

# Essays on Temporary Migration

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of the requirements for the degree of  
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**University College London.**

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I, Josep Mestres Domènech confirm that:

- the work presented in this thesis is my own and it has not been presented to any other university or institution for a degree.
- where information has been derived from other sources, I confirm that this has been indicated in the thesis.
- chapter two is based on cojoint work with Jérôme Adda (European University Institute) and Christian Dustmann (University College London).
- chapter three is based on cojoint work with Christian Dustmann (University College London).
- chapter four is based on cojoint work with Christian Dustmann (University College London).

Josep Mestres Domènech

# Abstract

My thesis dissertation focuses on the temporariness of migration, its diverse effects as well as on migration selection.

The first paper, *A Dynamic Model of Return Migration* analyzes the decision process underlying return migration using a dynamic model. We explain how migrants decide whether to stay or to go back to their home country together with their savings and consumption decisions. We simulate our model with return intentions and perform policy simulations.

The second paper, *Remittances and Temporary Migration*, studies the remittance behaviour of immigrants and how it relates to temporary versus permanent migration plans. We use a unique data source that provides unusual detail on the purpose of remittances, savings, and return plans, and follows the same household over time. Our results suggest that changes in return plans lead to large changes in remittance flows.

The third paper, *Savings, Asset Holdings, and Temporary*, analyzes how return plans affect not only remittances but also savings and the accumulation of assets. We show that immigrants with temporary return plans place a higher proportion of savings in the home country and have accumulated a higher amount and share of assets and housing value in the home country (compared to the host country).

Finally, the fourth paper, *Migrant Selection to the U.S.: Evidence from the Mexican Family Life Survey (MxFLS)*, studies the selection in terms of skills of recent migrants to the United States using the MxFLS. We highlight the important age gradient of migration, the different education attainment between age cohorts in Mexico and show the implications when analyzing migrant selection. Our claim is that in order to properly study the self-selection of migrants, it is necessary to compare migrants to non-migrants of the same age cohort.

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## Chapter 1

# Introduction

Migration is the result of a rational process. Individuals decide to leave their countries after assessing the potential benefits and costs of such decision. The decision on whether to return or not is the result of a rational calculation, as the initial migration decision was. We analyse in this thesis the potential temporariness of migration and study how migrants assess it. In addition, we show how migrants modify their behaviour in the host country depending on their migration return intentions. Finally, we focus on migrants' selection in terms of skills, its correct assessment and the implications it might have.

Chapter 2 analyzes the decision process underlying return migration using a dynamic model. In each period, migrants decide whether to stay in host country or to return to home country, simultaneously with consumption and investment choices. The decisions are taken comparing the discounted flow of utility between staying for an additional year and returning to the home country permanently, and depend on the capital invested in each country as well as on a series of stochastic shocks. The dynamic model framework allows migrants to revise their decisions in each period, given shocks in preferences for the home country and shocks in the relative income between the host country and the home country. We use the German Socio-Economic Study (GSOEP) panel data, which allows us to follow migrants from different countries for a period of 24 years. It also reveals their return intentions in each time period and whether they return or not. We calibrate our model of return intentions and perform several policy simulations. Our policy simulations illustrate the importance of economic prospects of the home country on modifying migrants' intentions to return to their home country, and the limited effect of one-off monetary subsidies might have.

It is important to understand migrants' intentions not only for its own sake. Return intentions modify as well migrants' behaviour while in the host country, and this issue is analyzed in chapters 3 and 4. Chapter 3 studies how the intended stay in the host country (or the potential return to the home country) modify migrants' remittance behaviour. We use the GSOEP data that provides unusual detail on remittances and return plans, and follows the same household over time. Our data allows us also to distinguish between different purposes of remittances. We analyze the association between individual and household characteristics and the geographic location of the family as well as return plans, and remittances. The panel nature of our data allows us to condition on household fixed effects. To address measurement error and reverse causality, we use an instrumental variable estimator. Our results show that changes in return plans are related to large changes in remittance flows.

Return plans affect not only remittances but also savings and asset accumulation. These issues are analyzed in Chapter 4 using the GSOEP dataset. We argue that not only the amount of savings and assets may be related to future return plans accumulation, but also if savings and assets are held in the home- and host country. Thus, comparing savings and assets between immigrants and natives may lead to serious underestimation when neglecting the home country component. We show that immigrants with temporary return plans place a higher proportion of their savings in the home country. In addition, both the magnitude and the share of assets and housing value accumulated in the home country are larger for immigrants who consider their migration as temporary, and lower the value of assets and property held in the host country. These decisions might have important implications for both home and host countries' asset and housing markets. Finally, and conditional on observable characteristics, we find no evidence that immigrants with temporary migration plans save more than immigrants with permanent migration plans.

The last topic we analyse in this thesis is the selection in terms of skills of recent migrants to the United States in chapter 5. Migrants are self-selected in terms of skills with respect to the non-migrant populations of both home and host countries. This

selection has important implications for both countries as the impact of migration on the non-migrant population depends on it. In this chapter we stress the important age gradient of migration, the different education attainment between age cohorts in Mexico and show the implications when analyzing migrant selection. Our results show that it is necessary to compare migrants to non-migrants of the same age cohort in order to properly analyse the self-selection of migrants. Our study shows that young male migrants from Mexico are negatively selected in terms of education, wages and test scores, which affects the impact their migration has in both host and home countries.

## **Chapter 2**

# **A Dynamic Model of Return**

# **Migration\***

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\*This chapter has been co-authored with Jérôme Adda and Christian Dustmann.

## 2.1 Introduction

The theoretical and empirical literature on migration has paid little attention to the fact that many migrants return to their home countries after having spent a number of years in the host country. This is surprising, since many migrations today are in fact temporary. For instance, labor migrations from Southern to central Europe in the 1950's – 1970's were predominantly temporary. Bohning (1987) estimates that "more than two thirds of the foreign workers admitted to the Federal Republic [of Germany], and more than four fifth in the case of Switzerland, have returned". Glytsos (1988) reports that of the one million Greeks migrating to West Germany between 1960 and 1984, 85% gradually returned home. Dustmann (1997) provides evidence for a substantial out migration over that period for other European countries. Return migration is also considerable for the United States. Jasso & Rosenzweig (1982) report that between 1908 and 1957 about 15.7 million persons immigrated to the United States and about 4.8 million aliens emigrated. They found that between 20% and 50% of legal immigrants (depending on the nationality) re-emigrated from the United States in the 1970's. Warren & Peck (1980) estimate that about one third of legal immigrants to the United States re-emigrated in the 1960's. Re-emigration rates in the United States and in several European countries were estimated to be between 20% to 60% during the 1990's (OECD (2008), Dustmann & Weiss (2007)).

To understand the motives of return migrations, as well as the factors which explain variation in migration durations, is important for designing optimal migration policies. The large labour migrations to Europe in the 1950's to 1970's were thought to be temporary by the receiving countries and, in fact, many of these migrants did eventually return.

Most countries want to attract the best workers for their local labour markets and want to put in place migration schemes that allow them so do so. Furthermore, there seems to be an understanding that it is desirable that these workers adopt easily to the social and economic structure of the host country. From the side of the migrant, the incentive for any migration, as well as the incentives to assimilate are heavily interrelated with the expected duration in the host region.

Little is known about the way migrants form their re-migration decisions. While emigrations are easily explained by simple static models, where the driving force

are wage differentials between regions, re-migrations occur despite persistently more favourable conditions in the host countries. Models which explain re-migrations must therefore introduce non-monetary aspects which explain return migration, or deviate from absolute measures of monetary wealth, consider decisions taken within family units, or take a more dynamic perspective, where intertemporal substitution is a driving force for return decisions.

The explanations found in the literature explaining why a return migration may be optimal, despite persistently more favourable conditions in the host country, build on such considerations. Stark & Taylor (1991) uses the theory of relative deprivation and arguments of risk spreading to explain why migrants may return to a less rich economy or region. Djajic & Milbourne (1988) explain return migration by assuming that migrants have a stronger preference for consumption at home than abroad. Dustmann (1999) shows that return migration may be optimal if the host country currency has a higher purchasing power in the home country, and if there are higher returns in the home economy on human capital, acquired in the host country.

None of these models allow for revisions of return plans during the migrants' migration history. They usually assume that the migrant has full information about the host country, and that no unforeseen shocks occur. Although these models give us some insight into the factors which are responsible for re-migration decisions, they seem to leave out two very important elements. First, habituation processes, which may lead the migrant to revise former migration plans in the course of his/her migration history. Second, shocks, or new information, which may lead the migrant to continuously revise previous migration plans. To appropriately address these issues is only feasible in a dynamic setting, where migration plans and their revisions are modeled explicitly.

In this paper, we develop a dynamic model of return migration. Migrants make a decision each period whether to stay in the host country or to return to the country of origin. The decisions taken are based on a comparison of the discounted flow of utility in the two locations and depend on the capital invested in each country, as well as on a series of stochastic shocks. On the one hand there is a country specific shock that reflects the economic conditions in the country of origin with respect to the host

country. On the other hand, there are shocks specific to the individual, which allow for different stochastic influences across individuals. Migrants are allowed to re-optimize their choices at every period after they have migrated. This feature is realistic: migrants revise their plans during the migration history. There are many reasons that might motivate them to do so, such as changes in his preferences for staying in host country due to habituation or unexpected changes in income.

Understanding the process of migrants' re-migration decisions is not only important for its own sake, though. The mere fact that some immigrants plan to return, while others do not, induces heterogeneity in their behaviour, like remittances (see chapter 3), savings and asset accumulation (see chapter 4), labour market behaviour, skill accumulation, consumption, etc. This heterogeneity is a consequence among others of the different economic situations they face after a return to their home countries, and which they take into account when making current economic decisions. These differences in plans may help to explain, for instance, differences in assimilation patterns between immigrant populations with different origin, as found in a number of empirical studies<sup>1</sup>.

There is some research on the effect of return plans on migrants' behavior. Djajic (1989) emphasizes that in a guest worker system, changes in wages and prices in the home country affect the migrant's consumption and labor supply in the host country. Galor & Stark (1990), Galor & Stark (1991) show that a return probability different from zero affects migrants' behavior and performance in the host country, if wages in the home country differ from those in the host country. These models assume that return decisions are exogenous, and not optimally chosen by the immigrant. Dustmann (1999) builds a model where human capital accumulation in the host country, and return migrations, are both chosen simultaneously. Dustmann (2000) explores the consequences for the empirical analysis of migrants' wage growth. If re-migration is chosen optimally, then empirical models which do not condition on the migration duration are misspecified, and may lead to biased parameter estimates.

Again, the process of forming return plans is modeled in a simplistic way. In our framework, where migrants may constantly revise their return plans, it is possible to

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<sup>1</sup>See, for instance, Borjas (1985) and Chiswick and Miller (1993).



update past return plans given new information or shocks. In this way, return plans are optimally chosen every period. From the perspective of the migrant and the host country, this revision is desirable to avoid an incorrect assessment of migrants' planned duration of stay in the host country.

## **2.2 Data and Some Evidence on Return Migration**

Many migrations nowadays are temporary. On average, four in ten long-term migrants leave their host countries and re-migrate after five years of residence (OECD (2008)). For the case of Germany, a large number of migrants enter the country and a large number also leave it. Figure 2.1 shows inflows to and outflows from Germany during the last forty years (1968-2008) for migrants from different countries of origin. The fluctuation patterns of both inflows and outflows are different for migrants from different countries of origin. This might suggest that home country specific economic conditions matter in migration decisions, both to emigrate from the home country but also to return to it.

In this paper, we use data from the first 24 waves of the German Socio-Economic Panel (GSOEP) for the years 1984 until 2007. This data set contains a boost sample of immigrants (including some 1500 households in the first wave) from the former labour migration countries Spain, Italy, Greece, Yugoslavia, and Turkey. Migrants from these countries were actively recruited during the late 1950's - early 1970's. Migrations were intended to be temporary both by the immigrant, as well as by the German authorities. However, no temporary residence permits were imposed, and migrants could stay permanently, if they wanted.

Our data has detailed information on individual characteristics, family background, and economic activities of migrants over the 24 years period. Furthermore, each year there was a complementary survey addressed to immigrants about various immigrant specific issues. One question refers to the migrant's return plans. We define as a temporary migrant those who want to return to their home country at some point in the future. The migrant is asked whether s/he intends to return to the home country, or to stay permanently in Germany. The exact wording of the question is "How long

do you want to live in Germany?” and the respondent can answer “I want to remain in Germany permanently”, “I want to return within the next 12 months” or “I want to stay several more years in Germany”. For the last option, he can state the “number of years” he wishes to stay in Germany. Thus, in addition to the information regarding the intention whether or not to return home, the sample also contains information about the intended remaining time in the host country, in case migrants would like to return<sup>2</sup>, and the completed migration spells until year 2007 for those who returned.

We provide some descriptive information about our data in table 2.1. In 1984, immigrants are on average 35 years old and have stayed in Germany for about 13 years. More than 70 percent intend to stay in Germany only for a temporary period of time (on average, 18 years) and return afterwards to their home country. The proportion of individuals in the sample that wants to return decreases over time, due to both sample selection and changes in return intentions. Of those who were in the sample in 1984, almost one quarter returned back to their home country at some point during the observational period (1984-2007).

Migrants change their return plans also during their stay in Germany. In table 2.2 we display cross-tabulations of intentions in subsequent years, where vertical entries refer to year  $t$  and horizontal entries to year  $t - 1$ . Of those who intended to return in year  $t - 1$ , about 82% still have the same intention in year  $t$ , but about 18% do not intend to return any more in year  $t$ . Of those who did not want to return in  $t - 1$ , almost one quarter want to return in year  $t$ . This indicates the existence of substantial fluctuations in return plans over the migration cycle.

In addition, the intended duration of stay changes over the migration experience. If a deterministic model was appropriate for explaining return plans, then responses should be updated each year in a mechanical manner. For instance, if an individual responds in year  $t$  to have the intention to remain for 5 more years abroad, then s/he should respond in year  $t + 1$  that s/he intends to remain only 4 more years, etc. This pattern does clearly not occur in our sample. Figure 2.2 shows the changes in the length of stay in the host country between one year and the following for those migrants that declare their intention to return in both dates. We should observe all observations

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<sup>2</sup>In case migrants intend to remain permanently, we will define the intended remaining time in the host country as the time until retirement at age 65.

concentrated around  $-1$  if intentions were updated in a deterministic way. This is clearly not the case for everyone. Only 20 percent update their intended stay in a deterministic manner, while more than 30 percent declare the same intended stay in  $t$  and  $t + 1$  and almost 50 percent update their intentions in a different manner. Those individuals that declare the same intended stay in  $t$  and in  $t - 1$  might include individuals who do not update their intentions because they answered quickly a probable return date using an heuristic information process (instead of a systematic one), without making a proper assessment when to return analyzing all alternatives, etc.

An additional example of how intended duration of stay is updated over the migration experience can be observed in Figure 2.3. The figures shows the intended duration of stay of individuals who were still in Germany in 2007 during the migration history. We can see how the intended duration of stay is modified during the stay in the host country and not in a deterministic way. In fact, the average intended stay even increases in the first years since migration, to start decreasing over time afterwards.

As mentioned previously, GSOEP also has information on completed migration spells. If migrants drop out of the panel because they return to their home country, this information is recorded in the next wave of the panel. This allows us to compare return intentions in 1984 (the first year the data is collected) and the actual returns until 2006 - see table 2.3. Of those who planned to return in 1984, almost 30 percent did indeed go back over the next 23 years. Of those who did not intend to return, 14 percent did in fact go back over the next 23 years period. These numbers indicate that intentions and realizations may vary quite considerably over the migration cycle.

We can compare as well the difference in years between intended and actual stay durations for those who returned before 2007. The differences between their intended return date and their actual return date are remarkable (figure 2.4). More than half of the migrants who returned before 2007 declared in 1984 an intended time of stay Germany close to their actual stay (plus or minus three years). However, almost half of the migrants either underestimated or overestimated their stay by more than three years.

The distribution of intended stay in the host country is shown in Figure 2.5. Around 75 percent of those individuals that want to return intend to do so in the following ten years. Migrants are more likely to report round figures as intended duration

of stay (e.g., 5 years, 10 years, 15 years, etc), as they might not know with certainty at which exact date they plan to return. The distribution of intended stay in the host country varies as well with duration of stay (Figure 2.6). Those individuals that recently arrived to the home country (between 0 to 9 years since migration) are more likely to report longer intended stays than those who have already stayed in the host country for longer and still want to return to their home country. In all categories, nevertheless, migrants are more likely to give round numbers as intended stay durations.

## 2.3 The Model

In our model, the agent has in every period a choice of location between his country of origin and the host country. Returning to his/her country of origin is a permanent decision. In either of these locations, he derives a specific utility, which depends on expenditures in that location, and the time spent there. At each period in time, the agent allocates his income into consumption,  $c$  and savings,  $s$ . The stock of savings,  $S$  is transferable across countries.

Let  $V(A, G, Y, \lambda, S, \eta_S, \eta_R)$  be the lifetime value of an individual of age  $A$ , who has been in the host country for  $G$  years and with a stock of asset  $S$ .  $Y$  is the GDP in the home country, relative to the host country.  $\lambda$  is a shock to preferences, while in the host country.  $\eta_S$  and  $\eta_R$  are two taste shocks, assumed to be iid and which follow an extreme value distribution. Let  $V^{Stay}(A, G, Y, \lambda)$  be the value of staying one additional period in the host country and  $V^{Return}(A, G, Y, S)$  the value of going back to the home country permanently at the beginning of the period. The value is then defined as:

$$V(A, G, Y, \lambda, S, \eta_S, \eta_R) = \max \{ V^{Stay}(A, G, Y, \lambda) + \eta_S, V^{Return}(A, G, Y, S) + \eta_R \} \quad (2.1)$$

The agent compares at each period the value of staying for one additional period and the value of returning at the beginning of the period. The value of staying is defined as:

$$V^{Stay}(A, G, Y, \lambda) = u^{Stay}(G, \lambda, c^S) + \beta E_{Y', \lambda' | Y, \lambda, \eta_S, \eta_R} V(A + 1, G + 1, Y', \lambda') \quad (2.2)$$

and the value of returning as:

$$V^{Return}(A, G, Y, S) = \max_{c^R} u^{Return}(A - G, c^R) + \beta E_{Y'|Y} V^{Return}(A + 1, G, Y', S') \quad (2.3)$$

The utility derived in the host country  $u^{Stay}$ , depends on the time spent in this country,  $G$ , on the realization of the taste shock,  $\lambda$  and on the consumption in this country,  $c^S$ . The consumption in host is fixed at  $c^R = 1 - \rho$ , as  $\rho$  is the percentage of income devoted to savings in host country. The taste shock follows a Markov process, and the agent has rational expectation over future realizations  $\lambda'$ . In the home country, the agent derives utility from consumption  $c^S$  and from the time spent in that country  $A - G$ .

The agent migrates to the host country, either because he has a strong preference for the host country (a high  $\lambda$ ), or because the host country offers a better technology to increase his savings  $S$ . Given the stochastic nature of the taste shocks, the agent does not know with certainty the date at which he plans to return. Changes on its migration status or on the type of permit he holds in the host country could enter in the model as a shock to the preference parameter  $\lambda$ . For example, after an amnesty, the relative preference for staying one year longer in the host country will be higher (due to the lower risk deportation, etc.).

This fact can have important consequences on the optimal strategy. If the agent has a preference for the host country, he would still need to accumulate some savings  $S$ , at least in the early years when  $G$  is not high enough to offset any big shocks on  $\eta_R$ . Conversely, an agent might stay in the host country for longer than he had planned for after a negative shock, increasing his duration in the host country,  $G$ . This increased stay in the host country, due to an habituation effect, might then modify his previous plans and the updated optimal plans for the migrant will be to stay longer than initially planned. For some agents, this might even lead to a permanent settlement in the host country, although their first intention was to go back to their country of origin after a small number of years. The model is able to produce a probability of leaving the country which are either decreasing or increasing in the number of years spent in the host country.

