten, fifteen etc. years, which suggests to split up the expected duration in several categories.

**Figure 1: Expected Duration of Stay of Household Heads in 1984**



Source: German Socio-Economic Panel, wave 1,; own calculations.

Our choice of categories was guided by two considerations. First, to have a sufficient number of observations falling within each time interval and, secondly, to account for expected behavioural differences within each category. Thus, we distinguish between the following duration categories:

- *short-term* (0 - 3 years),
- *medium-term* (4 - 7 years),
- *long-term* (8 - 30 years), and
- *permanent*.

Note that this split-up also allows us to analyse re-migration behaviour for both temporary and permanent migrants using the statistical model described in the next section<sup>1</sup>. The distribution of the observations in each wave within the observations period 1984 - 1989 is given in Table 1.

Table 1: Distribution of Expected Duration of Stay of Guest-Workers 1984 - 1989

Duration	1984	1985	1986	1987	1988	1989	1984 - 89
Short-term	25	20	20	18	14	13	19
Medium-term	19	22	22	21	19	15	20
Long-term	24	28	28	28	30	31	28
Permanent	31	30	30	33	37	40	33
Σ	1098	872	786	741	667	504	4668

*Note:* Numbers are percentages; due to rounding errors column sums may differ from 100.

The last line gives the number of individuals in each wave; this number declines over the observation period due to both return migration and other forms of sample attrition (non-response).

The table shows that the distribution of expected durations of stay has shifted to the long-term and permanent categories over the observation period. This may either have resulted from a change in the composition of foreigners due to return-migration or changes in expectations due to the lengthening of an individual's actual duration of stay or changes in other factors which determine return migration. Re-migration behaviour in 1984 was affected by the "return-promotion act" of 1983 which ruled that claimants of benefits paid for early re-migration had to leave Germany by September 1984 (see Hönekopp, 1987). This could explain the relatively high proportion of guest-workers falling into the short-term category in that year.

Following the literature on return migration referred to in the introduction we include the following groups of variables as potential determinants of an immigrant's expected duration of stay in the model;

<sup>1</sup> Restricting the analysis to temporary stayers and correcting for the resulting potential selectivity-bias with respect to the decision to stay permanently does not seem a feasible alternative, as both decisions depend on the same variables. Identification could therefore only be achieved by functional form, i.e. the non-linearity of the selectivity-correction term, which seems to be a problematic approach (see, e.g., Rendtel, 1992).

- *Personal characteristics*: sex, age, nationality, education, marital status, children in different age groups, disability;
- *Assimilation indicators*: years since migration, second generation dummy, children abroad, spouse abroad, language, subjective evaluation of well-being in Germany, owner of apartment/house;
- *Transfers*: yearly amount of transfers to home country, differentiated by kind of transfers;
- *Income variables*: labour earnings of household head, other net household income;
- *Labour Market Situation*: unemployment of household head and spouse; household head's cumulated unemployment duration within the last year.

Definitions of variables and summary statistics are contained in Table 2, where variables refer to mean values within the observation period 1984 - 1989. To make efficient use of the information in the sample we work with an unbalanced panel design of the first six waves of the SOEP. Thus individuals are included in the sample with the number of observations for an individual corresponding to the waves he or she has taken part in the panel.

Table 2. Definition of Variables and Summary Statistics

Variable	Variable Definition	Mean / Proportion	Standard deviation
<i>Dependent Variable</i>			
ESTAY_ST	Expected duration of stay in Germany = short term	19.0	-.-
ESTAY_MT	= medium term	20.1	-.-
ESTAY_LT	= long term	27.9	-.-
ESTAY_PT	= permanent	33.0	-.-
<i>Personal characteristics</i>			
SEX	Female = 1	8.6	-.-
AGE	Years of age	42.9	9.8
AGE50	Years of age above 50 years = 1	24.0	-.-
NATY	Nationality = Yugoslavia	23.3	-.-
NATG	= Greece	13.4	-.-
NATI	= Italy	21.7	-.-
NATS	= Spain (base category = Turkey)	12.3	-.-
EDUC_LOW	Low education	30.0	-.-
EDUC_HIGH	High education (base category = no degree)	13.0	-.-
MARRIED	Married = 1	84.2	-.-
CHILD_5	Child up to 5 y. in household present = 1	25.5	-.-
CHILD_15	Child between 6 and 15 years = 1	46.4	-.-
CHILD_18	Child between 16 and 18 years = 1	19.2	-.-
CHILD_19	Child older than 18 years present = 1	24.0	-.-
DISABLED	Disabled = 1	5.8	-.-

