Rev Econ Household (2011) 9:45–67
DOI 10.1007/s11150-009-9082-5

Determinants of savings and remittances: empirical evidence from immigrants to Germany

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Received: 1 September 2008 / Accepted: 13 November 2009 / Published online: 8 December 2009

Abstract This paper investigates the determinants of migrants' financial transfers to their home country using German data. A double-hurdle model is applied to analyze the determinants of the propensity to send transfers to the country of origin and the amount of transfers. The findings reveal that return intentions positively affect financial transfers of immigrants to their home country. The results of a decomposition analysis suggest that only a small part of the gap in financial transfers between temporary and permanent migrants can be attributed to differences in observable characteristics.

Keywords International migration · Savings · Remittances · Double-hurdle model · Decomposition analysis

JEL Classifications F22 · C34 · D12 · D91

1 Introduction

Due to the increasing relevance of international migration, the economic performance of migrants has become an important factor for both immigration and sending countries. In the receiving countries, the economic situation of the foreign-born population and the economic and societal integration of immigrant minorities into the host-countries' society have become a matter of intense debate among economists and policy makers (Fertig and Schmidt 2002; Zimmermann 2005). At the same time, the economic situation of migrants affects their remittances, which

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have grown to the largest source of external funding in many emigration countries (World Bank 2006a).

The economic literature on the performance of immigrants concentrates predominantly on the analysis of earnings and employment status (Chiswick 1978; Borjas 1994; Bauer et al. 2005). Only a few studies have examined wealth accumulation patterns of immigrants in their home countries (Amuedo-Dorantes and Pozo 2006), although migrants' savings in their country of origin may represent a substantial or even the major part of their overall financial transfers (Brown 1994). An investigation of such a long-run indicator of economic well-being may be relevant, because the capacity of immigrants to accumulate wealth in their home countries does not only reflect their economic performance in the host country, but also allows drawing inferences about their future economic situation.

According to the World Bank (2006a), remittances exceeded $US 233 billion worldwide in 2005. Moreover, recorded remittance flows to developing countries have doubled between 2000 and 2005, indicating a substantial increase in payments of migrants to their families in the source country. The traditional development literature has largely focused on the size and potential impact of migrants' remittances (Adams 1992; Durand et al. 1996). In addition, a sizeable theoretical and empirical literature has revealed that a variety of motives may induce migrants to send remittances to their countries of origin (Lucas and Stark 1985; Bernheim et al. 1985; Cox 1987; Cox and Rank 1992; Cox et al. 1987; Ilahi and Jafarey 1999; Amuedo-Dorantes and Pozo 2006).

Germany, a major immigration country in the European Union, represents an excellent example for the analysis of the importance of migrants' savings in the home country and their remittances. During the 1960s and early 1970s immigration to Germany was characterized by labor migration, mainly from South European countries (such as Italy, Spain, Greece, Turkey and Yugoslavia). West Germany pursued a policy of active "guest worker" recruitment to fill an acute shortage of low-skilled labor. Although the guest workers were expected to return to their countries of origin after their contracts expired, many of them decided to stay in Germany permanently (Bauer et al. 2005). These immigrants were typically very different in education, cultural background and motivation to their high-skilled European counterparts that migrated to the United States after the Second World War. Since about 1.5 million immigrants in Germany will reach retirement age within the next 15 years, their savings (both in Germany and the country of origin) and their return intentions may have a strong impact on the German pension system. Even though the majority of the foreign-born population does not originate from developing countries, immigrants residing in Germany remit a substantial part of their income. In 2004, remittance flows from Germany amounted to $US 10.4 billion (World Bank 2006b). A sizeable part of these transfers consists of savings-related remittances of temporary migrants (Merkle and Zimmermann 1992). Despite its importance, only a few studies consider savings as a relevant part of migrants' transfers to their home country.

This paper aims at providing empirical evidence on the relative importance of the determinants of migrants' transfers to their countries of origin, paying particular attention to return intentions. In the empirical analysis, which is based on data from

the German Socio-Economic Panel (SOEP), the determinants of savings in the country of origin and payments to family members and other persons to the source country are being examined. The paper contributes to the existing literature in several respects. First, while most of the studies on remittances concentrate on migrants' payments to developing countries, the analysis focuses on remittances of migrants from traditional labor-exporting countries, such as Turkey, Italy and Greece as well as refugees originating from former Yugoslavian countries. Second, in addition to migrants' payments to family members in their countries of origin—which are typically addressed by the literature on remittances—the analysis of German data allows an explicit consideration of migrants' savings in their home countries as a relevant part of their overall transfers. Bauer and Sinning (2009) demonstrate that immigrants—especially those who intend to stay in Germany permanently—save considerably less than comparable natives. This in turn may result in an increased utilization of the German social security system by immigrants. Against this background, this paper investigates the savings behavior of immigrants in their countries of origin. Third, a double-hurdle model is applied to assess the effects of relevant determinants on the individual decision to send transfers to the country of origin and the amount of transfers. Finally, utilizing information on migrants' return intentions, the gap in financial transfers between temporary and permanent migrants is decomposed into a part that may be explained by differences in observed characteristics and a part attributable to different coefficients.[1]

The empirical findings reveal that return intentions positively affect financial transfers of immigrants to their home country. Moreover, while the effect of the household size on migrants' transfers to the country of origin turns out to be significantly negative, remittances are higher if close relatives live in the sending country. The estimates further suggest that both savings and remittances vary substantially across countries of origin. The estimates of a decomposition analysis reveal that only a small part of the gap in financial transfers between temporary and permanent migrants can be attributed to differences in observable characteristics, indicating substantial behavioral differences between the two groups. Finally, the relatively low savings rate of permanent migrants in their countries of origin suggests that the German welfare system may face additional unforeseen burdens in the coming years.

2 Determinants of savings and remittances

An extensive literature provides theoretical and empirical evidence on general motives behind migrants' remittances and identifies relevant determinants. Stark (1985) were the first to note that—in addition to altruism—a variety of motives could play a decisive role in determining remittances. They considered the strategy

[1] Immigrants are being asked whether they intend to return to their country of origin or whether they intend to stay in Germany permanently. This information is utilized to distinguish between "temporary" and "permanent" migrants.

to secure inheritance and the desire to invest in assets at home as "pure self-interest" and designated the motives behind remittances that were based on implicit contractual agreements between migrant and family as "tempered altruism or enlightened self-interest". These motives could include, for example, the repayment of loans or payments that insure the migrant against income losses in the host country.

Several studies have provided evidence in support of these hypotheses. Bernheim et al. (1985) suggest that family members in the sending country may use their possibility of depriving migrants of their rights to inheritance to secure remittances. At the same time, expectations about future bequests may induce migrants to send remittances to their home country. Cox (1987) argues that altruism and exchange (such as repayments of educational costs or the purchase of services) are major motives behind migrants' remittances. Cox and Rank (1992) find empirical patterns for inter-vivos transfers (i.e. transfers between living persons) that are more consistent with exchange than altruism. Ilahi and Jafarey (1999) provide evidence on repayments of loans aimed at financing international migration. Finally, Amuedo-Dorantes and Pozo (2006) demonstrate that migrants do not only send remittances to their home country to insure family members against income losses (Coate and Ravallion 1993) but also to insure themselves.