As we mention previously, in our model return is an absorbing state (i.e., the

migrant cannot decide to re-migrate again to the host country). This feature is realistic for the case of guest-workers in Germany, that were hired on a temporary basis and with a foreseen return to the home country. It does not allow however for other situations, like seasonal workers that might migrate to the host country every year for some time and return back home afterwards, or other types of migrants that might also go back and forth between home and host countries.

**Specification of Preferences:** The utility functions are expressed as:

$$\begin{cases} u^{Stay}(G, \lambda, c^S) = \lambda c^{S\alpha} G^\gamma \\ u^{Return}(A - G, c^R) = c^{R\alpha} (A - G)^\gamma \end{cases}$$

where  $G$  is the duration in the host country and  $A$  is the age of the agent. The utility function has two main components: the utility derived from consumption times the utility derived from longer stay in each location. The duration of stay in the host country  $G$  is at least one year whenever comparing the utilities between staying or returning by definition, and it increases during the stay in the host country. The duration of stay in the home country prior to migration ( $A-G$ ) could be however permanently low for those migrants that entered the host country at very young age, which implies very low potential utility levels in the home country. The utility functions are such that the the marginal utility of consumption is reinforcing in the stocks. This is similar to addiction or habit formation.

$\lambda$  measures the relative taste for German life.  $\lambda$  is restricted to have zero or positive values. No upper bound is imposed, if a migrant receives a positive shock that increases their relative preference for the host country greatly, he will decide to stay longer in the country, maybe even not to return back home. Nevertheless, most individuals that want to return will have relative preference parameters between  $[0,1)$  in order to have incentives to go back to the host country.

The taste shock is assumed to follow an autoregressive process of order 1:

$$\lambda_t = (1 - \rho_\lambda)\mu_\lambda + \rho_\lambda\lambda_{t-1} + u_t \quad \text{with } u_t \sim \mathcal{N}(0, \sigma_u^2)$$

which we will approximate by a first order Markov process (see Tauchen & Hussey (1991)).

**Income Shocks:** The income processes is modelled as an AR(1) process

$$Y' = (1 - \rho_Y)\mu_Y + \rho_Y Y + \epsilon_Y$$

$$\epsilon_Y \sim N(0, \sigma_Y^2)$$

This modelisation imposes an income process that is the same for all immigrants from the same country of origin. In this sense, this variable should be interpreted as a measure of relative economic prospects of the home country relative to the host country, rather than the individual relative income.<sup>3</sup>

**Intentions:** We can compute the probability of returning to the home country at age  $A_t$ , conditional on still being in the country at age  $A_{t-1}$  as :

$$P_t^R = P^R(A_t, G_t, Y_t, \lambda_t, S_t) = \frac{\exp(V^{Return}(A_t, G_t, Y_t, S_t))}{\exp(V^{Return}(A_t, G_t, Y_t, S_t)) + \exp(V^{Stay}(A_t, G_t, Y_t, \lambda_t))} \quad (2.4)$$

due to the extreme value distribution of the shocks  $\eta_R$  and  $\eta_S$ .

We denote  $T^R$  as the random variable representing time until return. The probability at date  $t$  that the agent returns after  $k$  periods is :

$$P(T^R = t + k) = P_{t+k}^R \prod_{l=0}^{k-1} (1 - P_{t+l}^R) \quad (2.5)$$

We interpret the intention as the expected time the migrant will be willing to stay in the host country until return:

$$I_t = E_{\{\lambda_{t+k}, Y_{t+k}\}_{k=0}^{\infty} | \lambda_t, Y_t} \sum_{l=0}^{\infty} l P(T^R = t + l) \quad (2.6)$$

where the expectation is taken over all possible future paths for the taste shock  $\lambda_t$  and the relative wage  $Y_t$ . This expectation is non trivial to evaluate as it requires to calculate an infinite integral. Instead, we approximate it by simulations:

$$I_t(A_t, G_t, Y_t, S_t, \lambda_t) = \frac{1}{S} \sum_{s=1}^S \sum_{l=0}^{\infty} l P_s^R(T^R = t + l) \quad (2.7)$$

---

<sup>3</sup>An alternative would be to model using the individual income of the individual in the host country, which would take into account specific income shocks occurring to individuals. In that case, it will allow for changes in the relative position of the individual in the host country and the variable will have a different interpretation.

where  $P_s^R(T^R = l)$  is the probability of returning in period  $l$ , computed with a given path indexed by  $s$ ,  $\{\lambda_{t+k}, Y_{t+k}\}_{k=0}^\infty$ , for the taste shock and the relative wage.

**From Intentions to Preferences:** Finally, we denote  $I^{-1}$  the inverse of the intention function, which maps a given intention to a taste shock, conditional on age  $A$ , years since migration  $G$ , income  $Y$  and savings  $S$ .

$$\lambda_t = I^{-1}(A_t, G_t, Y_t, S_t, i_t) \quad (2.8)$$

We approximate the AR(1) process  $\lambda$  with a Markov chain with two values,  $\lambda$  high and  $\lambda$  low, following Tauchen (1986) procedure. Then, doing a linear interpolation, we define the  $\lambda$  that rationalizes the intention  $I$  as

$$\lambda_t = I^{-1}(A_t, G_t, Y_t, S_t, i_t) \approx \frac{I_t(A_t, G_t, Y_t, S_t, \bar{\lambda}) - I_t(A_t, G_t, Y_t, S_t, \underline{\lambda})}{I_t(A_t, G_t, Y_t, S_t, \bar{\lambda}) - I_t(A_t, G_t, Y_t, S_t, \underline{\lambda})} (\bar{\lambda} - \underline{\lambda}) + \underline{\lambda} \quad (2.9)$$

**Likelihood** The likelihood of observing a sequence of intended durations is

$$P(i_0, i_1, \dots, i_t) = P(i_t|i_{t-1}) \dots P(i_1|i_0)P(i_0) \quad (2.10)$$

as the probability of observing  $i_t$  in  $t$  is conditional on observing  $i_{t-1}$  in  $t - 1$ .

The probability of observing an intention of  $i_t$  at arrival is

$$\begin{aligned} P(i_0) &= P(I(0, A_t, Y_0, \lambda_0)) = P(\lambda_0 = I^{-1}(0, A_t, Y_0, i_0)) = \\ &= \frac{1}{\sqrt{\frac{\sigma_u^2}{1-\rho_\lambda^2}}} \varphi\left(\frac{\lambda_0 - (1-\rho_\lambda)\mu_\lambda}{\sqrt{\frac{\sigma_u^2}{1-\rho_\lambda^2}}}\right) \end{aligned} \quad (2.11)$$

$$\begin{aligned} P(i_t|i_{t-1}) &= P(\lambda_t = I^{-1}(A_t, G_t, Y_t, i_t)|\lambda_{t-1} = I^{-1}(A_{t-1}, G_{t-1}, Y_{t-1}, i_{t-1})) = \\ &= \frac{1}{\sigma_u} \varphi\left(\frac{\lambda_t - (1-\rho_\lambda)\mu_\lambda - \rho_\lambda\lambda_{t-1}}{\sigma_u}\right) \end{aligned} \quad (2.12)$$

## 2.4 Calibration

For each year the individual is present in the sample, we observe the number of years this individual intend to stay, his age, the number of years since migration as well as the



relative mean income in his home country with respect to Germany. This data forms the basis for our calibration.

For a given vector of parameters  $\theta$ , the probability that the individual will stay  $I$  years in Germany is computed, conditional on having been there  $n$  years. The intention is stochastic as the individual faces taste shocks in each period. Let's denote that probability  $\pi(I, n)$ . These probabilities are computed numerically, by calculating all possible sequences for the taste shocks.

Obviously, individuals are different. We allow for one type of heterogeneity in the model. Given the shocks to preferences, agents are ex post different in terms of intention to stay.<sup>4</sup>

As time in Germany pass on, immigrants face different realizations for their preference shocks. Those who draw adverse taste shocks revise their intended time in Germany downwards and return earlier. Those who face good shocks revise their intended length of stay upwards. This arises for two reasons. First, the preference shocks are persistent so a good shock today means that future shocks will be good as well. Second, as our model display habit formation, the longer the individual have been in Germany, the higher are his intentions to remain there.

Table 2.4 displays the calibrated coefficients for our the data. We included all migrants born in Turkey, Greece, Yugoslavia, Italy or Spain aged 17-65 during the period 1984-2007. The savings rate  $\rho$  used is equal to the average savings observed for those groups of migrants in the data (estimated in Dustmann & Mestres (2010b)). The income process is predicted as an AR(1) process using the observed relative per capita GDP between the host country and migrant's home countries for the period 1984-2007.<sup>5</sup> The rest of parameters  $\gamma$ ,  $\alpha$ ,  $\mu_\lambda$ ,  $\rho_\lambda$  and  $\sigma_u$  are calibrated such that the

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<sup>4</sup>However, there could be as well an ex ante heterogeneity in the data. Prior to emigrating, immigrants could have different views on how long they want to stay in Germany. Those with a high taste for German life, will eventually stay longer. To accommodate this heterogeneity, we should allow different types of individuals in the model as in Heckman & Singer (1984). However, this heterogeneity is not taken into account in this calibration exercise, as the share (and number) of types will imply an additional ad-hoc estimation.

<sup>5</sup>In this sense, this variable should be interpreted as a measure of relative economic prospects of the home country relative to the host country, rather than the individual relative income in both destinations.

percentage of variation explained by the model is as close as possible to the total variation. The percentage of explained variations by the model is 78 percent. The calibration results predict in a mean stay of 18.86 years, compared to a observed mean stay of 19.2.

Figure 2.7 compares the observed intention of stay with the predicted one from our model. Predicted intentions refer to the average individual observed in our data (who is 35 years old and has stayed already 15 years in Germany in 1984). Observed intentions refer to the intentions of those individuals with same age and years of residence in Germany (plus minus two years) observed in the data. Migrants that stay in Germany revise their expected intentions upwards during their migration period. The model captures fairly well this updating of expectations observed in the data.

Figure 2.8 and Figure 2.9 perform a similar comparison between predicted and observed intentions for younger individuals with shorter stays and older individuals with longer stays. Figure 2.8 shows the intentions of individuals aged 25 and that have stayed only 5 years in Germany in 1984. For those younger individuals with shorter stays, the model does not predict as accurately the observed intentions, in particular on the first years of residence in Germany. For older individuals with longer stays, the model does seem to predict pretty closely the observed intentions in the data (see figure 2.9).

The predicted intentions obtained using the calibration exercise are sensitive to the parameters chosen to different degrees. On the one hand, predicted intentions are not very sensitive to the chosen savings rate parameter  $\rho$  or to the relative income parameters (to a smaller extent). On the other hand, preference parameters do modify significantly the predicted intentions in the calibration. A higher average relative preference for staying in Germany  $\mu_\lambda$  reduces the probability of return and increases the duration of stay in the host country. In addition, the results are sensitive to the relative weight of  $\alpha$  and  $\gamma$ . Those combinations of parameters where  $\alpha$  has a higher relative weight than  $\gamma$  (like for the chosen calibrated parameters) have a much higher explana-

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An alternative would be to use the actual individual income of the individual in the host country, which would take into account specific income shocks occurring to them.

tory power than the opposite.

## 2.5 Policy Analysis

The construction and calibration of the dynamic model allows to study the effect of different policies on migrant return intentions, our main objective. This section develops different policy scenarios and the effects they have on migrant intentions following the model developed earlier.

The first policy simulation consists on a policy that gives a subsidy to those individuals who return to their home country <sup>6</sup>. The subsidy should induce those individuals who want to return to anticipate their return. The real effect should be to help those migrants who want to return but have not reach yet their savings target in Germany. The effects of giving a subsidy equivalent to the income earned during half a year and during one year are shown in Figure 2.10. As in the previous section, the intentions correspond to the average individual observed in our data in terms of age and length of residence in Germany. The figure shows that the effect of a subsidy modifies only slightly the intentions to return of migrants at any point of their migration. On average, a subsidy equivalent to the income earned during half a year induces the individual to reduce their intended stay in Germany by 100 days. A subsidy equivalent to one year income will induce a reduction on their intended stay of 208 days. In both cases, and at different durations of stay, migrants only reduce slightly their intended stay in Germany. Thus only those migrants that were intending to return in the very near future will anticipate their return, and the impact of such the policy will be very limited.

The second policy simulation corresponds to the impact of a change in the economic conditions in the home country. A 20 % increase in the relative income of the home country increases the probability of return to the home country and reduces the intended duration of stay in Germany (see Figure 2.11). The increase in relative income shown is equivalent to the increase in Spanish gdp per capita with respect to the German gdp observed from 1984 to 2007, the period of study of the data <sup>7</sup>. On average, the model predicts that the average migrant will reduce their intended stay by

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<sup>6</sup>The subsidy could be offered either by the host country or by the home country.

<sup>7</sup>During this period, the Spanish gdp per capita converged from 74.2% to 88.1% of the German gdp per capita.

980 days (over two and a half years). The effect is heterogenous along the migration experience, being much larger at younger age and shorter stays. A migrant aged 35 and who stayed 15 years in Germany will reduce his intentions to stay in Germany by 1237 days (almost three and a half years shorter intended stay). At older age and longer residence in Germany, the intentions however are almost unchanged.

Not only the average economic conditions of the home country, but also its economic stability affects migrants intentions. Figure 2.12 compares the effect of home country economic conditions in our model between an average of all home countries in the data versus Turkey's economic conditions during the period studied. During that period, Turkey has a lower mean income, lower persistence and higher income volatility <sup>8</sup>. A Turkish migrant will have a longer intended stay in Germany than the average migrant due to the different economic conditions in his home country. This difference in intended duration of stay in Germany is reduced the closer the migrant is to retirement age.

## 2.6 Conclusions

This study has developed a dynamic model to explain migrants' plans to return to their home country and how those are updated during the migration experience.

The policy simulations shown in the previous section have highlighted the different impacts that different policies and changes in the economic conditions of home countries can have in migrant return intentions.

Many countries have developed assisted voluntary return programs to incentivate migrants to return to their home countries. However, those programs have had only moderate success (OECD (2008)). The policy simulations performed in this chapter help explaining the small take-up rate of these return programs. The monetary subsidy offered is not sufficient to reduce migrants' intended stay in the host country to a level on which their return will be immediate. As migrants' intentions are only reduced slightly, subsidy programs have only a limited effect on anticipating actual returns.

The policy simulations using our model show as well that an important aspect mi-

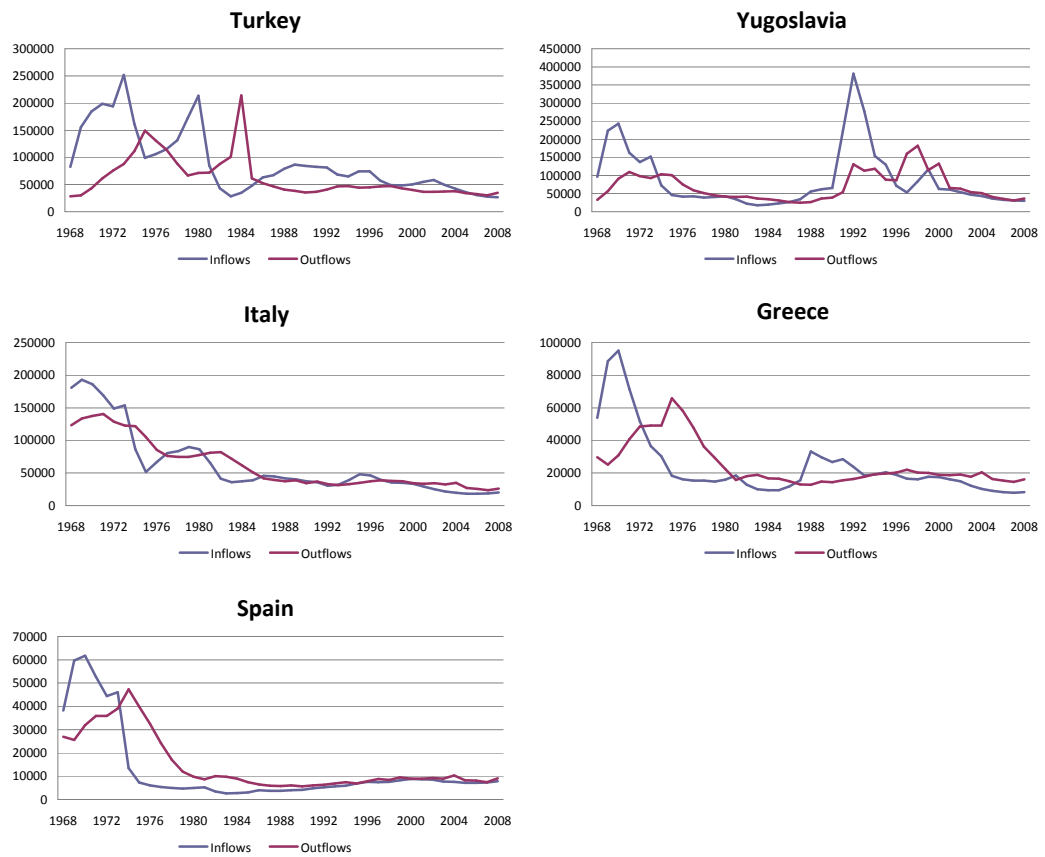
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<sup>8</sup>More precisely, Turkish relative gdp during the period observed, modeled as AR(1), is equal to ( $\mu_Y = 0.0607$ ,  $\rho_Y = 0.8079$ ,  $\epsilon_Y = 0.0009$ ).

grants take into account are the economic conditions of the home country. Migrants' intentions to return to their home country are substantially increased when the economic conditions of their home countries improve. Migrants are more likely to consider an early return to their home country when it can offer them economic prosperity. If not, they might not consider to return there, or at least not until retirement age.

This first chapter has considered the formation of migrants' intentions to stay in the host country and how they might be altered. The next two chapters will analyze the effect of changes in migrant's intentions to stay in the host country on migrant's behaviour there. In particular, chapter 3 will analyze the effect of intentions on remitting behaviour and chapter 4 on saving and asset holding behaviour.

Figure 2.1: Inflows and outflows of migrants in Germany by selected countries of origin, 1968-2008



Note: Statistisches Bundesamt, 1968-2008. Yugoslavia includes from 1992 to 2008 all the countries that previously formed Yugoslavia.

Table 2.1: Summary Statistics

	1984		1996		2007	
	<i>Mean</i>	<i>St.Dev.</i>	<i>Mean</i>	<i>St.Dev.</i>	<i>Mean</i>	<i>St.Dev.</i>
<b>Age</b>	35.2	13.0	41.3	12.9	45.7	11.0
<b>Age at arrival</b>	22.0	10.7	20.2	10.0	17.4	9.0
<b>Years since migration</b>	13.1	5.6	21.1	8.6	28.3	9.9
<b>Year of arrival in Germany</b>	1970.9	5.6	1974.9	8.6	1978.7	9.9
<b>Intention to return (1=Yes; 0=No)</b>	71.5%	45.1%	51.3%	50.0%	37.5%	48.5%
<b>Intended stay duration (years)</b>	18.1	16.5	20.6	14.0	18.7	11.2
<b>Actual return (1=Yes; 0=No)</b>	24.8%	43.2%	14.1%	34.8%	0.9%	9.5%
<b>Country of origin:</b>						
<b>Turkey</b>	36.7%	48.2%	42.6%	49.5%	49.1%	50.0%
<b>Yugoslavia</b>	18.5%	38.8%	23.2%	42.2%	23.3%	42.3%
<b>Italy</b>	18.4%	38.7%	16.4%	37.1%	16.4%	37.0%
<b>Greece</b>	14.0%	34.7%	11.7%	32.2%	7.7%	26.7%
<b>Spain</b>	12.5%	33.1%	6.1%	23.9%	3.5%	18.4%
<b>Number Observations</b>	2946		1468		660	

Note: GSOEP, 1984-2007.