Table 2 continued

<i>Integration indicators</i>			
YSM	Years since migration to Germany	17.2	5.4
SECGEN	Belonging to second generation = 1	1.7	-.
SPOUSE_A	Spouse living in home country = 1	6.1	-.
CHILD_A	Children living in home country = 1	12.7	-.
SPEAK_B	Knowledge of mother tongue = bad	0.9	-.
SPEAK_G	= good; (base category = sufficient)	95.1	-.
GSPEAK_B	Knowledge of spoken German = bad	17.3	-.
GSPEAK_G	= good; (base category = sufficient)	44.0	-.
FEEL_B	Subjective evaluation of well-being in Germany = bad	5.5	-.
FEEL_G	= good (base category = indifferent)	68.2	-.
OWNER	Owner of a house/apartment in Germany	6.5	-.
<i>Transfers</i>			
TRANSF	Last year's transfers to home country (1000 Marks)	2.7	5.1
TRANSF_FAM	Transfers to support family at home	1.4	2.9
TRANSF_SAV	Transfers to build up savings at home (base category = for other reasons)	0.7	3.4
<i>Income variables</i>			
HHLINC	Monthly net labour income of household head (1000 Marks)	1.7	1.0
RHINC	Other monthly net household income (1000 Marks)	1.1	1.6
<i>Labour Market Situation</i>			
UNEMP	Household head unemployed at date of interview = 1	7.4	-.
UNEMP_DUR	UNEMP interacted with cumulated unemployment duration within last year, DUR	0.5	2.2
SPUNEMP	Spouse unemployed = 1	3.3	-.
# individuals = 1330; # observations = 4668			

While most of the variables are self-explanatory, given the above discussion on the determinants of return migration, some may warrant some further comments.

- Since the number of female household heads is rather low in our sample we did not split the sample by gender or experiment with interacting this variable with other variables in the model, but control for sex by simply including a gender dummy as an explanatory variable in the model.
- Age is interacted with a dummy variable with a value of one for individuals older than 50 years, and zero otherwise, to take into account potential differences in behaviour of older guest-workers.



- The variable `SECGEN` takes on a value of one if the foreigner attended primary school in Germany which implies that he or she either has been born in Germany or migrated at a very early age.
- Besides the overall amount of last year's transfers to the home country we also distinguish transfers by two types with *for other reasons* as base category. `TRANS_FAM` is an indicator for *social integration*, `TRANS_SAV` for the savings motive mentioned above.
- The household head's net monthly labour income is interacted with dummies for nationality to allow for different effects of earnings on an individual's expected duration of stay in Germany.
- Gross net household income is divided into household head's net labour income and other income of the household to allow for differences in behaviour with respect to this variable. The latter variable also contains interest income on savings and thus acts as a proxy for household wealth.
- The household head's cumulated duration of unemployment is calculated by adding the duration of all unemployment spells within the twelve months before the date of interview in each wave, where spells may be both left and right censored. This variable is interacted with an individual's employment status at the date of interview. Thus, past unemployment duration has only an effect on an individual's expected duration of stay if he or she is unemployed at the date of interview. This variable also enters with its square to allow for non-linear effects of unemployment duration.

Finally, note that for the following reasons we do not include potential earnings or indicators for macroeconomic conditions in guest-workers' home countries as potential determinants for their expected duration variables in Germany. First, there is no information on a guest-workers expected earnings in the home country, and even simple measures of average earnings or macroeconomic indicators such as such as unemployment, inflation, profitability etc. are not readily available for all source countries under consideration. Secondly, the importance a guest-worker attaches to the latter indicators depends to a large extent on his or her economic and social status back home. Thirdly, even if these indicators were available it is not obvious that they would give much more information than simply including dummies for time, nationality and some interaction terms, which we have done for the earnings variable (see below).