Although a sizeable literature has attempted to discriminate between various motivations to remit, empirical evidence on migrants' savings in their countries of origin is rather scarce. However, a number of studies has highlighted the relevance of these savings. Amuedo-Dorantes and Pozo (2002), for example, compare wealth accumulation patterns of immigrants in the United States to those of comparable natives. They find that immigrants save significantly less than comparable natives and argue that the apparent lower precautionary savings of immigrants may be caused by the fact that immigrants engage in precautionary saving by remitting parts of their income to their home countries. Merkle and Zimmermann (1992) investigate migrants' savings in the host country as well as remittances using data from the German Socio-Economic Panel (SOEP). They find that return intentions significantly affect migrants' remittances but do not influence their savings behavior. Based on these results, they conclude that temporary migrants hold savings mainly in their home countries.

Most empirical studies on remittances have focused on income effects to assess the degree of altruism that may be inferred from the migrants' behavior. The pure altruism hypothesis, which postulates unity of the transfer-income derivative, could be rejected by several studies on transfers in developed and undeveloped economies (Cox 1987; Cox et al. 1987; Altonji et al. 1997). In addition to income, migrants' transfers are likely to be affected by income risks. Following the literature on risk-diversification within families (Stark 1991), Dustmann (1997) demonstrates that immigrants may accumulate more precautionary savings than comparable natives if they face high income uncertainties on the labor market of their host country. Amuedo-Dorantes and Pozo (2006) show that income risks may increase migrants' insurance payments to their countries of origin to smooth future consumption after remigration.

Against this background, the objective of the following analysis is to generate empirical evidence on the effect of relevant determinants on migrants' financial transfers to their countries of origin. Since some factors may have different effects on the propensity to send transfers to the country of origin and the amount of transfers, a double-hurdle model is applied, which allows a separate consideration of the underlying stochastic processes. Particular attention is paid to differences between temporary and permanent migrants. In order to isolate the part of the gap in financial transfers between temporary and permanent migrants caused by differences in observed characteristics from the part attributable to different coefficients, a Blinder-Oaxaca decomposition is employed.

3 Empirical strategy, data, descriptive statistics

3.1 Modeling participation and level decisions

Empirical studies on savings and remittances typically apply a binary Probit model to investigate the effects of relevant determinants on the propensity to save or remit and use a Tobit model to account for the censored nature of the outcome variable when modeling the amount of savings or remittances (Merkle and Zimmermann 1992; Rodriguez 1996; Cox et al. 1987). An important shortcoming of the Tobit model, however, is that zero values are considered as corner solution outcomes although the stochastic process that describes the individual decision to send transfers to the source country may differ considerably from the one that governs the decision about the amount of transfers. Specifically, in the context of savings and remittances, the use of the Tobit model implies that an interior solution occurs if the interest rate is sufficiently high or the price of sending transfers to the country of origin is sufficiently low (see also Yen et al. 1997). Since a sizeable part of the immigrant population never sends financial transfers to the source country (regardless of prices, interest rates and income), such "non-participation" decisions have to be considered in addition to corner solution outcomes.

A model that may be applied if the participation decision and the level of the dependent variable are determined by different stochastic processes is the double-hurdle model, which represents a generalization of the Tobit model. The double-hurdle model extends the Tobit model by allowing for a separate *first hurdle* that reflects the (binary) participation decision. Assuming that the error terms of the stochastic processes of level and participation decisions are uncorrelated leads to the independent double-hurdle model, while the dependent double-hurdle model accounts for the possible correlation between the two error terms. As a result of the presence of continuous observations on the dependent variable, exclusion restrictions are not required for a separate identification of the stochastic processes of the independent double-hurdle model (Blundell and Meghir 1987). To derive the double-hurdle model with independent error terms, consider latent participation d^* and level y^* as linear functions of the first-hurdle regressor $\mathbf{z}$ and the second-hurdle regressor $\mathbf{x}$:

$$d^* = \mathbf{z}'\boldsymbol{\alpha} + \omega, \tag{1}$$

$$y^* = \mathbf{x}'\boldsymbol{\beta} + \varepsilon, \tag{2}$$

with error terms $\omega \sim N(0, 1)$ and $\varepsilon \sim N(0, \sigma_\varepsilon^2)$. $\boldsymbol{\alpha}$ and $\boldsymbol{\beta}$ are the parameter vectors to be estimated. Since the double-hurdle model is based on the assumption that the error terms are normally distributed, the inverse hyperbolic sine (IHS) transformation (Burbidge et al. 1988) of the observed dependent variable is frequently applied (Yen and Jones 1997). The IHS transformation is given by

$$\begin{aligned} T(y) &= \log(\theta y + (\theta^2 y^2 + 1)^{1/2})/\theta \\ &= \sinh^{-1}(\theta y)/\theta, \end{aligned} \tag{3}$$

where θ represents an additional model parameter. The IHS transformation approximates $\log(y)$ for large values of y. In the empirical analysis, it is assumed that $\theta = 1$. The IHS double-hurdle model may be written as

$$\begin{aligned} T(y) &= \mathbf{x}'\boldsymbol{\beta} + \varepsilon \text{ if } \mathbf{z}'\boldsymbol{\alpha} + \omega > 0 \text{ and } \mathbf{x}'\boldsymbol{\beta} + \varepsilon > 0 \\ &= 0 \text{ otherwise.} \end{aligned} \tag{4}$$

The likelihood function of the independent IHS double-hurdle model is

$$\begin{aligned} L = &\prod_{i \in \Omega_0} \left\{ 1 - \Phi(\mathbf{z}'\alpha)\Phi\left(\frac{\mathbf{x}'\beta}{\sigma_\varepsilon}\right) \right\} \\ &\times \prod_{i \in \Omega_1} \left\{ \frac{1}{\sqrt{1 + \theta^2 y^2}} \Phi(\mathbf{z}'\boldsymbol{\alpha}) \frac{1}{\sigma_\varepsilon} \Phi\left[\frac{T(y) - \mathbf{x}'\boldsymbol{\beta}}{\sigma_\varepsilon}\right] \right\}, \end{aligned} \tag{5}$$

where $\Omega_0 = \{i | y_i = 0\}$, $\Omega_0 = \{i | y_i \neq 0\}$ and $\Omega_0 \cup \Omega_1 = \{1, 2, ..., N\}$. When $\theta = 0$, the likelihood function reduces to that of the independent double-hurdle model (Cragg 1971; Blundell and Meghir 1987).