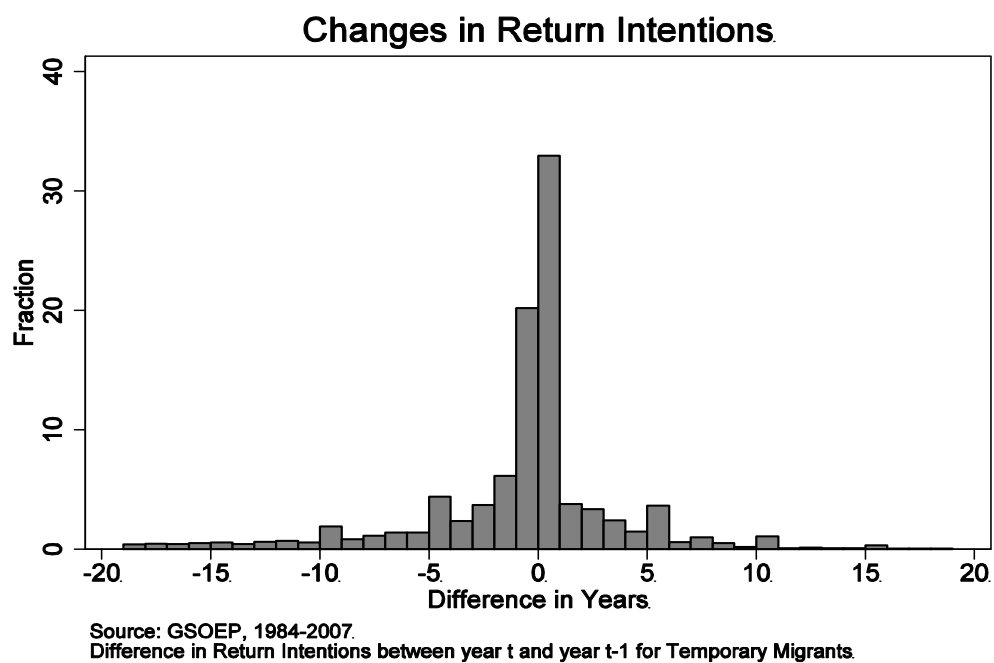
Table 2.2: Variations in return plans

<b>Intention to Return in <math>t-1</math></b>	<b>Intention to Return in <math>t</math></b>		<b>Total</b>
	<i>No</i>	<i>Yes</i>	
<i>Yes</i>	2753	12135	14888
<i>%</i>	18.49	81.51	100
<i>No</i>	7991	2568	10559
<i>%</i>	75.68	24.32	100
<i>Total</i>	10744	14703	25447
	42.22	57.78	100

Note: GSOEP, 1984-2007.

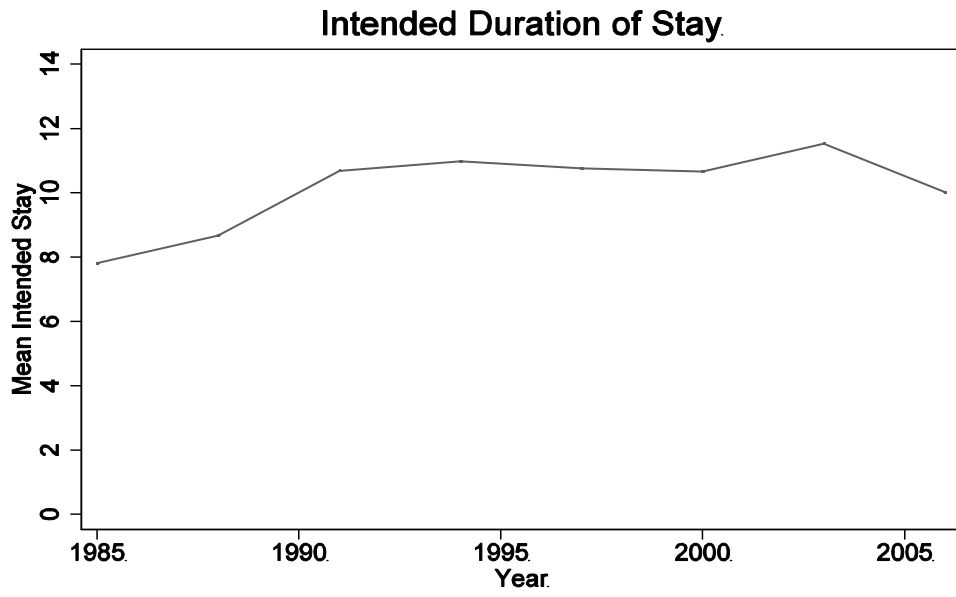


Figure 2.2: Changes in return intentions (difference in years)



Note: GSOEP, 1984-2007.

Figure 2.3: Intentions of migrants over time



Source: GSOEP, 1984-2007.  
Temporary Migrants who were still in Germany in 2007.

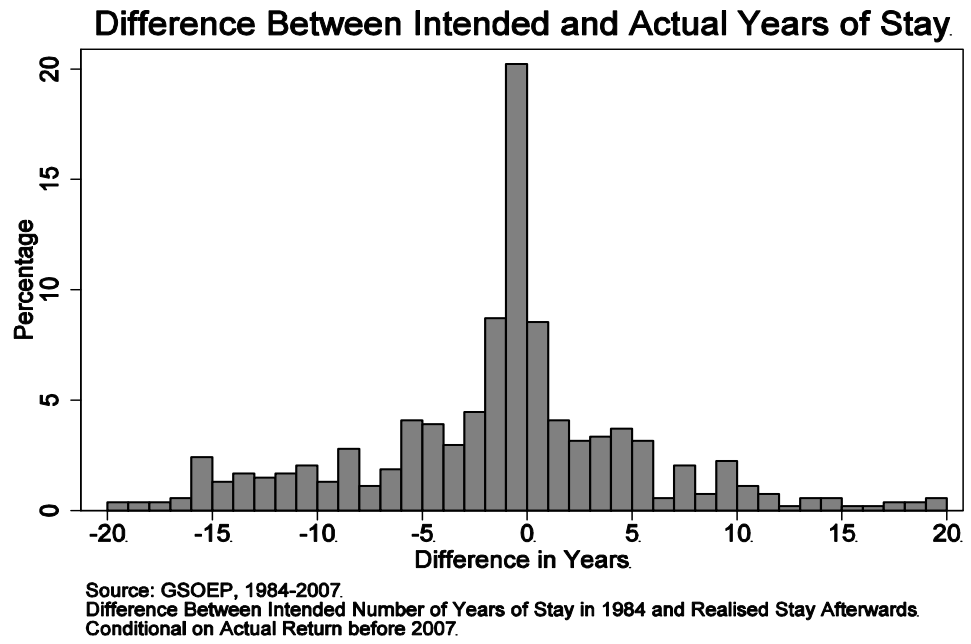
Note: GSOEP, 1984-2007.

Table 2.3: Differences between intention to return in 1984 and actual return (prior to 2007)

Year of return	Intention to Return in 1984		Total
	No	Yes	
<b>No return</b>	654	1,353	2,007
<b>1985</b>	19	137	156
<b>1986</b>	5	47	52
<b>1987</b>	8	43	51
<b>1988</b>	12	55	67
<b>1989</b>	3	37	40
<b>1990</b>	10	24	34
<b>1991</b>	5	19	24
<b>1992</b>	11	13	24
<b>1993</b>	2	23	25
<b>1994</b>	7	29	36
<b>1995</b>	3	22	25
<b>1996</b>	6	21	27
<b>1997</b>	4	14	18
<b>1998</b>	5	15	20
<b>1999</b>	0	15	15
<b>2000</b>	1	12	13
<b>2001</b>	5	13	18
<b>2002</b>	0	8	8
<b>2003</b>	1	8	9
<b>2004</b>	3	8	11
<b>2005</b>	1	7	8
<b>2006</b>	1	3	4
<b>Total</b>	766	1,926	2,692

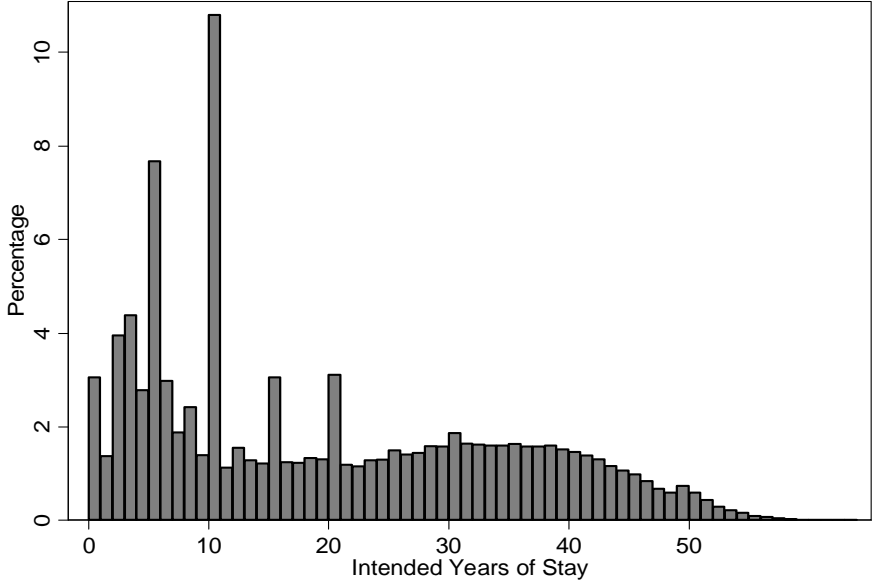
Note: GSOEP, 1984-2007.

Figure 2.4: Difference in years between intended and actual stay durations



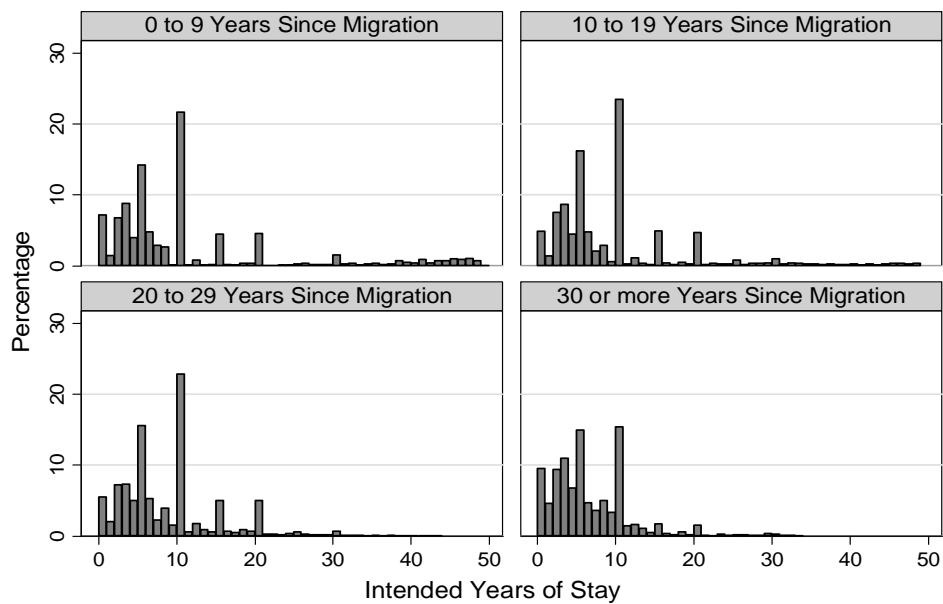
Note: GSOEP, 1984-2007.

Figure 2.5: Distribution of Migration Intentions



Note: GSOEP, 1984-2007. Intended number of years of stay in the host country before return.

Figure 2.6: Distribution of Migration Intentions by Duration of Stay



Graphs by ysmcat

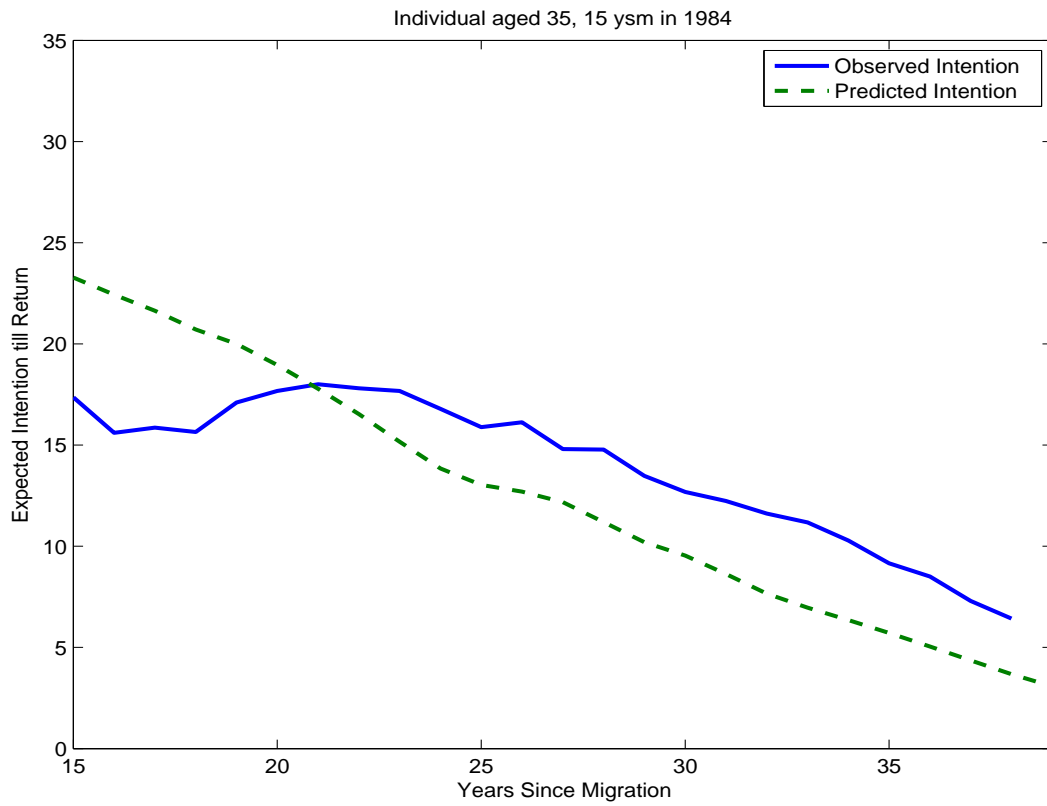
Note: GSOEP, 1984-2007. Intended number of years of stay in the host country before return.

Table 2.4: Calibrated coefficients

	<b>Mean Predicted Stay</b>	18.68
	<b>Mean Observed Stay</b>	19.2
	<b>R-Square</b>	0.78
<b>Parameters</b>		
	$\gamma$	0.15
	$\alpha$	0.3
<b>Savings Rate</b>		
	$\rho$	0.074
<b>Income*</b>		
	$\mu_Y$	0.4657
	$\sigma_\epsilon$	0.00001
	$\rho_Y$	0.8817
<b>Preferences</b>		
	$\mu_\lambda$	1
	$\sigma_u$	0.3
	$\rho_\lambda$	0.8

\* Income coefficients: coefficients from an estimated AR(1) process of the relative gdp between home and host country (1984-2007).  
 Observed savings rate during the period equal to 7.4% - see Table 4.2, chapter 2.  
 Rest of coefficients chosen such that predicted stay as close as possible to observed stay.

Figure 2.7: Observed Intention vs. Predicted Intention - Individual Aged 35 and 15 Years Since Migration

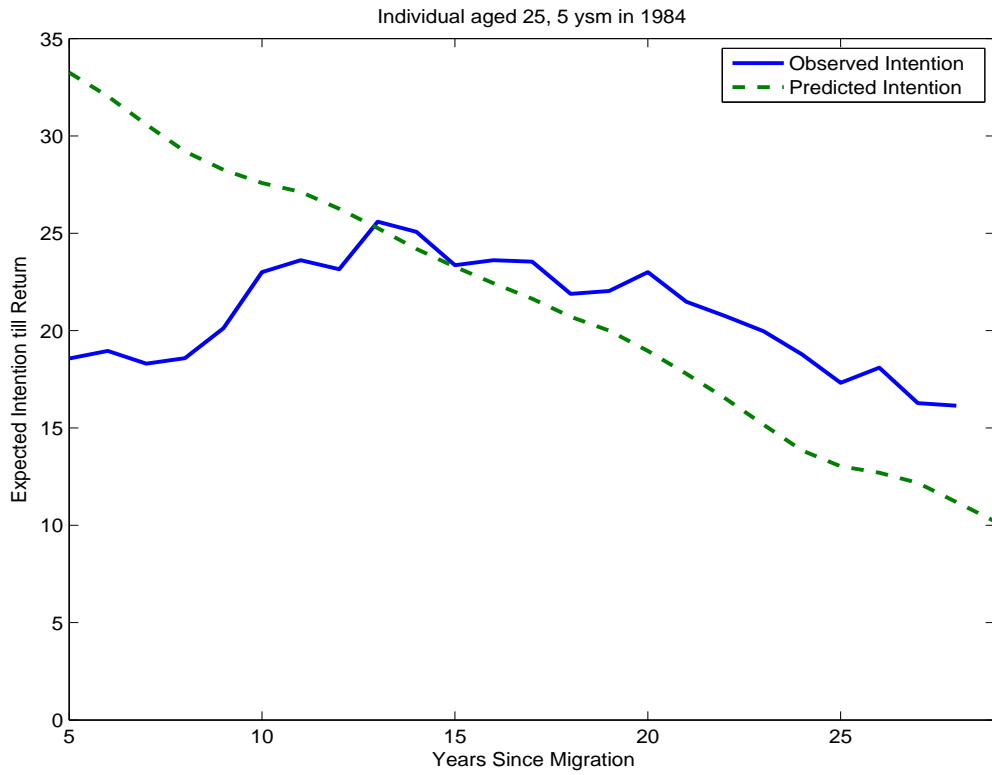


Note: GSOEP, 1984-2007.

Predicted intentions of an individual aged 35 and who stayed in Germany for 15 years in 1984. Average observed intentions of individuals aged 35 (+/- 2 years) and who stayed 15 (+/- 2 years) years in 1984. N=192 in 1985, N=47 in 2006.