### 3. Econometric Specification

The purpose of the econometric model described in this section is to explain a guest-workers intention to stay in Germany. As argued in the previous section we do not observe an exact indicator for this intention, but only know whether or not an individual's expected duration of stay falls within one of four broad categories measured on an ordinal scale, i.e. short-term, medium-term, long-term and permanent. Individual decisions can therefore be described by a discrete choice model with an ordered response variable. The econometric model takes into account both the nature of the dependent variable as an ordered categorical variable and individual effects by exploiting the panel structure of our data base, which should contribute to more efficient parameter estimates.

We model an individual's intention to re-migrate in period  $t$  as a continuous latent variable,  $y_{it}^*$ , given by

$$(1) \quad y_{it}^* = \beta' x_{it} + u_{it} \quad i = 1, 2, \dots, N; \quad t = 1, 2, \dots, T_i$$

where  $x_{it}$  is a vector of  $K$  explanatory variables (not including a constant),  $\beta$  a corresponding coefficient vector and  $u_{it}$  an error term which is composed of a time-constant individual effect,  $\varepsilon_i$ , and an error component,  $\omega_{it}$ , which varies both between individuals and over time, i.e.

$$(2) \quad u_{it} = \varepsilon_i + \omega_{it}$$

$$\text{with } \varepsilon_i \sim N(0, \sigma_\varepsilon^2); \quad \omega_{it} \sim N(0, \sigma_\omega^2)$$

$$E(\varepsilon_i, \omega_{jt}) = 0 \quad \forall i, j, t; \quad E(\omega_{it}, \omega_{j't'}) = 0 \quad \forall i, j, t' \neq t$$

$$u_{it} \sim N(0, \sigma_u^2) \quad \text{with } \sigma_u^2 = \sigma_\varepsilon^2 + \sigma_\omega^2$$

where  $N$  denotes the normal distribution function. The error components are assumed to be uncorrelated with  $x_{it}$ ,  $\forall i, t$ .

Since in period  $t$  we only observe individuals who have not re-migrated, our sample is selected with respect to the actual re-migration decision, which gives rise to a potential self-selectivity bias. Given that there are only very few re-migrants in each single year within the observation period and that the potential selectivity bias resulting from the exclusion of return migrants therefore seems of minor quantitative importance, we do not attempt to correct for it here<sup>2</sup>. Hence, we implicitly assume that sample attrition due to return migration (and for other reasons as well) occurs at random.

Let  $y_i$  be an indicator variable with values  $y_i = 1, 2, 3, 4$  and define constants  $\alpha_l$ ,  $l = 0, 1, 2, 3, 4$ , with  $\alpha_0 = -\infty$  and  $\alpha_4 = +\infty$ . For convenience the time index is neglected for the moment. The probability,  $\Pr$ , that an individual's intention to re-migrate falls in one of the four categories defined above is, after normalization, given by (see, e.g., Maddala, 1983: 47)

$$(3) \quad \Pr(y_i = 1) = \Phi(\tilde{\alpha}_1 - \tilde{\beta}' x_i)$$

$$\Pr(y_i = 2) = \Phi(\tilde{\alpha}_2 - \tilde{\beta}' x_i) - \Phi(\tilde{\alpha}_1 - \tilde{\beta}' x_i)$$

$$\Pr(y_i = 3) = \Phi(\tilde{\alpha}_3 - \tilde{\beta}' x_i) - \Phi(\tilde{\alpha}_2 - \tilde{\beta}' x_i)$$

$$\Pr(y_i = 4) = 1 - \Phi(\tilde{\alpha}_3 - \tilde{\beta}' x_i)$$

where  $\Phi$  is the standard normal distribution function and  $\tilde{\alpha}_l = \alpha_l / \sigma_u$ ,  $\tilde{\beta} = \beta / \sigma_u$ . Note that we have assumed equality of  $\sigma_u^2$  in each period here.

<sup>2</sup> Another reason why we do not attempt to correct for sample attrition here is that a standard two-step selectivity-correction procedure would also potentially lead to inconsistent parameter estimates due to the non-linearity of the equation for the expected duration of stay discussed below.