The marginal effects of the IHS double-hurdle model are given by the derivation of the unconditional mean with respect to the explanatory variables. The unconditional mean of y consists of the probability of y being uncensored and the conditional mean of y:

$$E(y) = P(y > 0)E(y|y > 0), \tag{6}$$

where

$$P(y > 0) = \Phi(\mathbf{z}'\alpha)\Phi\left(\frac{\mathbf{x}'\beta}{\sigma_\varepsilon}\right) \tag{7}$$

and

$$E(y|y > 0) = \Phi\left(\frac{\mathbf{x}'\beta}{\sigma_\varepsilon}\right)^{-1} \int_0^\infty \frac{y}{\sigma_\varepsilon \sqrt{1 + \theta^2 y^2}} \Phi\left[\frac{T(y) - \mathbf{x}'\boldsymbol{\beta}}{\sigma_\varepsilon}\right] dy. \tag{8}$$

The standard errors for the marginal effects may be derived using mathematical approximation (Fuller 1987).

3.2 Decomposition analysis

In order to provide a comprehensive descriptive analysis of behavioral differences between temporary and permanent migrants, particular attention is paid to the isolation of the part of the gap in transfers to the home country that can be explained by differences in socioeconomic characteristics from the part attributable to differences in coefficients using the decomposition method proposed by Blinder (1973) and Oaxaca (1973). To perform this decomposition, the empirical models are estimated separately for temporary (t) and permanent (p) migrants. For the linear regression models of groups $g = (t, p)$,

$$y_g^* = \mathbf{x}_g' \gamma_g + \eta_g, \tag{9}$$

Blinder (1973) and Oaxaca (1973) propose the decomposition[2]

$$\overline{y}_t^* - \overline{y}_p^* = (\overline{\mathbf{x}}_t - \overline{\mathbf{x}}_p)' \widehat{\gamma}_t + \overline{\mathbf{x}}_p' (\widehat{\gamma}_t - \widehat{\gamma}_p). \tag{10}$$

Bauer and Sinning (2008) show that a decomposition of the outcome variable similar to Eq. 10 is not appropriate for nonlinear regression models, because the conditional expectations $E(y_g|\mathbf{x}_g)$ may differ from $\overline{\mathbf{x}}_g' \widehat{\gamma}_g$. They propose to decompose the mean difference of y using conditional expectations evaluated at different coefficient estimates, i.e.

$$\begin{aligned} \Delta_{tp} &= E_{\gamma_t}(y_t|\mathbf{x}_t) - E_{\gamma_p}(y_p|\mathbf{x}_p) \\ &= [E_{\gamma_t}(y_t|\mathbf{x}_t) - E_{\gamma_t}(y_p|\mathbf{x}_p)] + [E_{\gamma_t}(y_p|\mathbf{x}_p) - E_{\gamma_p}(y_p|\mathbf{x}_p)]. \end{aligned} \tag{11}$$

To apply this decomposition to different nonlinear models, one has to estimate the sample counterparts $S(\widehat{\gamma}_g, \mathbf{x}_g)$ and $S(\widehat{\gamma}_h, \mathbf{x}_g)$ of the conditional expectations $E_{\gamma\_g}(y_g|\mathbf{x}_g)$ and $E_{\gamma\_h}(y_g|\mathbf{x}_g)$ for $g, h = (t, p)$ and $g \neq h$. In the empirical analysis, the decomposition results of Probit, Tobit and double-hurdle models will be reported. Appendix A illustrates the application of the decomposition for these models.

3.3 Data

The following empirical analysis utilizes data from the German Socio-Economic Panel (SOEP). The SOEP is a representative longitudinal study including German and immigrant households residing in the old and new German states which started in 1984. In 2005, more than 20,000 persons in about 12,000 households were sampled. The panel contains information about socioeconomic and demographic characteristics, household composition, occupational biographies, etc. The analysis is restricted to immigrant workers between 18 and 65 years. Immigrants are defined as foreign-born persons who immigrated to Germany since 1948. Due to the small number of observations, the sample does not include ethnic migrants from Central and Eastern Europe who received German citizenship after immigration. Since less

[2] Note that an alternative decomposition exists for Eq. 10. The choice of the decomposition equation, however, did not affect the results of the empirical analysis qualitatively. Consequently, the estimates of the alternative decomposition are not presented in this paper. They are available from the author upon request.

than two percent of the migrant population in the sample lives in East Germany, the analysis concentrates on immigrants residing in West Germany. Moreover, the year 1984 is not considered in the regression analysis because lag variables have to be generated for some of the explanatory variables of the model.

The SOEP contains detailed information about transfers of foreigners to their home country between 1984 and 1995. Immigrants were asked initially whether they sent any financial transfers to their home country. This information could be used to construct an indicator variable that differentiates between "participants" and "non-participants". Additionally, the amount of three types of transfers is observed from 1984 to 1995, namely savings for later, support for the family and other remittances.[3] After 1995, only the amount of transfers to persons in the countries of origin is available. Therefore, the analysis is limited to the examination of this rather general outcome measure between 1996 and 2005. Since participation and level decisions were again surveyed separately, a dummy variable indicating whether immigrants sent remittances to their countries of origin could also be constructed for the sample period 1996–2005.[4]

The set of explanatory variables considered in the empirical analysis include socioeconomic and demographic characteristics (age, gender, current and permanent income, the variation in past income streams and the number of years of education), household composition characteristics (household size, marital status and variables indicating whether the spouse or the children live in the source country) and migration background variables (return intentions, years since migration and indicator variables for different source countries). Since economic theory suggests that wealth accumulation depends on permanent rather than current income, the empirical models do not only include the current net income but also a measure of permanent income.[5] Moreover, the standard deviation of the average net income of the last five years is used as a proxy variable for income risk. In general, it may be expected that migrants are more likely to send transfers to the source country if they face higher income risks in their host country (Amuedo-Dorantes and Pozo 2006).

Since all kinds of transfers may be observed for both temporary and permanent migrants, differences between the two groups are taken into account in the empirical analysis. Specifically, since the SOEP provides information on return intentions of immigrants, temporary migrants may be defined as the group of migrants who intend to return to their country of origin, while permanent migrants may be considered as the group of migrants who intend to stay in Germany forever. An

[3] Specifically, foreign persons were asked the following: "In < last year > did you personally send or take money to your homeland?"—*no/yes*; "total in < last year > "—*amount*; "and how is this amount distributed?"—*support for my family/savings for later/other*.

[4] Specifically, persons were asked the following about payments to a foreign country: "In the last year, have you given any payments or financial support to relatives or other persons outside of this household?—*your parents/parents-in-law; your children (and son/daughter-in-law); separated/divorced wife/husband; other relatives; unrelated persons; no, I made none of these types of payments.*

[5] Similar to Blau and Graham (1990), permanent income was proxied using a measure of predicted current income.

indicator variable for return intentions is added to the empirical models to assess differences in savings and remittances between temporary and permanent migrants.