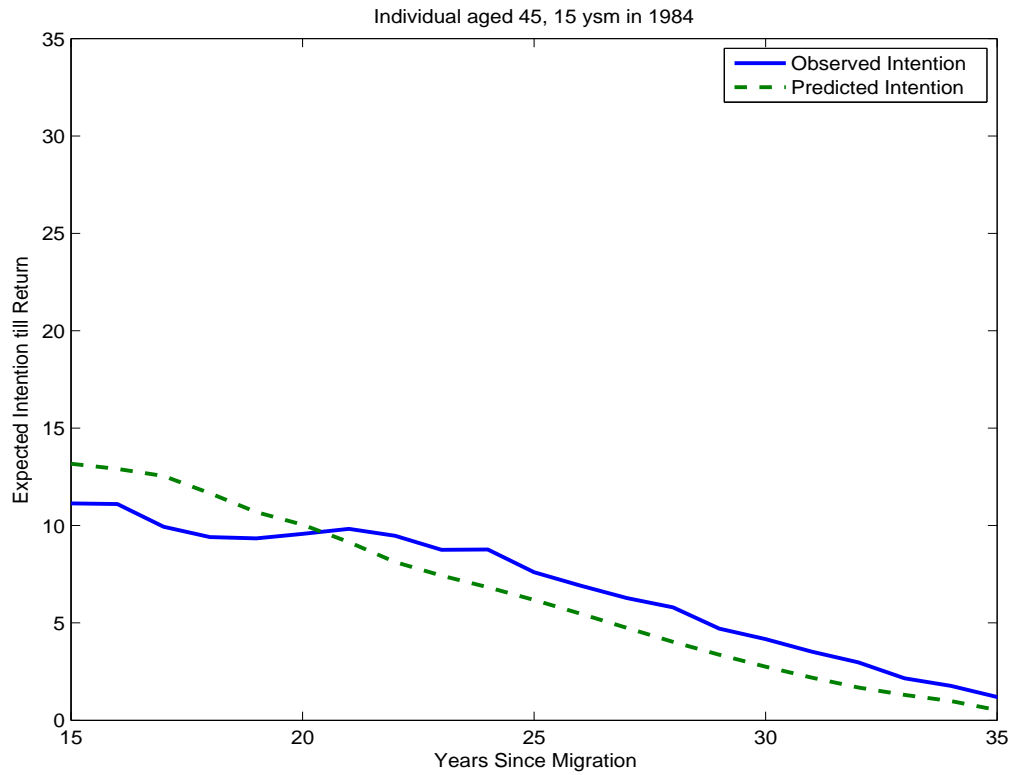


Figure 2.8: Observed Intention vs. Predicted Intention - Individual Aged 25 and 5 Years Since Migration



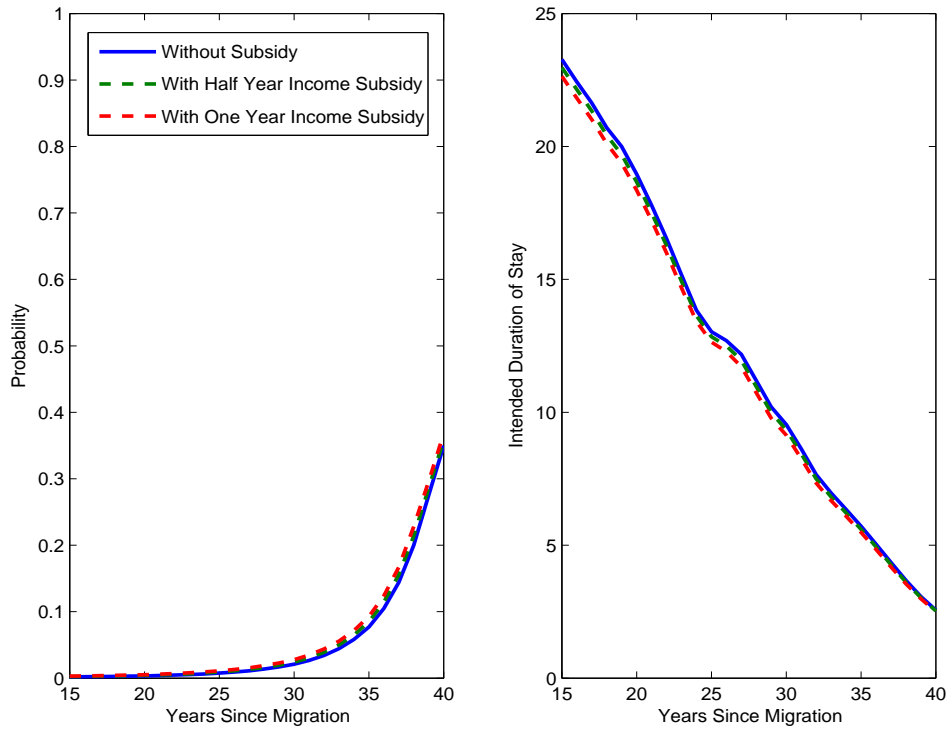
Note: GSOEP, 1984-2007.  
 Predicted intentions of an individual with 25th percentile characteristics, that is, aged 25 and who stayed in Germany for 5 years in 1984. Average observed intentions of individuals aged 25 (+/- 2 years) and who stayed 5 (+/- 2 years) years in 1984. N=91 in 1984, N=14 in 2006.

Figure 2.9: Observed Intention vs. Predicted Intention - Individual Aged 45 and 15 Years Since Migration



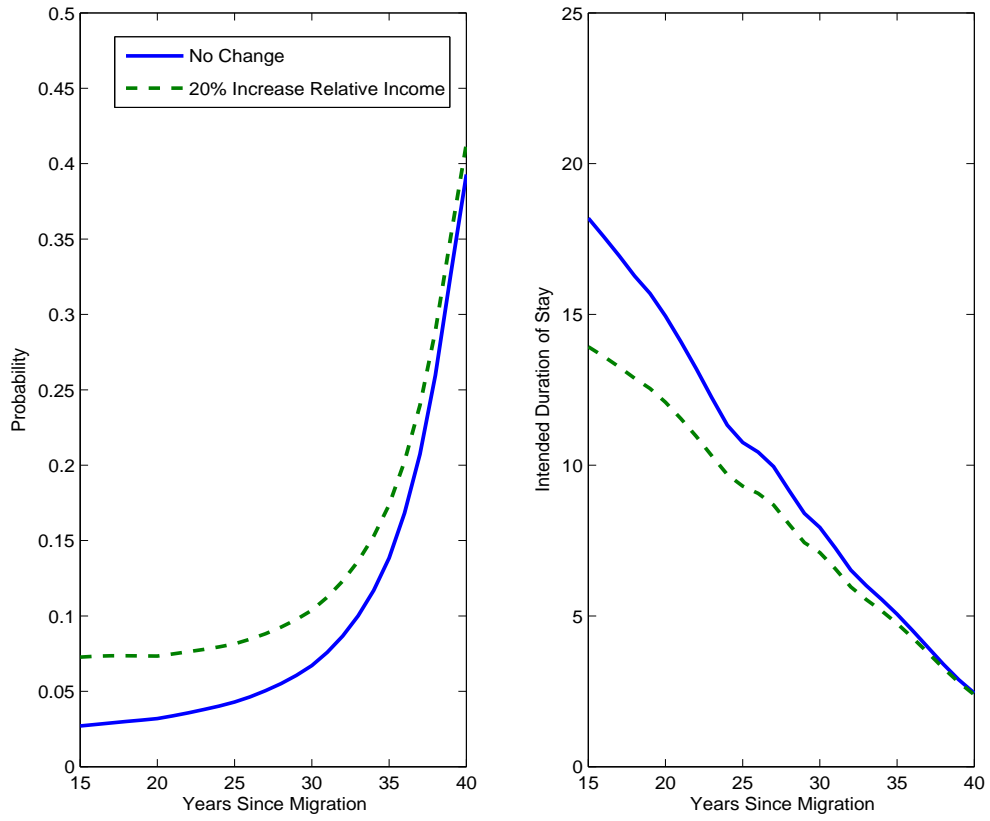
Note: GSOEP, 1984-2007.  
 Predicted intentions of an individual with 75th percentile characteristics, that is, aged 45 and who stayed in Germany for 25 years in 1984. Average observed intentions of individuals aged 45 (+/- 2 years) and who stayed 25 (+/- 2 years) years in 1984. N=138 in 1984, N=7 in 2006.

Figure 2.10: Effect of subsidy to return to home country



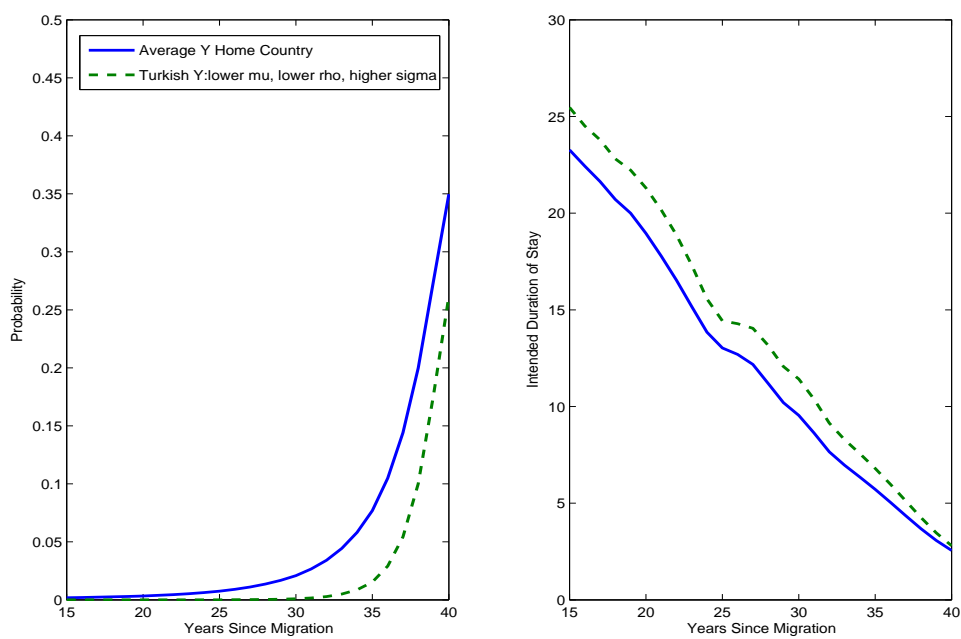
Note: GSOEP, 1984-2007. Calibrated coefficients (table 2.4.). Individuals with average age (35) and years since migration (15) in 1984.

Figure 2.11: Effect of change in relative income



Note: GSOEP, 1984-2007. Calibrated coefficients (table 2.4.). Individuals with average age (35) and years since migration (15) in 1984.

Figure 2.12: Effect of different home country economic conditions



Note: GSOEP, 1984-2007. Calibrated coefficients (table 2.4.). Individuals with average age (35) and years since migration (15) in 1984. Average economic conditions in home country versus Turkey's economic conditions during 1984 - 2007 (lower mean income, lower persistence and higher income volatility).

## **Chapter 3**

# **Remittances and Temporary Migration\***

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## 3.1 Introduction

The amount of remittances sent by immigrants back to their home countries has increased steadily over the last decades. Currently, the volume of remittances to developing countries using formal channels is estimated to be over \$240 billion (Ratha et al. (2007)). Their level is higher than official development aid and close to foreign direct investment and other capital inflows for developing countries. Remittances help economic development and are a major factor in poverty reduction<sup>1</sup>. In addition, remittances are now one of the primary sources of foreign exchange for many receiving countries.

For immigration countries, remittances constitute a non-negligible outflow of capital. Recent figures suggest that the outflow of remittances from high income OECD countries is over \$136 billion (Ratha et al. (2007)). For instance, in Germany the volume of remittances was about 0.31% of GDP in 2003 (Bundesbank (2008)).<sup>2</sup> This was equivalent to 150 % of Germany's total budget for official development aid in that year<sup>3</sup>.

It is therefore not surprising that a large literature has developed on the subject, see Docquier & Rapoport (2006) for an excellent survey. Key issues to understand are which migrant populations remit, for which purpose, and what determines the amount of remittances. Answers to these questions may help to create migration schemes that affect the way remittances are channeled into different purposes, thus supporting their optimal efficiency for economic development, and raising awareness about how different policies will lead to different incentives to remit.

A number of papers develop models for the different motives that may trigger remittances, and explore some of their empirical implications.<sup>4</sup> This research has provided us with a wealth of insight. Yet, on the empirical level we still know relatively

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<sup>1</sup>See e.g. Adams (2006a), Adams (2006b) and Acosta et al. (2006) for analysis.

<sup>2</sup>Germany is the third largest source country of remittances payments, after United States and Saudi Arabia, see Ratha (2003).

<sup>3</sup>Official Development Assistance accounted for 0.21% of GDP in Germany in 2003, see OECD (2005).

<sup>4</sup>See e.g. Lucas & Stark (1985), Lucas & Stark (1988), Hoddinott (1994), Funkhouser (1995), Poirine (1997), Agarwal & Horowitz (2002), de la Briere et al. (2002), Faini (2006), Okonkwo Osili (2007), Amuedo-Dorantes & Pozo (2006) and Hanson (2007).

little about the determinants of remittances, the various forms remittances may take, and how these interact with migrant behavior and the forms of migration. One particular aspect, which is in our view important, is the way the permanency of a migration affects the magnitude and purpose of remittance flows.

We address these questions in this paper. We analyze how remittance flows are related to the permanency of migration, and to the residential location of the family. Our empirical analysis is based on a panel data set of immigrants over the period from 1984-1994. This data contains repeated information about whether, and what amount of remittances is sent. It also distinguishes between remittances for family support, savings, and for a residual category "other purposes". Due to the information our data provides us about the return plans of immigrants, we are able to distinguish between individuals who consider their migration as temporary, and who consider their migration as permanent. The panel nature of our data, and repeated information on remittances as well as return intentions, allows us to explore and isolate the way the permanence of migration, as well as the locational distribution of the family, affect remittance flows, conditional on observed characteristics and unobserved fixed differences across households in their remittance propensity. We address measurement error problems and possible feedback of past remittances on current return plans by combining a fixed effects estimator with an IV strategy.

The structure of the paper is as follows: in section 2 we discuss the way remittances may be affected by return plans, and introduce our estimation strategy. In section 3 we provide some background information and discuss the data and our sample. In section 4 we show our estimation results, and section 5 concludes.

## **3.2 Remittances and return migration**

A difficulty with remittances is its measurement and exact definition. If we define remittances as all transfers from the immigration country to the immigrant's home country (a definition which we will follow below), then remittance flows consist of both transfers to support family and kinship in the origin country, as well as savings or investments for future consumption at home. The motivation for both types of transfers is different. While the first requires altruistic behavior and/or influence through the social reference group, the second can be modeled in a simple life cycle model (see e.g.



Dustmann (1997)).

Transfers for both family support and savings purposes may differ according to whether the migration is considered as temporary or as permanent. Remittances to support family and kinship can be viewed as intra-family transfers across national borders.<sup>5</sup> Thus, if temporary migrants have more of their (extended) family living abroad, they may remit more. Further, remittances may also respond to expectations about fulfillment of family and social commitments. Satisfying these expectations can be seen as a price to be paid for the option to return back home at a later stage, or as an "insurance" to be welcomed in the home community after returning. Also this motive would result in higher remittances of temporary migrants.<sup>6</sup>

Remittance flows may further be motivated by the wish to hold assets or savings in the home country. These may take the form of housing stock, capital investments, or simply savings. Thus, remittances motivated in this way are not different from an intertemporal allocation of consumption, or investment into durable consumption goods across national borders.<sup>7</sup> A positive probability of return may affect these transactions either by inducing a preference to holding assets and savings in the home country, or by inducing immigrants to shift more consumption from the present to the future, or both.

### 3.2.1 Empirical specification

Our main interest is in determining how the level of remittances is affected by household characteristics, and by immigrants' return plans. We estimate regressions of the following type:

$$Y_{it} = a_0 + a_1 X_{it} + \xi R_{it} + \epsilon_i + u_{it}, \quad (3.1)$$

where  $Y_{it}$  measures remittances, and the indices  $i$  and  $t$  denote households and

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<sup>5</sup>See Lucas & Stark (1985) for an early discussion. See Cox (1987), Cox et al. (1998) for empirical analysis of altruistic motives for private transfers. For a recent survey on the private transfer literature see Laferrere & Wolff (2000).

<sup>6</sup>Azam & Gubert (2006) stresses the role of the extended family and the village in migration and remittance decisions. Amuedo-Dorantes & Pozo (2006) investigates this motive empirically.

<sup>7</sup>As Durand et al. (1996) recognizes, "sending monthly remittances (...) and returning home with savings are interrelated behaviors that represent different ways of accomplishing the same thing: repatriating earnings".

time. The key variable of interest is  $R_{it}$ , which is a measure of the temporariness of the migration. As we explain below in more detail, we obtain this variable from survey questions on the migrant's intention to return home, which we observe in every wave of the panel that we use. These intentions may change over the migration history, and they may not always correspond to whether the migration has finally been permanent. But it is exactly these *plans* about a future return that determine remittance behavior.

The vector  $X_{it}$  collects characteristics of the household and the head of household. We include here the log of disposable household income, the number of adults and the number of children (below the age of 16) living in the household, and the number of employed household members. We also include characteristics of the head of household, like the gender, the employment status, the years since migration and its square, the number of years of education, and whether the partner is native born or the household head is single. Further, we include variables about whether the spouse or children are living abroad, and an indicator variable whether the head of household grew up in a rural area.

### 3.2.2 Identification

There are a number of problems with the estimation of equation (3.1). First, individuals who tend to return may at the same time have a higher (lower) propensity to send remittances. In this case, our estimate of  $\xi$  will be possibly upward (downward) biased, as the individual effect  $\epsilon_i$  will be correlated with return intentions  $R_{it}$ , so that  $E(\epsilon_i|X, R) \neq 0$ .<sup>8</sup> Some of this bias is likely to be eliminated by conditioning on the variables in  $X$ .

A further problem is that return intentions are likely to be measured with (possibly considerable) measurement error, thus creating an attenuation bias. In this case the "observed" return intention equals  $R_{it}^* = R_{it} + M_{it}$ . We assume here that the measurement error  $M_{it}$  has the "classical" properties of being uncorrelated with the true intention and being serially uncorrelated ( $E(R_{it}, M_{it}) = 0$ ,  $E(M_{it}, M_{is}) = 0$ ,  $t \neq s$ ). The downward bias is greatly exacerbated when estimating the model in differences or using fixed effects (see e.g. Hsiao (1986) for a detailed discussion).

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<sup>8</sup>If on the other hand, these individuals tend to save more in the host country rather than to remit, then the bias may be downwards.

Finally, remittances in previous periods may affect later return plans. For instance, past remittances, invested into assets or durable consumption goods, may have created returns that lead immigrants to change their current return intentions. This would imply that

$$R_{it} = b_0 + b_1 X_{it} + \sum_{s=1}^{t-1} d_s Y_{is} + \phi \epsilon_i + v_{it}. \quad (3.2)$$

If a positive shock to past remittances positively affects present return plans ( $d_s > 0$ ), then this would lead to a downward bias when using a difference or a fixed effects estimator. We deal with these problems by combining a fixed effect type estimation strategy (using within household variation for estimation only) with an instrumental variable estimator. The idea of our estimation strategy is as follows. In a first step, we eliminate the fixed effects by using a "forward orthogonal deviations" transformation (Arellano (2003)). This transformation removes the fixed effects by subtracting from each observation  $t = 1, \dots, T - 1$  the mean of the remaining future observations (rather than the mean of all observations, as does the standard FE estimator) in the sample. The forward orthogonal deviations transformation of a variable  $X_{it}$  is defined as  $X_{it}^0 = \sqrt{(T-1)/(T-t+1)}(X_{it} - \frac{1}{T-1} \sum_{s=t+1}^T X_{is})$  (see Arellano (2003) and Arellano & Bover (1995) for more details), so that equation (3.1) is transformed into

$$Y_{it}^0 = a_1 X_{it}^0 + \xi R_{it}^{*0} + \eta_{it}^0; \quad \eta_{it}^0 = u_{it}^0 - \xi M_{it}^0 \quad (3.3)$$

This transformation eliminates the fixed effect, but not the measurement error problem and the problem that past levels of remittances may affect future return intentions, so that pooled estimation of (3.3) would still lead to biased and inconsistent estimates. We therefore instrument the forward deviations using *past* return intentions of other household members as instruments. If the measurement error has the "classical" properties we describe above, and if future shocks to remittances are not correlated with past return intentions (as in 3.2), then past values of return intentions are appropriate instrumental variables.

The estimator could be implemented by using pooled 2SLS estimation. However, this estimator is inefficient as it does not use all instrumental variables available in each period. More efficient is a GMM type estimator as in Arellano & Bond (1991), which makes use of all instruments available in each period. We use here the orthogonal

deviations GMM estimator as suggested by Arellano & Bover (1995) (see also Arellano (2003) or Roodman (2006)).