Given the assumptions on the error components in eq. (2) define an ordered probit model. The likelihood function for period  $t$  can be written as

$$(4) \quad L_t = \prod_{i=1}^N \prod_{l=1}^4 \left( \Phi(\tilde{\alpha}_{i,t} - \tilde{\beta}'_l x_{i,t}) - \Phi(\tilde{\alpha}_{i-1,t} - \tilde{\beta}'_l x_{i,t}) \right)^{\delta_{it}}$$

$$\text{with } \delta_{it} = \begin{cases} 1 & \text{if } y_i \text{ falls into category } l \text{ in period } t \\ 0 & \text{otherwise} \end{cases}$$

The likelihood function for the whole sample is then simply given by multiplying the period-specific likelihood functions, i.e.

$$(5) \quad \bar{L} = \prod_{t=1}^{T_i} L_t$$

where  $T_i$  is the number of periods individual  $i$  is observed in the sample.  $T_i$  varies across individuals due to sample attrition.

Given the distributional assumptions in (2), consistent estimates of the  $\beta$  coefficients can either be obtained by maximizing the likelihood function in eq. (4) for a single cross-section or the likelihood function in eq. (5) for the pooled sample. Following Chamberlain (1984) more efficient estimates can be obtained if the correlation between the error terms is taken into account by the following two-stage estimation procedure.

In the first step, consistent estimates for  $\beta_i$  based on eq. (4) are obtained for each single cross section. Then, an estimate for the asymptotic variance-covariance matrix of  $\beta = (\beta_1, \dots, \beta_T)$  is calculated which is given by

$$(6) \quad V(\hat{\beta}) = \Lambda = (D' \Psi^{-1} D)^{-1}$$

with  $D_i = -\partial^2 \ln L_i / \partial \beta_i \partial \beta_i'$

where  $D = \text{diag}\{D_1, \dots, D_T\}$

and  $\Psi = (\Psi_{s,t})_{s,t=1}^T$

$$\text{with } \Psi_{s,t} = E \left[ \left( \partial \ln L_s / \partial \beta_s' \right) \left( \partial \ln L_t / \partial \beta_t' \right)' \right]$$

$\Psi_{s,t}$  is estimated by the corresponding empirical sample moments,  $D_i$  can be calculated by exploiting the fact that the information matrix and the inverse of the variance-covariance matrix are asymptotically equivalent.

In the second step, this estimated variance-covariance matrix is then used as weighing matrix in the minimum distance estimation, where the following function is minimized

$$(7) \quad \min_{\theta} \left[ \hat{\beta} - g(\theta) \right]' \hat{\Lambda}^{-1} \left[ \hat{\beta} - g(\theta) \right]$$

where  $\theta$  is the  $(K \times 1)$  coefficient vector in the panel probit and  $g(\theta) = \iota \otimes \theta$ , with  $\iota$  a  $(T \times 1)$  vector of ones. Note that the  $\alpha_{it}$  do not enter eq. (7) and are thus allowed to vary between cross sections. In this way, we try to control for changes in the economic environment affecting all individuals between different time periods in a

similar way as including time dummies in a pooled regression model, which is not possible here due to the specification of the ordered probit model.

A consistent estimate of the variance-covariance matrix of  $\theta$  is given by

$$(8) \quad (\hat{\theta}) = (\hat{G}'\hat{\Lambda}^{-1}\hat{G})$$

with  $\hat{G} = \partial \mathcal{L}(\hat{\theta}) / \partial \theta$ .

Tests of hypotheses can be based on the distance function, DIS, in equation (9) evaluated at  $\hat{\theta}$  which follows a  $\chi^2$  distribution with  $k$  degrees of freedom equal to the number of variables in the model. The test statistic is

$$(9) \quad DIS_{H_1} - DIS_{H_0} \sim \chi^2(k_{H_1} - k_{H_0})$$

where  $H_0$  is the null and  $H_1$  the alternative hypothesis.

#### 4. Empirical Results

Following the two-stage estimation procedure outlined in the previous section we first estimated reduced-form ordered-probit models for each year separately and then corrected the variance-covariance matrix based on these estimates in the second step. The estimated coefficient of a particular explanatory variable show the relative effect of this variable on the intensity to re-migrate, i.e. on  $y_{it}^*$ . Estimation results for the random effects ordered Probit Model are given in Table 3. For the sake of comparison, estimation results for the simple pooling model are given in Table A1 in the appendix. Note that we have included time dummies for 1985 to 1989, with 1984 as reference period in the pooled model in order to allow for changes in the economic environment affecting all individuals similarly.