Following the contribution of Lucas and Stark (1985), empirical studies have shown that the marital status and the household size and composition in the migrants' home and host country are important determinants of remittances (Hodinott 1994; de la Briere et al. 2002). For that reason, the set of explanatory variables includes information about the household composition, such as the household size and the marital status. Unfortunately, the SOEP does not contain information about the household size of immigrants in their home country. Instead, dummy variables indicating whether the spouse or children of the respondent live in the country of origin are considered. To avoid causality problems, lag variables are used for some of the explanatory variables in the regression models.

Both savings and remittances may vary substantially across countries of origin, because the migration process leads immigrants to be a highly selected group of individuals (Borjas 1987). Funkhouser (1995) demonstrates that the self-selection of immigrants may have a decisive influence on their remittances. The savings behavior may also be affected by the cultural background (Carroll et al. 1994, 1999). To account for variations across countries of origin, the empirical models include source country indicators. The sample is restricted to immigrants from OECD member countries and former Yugoslavian countries. Source country indicators were generated for immigrants from major traditional labor-exporting countries, namely Turkey, Italy and Greece as well as for immigrants from former Yugoslavia.[6]

Finally, in addition to source country variations, differences between immigration cohorts may exist. Specifically, migrants' remittances typically decline as the duration of residence in the host country increases (DeVoretz and Vadean 2005), while wealth levels of more established immigrants in their host countries tend to be higher than those of more recent immigration cohorts (Bauer et al. 2009), suggesting that the length of stay in the host country may have positive effects on migrants' savings in the source country. In the empirical analysis, differences between immigration cohorts are considered by controlling for the number of years since migration. After excluding all observations with missing values on one of the variables used in the analysis, the panel data set contains 8,559 person-year-observations of 1,657 individuals for the period 1985–1995 and 5,493 person-year-observations of 1,250 persons for the period 1996–2005.

3.4 Descriptive statistics

The descriptive statistics presented in Table 1 point to substantial disparity in both the propensity to send financial transfers to the country of origin and the amount of transfers of temporary and permanent migrants. Specifically, 7.8% of the migrants who intend to return send savings to their country of origin, while the corresponding

[6] A detailed description of the definition of all variables used in the analysis is given in Appendix B (Table 2).

Table 1 Savings and remittances

	Temporary migrants		Permanent migrants	
	Mean	Standard deviation	Mean	Standard deviation
1985–1995				
Proportion of migrants saving in the source country	0.078	0.268	0.028	0.166
Savings in the source country	29.31	173.72	8.03	85.85
Savings in the source country if > 0	376.50	507.38	282.73	428.55
Proportion of migrants sending remittances to family members in the source country	0.341	0.474	0.271	0.444
Payments to family members	85.53	184.75	62.19	162.22
Payments to family members if > 0	251.06	242.19	229.66	242.46
Proportion of migrants reporting to send any financial transfers to the source country	0.459	0.498	0.336	0.472
N	5,565		2,994	
1996–2005				
Proportion of migrants sending remittances to persons in the source country	0.210	0.407	0.156	0.363
Payments to persons in the source country	42.88	134.03	27.34	105.03
Payments to persons in the source country if > 0	204.23	229.53	175.39	211.85
Proportion of migrants reporting to send any financial transfers to the source country	0.226	0.418	0.182	0.386
N	2,276		3,217	

proportion of permanent migrants is only 2.8%. Moreover, the share of temporary migrants who report remittances to their home country over the period 1985–1995 is 7.0 percentage points higher than the corresponding share of permanent migrants. Although a lower proportion of migrants reports remittances after 1995, this gap still amounts to 5.4 percentage points. While temporary migrants save on average almost 30 € per month in their home country, the average amount of permanent migrants is less than 10 € Given that positive values are being reported, the average amount of savings of temporary migrants is about 376 € (22.4% of the current net income), while permanent migrants save about 283 € (17.4% of the current net income) in their home country. Both conditional and unconditional amounts of remittances of temporary migrants are higher than those of permanent migrants. The conditional amount of remittances as a fraction of household net income is 18.9% among temporary migrants and 16.6% among permanent migrants over the period 1985–1995. After 1995, the corresponding proportions amount to 17.1% for temporary and 11.8% for permanent migrants. Finally, the share of temporary migrants who report to send any financial transfers to the country of origin is higher than the corresponding share of permanent migrants in both sample periods.

4 Results

This section presents Probit, IHS Tobit and IHS double-hurdle estimates of migrants' savings and remittances.[7] In addition to the IHS double-hurdle model with independent error terms, a dependent IHS double-hurdle model (Yen and Jones 1997) was estimated. Wald tests were performed to test the dependency of the stochastic processes of the double-hurdle model. The test results reveal that participation and level equations are independent for all types of transfers. The corresponding estimates of the correlation coefficients of the dependent IHS double-hurdle models confirm these findings. Consequently, the following tables include the estimates of the independent rather than those of the dependent IHS double-hurdle model. To investigate whether the independent IHS double-hurdle model is more appropriate in modeling migrants' transfers to the source country than the IHS Tobit model, the test procedure proposed by Vuong (1989) was applied (see also Yen 2005). In all cases, the results of the Vuong-tests indicate that the double-hurdle model represents a more suitable way of modeling migrants' financial transfers than the Tobit model.[8]

Table 2 includes the estimates of the determinants of migrants' savings surveyed between 1985 and 1995. The marginal effects of the different models denote the size and direction of the impact of the explanatory variables. The marginal effects of the double-hurdle model, which were evaluated at the means of the independent variables, indicate the effect of a change in one of the explanatory variables on participation, conditional mean and unconditional mean of the dependent variable, respectively.[9]

The Probit estimates in Table 2 reveal substantial disparity in the propensity to save and the amount of savings of temporary and permanent migrants. The marginal effect indicates that the probability of temporary migrants to accumulate wealth in their home country is 4.0 percentage points higher than the corresponding probability of permanent migrants—even after controlling for other relevant determinants. The Probit estimates further provide evidence for a positive transfer-age profile which is consistent with the implications of the inter-temporal consumption model.[10] A higher current net income increases the propensity to save, while the effect of variations in past income streams is negative, suggesting that income risks seem to reduce rather than increase the propensity to accumulate wealth in the home country. Even after controlling for current income, permanent income has an additional effect on the propensity to save, indicating that permanent income has a strong influence on migrants' decision to accumulate wealth in the country of origin. Both the marginal effects of the length of education and the household size are significantly negative. The estimates further exhibit that the propensity of migrants to save in their home country

[7] All estimates are weighted using weights provided by the SOEP. Standard errors are adjusted to take repeated observations of households into account.

[8] All test results and the underlying estimates are available from the author upon request.

[9] The marginal effects are not strictly defined for binary explanatory variables. The reported values are actually changes in the dependent variable in response to the change in the binary variable from zero to one.

[10] The inter-temporal consumption model postulates an inverted U-shaped savings-age profile. However, including a squared function of age in the empirical model and calculating the marginal effect as a linear combination of age coefficients did not change the marginal effect.