We should mention that, although our estimation strategy eliminates the main problems in estimating the effects of return plans on remittances, other processes of feedback between return intentions and remittances may be present. For instance, our estimator is invalid if *future* remittances affect *current* return plans of other household members, conditional on observables. While we believe that the mechanism in (3.2) (where past remittances affect current return plans), addressed by our estimation strategy, is plausible, we find it difficult to make a case for why future remittances should affect current return intentions.

We should mention that the intention to return might well be jointly decided with family location or employment and earnings. Our estimator might solve part of this endogeneity problem if past intentions are not related with current family location or current earnings. However, if that is not the case, the coefficient on return intentions will be biased.

### 3.2.3 Selection through return migration

A remaining problem with the interpretation of the parameters is that our sample is selected - over the course of the panel, we observe more households who have a higher propensity to stay permanently. This selection may be correlated with our measure for a return migration intention: those with a higher intention to return will be less likely to be in the sample. If those who remain in the sample have different remittance behavior (conditional on all the variables we include in the model as well as the measure for the return intention), then this will bias our estimate for  $\xi$ .

This bias can be signed under some assumptions: it will be downward if the residuals in the selection equation and the remittance equation are positively correlated (indicating that those who remain in the sample remit less than those who drop out of the sample due to return, conditional on other regressors)<sup>9</sup>. In that case we can interpret

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<sup>9</sup>More formally, suppose that the latent index for being selected into the sample,  $s^*$  is linear in  $RI$ , the return intention, with  $s_i^* = \alpha_0 + \alpha RI_i + e_i$ , and that an individual is in the sample if  $s_i^* > 0$ . Suppose that the outcome equation is given by  $y_i = \gamma_0 + \gamma RI_i + f_i$ , and assume that  $e_i$  and  $f_i$  are jointly normally distributed, with variances 1 and  $\sigma_v^2$  and correlation coefficient  $\rho$ . Then selection could be accounted for by adding the generalized residual  $E(f_i | s_i^* > 0) = \lambda(c_i)$  to the estimation equation,

the coefficients on the temporary migration measure as a lower bound. However, it is also theoretically possible that the residuals in the selection equation and the remittance equation are negatively correlated indicating that those who remain in the sample remit more (after accumulating more host-country specific human capital, for example). In this case, the estimates will no longer be a lower bound.

When conditioning on individual effects, this problem will disappear if selection is based on "permanent" characteristics, as in this case the selection term is constant over time and is eliminated.

### 3.3 Background, data and descriptive evidence

#### 3.3.1 Background

Between the mid 1950's and 1973, the strong economic development in Northern Europe and the resulting demand for labor led to a large inflow of immigrants mainly from the periphery countries of Europe, but also from Turkey, North Africa, South America and Asia. The main receiving countries were Belgium, France, Germany, the Netherlands, Switzerland, and the Scandinavian countries.

The West-German economy experienced a strong upward swing after 1955, accompanied by a sharp fall in the unemployment rate (between 1955 and 1960, the unemployment rate fell from 5.6 % to 1.3 %) and an increase in labor demand. This generated a large immigration of workers from Southern European countries and Turkey into Germany. The percentage of foreign-born workers employed in West Germany increased from 0.6 percent in 1957 to 5.5 percent in 1965, and to 11.2 percent in 1973. Bilateral recruitment agreements were set up between Germany and Italy, Spain, Greece, Turkey, Portugal and Yugoslavia in the 1950's and 1960's.

Labor migration over this period was initially considered as temporary by both the immigration countries and the emigration countries. Individuals were not expected to settle permanently. The German recruitment policy was based on the assumption that

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where  $\lambda(c_i) = \phi(c_i)/\Phi(c_i)$ , with  $\phi$  and  $\Phi$  being the density and distribution function of the standard normal, and  $c_i = \alpha_0 + \alpha RI_i$ . We obtain the estimation equation  $y_i = \gamma_0 + \gamma RI_i + \sigma_v \rho \lambda(c_i) + \zeta_i$ . Omission of  $\lambda(c_i)$  results in a biased estimate for  $\gamma$ . The expectation of the error term when omitting  $\lambda$ , conditional on  $RI_i$ , is  $\rho \sigma_v E(\lambda(c_i)|RI_i)$ . Since  $\lambda$  decreases in  $c_i$ , the bias is downward for  $\rho < 0$  and  $\alpha < 0$ .

foreign workers would after some years return to their home countries. Still, although return migration has been quite considerable (see Bohning 1987), a fraction of foreign-born workers settled more permanently<sup>10</sup>.

### 3.3.2 The data and sample

We use for this analysis 12 waves of the German Socio-Economic panel (GSOEP 1984-1995). The GSOEP is a household-based panel survey, similar to the US Panel Study of Income Dynamics (PSID) or the British Household Panel Study (BHPS). Initiated in 1984, the GSOEP oversamples the then resident immigrant population in Germany, which stems from the migration movement we have described above. In the first wave, about 4500 households with a German-born household head were interviewed, and about 1500 households with a foreign born household head. The data are unique in providing repeated information on a boost sample of immigrants over a long period of time. For our analysis, we use observations for the foreign-born from the over-sample, as well as from the standard sample.

Each individual in a household and over the age of 16 is interviewed. The household head provides information about all other individuals in the household and below the interviewing age. Individuals who leave households and form their own households are included in the panel.

The GSOEP data provides a rich set of survey questions on remittances and savings. It distinguishes between remittances for family support, remittances for saving purposes in the home country, and remittances for other motives. The data on remittances is both qualitative and quantitative. Immigrants are asked whether they remit for each of the above purposes. They are further asked to quantify the amount of money they sent back home for each of these purposes during the previous calendar year. Information on remittances is available for the years 1984-1994, with the exception of the years 1991 and 1993<sup>11</sup>. All monetary variables (including remittances and savings) are measured at the household level in real amounts, where the reference year is 2002.

A further unique feature of our data is that immigrants provide information in

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<sup>10</sup>The stock of foreign labor in Germany in 2004 was 3.7 million people, of which around 60 per cent originated from the sending countries considered here (OECD (2006)).

<sup>11</sup>See Table 3.6 for data availability as well as the Data Construction Appendix 3.6 for a complete description of the variable construction.

each wave of the panel on whether they intend to remain permanently in Germany, or whether they wish to return home at some stage in the future. We use this information to construct a binary variable that measures the return plan of the immigrant. As we discuss above, return plans may change over the migration history, and may deviate from the final return decision; however, remittances (as other behavior) are based on current plans rather than future realizations.

In addition, we have individual and household characteristics in the host country, as well as information on family members who are living in the country of origin. There is no information on the use of remittances by the family members in the origin country, or of other household characteristics or income in the home country.

We provide summary statistics of the variables we use in Table 3.1. We account for the individual characteristics of the head of household as well as for the number of adults, children and employed individuals on the household. Entries in Table 3.1 show that the average age of household heads in our sample is 45 years, and that migrants resided slightly less than 20 years on average in Germany. More than 83 percent of the head of households are male, and 77 percent are employed. The average net household income is 22000 Euros (in 2002 prices). Around 6 percent of household heads are married with a native partner. With respect to members of the family living abroad, around 9 percent of heads of households report that their partner lives abroad. The percentage of head of households that have children under the age of 16 in another country (different from the host country) is 14 percent. Around 42 percent of all heads of households report that they grew up in a rural area up to age 15 ("rural childhood"). Finally, on average, more than half of the household heads in our sample report that they would wish to return to their home country at some point in the future.

## **3.4 Results**

### **3.4.1 Descriptive evidence**

In Table 3.2 we report in the first four columns the percentage of households that remit, the amount of remittances sent per household, overall, conditional on remitting and as a percentage of household disposable income. About 40 % of households report that they have sent remittances during the last year. On average households remit around 1500 Euros (in 2002 prices) per year, which corresponds to 8.2 % of disposable household

income. Conditional on remitting, the average amount remitted per household is over 3800 Euros. Our data distinguishes between different types of remittances, and overlap is possible. These are reported in the last three columns of the table. The largest fraction of remittances is for the purpose of family support: around 28 % of households report to remit for that reason. Around 6 % of households transfer remittances to be saved in the home country, while almost 9 % sent remittances for other non-specified purposes.

The next row distinguishes between households where the head has a permanent or temporary migration intention. Households with temporary intentions have a 25 percentage points higher probability to remit, and the total unconditional amount (and the amount as percentage of disposable income) is more than twice the magnitude. Even after conditioning on remitting a positive amount, temporary migrants remit more than permanent migrants. The breakdown of remittances in its different purposes in the last three columns shows also differences for each single category.

The next rows draw distinction between remittances of households with different characteristics. The difference between remittances for households where the spouse lives abroad as opposed to single households or households where the spouse lives in the host country is again large, with around two thirds of households in the first category sending remittances, compared to only 42 percent in the latter one. In addition, the average amount remitted for households where the spouse lives abroad is 2988 Euros, two times larger than for those households whose head is single or where the spouse lives in the host country. There are also large differences in remittance probabilities and the overall amounts remitted according to whether children are living abroad or not. Not surprisingly, the largest differences are in the category "remittances for family support", while "remittances for savings for later" and "remittances for other purposes" are more similar.

The distribution of household remittances is shown in table 3.3. The first panel shows the distribution of the total amount remitted unconditional on remitting a positive amount, while the second panel shows the distribution conditional on remitting a positive amount. In both cases, temporary migrants remit a higher amount than permanent migrants, both overall and as a percentage of household income. Conditional on remitting, the amount remitted by the median temporary migrant is over 3300 Euros (around 15% of the household disposable income). This amount is higher than the



amount remitted by the median permanent migrant, 2529 Euros (11% of the household disposable income).

### 3.4.2 Remittances and return plans

The descriptive evidence we present in the last section suggests large differences in remittance behavior between households with permanent and temporary migration plans. Some of these differences may be due to differences in household composition and individual characteristics of household members; they may also be due to differences in the family's residential allocation. We now turn to regression results that hold background characteristics constant.

We commence with an analysis of whether or not the household sends remittances, and of which type. In the upper panel of Table 3.4, we report estimation results of linear probability models.<sup>12</sup> We report in the first specification estimates of an indicator variable as to whether the head of household considers the migration as permanent or temporary. In the second specification we add information about the whereabouts of the spouse and the children in the home country. All specifications include time and country of origin dummies, and condition on age, years since migration (and its square), education, gender, marital status and employment status of the head of household as well as disposable household income, the number of adults and the number of children in the household, and whether the individual grew up in a rural area. Standard errors, reported below the coefficients, are clustered by households. We report the full set of estimation results in table 3.7.

Results in the first pair of columns refer to whether the household sends remittances. Unconditional on the residential location of the family, temporary migration plans are associated with a 13.4 percentage point higher probability to remit (remember that only 46 percent of households remit in our sample, so that this estimate corresponds to a 29 percent difference); conditional on family location, the estimate only drops slightly, and suggests a difference of 10 percentage points. The coefficients on the family location decisions, reported in the second column, suggest a sizeable association between remittance propensities and whether spouse or children live abroad. Households where the spouse is living abroad are associated with a 10 percentage point

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<sup>12</sup>Marginal effects from probit models are almost identical.

higher probability to remit; if children live abroad, this probability is a further 14 percentage points higher. This suggests that remittance behavior is strongly affected by the location of the family. But even conditional on family location, temporary migration plans remain strongly related to remittances: those with temporary plans still have a 10 percentage points higher probability to remit.

The next three pairs of columns report results distinguishing between the three different purposes of remittances that are reported in our survey: remittances to support the family, to accumulate savings in the home country, and for other purposes. Temporary migration plans are strongly related to remittances sent for family support (although the estimate has nearly halved), even conditional on the location of the immediate family. One reason may be that migrants with temporary migration plans have commitments towards family members other than the spouse and children, compared with migrants with permanent intentions. This could be either because a larger fraction of the extended family is still living abroad (which we do not measure), or because the temporary nature of their intended migration induces a larger response to expectations from, and commitments to family and kinship. Not surprisingly, remittances for family support are strongly associated with the locational choice of the immediate family, as suggested by the coefficients on the spouse and children variables. On the other hand, having family members abroad slightly decreases remittances for other purposes as well as savings in the home country. The coefficient estimates for savings in the home country and "other" remittances are smaller, and hardly affected by adding the location of the immediate family.

Table 3.7 reports results for the full set of parameter estimates. We briefly discuss here estimates of the income and education variables, for the specification in the first two columns. The probability of sending remittances increases with disposable household income, which is compatible with previous empirical findings<sup>13</sup>. The magnitude of this association is quite considerable: an increase in household income by 1 log point is related to an increase in the probability to remit of about 11 percentage points. Remittances also decrease with educational attainments of the household head, conditional on household income. This is in line with Faini (2006) who finds that remittances are

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<sup>13</sup>Lucas & Stark (1985), Hoddinott (1994) and Funkhouser (1995) also report a positive association between remittance behavior and migrant's income.

lower for the highly skilled. He suggests as an explanation that skilled immigrants have longer migration periods, and a higher probability of re-uniting with their families. Our results show that the coefficient on the education variable is still negative and significant even conditional on location of spouse and children and the temporary migration variable (column 2 in Table 3.7). One explanation is that households where the head is better educated may enjoy more favorable conditions in the home country, thus reducing the need for remittances. The better educated may also be less affected by social pressure to remit.

In the lower panel of Table 3.4, we show results for the same specifications, where we use the logarithm of the reported amounts of remittances as the dependent variable. For zero observations, we set remittances equal to 1.<sup>14</sup> Again, we report only the coefficients on the temporary measure of migration, and the location of the immediate family; the full set of results is reported in Table 3.8.

Overall, the qualitative results are similar to those we discuss above. The magnitude of the coefficient estimates are large: total remittances are more than one log point higher when the migration is intended to be temporary. The coefficient drops to 0.84 when we condition on the location of the family. As before, most of the difference between temporary and permanent households is due to family support, as columns 2 suggest. However, savings in the home country and "other" remittances are also significantly larger for households with temporary migration plans. While the coefficient estimate decreases when we condition on family location for family remittances, it increases for the other two purposes.

Alternatively, we have estimated Tobit specifications; results are very similar. We have also estimated the regression conditioning on remitting a positive amount, see Table 3.9.<sup>15</sup> Results show that temporary migrants that remit remit an amount 23 % higher than permanent migrants that remit. In particular, the amount remitted for family

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<sup>14</sup>The dependent variable is thus  $\ln(Z + 1)$ , where  $Z$  are total remittances in 2002 Euros.

<sup>15</sup>The determinants on whether to remit might be different from those determining how much to remit. Return intentions could influence the decision on whether to remit or not; while other factors influence more the amount remitted (or vice-versa). The results in 3.9 show that intentions to return modify not only the probability to remit but also the amount remitted overall and for family support. Nevertheless, other explanatory variables like years of education or employment affect differently the decision to remit and the amount remitted.

support is significantly higher for temporary migrants. After conditioning on remitting a positive amount for savings or for other purposes, however, there are no significant differences between temporary and permanent migrants.

### 3.4.3 Fixed effects, measurement error and reverse causality

The estimates we report in the last section can not be interpreted as causal, as we discuss in section 3.2.1. The estimated association between the temporary character of migration and remittances may partly reflect that those immigrants who are intending to return home are also more inclined to remit. Two further problems we discuss are that the return intention variable is likely to be measured with considerable error, and that past remittances may affect current return plans. These are likely to lead to a downward bias in a fixed effects regression. In this section, we attempt to address these issues, by using the GMM type estimator we explain in section 3.2.1.

In Table 3.5 we report estimation results both for the probability to remit (Panel A) and for the amount of remittances (Panel B). Specifications are identical to specification 2 in Table 3.4, and we report as a benchmark (column 1) results from that specification. Columns 2 and 3 report conventional fixed effects (FE) estimates and fixed effects estimates using forward orthogonal deviations. The results show that estimates for the two specifications are very similar, but that conditioning on fixed effects reduces the temporary migration coefficient considerably. As we discuss above, this could be due to unobserved factors that affect remittance behavior as well as temporary migration intentions, but it could also be due to measurement error in the intention variables, or the feedback mechanisms in equation (3). In column 4 we report GMM estimates, using past levels of return plans of other household members as instruments, as described above. These are considerably larger than the FE estimates, and slightly larger than the OLS estimates. They suggest a 16.2 percentage point higher probability of sending remittances for immigrants with temporary migration plans.<sup>16</sup> Comparing FE estimates with GMM estimates suggests that both measurement error and/or feedback leads to a downward bias in FE estimates.

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<sup>16</sup>The Arellano & Bond (1991) test for second-order autocorrelation on the residuals in differences does not reject the null of no serial correlation (p-value 0.9), implying that using lags as instruments is a valid strategy. In addition, the Hansen test for joint validity of the instruments has a p-value of 0.91, showing that the overidentifying restrictions are comfortably accepted.

In the lower panel of the table we assess the magnitude of these effects, using the logarithm of the total amount of remittances (plus one) as a regressor. The coefficient estimate on temporary migration drops in the fixed effects specification, but is still significant, suggesting that temporary migration plans increase remittances overall by 28 percent. GMM estimates in column 4 are again larger than the OLS estimates, showing that temporary vs permanent migration plans increase total remittances by 1.3 log points.<sup>17</sup>

### 3.5 Discussion and conclusion

To obtain an idea of the magnitude of the relationship between remittance flows and permanent versus temporary migration plans, we provide some simple estimates based on the GMM results in Table 3.5. Over the period we consider, the average yearly flow of remittances sent home by the immigrants in our sample amounts to 1736 Euros per household, or 504 Euros per individual<sup>18</sup>. This corresponds to an aggregate of more than 2 billion Euros in 1995 (equivalent to 0.12% of the German GDP in that year), for the population of immigrants that are represented in our sample<sup>19</sup>. Now consider an increase in permanent migration plans of 10 percentage points (over the ten years period, permanent migration intentions of households have increased by 30 percentage points). This change is equivalent to a drop in remittances sent of 15 percent of the total amount remitted, corresponding to around 300 million Euros, or around 0.018% of the German GDP in 1995.

The drop in remittances is even more important for receiving countries. To put this number into perspective, consider Turkey. In 1994, remittance flows corresponded to 2.1% of the Turkish GDP, much higher than foreign direct investment (0.51%) or

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<sup>17</sup>We have also estimated the model using as instruments past return intentions of both the head of household and other household members, or the head of household only. Estimates are similar to those reported.

<sup>18</sup>We obtain this number by dividing the average remittances per household by the average household size for our sample during the years 1984-1994. This amount is in line with official aggregate statistics: total remittance flows in 1995 were 4.12 billion Euros (in 2002 prices) according to Bundesbank (2008), which corresponds to 574 Euros per immigrant, based on the total immigrant population.

<sup>19</sup>Immigrants from Turkey, Ex-Yugoslavia, Greece, Italy and Spain, who accounted for 60 percent of the total immigrant population in Germany in 1995 (OECD (2006)).

aid (0.18%)<sup>20</sup>. An increase in permanent intentions to stay in Germany of Turkish immigrants by 10 percentage points corresponds to a decrease in remittance flows of 138 million Euros, using our GMM estimates in Table 3.5. This is equivalent to around 0.28% of Turkish GDP in 1994, an amount equivalent to more than half of foreign direct investment received by Turkey in 1994 and much higher than the total amount of aid received. Although these are rough calculations, they highlight the magnitude of the effects of temporary vs permanent migration on remittance behaviour.

Our results emphasize the importance of the particular form of migration for immigrant behavior. They suggest that migration policies that encourage temporary migration are likely to lead to higher remittance flows than migration policies that encourage permanent settlement. Thus, our analysis suggests that remittances need to be discussed in conjunction with the particular form of migration.