For most variables the two estimation procedures yield qualitatively similar results. Since the random effects panel probit model gives more efficient parameter estimates than the simple pooling model without requiring too severe additional assumptions, we prefer the former specification and restrict the following discussion to the estimation results summarized in Table 3.

Table 3. Determinants of Expected Duration of Stay; Panel Random Effects Ordered Probit Model, 1984 - 1989

Variable	Coefficient	t	$\chi^2$ (d.o.f.)
<i>Personal Characteristics</i>			
SEX	0.1214	1.32	
AGE	0.0020	0.03	] 23.97*
AGESQ/100	-0.0153	0.17	
AGE50	0.0348	0.83	] 49.02*
AGE50SQ/100	-0.0808	2.24*	
NATY	0.2169	1.97*	
NATG	-0.0652	0.45	
NATI	0.1171	0.97	
NATS	0.0307	0.19	

Table 3 continued

EDUC_LOW	0.0739	1.30	
EDUC_HIGH	0.1462	1.96*	
MARRIED	-0.0552	0.79	
CHILD_5	-0.0141	0.26	
CHILD_15	0.1505	2.83*	
CHILD_16	-0.0388	0.74	
CHILD_19	0.1140	2.00*	
DISABLED	0.0335	0.38	
<i>Integration indicators</i>			
YSM	0.0179	0.95	] 40.31* (2)
YSMSQ/100	0.0259	0.47	
SECGEN	-0.2392	1.08	
SPOUSE_A	-0.0751	0.75	
CHILD_A	-0.2561	3.82*	
SPEAK_B	0.1220	0.61	
SPEAK_G	-0.0762	1.01	
GSPEAK_B	-0.2111	3.99*	
GSPEAK_G	0.1819	4.04*	
FEEL_B	-0.1996	2.82*	
FEEL_G	0.1814	4.36*	
OWNER	0.3510	3.12*	
<i>Transfers</i>			
TRANSF	-0.0245	4.00*	
TRANSF_FAM	-0.0073	0.90	
TRANSF_SAV	0.0027	0.33	
<i>Income variables</i>			
HHLINC	-0.0343	0.78	] 29,40* (4)
HHLINC_Y	0.0311	0.58	
HHLINC_G	-0.0128	0.17	
HHLINC_I	0.0116	0.20	
HHLINC_S	0.0613	0.78	
RHINC	-0.0235	1.73*	
<i>Labour Market Situation</i>			
UNEMP	-0.2724	1.98*	] 14,56* (2)
UNEMP_DUR	0.0595	1.25	
UNEMP_DURSQ	-0.0034	0.95	
SPUNEMP	-0.2364	2.65*	
Distance-statistic: $\chi^2(42) = 300.23$ ; # observations = 4668			

Note: Test statistics are marked by an asterisk if significant at the 5% level

To start with the personal characteristics, the effect of gender on an individual's expected duration of stay is statistically insignificant, which may be due to the relatively small number of female household heads in our sample. As shown by the  $\chi^2$ -tests in the last column in the table both age variables and their squares are statistically significant. For both age groups the age effect is negative within the relevant range, where the negative effect is much stronger for the older age group.

Thus, the implied age pattern is consistent with the hypothesis that the probability of return migration increases as guest-workers approach the retirement age.

Relative to Turks national differences are only significant for guest-workers from Yugoslavia who intend to stay longer in Germany. Higher education also increases an individual's expected duration of stay significantly, which can be explained by the more restricted transferability of specific human capital to the home country. While being married with the spouse living in Germany has no statistically significant effect on this variable, the presence of children in the age groups of 6 to 15 years increases the household head's expected duration of stay significantly. The latter result can be explained by the desire of guest-workers with young children to have them completed school in Germany. On the other hand, having grown-up children (older than 18 years) in Germany increases the expected duration of stay of the household head. Given that most second-generation foreigners in this age group do not intend to return to their parents' home country, this result is compatible with the hypothesis that older household heads chose their residence within a household context, which implies that the number of permanent stayers among guest-workers will increase with the proportion of second-generation foreigners in Germany<sup>3</sup>. Whether or not a guest-worker has severe health problems and has officially been testified as disabled does not affect his remigration decision. As the provision of health care in Germany is well developed relative to the source countries this is a somewhat unexpected result, given that we control for potential intervening factors, unemployment in particular.