Table 2 Probit, IHS Tobit and independent IHS double-hurdle estimates: Savings in the source countries—1985–1991, 1993, 1995

	Probit		Tobit		Double-hurdle					
					Participation		Conditional expectation		Unconditional expectation	
	Marginal effect	*t*-value	Marginal effect	*t*-value	Marginal effect	*t*-value	Marginal effect	*t*-value	Marginal effect	*t*-value
Intended return migration$_{(t-1)}$	0.040	7.45	0.201	4.51	0.035	4.44	0.188	1.07	0.216	4.52
Age	0.001	2.53	0.003	0.87	0.001	0.89	−0.003	−0.52	0.003	0.83
Female	0.180	2.40	0.752	0.75	0.116	0.82	1.017	0.97	0.797	0.85
Current income × 10^2	0.002	4.17	0.008	1.51	0.001	1.45	0.025	1.84	0.009	1.61
Variation in past income streams × 10^2	−0.002	−1.87	−0.002	−0.32	−0.001	−0.38	0.119	3.08	0.002	0.31
Permanent income × 10^2	0.025	2.96	0.109	1.42	0.018	1.41	0.181	1.05	0.120	1.49
Years of education	−0.021	−3.28	−0.097	−1.75	−0.017	−1.74	−0.101	−0.78	−0.105	−1.79
Household size	−0.005	−2.97	−0.021	−1.24	−0.003	−1.19	−0.087	−1.67	−0.025	−1.39
Married	0.014	1.81	0.083	1.06	0.014	1.01	0.177	0.71	0.091	1.10
Spouse lives in the source country$_{(t-1)}$	−0.013	−1.01	−0.053	−0.48	−0.009	−0.45	0.026	0.09	−0.053	−0.44
Children live in the source country$_{(t-1)}$	0.021	2.45	0.093	1.15	0.015	1.14	0.031	0.17	0.094	1.14
Years since migration	−0.001	−0.02	0.006	1.09	0.001	1.03	0.021	1.32	0.007	1.17
Country of origin: Turkey	−0.009	−1.19	−0.061	−0.80	−0.011	−0.86	0.218	1.02	−0.057	−0.69
Country of origin: Italy	−0.026	−3.32	−0.163	−2.67	−0.029	−2.60	0.047	0.19	−0.172	−2.48
Country of origin: Greece	−0.024	−3.00	−0.185	−4.24	−0.034	−4.08	−0.061	−0.24	−0.202	−4.04
Country of origin: Ex-Yugoslavia	−0.015	−1.82	−0.143	−2.40	−0.025	−2.40	0.058	0.26	−0.150	−2.24

Notes: Number of observations: 8,559. Weighted estimates based on weights provided by the SOEP. Standard errors are adjusted in order to take repeated observations of households into account. The regression further includes year dummies. Vuong-test of unweighted independent IHS double-hurdle model vs. unweighted IHS Tobit model: $z = 21.67$, $P > z = 0.000$

is substantially higher if children live in the sending country. Finally, the estimates point to substantial disparity in wealth accumulation of immigrants from different countries of origin. Specifically, turkish immigrants are significantly more likely to save in their home country than immigrants from other traditional sending countries. The different propensities may either be attributed to cultural differences (for example, turkish immigrants may prefer saving in Turkey because of better access to Islamic Banking) or different financial incentives (such as high interest rates).

The estimates of the Tobit model in Table 2 suggest that the conditional savings gap between temporary and permanent migrants is about 20 percentage points. While the marginal effects of the source country indicators suggest that average turkish migrants save higher amounts in their home country than migrants from Italy, Greece or former Yugoslavian countries, the marginal effects of all other variables are insignificant, indicating that socioeconomic and demographic characteristics do not explain variations in the amount of savings in the country of origin. The estimates of the double-hurdle model largely confirm the findings of the Probit and Tobit estimates with regard to return intentions and cross-country variations. However, in contrast to the Probit model, the estimates of the participation equation suggest that socioeconomic and demographic characteristics of immigrants play a minor role in explaining the propensity to save in the country of origin. Moreover, the estimates of the conditional expectation exhibit a significantly positive effect of variations in past income streams on the amount of savings, suggesting that income risks seem to increase the amount of savings in the source country. Finally, the "overall" marginal effects of the unconditional expectation indicate that return intentions and cross-country variations are the major determinants of migrants' savings in their home country.

Tables 3 and 4 contain the estimates of payments to family members (1985–1995) and payments to persons in the source countries (1996–2005), respectively. The marginal effects of return intentions suggest that temporary migrants are more likely to remit and remit a higher amount to family members than comparable permanent migrants. The effects are also larger than the corresponding effects of return intentions on savings (Table 2). The estimates of both Tobit and double-hurdle models presented in Table 3 exhibit a gap of more than 40 percentage points between temporary and permanent migrants, while the corresponding gap in Table 4 is about 28 percentage points for the double-hurdle model.

The estimates in Table 3 suggest that age increases both the propensity to remit and the amount of remittances. Moreover, current income turns out to be a strong predictor of migrants' payments to family members, while the marginal effects of permanent income are insignificant. The household size in Germany has a significantly negative effect on both the propensity to remit and the amount of remittances. In contrast, remittances are more likely and significantly higher if close relatives live in the source countries. The results further exhibit substantial heterogeneity across countries of origin. Finally, while the Probit estimates in Table 4 have the expected signs and levels of significance in most cases, the estimates of the Tobit and the double-hurdle model are only significant for source country indicators and variables describing the household composition.

The estimates presented in Tables 2, 3 and 4 reveal substantial differences in the propensity and the amount of migrants' transfers to their countries of origin. In order to

Table 3 Probit, IHS Tobit and independent IHS double-hurdle estimates: payments to family members in the source countries—1985–1991, 1993, 1995