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<sup>20</sup>OECD (2005), WorldBank (2006).

## 3.6 Data Construction Appendix

We use data from the first 12 waves of the German Socio-Economic Panel (years 1984-1995). Our sample consists of migrant households whose head was born in Turkey, Greece, Yugoslavia, Italy or Spain.

Individuals are asked in each wave of the panel whether they intend to remain permanently in Germany, or whether they wish to return home at some stage in the future. We construct a binary variable that equals 1 if the head of household plans to return in the future.

Household income corresponds to the net monthly income of the household, in 2002 Euros and transformed to the yearly level. The exact wording of the question is "If everything is taken together: how high is the total monthly income of all the household members at present? Please give the monthly net amount, the amount after the deduction of tax and national insurance contributions. Regular payments such as rent subsidy, child benefit, government grants, subsistence allowances, etc., should be included. If not known exactly, please estimate the monthly amount."

Individuals declare each year the amount of remittances sent in the previous year (except for the surveys in 1992 and 1994). The wording of the question is "(Last year) did you personally send or take money to your homeland?". In case of an affirmative answer, individuals are asked for the overall amount and the purpose: "And how is this amount distributed between support for your family, savings for later and other". "Savings" correspond to the amount of savings in the home country. "Other" corresponds to any other purpose. We aggregate these amounts to the household level and lag them for one year to match them time-wise with the rest of observed variables.

Table 3.1: Summary Statistics - 1984-1994

	<i>Mean</i>	<i>Std. Dev.</i>
Sex	0.834	0.371
Age	45.210	12.210
Age At Arrival	25.178	8.587
Years Since Migration	19.026	6.270
Number Years Education	9.588	1.925
Household Income	22030	12922
Number Children in Household	0.853	1.093
Number Adults in Household	2.203	1.031
Number Employed Individuals in Household	1.395	0.903
Employed	0.769	
Non Single	0.877	
Native Partner	0.058	
Spouse Abroad	0.093	
Children Abroad	0.137	
Rural Childhood	0.418	
Temporary	0.517	

Note: Calculations based on GSOEP data, 1984-1990, 1992, 1994. Individual information corresponds to the head of household. Household Income in 2002 Euros.



Table 3.2: Remittances by Household Characteristics

	<i>Percent Households Remitting</i>	<i>Total Amount (in 2002 Euros)</i>	<i>Total Amount Conditional on Remitting</i>	<i>Total Amount As Percentage of HH Disposable Income</i>	<i>Percent Households Remitting to Family</i>	<i>Percent Households Remitting for Savings</i>	<i>Percent Households Remitting for Other Purposes</i>
Total Migrant	39.55%	1,505	3,806	7.44%	28.48%	5.79%	8.84%
Permanent	25.97%	824	3,173	4.04%	18.84%	2.76%	5.80%
Temporary	51.09%	2,056	4,024	9.87%	37.05%	8.26%	11.65%
No Spouse Abroad	41.59%	1,501	3,610	6.68%	29.55%	6.34%	9.91%
Spouse Abroad	66.23%	2,988	4,512	19.09%	55%	5.37%	5.72%
No Children Abroad	41.75%	1,455	3,486	6.59%	29.36%	6.44%	9.97%
Children Abroad	69.66%	3,281	4,710	18.32%	57.87%	7.23%	9.07%

Note: Calculations based on GSOEP data (1984-1990,1992,1994), on household level, using household weights. Information on temporary intention, spouse and children abroad corresponds to the head of household. "No Spouse Abroad" includes single heads of household. "No children abroad" includes heads of household with children in the host country and without children.

Table 3.3: Distribution of Household Remittances

		<i>p10</i>	<i>p25</i>	<i>p50</i>	<i>p75</i>	<i>p90</i>
<b><i>Total Amount Remitted unconditional on remitting</i></b>						
<b>All</b>	Euros	0	0	0	1897	4904
	As percentage of HH Income	0%	0%	0%	8%	25%
<b>Permanent</b>	Euros	0	0	0	0	3046
	As percentage of HH Income	0%	0%	0%	0%	14%
<b>Temporary</b>	Euros	0	0	0	3161	6497
	As percentage of HH Income	0%	0%	0%	14%	31%
<b><i>Total Amount Remitted conditional on remitting</i></b>						
<b>All</b>						
	Euros	649	1383	3042	5408	8296
	As percentage of HH Income	3%	7%	13%	26%	44%
<b>Permanent</b>	Euros	442	1298	2529	4220	7790
	As percentage of HH Income	2%	6%	11%	20%	38%
<b>Temporary</b>	Euros	677	1658	3337	5531	8798
	As percentage of HH Income	3%	7%	15%	28%	46%

Note: Calculations based on GSOEP data (1984-1990,1992,1994), on household level, using household weights. Information on temporary intention corresponds to the head of household.

Table 3.4: Probability to Remit and Amount Remitted - OLS

Household Sent Remittances (=1 Yes, =0 No)								
	<i>Total</i>		<i>Family Support</i>		<i>Savings for Later</i>		<i>Other Purposes</i>	
Temporary	0.134**	0.096**	0.101**	0.057**	0.029**	0.030**	0.033**	0.043**
	(0.020)	(0.020)	(0.020)	(0.020)	(0.008)	(0.008)	(0.013)	(0.013)
Spouse Abroad		0.097*		0.1		-0.026		-0.022
		(0.046)		(0.054)		(0.017)		(0.024)
Children Abroad		0.141**		0.177**		0		-0.005
		(0.031)		(0.031)		(0.014)		(0.016)
R-squared	0.162	0.172	0.122	0.141	0.033	0.034	0.032	0.034
Logarithm (Amount Remitted + 1)								
Temporary	1.114**	0.837**	0.819**	0.483**	0.222**	0.235**	0.250*	0.337**
	(0.163)	(0.162)	(0.160)	(0.155)	(0.062)	(0.064)	(0.098)	(0.100)
Spouse Abroad		0.899*		0.925*		-0.219		-0.204
		(0.376)		(0.410)		(0.132)		(0.170)
Children Abroad		1.256**		1.565**		-0.008		-0.051
		(0.257)		(0.251)		(0.109)		(0.119)
R-squared	0.177	0.193	0.135	0.162	0.033	0.034	0.033	0.036
Observations	8,917	7,709	8,917	7,709	8,917	7,709	8,917	7,709

\* significant at 5%; \*\* significant at 1%

Note: GSOEP data (1984-1990,1992,1994). Household level, weighted regression using household weights. All specifications include time and country dummies and condition on age, years since migration (and its square), education, gender, marital status, childhood in a rural area in the home country and employment status of the head of household as well as household income, employment status other members of the household, number of adults and children in the host country household. Standard errors are clustered by household.

Table 3.5: Probability to Remit and Amount Remitted - Fixed Effects and GMM

<u>Household Sent Remittances (=1 Yes, =0 No)</u>				
	<i>OLS</i>	<i>FE</i>	<i>FE Orthog</i> <i>Deviations</i>	<i>GMM</i>
	(1)	(2)	(3)	(6)
Temporary	0.096** (0.020)	0.032* (0.015)	0.034** (0.0145)	0.162* <sup>a</sup> (0.069)
<u>Logarithm (Amount Remitted+1)</u>				
Temporary	0.837** (0.162)	0.244* (0.121)	0.253** (0.115)	1.396** <sup>b</sup> (0.542)
Observations	7,709	7,984	6,574	6,473
Number of Never Changing Person ID		1,411	1,173	1,170

\* significant at 5%; \*\* significant at 1%

Note: GSOEP data (1984-1990,1992,1994). Household level, using household weights. All specifications include time dummies and condition on marital status and employment status of the head of the household, as well as household income, employment status of the rest of the members of the household, number of adults and children in the host country household and indicator variables for spouse and children in the home country. OLS specification includes in addition country dummies, age, years since migration (and its square), education, gender and childhood in a rural area in the home country. Standard errors are clustered by household. Instrumental variables used in GMM: lags in average intention to return (t-1, ..., 1) of other household members.

(a) AR(1) Test: z=-10.42 P-Value=0 AR(2) Test: z=-0.112 P-Value=0.911  
Hansen Test =31.88 P-Value=0.619

(b) AR(1) Test: z=-10.469 P-Value=0 AR(2) Test: z=-0.14 P-Value=0.888  
Hansen Test =32.34 P-Value=0.597

Table 3.6: GSOEP Data Availability

<i>Variable Name</i>	<i>Description</i>	<i>Availability</i>
Total Remittances	Total Amount sent to Home Country	1984-1990,1992,1994
Family Remittances	Amount sent to Support the Family	1984-1990,1992,1994
Savings at Home Country	Amount Saved in the Home Country	1984-1990,1992,1994
Remittances for other purposes	Amount sent for other purposes	1984-1990,1992,1994
Savings at Host Country	Amount Saved in the Host Country	1992-2003
Household Income	Annual Net Household Income	1984-2003
Return Intention	Intention to Return to the Home Country	1984-2003
Spouse Abroad	Spouse in the Home Country	1984-1997
Children Abroad	Under Aged Children in the Home Country	1984-1997
Number of Adults	Number Adults Host Country Household	1984-2003
Number of Children	Number Children Host Country Household	1984-2003

Note: German Socio Economic Panel (GSOEP) data.

Table 3.7: Probability to Remit - Full Set of Results

	<i>Total</i>		<i>Family Support</i>		<i>Savings for Later</i>		<i>Other Purposes</i>	
Age/10	0.028*	-0.001	0.032*	0.009	0.006	0.008	-0.004	-0.005
	(0.014)	(0.017)	(0.013)	(0.017)	(0.007)	(0.008)	(0.007)	(0.009)
Years Since Migration/10	0.165*	0.165	0.116	0.073	0.024	0.008	0.007	0.056
	(0.074)	(0.086)	(0.064)	(0.083)	(0.024)	(0.033)	(0.041)	(0.039)
YSM-Squared/100	-0.064**	-0.049*	-0.050**	-0.032	-0.009	-0.004	-0.005	-0.012
	(0.017)	(0.021)	(0.015)	(0.021)	(0.006)	(0.008)	(0.009)	(0.010)
Log HH Income	0.109**	0.106**	0.087**	0.077**	0.021**	0.029**	0.018	0.018
	(0.024)	(0.027)	(0.020)	(0.023)	(0.008)	(0.010)	(0.013)	(0.015)
Number Adults HH Host	-0.049**	-0.034*	-0.051**	-0.029	-0.008	-0.01	0.016	0.011
	(0.014)	(0.014)	(0.014)	(0.015)	(0.006)	(0.006)	(0.009)	(0.011)
Number Children HH Host	-0.024*	-0.017	-0.031**	-0.019	0.002	0.000	-0.001	-0.004
	(0.010)	(0.011)	(0.009)	(0.011)	(0.004)	(0.005)	(0.005)	(0.006)
Employment Head HH	0.130**	0.121**	0.123**	0.116**	0.004	0.011	-0.005	-0.012
	(0.031)	(0.034)	(0.031)	(0.034)	(0.011)	(0.012)	(0.016)	(0.017)
Number Employed HH	0.042**	0.044**	0.019	0.021	0.021**	0.018*	0.025*	0.029**
	(0.015)	(0.016)	(0.015)	(0.016)	(0.007)	(0.008)	(0.010)	(0.010)
Number Years Education	-0.017*	-0.019**	-0.013	-0.014*	-0.004	-0.005*	0.001	-0.002
	(0.007)	(0.007)	(0.007)	(0.007)	(0.002)	(0.003)	(0.003)	(0.003)
Male Head HH	0.124**	0.164**	0.082*	0.134**	0.028**	0.031*	0.017	0.021
	(0.045)	(0.054)	(0.041)	(0.049)	(0.009)	(0.013)	(0.018)	(0.025)
Non Single Head HH	0.05	-0.019	0.055	-0.035	0.007	0.012	0	0.004
	(0.046)	(0.054)	(0.044)	(0.051)	(0.012)	(0.018)	(0.020)	(0.026)
Native Partner	-0.110*	-0.091	-0.051	-0.034	-0.047**	-0.047**	-0.072**	-0.064**
	(0.054)	(0.064)	(0.046)	(0.055)	(0.010)	(0.012)	(0.016)	(0.019)
Temporary	0.134**	0.096**	0.101**	0.057**	0.029**	0.030**	0.033**	0.043**
	(0.020)	(0.020)	(0.020)	(0.020)	(0.008)	(0.008)	(0.013)	(0.013)
Spouse Abroad		0.097*		0.1		-0.026		-0.022
		(0.046)		(0.054)		(0.017)		(0.024)
Children Abroad		0.141**		0.177**		0.000		-0.005
		(0.031)		(0.031)		(0.014)		(0.016)
Rural Childhood		0.066*		0.041		0.000		0.008
		(0.027)		(0.026)		(0.010)		(0.013)
Observations	8,917	7,709	8,917	7,709	8,917	7,709	8,917	7,709
Pseudo R-sq	0.162	0.172	0.122	0.141	0.033	0.034	0.032	0.034

\* significant at 5%; \*\* significant at 1%

Note: Dependent variable: Household sent remittances (=1 Yes, =0 No). GSOEP data (1984-1990,1992,1994). Weighted regression using household weights. All specifications include time and country dummies. Standard errors are clustered by household.

Table 3.8: Amount Remitted - Full Set of Results

	<i>Total</i>		<i>Family Support</i>		<i>Savings for Later</i>		<i>Other Purposes</i>	
Age/10	0.269*	0.034	0.284**	0.104	0.045	0.058	-0.033	-0.032
	(0.113)	(0.139)	(0.101)	(0.134)	(0.057)	(0.062)	(0.053)	(0.067)
Years Since Migration/10	1.197*	1.26	0.808	0.48	0.172	0.049	0.013	0.385
	(0.605)	(0.684)	(0.508)	(0.642)	(0.198)	(0.270)	(0.319)	(0.297)
YSM-Squared/100	-0.498**	-0.390*	-0.379**	-0.232	-0.066	-0.025	-0.034	-0.083
	(0.138)	(0.165)	(0.114)	(0.156)	(0.049)	(0.068)	(0.073)	(0.080)
Log HH Income	0.981**	0.996**	0.749**	0.694**	0.192**	0.256**	0.153	0.16
	(0.205)	(0.239)	(0.159)	(0.185)	(0.069)	(0.084)	(0.104)	(0.119)
Number Adults HH Host	-0.503**	-0.358**	-0.492**	-0.300**	-0.071	-0.09	0.116	0.079
	(0.111)	(0.114)	(0.104)	(0.116)	(0.046)	(0.047)	(0.069)	(0.081)
Number Children HH Host	-0.246**	-0.180*	-0.303**	-0.190*	0.019	-0.004	-0.002	-0.022
	(0.076)	(0.083)	(0.072)	(0.082)	(0.036)	(0.040)	(0.040)	(0.046)
Employment Head HH	1.012**	0.940**	0.954**	0.894**	0.021	0.068	-0.045	-0.091
	(0.237)	(0.256)	(0.232)	(0.255)	(0.083)	(0.092)	(0.123)	(0.133)
Number Employed HH	0.393**	0.397**	0.172	0.183	0.171**	0.145*	0.201*	0.231**
	(0.123)	(0.128)	(0.114)	(0.121)	(0.057)	(0.060)	(0.078)	(0.080)
Number Years Education	-0.119*	-0.123*	-0.084	-0.087	-0.031	-0.041*	0.004	-0.01
	(0.057)	(0.058)	(0.055)	(0.053)	(0.019)	(0.020)	(0.022)	(0.024)
Male Head HH	1.118**	1.460**	0.717*	1.135**	0.233**	0.253*	0.174	0.193
	(0.348)	(0.405)	(0.316)	(0.367)	(0.072)	(0.103)	(0.127)	(0.174)
Non Single Head HH	0.557	-0.042	0.598	-0.161	0.048	0.096	-0.029	0.013
	(0.351)	(0.407)	(0.331)	(0.382)	(0.097)	(0.144)	(0.154)	(0.199)
Native Partner	-1.069**	-0.921*	-0.536	-0.394	-0.376**	-0.376**	-0.570**	-0.509**
	(0.367)	(0.431)	(0.315)	(0.375)	(0.078)	(0.093)	(0.116)	(0.137)
Temporary	1.114**	0.837**	0.819**	0.483**	0.222**	0.235**	0.250*	0.337**
	(0.163)	(0.162)	(0.160)	(0.155)	(0.062)	(0.064)	(0.098)	(0.100)
Spouse Abroad		0.899*		0.925*		-0.219		-0.204
		(0.376)		(0.410)		(0.132)		(0.170)
Children Abroad		1.256**		1.565**		-0.008		-0.051
		(0.257)		(0.251)		(0.109)		(0.119)
Rural Childhood		0.585**		0.351		-0.002		0.084
		(0.211)		(0.204)		(0.084)		(0.103)
Observations	8,917	7,709	8,917	7,709	8,917	7,709	8,917	7,709
Pseudo R-sq	0.177	0.193	0.135	0.162	0.033	0.034	0.033	0.036

\* significant at 5%; \*\* significant at 1%

Note: Dependent variable: Logarithm (Amount Remitted+1). GSOEP data (1984-1990,1992,1994). Weighted regression using household weights. All specifications include time and country dummies. Standard errors are clustered by household.

Table 3.9: Amount Remitted Conditional on Remitting - Full Set of Results

	<i>Total</i>		<i>Family Support</i>		<i>Savings for Later</i>		<i>Other Purposes</i>	
Age/10	0.113*	0.108	0.144*	0.120	0.050	-0.058	0.012	0.023
	(0.053)	(0.056)	(0.069)	(0.069)	(0.084)	(0.091)	(0.083)	(0.090)
Years Since Migration/10	-0.124	0.000	-0.183	-0.201	-0.665	-0.484	-0.525	-0.678
	(0.253)	(0.291)	(0.295)	(0.330)	(0.449)	(0.518)	(0.401)	(0.440)
YSM-Squared/100	-0.014	-0.018	0.014	0.039	0.168	0.148	0.110	0.182
	(0.066)	(0.074)	(0.077)	(0.085)	(0.126)	(0.140)	(0.109)	(0.116)
Log HH Income	0.482**	0.531**	0.554**	0.619**	0.608**	0.575**	0.222	0.222
	(0.141)	(0.162)	(0.112)	(0.116)	(0.177)	(0.198)	(0.177)	(0.186)
Number Adults HH Host	-0.245**	-0.198**	-0.301**	-0.232**	-0.139	-0.161	-0.039	-0.047
	(0.045)	(0.047)	(0.048)	(0.049)	(0.095)	(0.096)	(0.064)	(0.069)
Number Children HH Host	-0.119**	-0.076*	-0.164**	-0.108**	-0.025	-0.049	0.053	0.051
	(0.029)	(0.030)	(0.032)	(0.035)	(0.051)	(0.056)	(0.046)	(0.048)
Employment Head HH	0.186	0.196	0.285*	0.301*	-0.221	-0.359	0.121	0.213
	(0.113)	(0.117)	(0.141)	(0.146)	(0.234)	(0.253)	(0.175)	(0.181)
Number Employed HH	0.109	0.100	0.031	0.014	-0.086	-0.047	0.071	0.045
	(0.057)	(0.060)	(0.062)	(0.064)	(0.107)	(0.112)	(0.086)	(0.093)
Number Years Education	0.032	0.040*	0.032	0.043	0.063	0.048	0.012	0.025
	(0.018)	(0.018)	(0.023)	(0.024)	(0.033)	(0.034)	(0.025)	(0.028)
Male Head HH	0.569**	0.668**	0.427**	0.534**	0.695**	0.694**	0.700*	0.439
	(0.140)	(0.181)	(0.138)	(0.178)	(0.210)	(0.240)	(0.294)	(0.354)
Non Single Head HH	0.396**	0.121	0.462**	0.143	0.025	0.035	-0.304	-0.306
	(0.123)	(0.140)	(0.149)	(0.160)	(0.172)	(0.219)	(0.213)	(0.262)
Native Partner	-0.832**	-0.708**	-0.695**	-0.569**	0.165	0.117	-0.571	-0.688
	(0.136)	(0.149)	(0.130)	(0.142)	(0.558)	(0.575)	(0.353)	(0.359)
Temporary	0.177**	0.234**	0.174*	0.184*	-0.099	-0.125	0.039	0.169
	(0.063)	(0.064)	(0.074)	(0.073)	(0.145)	(0.170)	(0.121)	(0.131)
Spouse Abroad		0.239*		0.266**		-0.018		-0.386
		(0.113)		(0.096)		(0.224)		(0.326)
Children Abroad		0.225**		0.371**		-0.148		-0.087
		(0.064)		(0.074)		(0.163)		(0.168)
Rural Childhood		0.127		0.100		-0.040		0.220*
		(0.067)		(0.077)		(0.128)		(0.107)
Number Observations	3,812	3,501	2,623	2,419	700	639	965	870
R-Squared	0.177	0.200	0.228	0.261	0.150	0.139	0.083	0.108

\* significant at 5%; \*\* significant at 1%

Note: Dependent variable: Logarithm (Amount Remitted+1) conditional on remitting a positive amount in each remittance category. GSOEP data (1984-1990,1992,1994). Weighted regression using household weights. All specifications include time and country dummies. Standard errors are clustered by household.