Turning to the assimilation indicators, we find that the expected duration of stay in Germany increases, at an increasing rate, with years since migration. This result strongly supports the hypothesis that guest-workers become the more integrated into German society the longer they have been in Germany. Somewhat surprisingly, belonging to the "second generation", i.e. having either been born or attended primary school in Germany, seems to have no significant effect on an individual's expected duration of stay, which is probably due to the small number of individuals falling into this category.

While having a spouse in the home country does not per se affect a guest-workers re-migration decision significantly, having children abroad has a strong negative effect on his or her expected duration of stay in Germany, as expected. As these two variables are strongly correlated their effects should be interpreted together as joint influence of having a family in the home country. The result that knowledge of the mother tongue does not significantly affect an individual's decision to re-migrate is probably due to the small number of foreigners in our sample with only a poor knowledge of their spoken mother tongue. In contrast, knowledge of the German language, which seems to be a strong indicator for integration in society, has a relatively strong effect. Similarly, a guest-worker's subjective feeling in Germany has a strong effect on his intention to stay or return. Finally, owning a house or apartment in Germany has a very strong positive effect on a foreigner's expected duration of stay. This, too, is compatible with the hypothesis that the

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<sup>3</sup> The importance of the link between the first and the second generation of guest-workers in Germany for the duration of stay of the former is also stressed by Backhaus-Maul/Vogel (1992) referring to recent research on the social integration of older guest-workers in Germany.

more integrated a guest-worker is in German society the longer his or her expected duration of stay.

As expected, the higher a guest-worker's transfers to the home country the shorter his or her expected duration of stay in Germany. This result complements the one reported in a study by Dustmann (1992) who showed that a dummy variable for transfers has a positive effect on a guest-worker's expected duration of stay in Germany, but did not consider how this effect varies with the amount transferred. In order to test whether the effect differs between transfers to support the family and transfers to build up savings at home we have distinguished between these two possibilities, but found no statistically significant difference between them.

Given our specification of the interaction terms of the household head's labour income with the dummies for nationality, estimation results show that the effect of labour income is not statistically significant for Turks, while for the other groups the interaction terms are jointly significant. Adding the coefficient on HHINC and the respective coefficient on the interaction terms, which gives the overall effect of this variable on an individual's expected duration of stay, shows that for Italians and Greeks the effect is not much different from that for the Turks, virtually zero for guest-workers from Yugoslavia and positive for Spaniards. These differences may arise from different situations between home countries, i.e. differences in earnings differentials, and/or nation-specific responses to earnings differentials. As we do not observe potential earnings in the home countries these effects cannot be identified. It should also be noted that the effects of both HHINC and the interaction terms may not be estimated very accurately as these variables are strongly correlated with YSM and the dummies for nationality. Other net household income, RHINC, significantly reduces an individual's expected duration of stay. Given that this variable also includes interest income on wealth and thus acts as a proxy for savings this result is compatible with the hypothesis that the re-migration decision is influenced by the savings motive.

Being unemployed at the date of interview lowers an individual's expected duration of stay significantly, a result which has also been obtained by Dustmann (1992) who interprets it as contradictory to the assertion that unemployed guest-workers will not re-migrate as long as they can draw unemployment benefits. Given this interpretation, it seems natural not only to include the employment status at the date of interview but also an individual's cumulated duration of unemployment within a reference period as explanatory variable in the model if he or she is unemployed at the date of interview. In order to allow for non-linear effects of this variable its square is also included in the regression. Both interaction variables are jointly significant and imply that for durations up to approximately nine months the effect on the expected duration of stay is positive and then becomes negative. Although this result qualifies the above finding somewhat, for its interpretation one has to take into account that an individual's employment status and the duration variable are highly correlated. Finally, there is strong evidence for the hypothesis that unemployment of the spouse also affects the decision of the household head to re-migrate.