	Probit		Tobit		Double-hurdle					
					Participation		Conditional expectation		Unconditional expectation	
	Marginal effect	*t*-value	Marginal effect	*t*-value	Marginal effect	*t*-value	Marginal effect	*t*-value	Marginal effect	*t*-value
Intended return migration$_{(t-1)}$	0.076	7.09	0.413	3.88	0.072	3.45	0.269	3.52	0.478	3.88
Age	0.006	10.34	0.046	5.16	0.008	4.96	0.013	2.26	0.051	5.11
Female	−0.169	−1.75	0.121	0.07	0.012	0.04	−0.530	−0.48	−0.087	−0.05
Current income × 10^2	0.008	6.36	0.055	2.99	0.010	3.18	0.012	0.90	0.061	3.06
Variation in past income streams × 10^2	−0.005	−2.38	−0.054	−1.61	−0.010	−1.55	0.007	0.37	−0.057	−1.54
Permanent income × 10^2	−0.012	−0.73	0.114	0.40	0.019	0.37	−0.038	−0.22	0.098	0.31
Years of education	0.003	0.26	−0.093	−0.45	−0.019	−0.50	0.094	0.70	−0.080	−0.35
Household size	−0.023	−6.78	−0.144	−2.92	−0.025	−2.80	−0.093	−2.48	−0.166	−3.02
Married	0.009	0.59	−0.067	−0.30	−0.021	−0.49	0.146	1.05	−0.073	−0.30
Spouse lives in the source country$_{(t-1)}$	0.261	8.25	0.749	2.28	0.164	2.48	0.526	3.86	1.144	2.84
Children live in the source country$_{(t-1)}$	0.314	16.51	1.705	6.64	0.299	6.85	0.394	5.26	1.879	7.07
Years since migration	−0.005	−4.60	−0.026	−1.47	−0.004	−1.48	−0.011	−1.16	−0.030	−1.62
Country of origin: Turkey	0.164	8.06	1.429	4.44	0.255	4.99	−0.142	−0.90	1.381	4.67
Country of origin: Italy	−0.067	−3.38	0.025	0.07	−0.001	−0.01	0.316	1.74	0.089	0.25
Country of origin: Greece	0.168	7.60	1.302	2.77	0.205	3.21	0.110	0.67	1.199	3.20
Country of origin: Ex-Yugoslavia	0.224	10.55	1.962	4.59	0.320	5.80	0.015	0.10	1.795	5.57

Notes: See notes to Table 2. Vuong-test of unweighted independent IHS double-hurdle model vs. unweighted IHS Tobit model: $z = 48.69$, $P > z = 0.000$

Table 4 Probit, IHS Tobit and independent IHS double-hurdle estimates: payments to persons in the source countries—1996–2005

	Probit		Tobit		Double-hurdle					
					Participation		Conditional expectation		Unconditional expectation	
	Marginal effect	*t*-value	Marginal effect	*t*-value	Marginal effect	*t*-value	Marginal effect	*t*-value	Marginal effect	*t*-value
Intended return migration$_{(t-1)}$	0.054	5.29	0.238	1.94	0.047	1.91	0.159	1.00	0.276	1.97
Age	0.002	4.08	0.004	0.67	0.001	0.50	0.015	1.36	0.005	0.83
Female	−0.284	−3.38	−1.077	−1.34	−0.222	−1.49	2.009	0.91	−0.969	−1.14
Current income × 10^2	0.001	1.50	0.009	0.95	0.001	0.80	0.015	1.18	0.010	0.95
Variation in past income streams × 10^2	0.001	0.21	−0.032	−0.98	−0.006	−1.04	0.033	0.92	−0.030	−0.85
Permanent income × 10^2	−0.052	−3.06	−0.192	−1.08	−0.039	−1.11	0.315	0.88	−0.160	−0.80
Years of education	0.037	2.96	0.175	1.35	0.036	1.41	−0.233	−0.88	0.157	1.09
Household size	−0.028	−6.47	−0.146	−2.90	−0.029	−2.83	−0.041	−0.53	−0.161	−2.77
Married	0.069	4.78	0.378	2.81	0.081	2.79	−0.225	−0.92	0.412	2.64
Spouse lives in the source country$_{(t-1)}$	0.272	5.92	0.421	0.93	0.082	0.98	0.438	0.81	0.540	1.02
Children live in the source country$_{(t-1)}$	0.060	2.28	0.697	1.14	0.127	1.18	0.431	1.98	0.795	1.29
Years since migration	−0.002	−3.12	−0.006	−0.96	−0.001	−0.85	−0.012	−0.94	−0.008	−1.04
Country of origin: Turkey	0.081	4.67	1.173	3.00	0.206	3.36	0.465	1.91	1.208	3.23
Country of origin: Italy	−0.123	−6.91	−0.169	−0.72	−0.036	−0.76	0.521	1.36	−0.128	−0.46
Country of origin: Greece	0.017	0.82	0.793	2.13	0.135	2.31	0.278	1.09	0.794	2.31
Country of origin: Ex-Yugoslavia	0.195	10.22	1.604	3.75	0.269	4.39	0.318	1.38	1.537	4.25

Notes: See notes to Table 2. Number of observations: 5,493. Vuong-test of unweighted independent IHS double-hurdle model vs. unweighted IHS Tobit model: $z = 27.90$, $P > z = 0.000$

Table 5 Decomposition analysis—temporary vs. permanent migrants

	1985–1995		1996–2005
	Savings	Remittances	Remittances
$\widehat{\Delta}^{\text{Probit}}$	0.049 [0.000]	0.068 [0.000]	0.044 [0.020]
Explained Part	0.006 [0.002] (13.8)	0.023 [0.010] (34.9)	0.011 [0.221] (25.9)
Unexplained Part	0.042 [0.000] (86.2)	0.044 [0.003] (65.1)	0.032 [0.109] (74.1)
$\widehat{\Delta}^{\text{Tobit}}$	0.279 [0.000]	0.402 [0.000]	0.298 [0.000]
Explained Part	−0.140 [0.111] (−50.2)	−0.022 [0.766] (−5.5)	−0.058 [0.561] (−19.5)
Unexplained Part	0.420 [0.000] (150.2)	0.425 [0.002] (105.5)	0.357 [0.035] (119.5)
$\widehat{\Delta}^{\text{Double-Hurdle}}$	0.321 [0.000]	0.543 [0.000]	0.337 [0.000]
Explained Part	0.048 [0.002] (15.1)	0.233 [0.000] (43.0)	0.033 [0.345] (10.1)
Unexplained Part	0.273 [0.000] (84.9)	0.309 [0.000] (57.0)	0.303 [0.000] (89.9)
N_t	5,565	5,565	2,276
N_p	2,994	2,994	3,217

Notes: Bootstrapped (50 replications) *P*-values in brackets. Percentages of the raw differential are reported in parentheses

distinguish the part of these differences that is caused by different socioeconomic characteristics from the part attributable to different coefficients, a Blinder-Oaxaca decomposition is applied. Table 5 reports the decomposition results based on Probit, Tobit and double-hurdle estimates for the different types of transfers.[11] In all cases, the predicted raw gap between temporary and permanent migrants is significantly positive, confirming the results of the estimates presented in Tables 2, 3 and 4. Moreover, the decomposition results suggest that a major part of the gap is explained by differences in coefficients rather than differences in observed characteristics, indicating that temporary and permanent migrants have different preferences for sending transfers to their countries of origin. The decomposition results of the Probit model, for example, show that 86.2% of the raw differential in the propensity to save may be attributed to differences in coefficients, while the part that is due to differences in observed characteristics is only 13.8%. The explained part of the savings gap is even negative for the Tobit model, suggesting that higher savings would have been expected for permanent migrants, given their advantageous characteristics. Finally, the decomposition results of the double-hurdle model reveal that about 85% of the savings gap and about 60–90% of the gap in remittances may be attributed to behavioral differences.[12]

Overall, the behavioral differences revealed by the decomposition analysis suggest that migration motives are in line with migrants' preferences for sending transfers to their countries of origin. While financial transfers of temporary migrants are higher and more likely than those of permanent migrants, only a small part of the differences

[11] The underlying estimates of the decomposition analysis in Table 5 are available upon request.