## **Chapter 4**

# **Savings, Asset Holdings, and Temporary Migration\*.**

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## 4.1 Introduction

The economic performance of immigrants is important for assessment of the welfare implications of immigration. Not surprisingly therefore, a large number of papers investigate the (relative) earnings position of immigrants over the migration cycle, for different countries, and using both cross-section and time-series data (from the early works of Chiswick (1978) and Borjas (1985) to Dustmann (1993), Friedberg (1993), Borjas (1995), Barth et al. (2004), Bratsberg et al. (2006) and Lubotsky (2007) among others). An area that has received less attention, but is perhaps equally important for assessing the economic position of immigrants in the receiving country, is their asset accumulation and savings.

Like earnings, assets and savings are likely to be affected by plans about a future return. Return intentions in the past may have affected past earnings as well as past expenditures, and therefore the magnitude of current asset holdings and past and current savings. Return intentions can affect as well the amount of precautionary savings migrants held. Dustmann (1995) and Dustmann (1997) have shown that, under certain conditions, migrants might hold a greater amount of precautionary savings if they face a greater income risk in the host country.<sup>1</sup>

Furthermore, past and current return intentions may determine where assets and savings are held. For instance, when considering housing and other investments, these may be undertaken in the country of origin if migrations are intended as temporary rather than permanent.<sup>2</sup>

A number of papers analyse the wealth gap between immigrants and natives. Most of these report a persistent gap, even conditional on observable characteristics<sup>3</sup>. However, most measures of immigrant wealth do not consider immigrants' wealth in the home- and host country separately. Hence, an analysis that considers wealth accumu-

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<sup>1</sup>Although they could also hold a lower amount of precautionary savings if the labour markets of both home and host countries are correlated, as they could diversify risk between the two.

<sup>2</sup>See Woodruff & Zenteno (2007) and Yang (2006) for evidence on the creation of enterprises of immigrants in their home countries while abroad. Dustmann & Kirchkamp (2002) and Mesnard (2004) provide evidence of immigrants undertaking entrepreneurial activities after return.

<sup>3</sup>See for example Blau & Graham (1990), Coulson (1999), Borjas (2002), Amuedo-Dorantes & Pozo (2002), Painter et al. (2003), Osili & Paulson (2004), Cobb-Clark & Hildebrand (2006), Sinning (2007, 2009) or Bauer et al. (2011).

lation without differentiating between locations may only give an incomplete picture of asset holdings and savings. In addition, most of these studies do not allow either for heterogeneity across immigrants due to differences in past and current return plans.<sup>4</sup>

In this paper, we provide an analysis of immigrant savings and asset holdings in relation to past and current return plans. We also consider the possibility that savings and assets are held not only in the host country, but also in the country of origin. Our analysis is based on a unique data source that provides information on asset holdings, its composition and location, as well as immigrants' return plans. We describe immigrants' asset accumulation and savings, and how it relates to return intentions, as well as individual and household characteristics. The paper makes two contributions. First, it provides analysis of the relationship between return plans, on the one hand, and savings and asset holdings on the other. Second, it illustrates the importance of considering migrants' asset holdings not only in the host- but also the home country.

Our results show that the overall level of savings and asset accumulation of immigrants would be severely underestimated if the home country wealth is not taken into consideration. In addition, they show how immigrants' return plans are related to wealth accumulation. The total value of assets held does not differ significantly between immigrant households with temporary intentions and those with permanent ones. However, the distribution of these assets between host- and home country location does differ. Migrants who plan to return do allocate a higher proportion of their savings, assets and property in their home country.

The structure of the paper is as follows: in the next section we discuss conceptual considerations, in section 4.3 we present our data and explain the descriptive evidence, in section 4.4 we show our results and finally in section 4.5 we conclude and discuss potential implications.

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<sup>4</sup>An exception is Bauer & Sinning (2011), who found that savings behaviour of migrants is related to their return plans. The analysis considers different measures of migrant savings, assuming either that no remittances are saved or that all remittances are saved, without differentiating between remittance purposes. It does not investigate immigrant home-ownership or asset holdings.

## 4.2 Conceptual considerations and estimation

### 4.2.1 A Simple Model

We start with a simple model that focuses on the way temporary vs permanent migrations relate to savings behavior. A more detailed analysis of the interplay between savings and return (both exogenous and optimally chosen) can be found in Dustmann (1995).

As in Galor & Stark (1990), suppose that the lifetime of the immigrant can be divided into 2 sub-periods: period 1 is the time to be spent in the host country, and period 2 is the time to be spent in the home country after a possible return. Return in period 2 takes place with probability  $p$ . In the case that  $p = 0$ , the migration is permanent. Consider the following inter-temporal utility function:

$$U = u^1(c^1) + p\beta u^2(c^{E2}) + (1-p)u^2(c^{I2}). \quad (4.1)$$

In equation (4.1),  $u^1$  is the sub-utility in period 1 in the host country and  $\beta u^2$  and  $u^2$  are the sub-utilities in period 2 in the home and in the host country respectively, which we assume as being strictly concave in consumption. Further,  $c^1$ ,  $c^{I2}$  and  $c^{E2}$  are first and second period consumption in immigration (index  $I$ ) and emigration (index  $E$ ) countries respectively. The parameter  $p \in [0, 1]$  is the probability the migrant attaches to a possible return to the home country in the second period.

Consumption in the second period in the case of a return may induce more utility than consumption in the host country, due to complementarities through climate, friends, etc. This is captured by the parameter  $\beta$ . If  $\beta > 1$ , the migrant has a higher level of utility and a higher marginal utility if he/she consumes in the home country.

The budget constraint for the first period is given by  $w^1 = c^1 + s$ . The budget constraint for the second period is  $w^{I2} + s = c^{I2}$  in the case of a permanent migration and  $w^{E2} + r s = c^{E2}$  in the case of a return. Earnings in period 1 are denoted by  $w^1$ , and in period 2 by  $w^{E2}$  and  $w^{I2}$  in home and host countries respectively. The purchasing power of the host country currency in the home country is given by  $r$ . If  $r > 1$ , the purchasing power of the host country currency is higher in the migrant's home country.<sup>5</sup>

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<sup>5</sup>For simplicity we have assumed that interest rates are equal in the two countries; if interest rates were different between home and host country then this would be an additional source of differential

The choice variable in period 1 is savings  $s$ . Given the budget constraint, it fixes consumption in the first period ( $c^1$ ) and in the second period ( $c^{E2}$ ,  $c^{I2}$ ). The first order condition is given by:

$$\frac{d}{ds} : u_1^1 = p \beta u_1^2 r + (1 - p) u_1^2 \quad (4.2)$$

where the subscript  $_1$  denotes the first derivative.

Equation (4.2) determines the optimal level of savings. Savings will be set such that the marginal cost in terms of forgone utility in period 1 is equalized to the expected marginal return in period 2. If  $p = 0$  (the migration is permanent), savings will equalize the marginal utility of consumption in the two periods in the host country. If  $p \in (0, 1)$ , a change in  $p$  leads to a change in savings according to the following relationship:

$$\frac{ds}{dp} = \frac{-[r \beta u_1^2 (w^E + rs) - u_1^2 (w^I + s)]}{u_{11}^1 + p \beta r^2 u_{11}^2 + (1 - p) u_{11}^2}. \quad (4.3)$$

The expression in the denominator is always negative. Assume first that  $\beta = 1$  and  $r = 1$ : Preferences for consumption are the same in the two countries, as is the purchasing power of the host country currency. In that case, savings will be increasing in  $p$  as long as  $w^E < w^I$ , due to strict concavity of the utility function. The intuition is that an increase in savings increases the marginal utility of consumption by more in the home country, due to lower wages; thus, an increase in the return probability  $p$  leads to higher savings. Now suppose that  $\beta > 1$ : Individuals prefer to consume at home rather than abroad. This will reinforce the effect of an increase in the return probability on savings. Finally, suppose that the purchasing power of the host country currency is higher at home so that  $r > 1$ . In this case, the overall effect on savings is ambiguous, as it is now unclear whether an increase in savings increases the marginal utility of consumption more in the home- or the host country. Sufficient for the effect of an increase in  $p$  on savings to be positive is that the wage differential between home- and host country is larger than the gain obtained on savings through the purchasing power differential  $w^I - w^E > (r - 1) s$ . Thus, according to this simple model, savings may be positively or (if purchasing power differentials are important) negatively affected by an increase in the return probability, or the two effects may compensate each other.

Our simple model has nothing to say however about where savings are held. It may well be that immigrants who assign a high probability to a return are more likely to transfer some of their savings to the home country. If that is the case, an empirical analysis of immigrants' savings may lead to an underestimate when only considering savings in the host economy.

Now consider asset holdings, like housing assets or long-term investments. If these are proportional to the level of past savings, then our simple life-cycle model should suggest that in general, the relationship to the temporariness of a migration is ambiguous. The model does not explain where these assets are held. However, it is not unlikely that immigrants who assign a high probability to a later return have a preference for accumulation in the home country. This is particularly the case for assets that have the character of durable consumption goods, and that can not be moved from one place to another, like housing assets.

### 4.2.2 Empirical Implementation

In the empirical analysis we regress the various outcome variables on a vector of individual specific characteristics, country of origin dummies, and a measure for the probability to return. The generic regression has the form

$$Y_i = \alpha_1 + X_i' \alpha_2 + \gamma T_i + u_i \quad (4.4)$$

where  $Y_i$  is the respective outcome,  $X_i$  is a vector of background characteristics,  $u_i$  is an error term, and  $T_i$  is a measure for the temporariness of a migration. As we explain below, in our data we observe for each year an indicator question whether or not the individual would like to return home at some point in the future. These intentions may change over time, and accordingly affect the savings- and asset holding decision. In our analysis, we will use the average intention to return, computed from information over the last five years, as a measure of temporariness when analyzing asset holdings, and the current intention to return when analyzing current savings.

We would like to emphasize that we do not interpret our estimates as causal. While in our simple model, the return probability is exogenously given, immigrants may well choose whether they wish to return, and this choice may not be exogenous to savings- or asset accumulation decisions. Further, our measure for the temporariness of a mi-

gration may well be measured with error, which would bias the coefficient estimate towards zero. We believe however that the associations between the temporariness of a migration on the one hand, and savings- and asset accumulation behavior, as well as the choice of where these are to be held, conditional on background characteristics, are interesting and important.<sup>6</sup> The overall comparison in savings and asset accumulation between immigrants and natives is of course not affected by possible endogeneity of return migrations.

## 4.3 Background and data

### 4.3.1 Background

The West-German economy experienced a strong upward swing after 1955, accompanied by a sharp fall in the unemployment rate. Between 1955 and 1960, the unemployment rate fell from 5.6 % to 1.3 % (*Arbeitslosigkeit im Zeitverlauf* (2009)). At the same time, the percentage of foreign born workers from Southern European countries and Turkey employed in West Germany increased from 0.6 percent in 1957 to 5.3 percent in 1965, to 11.2 percent in 1973 (see Blitz (1977)). Immigration was regulated by bilateral recruitment agreements. Such agreements were set up with Italy, Spain, Greece, Turkey, Portugal and Yugoslavia in the 1950's and 1960's. After 1973, recruitment of foreign labour stopped. Nevertheless, immigration from these countries continued, due to family reunification (see Dustmann (1996) for more details). The immigrant population we study in this paper stems from that migration movement. Labor migration over this period was initially considered as temporary by both the immigration countries and the emigration countries. Still, although return migration has been quite considerable (see Bohning (1987)), a large fraction of foreign born workers settled permanently<sup>7</sup>.

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<sup>6</sup>In Dustmann & Mestres (2010a) where we analyze remittances and their relationship to temporary migration decisions, we address these problems by combining a fixed effects estimator with an IV strategy. In that paper, we have access to repeated information for remittances for a large number of time periods. We find that the IV-fixed effects estimates are close to the original OLS estimates, due to the downward bias through measurement error being of similar size than the upward bias induced through unobservable heterogeneity. Assets and savings - which we analyze in this paper - are only observed once or twice over the course of the panel.

<sup>7</sup>The stock of foreign labor in Germany in 2004 was 3.7 million people, of which around 60 per cent originated from the sending countries considered here (table B.1.5, citetOECD-MigrOutlook-2006).

### 4.3.2 Data and Sample

The data set we use is the German Socio-Economic Panel (GSOEP). The GSOEP is a household-based panel survey, similar to the US Panel Study of Income Dynamics (PSID) or the British Household Panel Study (BHPS). Initiated in 1984, the GSOEP oversamples the then-resident immigrant population in Germany, which stems from the migration movement we have described above. In the first wave, about 4500 households with a German born household head were interviewed, and about 1500 households with a foreign born household head. The data are unique in providing repeated information on a boost sample of immigrants over a long period of time. For our analysis, we use observations for the foreign born from the over-sample, as well as observations for the native born from the standard sample.

Each individual in a household and over the age of 16 is interviewed. The household head provides information about all other individuals in the household and below the interviewing age. Individuals who leave households and form their own households are included in the panel.

The GSOEP data provides information on asset holdings in both the home- and host country only for the year 1988. For that year only, there is detailed information on the type of asset holdings, their values and - importantly - whether the asset is held in the host- or source country.<sup>8</sup> Asset holdings refer to the total amount of asset holdings of the household (including cash, savings, home ownership, etc.) net of financial obligations in each location separately. Home ownership refers to all houses, apartments or any other property of the household at market prices in both home and host countries.

Savings are declared in both home- and host country locations only for the years 1992 and 1994<sup>9</sup>. Savings in the host country correspond to the net monthly savings of the household transformed to a yearly level. Savings in the home country correspond to the individual yearly amount remitted for saving purposes in the home country and transformed to household level. We construct the total amount of household savings as the sum of the yearly amounts the household saved in both locations. We will use

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<sup>8</sup>See the Appendix for a more detailed description of the data construction.

<sup>9</sup>The amount of savings in Germany is declared from 1992 onwards, while the amount saved in the home country is declared only on the years 1984-1990, 1992 and 1994. See the data construction appendix for further details.



those two years where we observe savings in both locations (1992 and 1994) to study the allocation of savings. All monetary variables are at the household level in real amounts, where the reference year is 2002.

A further unique feature of our data is that immigrants provide information in each wave of the panel whether they intend to remain permanently in Germany, or whether they wish to return home at some stage in the future. We use this information to differentiate between those who do and those who do not plan to return to the home country. If economic decisions are involved, it is likely that these are based on intentions of this sort, rather than on possible realizations at a later stage.

In addition, we observe individual and household characteristics in the host country, as well as information on family members who are living in the country of origin.

## 4.4 Results

### 4.4.1 Descriptive Evidence

*Individual Characteristics:* As we mention above, we measure savings and asset accumulation on the level of the household. When we refer to characteristics of individuals within households, we typically refer to the head of household. Entries in Table 1 show that the average age of household heads in our sample is 45 years, and that migrants resided slightly less than 22 years on average in Germany. Almost 90 percent of the head of households are male, and 78 percent are employed. The yearly average net household income is around 25,000 Euros (in 2002 prices). Around 93 percent of household heads are not single; however, only 7 percent have native partners. Almost 40 percent of all heads of households report that they grew up in a rural area. The last variable measures the return intention of the household head. On average, 51 percent of the household heads in our sample report that they would wish to return to their home country at some point in the future.

*Savings:* We study the yearly amount of savings for the years 1992 and 1994. For immigrants, savings refer to the total amount saved as well as the amounts saved in host- and home countries. As a reference, we also report savings for native born individuals. Here savings refer to the total amount saved. In the upper panel of Table 2, we describe savings for all immigrants in the first pair of columns; in next two pairs of columns we distinguish between immigrants with temporary and permanent return plans. In the

following pair of columns we report the mean difference between immigrant groups and its t-statistic. The information on return plans refers to the head of household.<sup>10</sup>

About 48 percent of all immigrant households report to save in the host country. The average amount saved is 2046 Euros (not conditional on saving a positive amount), which corresponds to 7.4 percent of overall household income. Immigrants with permanent migration plans are less likely to save in the host country than those with temporary plans, and they save a lower amount. The difference in savings in the host country corresponds to one percent of the household income. The next row shows the savings in the home country. The proportion of immigrants with temporary intentions who save is more than 4 percentage points higher than that of immigrants with permanent intentions, with the amount saved being higher as well. Both differences are significantly different statistically. Finally, the last three rows report the total amount of yearly savings. As a point of reference, we report the total amount of savings of natives in the last two columns. One in two of all immigrants households report to save, as compared to 65 percent of native households. The total average amount of savings is equal to 2199 Euros (which corresponds to 8.1% of immigrants' household income, as compared to 10% for natives), which is lower than the average savings for natives both in absolute value and relative to their household incomes.<sup>11</sup>

When we distinguish between immigrants with permanent and temporary intentions, there is a clear difference between the two groups, with those with temporary intentions saving more in absolute terms, as well as in percentage of their household income.

*Home Ownership and Assets:* A set of questions asking about asset holdings was included in the survey in 1988. For immigrants, questions relate to property and asset holdings, both in Germany and in the home country. For natives, questions relate to total property and asset holdings. We report descriptives in the second (home ownership) and third (assets) panels of Table 2. As before, the first two columns report averages for all immigrants, while the next columns distinguish between immigrants with per-

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<sup>10</sup>We use all observations for which both savings or asset information and return plans are reported.

<sup>11</sup>The household savings ratio in our data is in line with aggregate data from the German Central Bank's (Bundesbank) Financial Accounts, where household savings correspond on average to 12% of household disposable income for years 1992 and 1994 (Bundesbank, 2008).

manent and temporary migration plans respectively. We include the natives' average as reference in the last two columns.

Only about 8.4 percent of all immigrant households report owning housing property in Germany. Distinguishing between immigrants with temporary and permanent intentions reveals remarkable differences, however. While 14 percent of immigrants with a permanent migration intention own housing property in Germany, only 5 percent of those who wish to return do so. Likewise, the value of the housing stock is much lower for the latter category.

In the next row we report home ownership in the home country. About 44 percent of all immigrant household report to own property in the home country. Finally, the last row combines this number with the proportion of immigrants who hold property in Germany (first row). Half of the immigrants hold property in either home- or host country. This contrasts with 44 percent of native born households that hold property. The average value of immigrants' property is about 30 percent lower than that of natives; however, this may partly reflect lower property prices in the countries of origin.