## 5. Summary and Conclusion

We have analyzed guest-workers' expected duration of stay in Germany within an econometric model taking into account the important distinction between permanent and temporary stayers, where the expected duration of stay for the latter has been differentiated in short-term, medium-term and long-term stayers. The model has been estimated for household heads on the first six waves of the German Socio-Economic Panel taking advantage of the panel structure of our data base to obtain efficient parameter estimates.

The estimation results show that, besides certain personal characteristics, in particular age, nationality and education, the family context has an important influence on the household head's expected duration of stay in Germany. Both the presence of children who have not yet completed school and grown-up children increase the expected duration of stay of the household head significantly. Other indicators for the degree of a guest-worker's integration in German society, such as years since migration, the ability to speak German, the subjective feeling of well-being associated with the stay in Germany, whether or not the household head has a child in the home country, and whether or not he or she owns property in Germany, also affect individual re-migration decisions significantly. On the other hand we find that the higher the amount of money a guest-workers transfers to his or her home country the shorter the expected duration of stay. We also find that the effect of the household head's labour income differs between source countries, and that the higher other household income the shorter the expected duration of stay. Finally, an important result is that a guest-worker's labour market position, in particular the state and duration of unemployment, has significant effects on an individual's expected duration of stay in Germany.

Given that individual expectations are on average correct and/or determine actual re-migration behaviour, these results should contribute to an understanding of the determinants of observed future outflows of migrants, which seems important for the implementation of an effective migration policy.



## Appendix

Table A1. Determinants of Expected Duration of Stay;  
Pooled Ordered Probit Model, 1984 - 1989

Variable	Coefficient	t	$\chi^2$ (d.o.f.)	
Personal Characteristics				
SEX	0.1030	1.53	] 11.58* (2) ] 39.60* (2)	
AGE	-0.0441	1.68		
AGESQ	0.0436	1.26		
AGE50	-0.0049	0.30		
AGE50SQ	-0.0391	2.58*		
NATY	0.3030	5.65*		
NATG	-0.2059	3.32*		
NATI	0.0572	1.09*		
NATS	0.0584	0.91		
EDUC_LOW	0.0705	1.88		
EDUC_HIGH	0.0540	1.07		
MARRIED	-0.0510	0.93		
CHILD_5	-0.0682	1.58	] 47.10* (2)	
CHILD_15	0.1323	3.44*		
CHILD_16	0.0349	0.74		
CHILD_19	0.1165	2.43*		
DISABLED	0.1183	1.65		
Integration indicators				
YSM	-0.0041	0.32		
YSMSQ	0.0897	2.48*		
SECGEN	0.0044	0.03		
SPOUSE_A	-0.1006	1.28		
CHILD_A	-0.2980	5.46		
SPEAK_B	-0.3060	0.17		
SPEAK_G	-0.1219	1.60		
GSPEAK_B	-0.2502	5.26		
GSPEAK_G	0.1848	4.80*		
FEEL_B	-0.1693	2.36*		
FEEL_G	0.2364	6.16*		
OWNER	0.5165	6.72*		
TRANSF	-0.0312	5.33*		
TRANSF_FAM	-0.0031	0.38		
TRANSF_SAV	0.0057	0.83		
Income variable				
HHLINC	0.0744	0.54	] 11.82* (4)	
HHLINC_Y	0.1114	0.97		
HHLINC_G	-0.0227	0.36		
HHLINC_I	-0.2261	2.17*		
HHLINC_S	0.3543	2.27*		
RHINC	-0.0289	2.44*		

Table A1 continued

<i>Labour Market Situation</i>			
UNEMP	-0.2515	1.79	
UNEMP_DUR	0.0070	0.14	] 4.4 ] (2)
UNEMP_DURSQ	0.0016	0.42	
SPUNEMP	-0.1874	2.15*	
<i>Year Dummies</i>			
DUM 85	0.0175	0.35	
DUM 86	-0.0015	0.03	
DUM 87	0.0415	0.78	
DUM 88	0.1507	2.64*	
DUM 89	0.2279	3.60*	

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Likelihood-ratio statistic: -  $\chi^2(47) = 907,94$ ; # observations = 4668

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*Note:* Test statistics are marked by an asterisk if significant at the 5 % level

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