[12] This result is in line with Glytsos (1997) who investigates the remittance behavior of Greek immigrants in Germany and Australia and differentiates between temporary and permanent migrants. He finds that remittances of Greek immigrants in Germany constitute obligatory income streams to close relatives in Greece, while remittances of permanent migrants are considered as voluntary gifts.

between the two groups can be explained by different observable characteristics.[13] At the same time, the relatively low savings rate of permanent migrants suggests that the German welfare system may face additional unforeseen burdens in the coming years. Empirical evidence on the savings behavior of temporary and permanent migrants in Germany suggests that permanent migrants save significantly less than natives (Bauer and Sinning 2009) and hence it must be feared that they have not accumulated sufficient savings for the time of their retirement. The relatively low savings rates of permanent migrants in their countries of origin may contribute additionally to an increased utilization of the German social security system.

5 Conclusions

This paper provides empirical evidence on the relative importance of the determinants of migrants' transfers to their country of origin, paying particular attention to return intentions. In the empirical analysis, which is based on data from the German Socio-Economic Panel (SOEP), the determinants of different types of transfers are being investigated. In addition to Probit and Tobit models, a double-hurdle model is applied to assess the effects of different determinants on both the migrants' propensity to send transfers to the source country and the amount of transfers. Vuong-tests suggest that the double-hurdle model represents the correct specification for the analysis of migrants' savings and remittances rather than the conventional Tobit model usually applied in the literature.

The empirical analysis reveals that return intentions positively affect financial transfers of immigrants to their country of origin. The household size turns out to have a significantly negative impact on migrants' transfers, indicating that migrants with children do not seem to have the financial capacity to send remittances to the country of origin. The estimates further suggest that both the propensity to remit and the level of remittances are significantly higher if close relatives live in the country of origin. Moreover, both savings and remittances vary substantially across countries of origin. The results of a decomposition analysis reveal that only a relatively small part of the gap in financial transfers between temporary and permanent migrants can be attributed to differences in observed characteristics, exhibiting substantial behavioral differences between temporary and permanent migrants. This result implies that migration motives are in line with migrants' preferences for sending transfers to their countries of origin. At the same time, the relatively low savings rate of permanent migrants indicates that the German welfare system may face additional unforseen burdens in the coming years.

Acknowledgements The author is grateful to Thomas Bauer, Julian Fennema, Paul Frijters, John Haisken-DeNew, Torge Middendorf, Harald Tauchmann and Florin Vadean for helpful comments on an earlier draft of this paper. Financial support of the German Israeli Foundation (G.I.F. Research Grant No. G-989-232.4/2007) is gratefully acknowledged.

[13] In fact, the descriptive statistics presented in Appendix-Table 1 reveal that differences in observable characteristics between temporary and permanent migrants are rather small.

Appendix A: methods and formulas

Probit decomposition

The binary Probit model of the groups $g = (t, p)$ may be written in the form of a latent regression model, i.e.

$$d_{ig}^{*} = \mathbf{x}_{ig}'\delta_g + \vartheta_{ig} \quad i = 1, \ldots, N_g, \quad \sum_g N_g = N,$$

where d_{ig}^{*} is unobserved. Instead of d_{ig}^{*}, only the following realizations are observed:

$$d_{ig} = \begin{cases} 0 & \text{if} \quad d_{ig}^{*} \leq 0, \\ 1 & \text{if} \quad d_{ig}^{*} > 0. \end{cases}$$

Given that the error term ϑ is homoscedastic and normally distributed across observations ($i = 1, ..., N_g$), the conditional expectation of d_{ig} evaluated at the parameter vector δ_g is

$$E_{\delta_g}(d_{ig}|\mathbf{x}_{ig}) = \Phi(\mathbf{x}_{ig}'\delta_g),$$

where $\Phi(\cdot)$ is defined as the cumulative standard normal distribution. After estimating the parameter vector δ_g, the sample counterparts of the single components of the decomposition equation may be written as

$$S(\widehat{\delta}_g, \mathbf{x}_{ig}) = \frac{1}{N_g}\sum_{i=1}^{N_g} \Phi(\mathbf{x}_{ig}'\widehat{\delta}_g).$$

The sample counterpart of $E_{\delta_h}(d_{ig}|\mathbf{x}_{ig}), S(\widehat{\delta}_h, \mathbf{x}_{ig})$, is obtained by replacing $\widehat{\delta}_g$ with $\widehat{\delta}_h$ in the equation above, where $g, h = (t, p)$ and $g \neq h$. The sample counterparts can be used to calculate the decomposition equation of the Probit model:

$$\widehat{\Delta}^{\text{Probit}} = [S(\widehat{\delta}_t, \mathbf{x}_{it}) - S(\widehat{\delta}_t, \mathbf{x}_{ip})] + [S(\widehat{\delta}_t, \mathbf{x}_{ip}) - S(\widehat{\delta}_p, \mathbf{x}_{ip})],$$

where the first term on the right-hand side displays the part of the gap between temporary and permanent migrants attributable to differences in the characteristics $\mathbf{x}$ and the second term the part that is caused by different coefficients δ.

Tobit decomposition

The Tobit model may be written in the following form:

$$y_{ig}^{*} = \mathbf{x}_{ig}'\lambda_g + v_{ig} \quad i = 1, \ldots, N_g, \quad \sum_g N_g = N, \text{ where}$$

$$y_{ig} = \begin{cases} 0 & \text{if} \quad y_{ig}^{*} \leq 0, \\ y_{ig}^{*} & \text{if} \quad y_{ig}^{*} > 0. \end{cases}$$

Assuming homoscedastic and normal distributed error terms, the conditional expectation of y_{ig} evaluated at the parameter vector λ_g consists of the probability of y_{ig} being uncensored and the expectation of y_{ig} given positive values, i.e.

$$\begin{aligned} E(y_{ig}|\mathbf{x}_{ig}) &= P(y_{ig} > 0|\mathbf{x}_{ig})E(y_{ig}|y_{ig} > 0, \mathbf{x}_{ig}) \\ &= \Phi\left(\frac{\mathbf{x}'_{ig}\lambda_g}{\sigma_{v_g}}\right)\mathbf{x}'_{ig}\lambda_g + \sigma_{v_g}\Phi\left(\frac{\mathbf{x}'_{ig}\lambda_g}{\sigma_{v_g}}\right), \end{aligned}$$

where σ_{v_g} denotes the standard error of v_g and $\phi(\cdot)$ represents the standard normal density function. Given the estimates of the parameters λ_g and σ_{v_g}, the sample counterpart of this expression is

$$S(\widehat{\lambda}_g, \mathbf{x}_{ig}) = \frac{1}{N_g}\sum_{i=1}^{N_g}\Phi\left(\frac{\mathbf{x}'_{ig}\widehat{\lambda}_g}{\widehat{\sigma}_{v_g}}\right)\mathbf{x}'_{ig}\widehat{\lambda}_g + \widehat{\sigma}_{v_g}\Phi\left(\frac{\mathbf{x}'_{ig}\widehat{\lambda}_g}{\widehat{\sigma}_{v_g}}\right).$$

Similar to the Probit model, the sample counterparts may be used to estimate the components of the decomposition equation:

$$\widehat{\Delta}^{\text{Tobit}} = [S(\widehat{\lambda}_t, \mathbf{x}_{it}) - S(\widehat{\lambda}_t, \mathbf{x}_{ip})] + [S(\widehat{\lambda}_t, \mathbf{x}_{ip}) - S(\widehat{\lambda}_p, \mathbf{x}_{ip})].$$

Double-hurdle decomposition

The conditional expectation of y_{ig} evaluated at the parameter vectors β_g and α_g of the independent double-hurdle model described in Sect. 3 may be written as

$$\begin{aligned} E_{\beta_g,\alpha_g}(y_{ig}|\mathbf{x}_{ig}) &= P(y_{ig} > 0|\mathbf{x}_{ig})E(y_{ig}|y_{ig} > 0, \mathbf{x}_{ig}) \\ &= \left[\Phi\left(\frac{\mathbf{x}'_{ig}\beta_g}{\sigma_{\varepsilon_g}}\right)\mathbf{x}'_{ig}\beta_g + \sigma_{\varepsilon_g}\Phi\left(\frac{x'_{ig}\beta_g}{\sigma_{\varepsilon_g}}\right)\right]\Phi\left(\mathbf{z}'_{ig}\alpha_g\right), \end{aligned}$$

where σ_{ε_g} is the standard error of the model error term ε_g. The sample counterpart can be obtained by estimating the model parameters β_g, α_g and σ_{ε_g} for the two groups and calculating the following expression:

$$S(\widehat{\beta}_g, \mathbf{x}_{ig}) = \frac{1}{N_g}\sum_{i=1}^{N_g}\left[\Phi\left(\frac{\mathbf{x}'_{ig}\widehat{\beta}_g}{\widehat{\sigma}_{\varepsilon_g}}\right)\mathbf{x}'_{ig}\widehat{\beta}_g + \widehat{\sigma}_{\varepsilon_g}\Phi\left(\frac{\mathbf{x}'_{ig}\widehat{\beta}_g}{\widehat{\sigma}_{\varepsilon_g}}\right)\right]\Phi(\mathbf{z}'_{ig}\widehat{\alpha}_g).$$

Then the resulting decomposition equation of the double-hurdle model is given by

$$\widehat{\Delta}^{\text{Double-Hurdle}} = [S(\widehat{\beta}_t, \mathbf{x}_{it}) - S(\widehat{\beta}_t, \mathbf{x}_{ip})] + [S(\widehat{\beta}_t, \mathbf{x}_{ip}) - S(\widehat{\beta}_p, \mathbf{x}_{ip})].$$

Appendix B—Tables

(See Tables 6 and 7)

Table 6 Descriptive statistics

Variable	Temporary migrants		Permanent migrants	
	Mean	Standard deviation	Mean	Standard deviation
1984–1995				
Socioeconomic characteristics				
Age	41.4	10.2	40.6	10.3
Female	0.302	0.459	0.301	0.459
Current income	1268	467	1273	467
Variation in past income streams	150.0	230.2	157.1	201.6
Permanent income	1194	332	1230	334
Years of education	9.3	1.8	9.6	2.0
Household composition				
Household size	3.5	1.6	3.5	1.6
Married	0.781	0.413	0.735	0.442
Spouse lives in the source country	0.071	0.257	0.072	0.259
Children live in the source country	0.116	0.320	0.066	0.249
Migration background				
Years since migration	19.2	5.6	20.0	6.3
Country of origin: Turkey	0.431	0.495	0.419	0.493
Country of origin: Italy	0.187	0.390	0.195	0.397
Country of origin: Greece	0.119	0.324	0.067	0.250
Country of origin: Ex-Yugoslavia	0.205	0.404	0.274	0.446
N	5,565		2,994	
1996–2005				
Socioeconomic characteristics				
Age	44.2	10.3	43.2	10.8
Female	0.351	0.477	0.307	0.461
Current income	1402	814	1492	739
Variation in past income streams	166.9	199.3	174.2	246.6
Permanent income	1263	359	1354	359
Years of education	10.1	2.6	10.9	2.7
Household composition				
Household size	3.3	1.4	3.4	1.5
Married	0.793	0.406	0.798	0.402
Spouse lives in the source country	0.032	0.177	0.011	0.105
Children live in the source country	0.047	0.211	0.042	0.200
Migration background				
Years since migration	23.7	8.7	23.9	9.5
Country of origin: Turkey	0.320	0.467	0.351	0.477
Country of origin: Italy	0.164	0.370	0.102	0.302
Country of origin: Greece	0.089	0.284	0.048	0.214
Country of origin: Ex-Yugoslavia	0.205	0.404	0.202	0.402
N	2,276		3,217	

Table 7 Definition of variables

Variable	Description
Savings and remittances	
Savings in the source country	Average monthly amount of savings in the source country (in real 2000 € 1985–1995).
Payments to family members in the source country	Average monthly amount ofpayments tofamily members in the source country (in real 2000 € 1985–1995).
Payments to persons in the source country	Average monthly amount of payments to persons in the source country (in real 2000 € 1996–2005).
Sent financial transfers to the source country	1985–1995: 1 if respondent reports to have sent financial transfers to the source country last year; 0 otherwise.
	1996–2005: 1 if respondent reports to have sent payments to persons in the source country last year; 0 otherwise.
Socioeconomic characteristics	
Age	Age of respondent in years.
Female	1 if respondent is female; 0 otherwise.
Current income	Net income last month (in real 2000 €).
Variation in past income streams	Standard deviation of current net income over the last 5 years.
Permanent income	Estimated permanent income (in real 2000 €).
Years of education	Education of respondent in years.
Household composition	
Household size	Number of persons in household.
Married	1 if respondent is married; 0 otherwise.
Spouse lives in the source country	1 if spouse of respondent lives in the source country; 0 otherwise.
Children live in the source country	1 if children of respondent live in the source country; 0 otherwise.
Migration background	
Intended return migration	1 if respondent intends to return to the home country, 0 otherwise.
Years since migration	Duration of German residence in years.
Country of origin: Turkey	1 if respondent originates from Turkey; 0 otherwise.
Country of origin: Italy	1 if respondent originates from Italy; 0 otherwise.
Country of origin: Greece	1 if respondent originates from Greece; 0 otherwise.
Country of origin: Ex-Yugoslavia	1 if respondent originates from former Yugoslavia; 0 otherwise.
Country of origin: Other	1 if respondent originates from other OECD member country (reference category); 0 otherwise.

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