In the next columns we distinguish again between immigrants with temporary and permanent return plans. One in two immigrant households with return plans reports owning housing stock in the home country, compared to just 31 percent of those with permanent intentions. In addition, the value of property in the home country is more than twice as high for those who wish to return. Overall, temporary migrants are more likely to own property. However, the total value of home ownership is similar between immigrant households who wish to return and those who do not.

The next panel reports information on asset holdings. Asset holdings refer to the total amount of assets (including cash, savings, property, etc.) net of financial obligations. For immigrants the questions draw a distinction between assets held in Germany, and assets held in the home country. The numbers suggest that if we consider only asset holdings of immigrants in the host country, the amount of asset holdings is considerably lower than those of natives. However, this difference is significantly reduced when taking into account that immigrants hold assets also in the home country. There is again a stark difference in the distribution of asset holdings between immigrants with temporary and permanent intentions. While permanent migrants hold most of their assets in the host country, temporary migrants hold assets mostly in the home country.

The total amount of asset holdings is slightly higher for permanent migrants.

To summarize, these figures show that - for any comparison between immigrant and native households - it is important to consider immigrants' savings and assets in the country of origin. Further, the figures also show differences in savings, total property and asset holdings between immigrants with temporary and permanent migration plans. There are also stark differences between these two groups as to where those assets are held. Immigrants with temporary migration plans hold less property and assets than immigrants with permanent plans in the host country, but more in the home country. This points at different wealth allocation profiles between those migrants who want to return and those who do not. It also suggests that the way immigrants may possibly affect the housing market in the host- and the home country depends on their re-migration plans.

#### **4.4.2 Conditional Results**

We now focus on the differences between immigrants with temporary and permanent migration plans. The numbers we report in Table 2 do not account for differences in household- and individual characteristics. They also relate differences in asset holdings to differences in contemporaneous intentions about a possible return. We now provide some further results, where we condition on differences in household characteristics, and use information about contemporaneous return plans (in the case of savings), and average past return plans (in the case of asset holdings).

For both savings, home ownership and asset holdings, we estimate linear probability models (LPM) for the binary outcome variable, and OLS and Tobit models for the amount of savings.

##### **Savings**

As we discuss in section 2, it is generally ambiguous whether immigrants with temporary migration plans save more than immigrants with permanent plans. This is in line with the figures in Table 2, which show that temporary migrants are more likely to save both in the host- and the home country. Some of these differences may be due to differences in composition between the two groups. To investigate this further, we now present some conditional estimates, where we use data for two years of our panel (1992 and 1994) that provide information on the amount of savings in each location. We construct a measure for total savings, and the ratio of savings in the home vs the

host country. If immigrants with temporary intentions have a higher propensity to save, we should observe that they save more than those with permanent intentions overall. If (in addition) temporary immigrants have a preference for shifting savings to the home country, then the ratio of home- to host country savings should be positively related to return plans.

Results are reported in the Table 3. In the first column, we use the total amount of savings as the dependent variable. Columns 2 and 3 distinguish between savings in the home- and host country. Column 4 reports the ratio of savings in the home country and total savings. We report LPM results in the first panel, OLS results in the second panel and Tobit results in the third panel.<sup>12</sup> The point estimates on the temporary migration variable in columns 1 suggest that overall, immigrants with temporary migration plans save more than immigrants with permanent migration plans. Estimates are however not statistically significant. When splitting up savings into savings in the home- and host country, temporary migration plans are positively and significantly associated with savings for the home country only. In the last column, we report the ratio of savings in home vs host country, which is positively and significantly related to return plans. Thus, the estimates are consistent with the hypothesis that immigrants with temporary migration plans have a preference to holding their savings in the origin country rather than in the host country. They do not point at immigrants with temporary return plans saving more than immigrants with permanent plans, conditional on other observable characteristics.

### Property and Assets Holdings

We now turn to property- and asset holdings of immigrants. Distinction between asset holdings in the home- and in the host country is only available for one year (1988). Assets measure the stock of assets accumulated up to 1988. As the stock of assets has been accumulated over previous years, we use the average return intention for years

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<sup>12</sup>Total amount of savings corresponds to the amount reported. See Table 4.6 for full regression results with all the additional control variables for Total Savings. Those results suggest that both current household income and employment of the head of the household affect savings positively. Age, years since migration, and education of the head of household do not seem to be significantly associated with household savings conditional on household income and employment of the head of the household.

1984-1988 as a regressor.<sup>13</sup>

We show the results for property ownership in Table 4 and for overall asset holdings in Table 5, using similar specifications as above. We report the coefficient estimates for the average of return intentions over the period 1984-1988.<sup>14</sup> We report in the first column the total amount of property ownership, while columns 2 and 3 differentiate between the property location in home and host country. Column 4 reports the ratio of property holdings in the home country with respect to total property. The first panel shows the results of a simple LPM estimation on the binary outcome whether migrants have any property holdings.

The results show that on average temporary migration plans are associated with a 12.2 percentage points higher likelihood to hold property. Further, return plans are negatively associated with owning housing property in the host country, but positively associated with owning property at home. The intention to return to the home country is associated with an 8 percentage points lower likelihood to own a house in the host country, but an almost 20 percentage points higher likelihood to own a house in the home country.

In the second and third panel of the Table, we report OLS and Tobit results for the value of the property held (in 2002 Euros). These results indicate that the total value of property that immigrants with temporary migration plans hold is not significantly different from that of those with permanent plans. However, there is a stark and significant difference in the property wealth allocation between host and home countries. Those immigrants with temporary return plans hold a lower amount of property in the host country and a higher amount of property in the home country, in both OLS and Tobit specifications.

In the last column, we report again the impact of temporary migration plans on the ratio between property held in the home country, and total property holdings. As for savings, this ratio is strongly skewed towards holdings in the home country for immigrants with temporary migration intentions, in both specifications.

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<sup>13</sup>We only have information on return plans since the start of the panel in 1984.

<sup>14</sup>See Table 4.7 for the full set of regression results. Household income and household size are, respectively, positively and negatively associated with asset accumulation. Furthermore, conditional on household income and household size, households with older and better educated heads hold more wealth.

We show the results for asset holdings in Table 5. Again, we report the coefficient estimates for the average of return intentions over the period 1984-1988. The structure of the table is identical to the previous one. The results suggests that the total value of assets held does not differ significantly between temporary and permanent immigrants. However, the geographical location as to where assets are held is different: Households with temporary intentions hold more assets in the home country, and less in the host country, after controlling for household income and other characteristics. As the results in the last column show, the ratio of home country held assets to total assets is positively related to return plans.

## **4.5 Conclusions**

In this paper, we analyze savings and asset holdings of immigrants in relation to their return plans. Our analysis distinguishes between savings, housing stock and assets held in the home- and in the host country. We find evidence that return plans are associated with a different distribution of savings, property and assets between host- and home country locations.

Our results show further that there is no significant difference in total savings, property and asset holdings between immigrants with permanent and temporary migration plans, conditional on observable household background characteristics. However, immigrants with intentions to return are less likely to own property in the host country and more likely to own property in the home country, and this difference is quite substantial. Thus, our study points at immigration policies that favor permanent migrations having a different impact on the domestic housing market than policies that favor temporary policies.

Temporary migration plans are also associated with holding a higher proportion of savings and assets in the home countries. Finally, for both groups of immigrants assets held in the home country are quite substantial. Thus another important finding of our paper is that an assessment of immigrants' wealth accumulation needs to take account of wealth and assets accumulated in the home countries. This is more important, the more migrations are of a temporary character.

We should emphasize again that the relationship between the temporariness of migrations and savings- and asset accumulation behavior that we show in this paper

should not be interpreted as causal. Nevertheless, our study points at possibly substantial differences in the location of savings- and asset holdings between immigrants with different intentions about the permanency of their migration. Further, we find no evidence that total savings and assets held are different between these two groups.



## 4.6 Data Construction Appendix

We use data from the German Socio-Economic Panel. Asset holdings are reported for the year 1988, based on a special survey module. Savings are reported for the years 1992 and 1994. Our sample consists of immigrant households whose head was born in Turkey, Greece, Yugoslavia, Italy or Spain.

Information on return plans are provided in each wave of the panel. Individuals were asked whether they intend to remain permanently in Germany, or whether they wish to return home at some stage in the future. We construct a binary variable that defines as temporary those who plan to return in the future.

As return plans may change, and asset accumulation is related to past return intentions, we construct an average return intention variable for the last five years before assets are measured (that is, 1984-1988).

All our income variables are reported in real terms (in Euros, deflated to the base year 2002), and at household level. Household income corresponds to the net monthly income of the household transformed to annual level. The exact wording of the question is "If everything is taken together: how high is the total monthly income of all the household members at present? Please give the monthly net amount, the amount after the deduction of tax and national insurance contributions. Regular payments such as rent subsidy, child benefit, government grants, subsistence allowances, etc., should be included. If not known exactly, please estimate the monthly amount."

Information on household savings in the home country is available for the years 1984-1990, 1992 and 1994, and corresponds to the yearly amount saved in the home country by the household. The question asks individuals to declare the amount sent or taken to the home country for the purpose of "savings for later"; we transform this variable to the household level. Information on household savings in the host country is available for the year 1992 onwards and corresponds to the net monthly savings of the household transformed to yearly level. The question survey asked is "Do you usually have an amount of money left over each month for major purchases, emergencies, or savings? If yes, how much?". This implies that information on savings in both the home and the host country is available only for two years (1992 and 1994). For those years, we construct the total amount of savings as the sum of savings in both locations.

We use asset information drawn from questions in a special survey in year 1988

where immigrants were asked for their asset holdings both in the home and in the host country separately.

Asset holdings refer to the total amount of asset holdings (including cash, savings, property, etc.) but net of financial obligations, both in the home and host countries. The wording of the question is "If you could add up all the wealth of this household (including cash, goods and property you own but without furniture), what will be the approximate total value of it? Please make sure to subtract all the mortgages, loans and credits that you could have on them". Property includes the houses, apartments or any other property at market prices, both in the home and host countries. For each type of property, the wording of the question is "Are you the owner of (specific type of property)? If yes, how much do you estimate its commercial value is, that is, how much money will you get if you sold it now?". All entries correspond to the aggregated household amounts declared in the year 1988, in Euros, deflated to the base year 2002.

Table 4.1: Summary Statistics

	<b>1988</b>		<b>1992 and 1994</b>	
	Mean	Std. Dev.	Mean	Std. Dev.
Age	45.63	9.46	45.37	12.13
Age At Arrival	26.12	7.87	22.60	9.53
Years Since Migration	19.46	5.00	22.80	5.97
Number Years Education	9.36	1.96	9.48	1.93
Household Income	25809	13811	24430	11110
Number Children in Household	0.71	1.03	0.89	1.07
Number Adults in Household	2.91	1.44	2.48	1.08
Number Employed Individuals in Household	1.63	0.94	1.54	0.94
Sex	0.91	0.29	0.85	0.36
Employed	0.82	0.39	0.76	0.43
Non Single	0.93	0.25	0.91	0.29
Native Partner	0.06	0.24	0.08	0.27
Spouse Abroad	0.06	0.23	0.03	0.17
Children Abroad	0.12	0.33	0.05	0.21
Rural Childhood	0.43	0.50	0.37	0.48
Temporary	0.67	0.47	0.44	0.50
Number of Observations	906		1686	

corresponds to the head of household. Household Income in 2002 Euros. Sample in 1988 is used in the asset holdings analysis; sample in 1992 and 1994 is used in the savings analysis.

Table 4.2: Savings, Home Ownership and Assets

	<i>All Immigrants</i>		<i>Temporary Immigrants</i>		<i>Permanent Immigrants</i>		<i>Temporary - Permanent Migrants</i>		<i>Natives</i>	
	<i>Mean</i>	<i>N</i>	<i>Mean</i>	<i>N</i>	<i>Mean</i>	<i>N</i>	<i>Mean Difference</i>	<i>t</i>	<i>Mean</i>	<i>N</i>
<b>Savings</b>										
<i>In Host Country</i>										
Proportion that saves	48.3%	1871	50.4%	782	46.7%	1089	3.6%	1.55		
Average Amount (Std.Dev.)	2046 (3655)	1871	2218 (3585)	782	1922 (3700)	1089	297	1.74		
Average Value as Percentage HH Income	7.4%	1809	8.0%	754	7.0%	1055	1.0%	1.89		
<i>In Home Country</i>										
Proportion	4.8%	1902	7.3%	797	3.0%	1105	4.3% **	4.35		
Average Amount (Std.Dev.)	155 (1207)	1902	230 (1127)	797	101 (1259)	1105	129 *	2.31		
Average Value as Percentage HH Income	0.7%	1838	0.9%	769	0.5%	1069	0.3%	1.26		
<i>Total Sum Home and Host Country</i>										
Proportion	49.8%	1871	52.8%	782	47.6%	1089	5.2% *	2.24	65.4%	6901
Average Amount (Std.Dev.)	2199 (3921)	1871	2448 (3835)	782	2021 (3974)	1089	427 *	2.32	2888 (5101)	6901
Average Value as Percentage HH Income	8.1%	1809	8.8%	754	7.5%	1055	1.3% *	2.17	9.9%	6688
<b>Home Ownership</b>										
<i>In Host Country</i>										
Proportion that Holds Property	8.4%	860	5.5%	577	14.1%	283	-8.6% **	-4.31		
Average Value (Std.Dev.)	13814 (55896)	857	7324 (38995)	575	27049 (78417)	282	-19726 **	-4.91		
<i>In Home Country</i>										
Proportion that Holds Property	44.2%	859	50.5%	576	31.4%	283	19.1% **	5.37		
Average Value (Std.Dev.)	30043 (59823)	835	36764 (66816)	560	16356 (38792)	275	20408 **	4.69		
<i>Total Sum Home and Host Country</i>										
Proportion that Holds Property	49.9%	859	53.8%	576	42.0%	283	11.8% **	3.26	43.6%	3329
Average Value (Std.Dev.)	44381 (81167)	832	44443 (78167)	558	44255 (87108)	283	188	0.03	60973 (111939)	3194
<b>Asset Holdings</b>										
<i>In Host Country</i>										
Proportion that Holds Assets	73.4%	629	74.0%	400	72.5%	229	1.5%	0.04		
Average Value (Std.Dev.)	31649 (96379)	629	20805 (126877)	400	50591 (128105)	229	-29786 **	-3.76		
<i>In Home Country</i>										
Proportion that Holds Assets	71.6%	595	75.7%	423	61.6%	172	14.0% **	3.46		
Average Value (Std.Dev.)	48723 (75382)	595	54130 (81975)	423	35424 (53899)	172	18706 **	2.76		
<i>Total Sum Home and Host Country</i>										
Proportion that Holds Assets	83.7%	486	84.3%	331	82.6%	155	1.7%	0.48	79.8%	2959
Average Value (Std.Dev.)	66777 (103651)	486	65949 (96608)	331	68544 (117606)	155	-2595	0.25	104966 (162877)	2959

Note: Calculations based on GSOEP data on household level. Average amount (in 2002 Euros) not conditional on reporting any positive amount. Property Ownership includes house, apartment or any other property. Asset holdings refer to the total amount of asset holdings net of financial obligations, including cash, savings, property, etc. Savings in the host country corresponds to the net monthly savings of the household transformed to annual amount. Savings in the home country corresponds to the yearly amount remitted to the home country and that is saved. Both Property Ownership and Asset holdings refer to the year 1988. Savings Flows refer to years 1992 and 1994. We use all observations for which respective information is available. \* significant mean difference at 5%; \*\* significant mean difference at 1%

Table 4.3: Savings - Home and Host Country

<i>Linear Probability Model</i>				
<i>Savings (=1 Yes, =0 No)</i>				
	<i>Total</i>	<i>Host Country</i>	<i>Home Country</i>	
Temporary	0.044	0.024	0.034***	
<i>(Std.E.)</i>	(0.028)	(0.028)	(0.013)	
<i>OLS</i>				
	<i>Total</i>	<i>Amount Savings</i>		<i>Ratio Home vs Total</i>
		<i>Host Country</i>	<i>Home Country</i>	
Temporary	14.09	-89.944	99.476	0.029***
<i>(Std.E.)</i>	(233.296)	(221.917)	(60.442)	(0.009)
<i>Tobit</i>				
	<i>Total</i>	<i>Amount Savings</i>		<i>Ratio Home vs Total</i>
		<i>Host Country</i>	<i>Home Country</i>	
Temporary	179.181	51.145	116.343***	0.020***
<i>(Std.E.)</i>	(166.524)	(151.934)	(41.013)	(0.006)
Observations	1659	1659	1685	1680
<i>OLS conditional on positive savings</i>				
	<i>Total</i>	<i>Amount Savings</i>		<i>Ratio Home vs Total</i>
		<i>Host Country</i>	<i>Home Country</i>	
Temporary	-148.602	1529.99	-110.686	0.138
<i>(Std.E.)</i>	(342.531)	(1054.869)	(367.049)	(0.094)
Observations	808	86	835	81

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Note: GSOEP data (1992 and 1994). Household level. All specifications include time and country dummies and condition on age, years since migration (and its square), education, gender, marital status and employment status of the head of household as well as household income and number of adults and children in the host country household. Standard errors are clustered by household. Tobit results show unconditional marginal effects. Reported coefficients correspond to the coefficient on the contemporary temporary intention variable.

Table 4.4: Property Ownership - Home and Host Country

<i>Linear Probability Model</i>				
<i>Property Ownership (=1 Yes, =0 No)</i>				
	<i>Total</i>	<i>Host Country</i>	<i>Home Country</i>	
Temporary	0.122*	-0.079**	0.190**	
(Std.E.)	(0.055)	(0.03)	(0.054)	
<i>OLS</i>				
<i>Amount Property</i>				
	<i>Total</i>	<i>Host Country</i>	<i>Home Country</i>	<i>Ratio Home vs Total</i>
Temporary	7456.369	-22919.058**	30939.940**	0.214**
(Std.E.)	(8832.433)	(5565.475)	(6773.723)	(0.054)
<i>Tobit</i>				
<i>Amount Property</i>				
	<i>Total</i>	<i>Host Country</i>	<i>Home Country</i>	<i>Ratio Home vs Total</i>
Temporary	11678.86	-4573.934**	28297.509**	0.243**
(Std.E.)	(7608.978)	(1520.867)	(5849.031)	(0.061)
Observations	739	738	719	739
<i>OLS conditional on holding a positive amount of property</i>				
<i>Amount Property</i>				
	<i>Total</i>	<i>Host Country</i>	<i>Home Country</i>	<i>Ratio Home vs Total</i>
Temporary	-8355.309	-84037.543*	42852.049**	0.102**
(Std.E.)	(15185.977)	(32465.609)	(14175.784)	(0.035)
Observations	361	56	327	327

\* significant at 5%; \*\* significant at 1%

Note: GSOEP data (1988). Household level. All specifications include time and country dummies and condition on age, years since migration (and its square), education, marital status, household income, employment status and number of adults and children in the host country household. Property ownership includes the purchase of house, apartment or any other property, in the host and in the home country. Tobit results show unconditional marginal effects. Reported coefficients correspond to the average intention to return up to 1988 (1984-1988).

Table 4.5: Asset Holdings - Home and Host Country

<i>Linear Probability Model</i>				
<i>Asset Holdings (=1 Yes, =0 No)</i>				
	<i>Total</i>	<i>Host Country</i>	<i>Home Country</i>	
Temporary	-0.036	0.002	0.096	
(Std.E.)	(0.053)	(0.057)	(0.059)	
<i>OLS</i>				
<i>Amount Asset Holdings</i>				
	<i>Total</i>	<i>Host Country</i>	<i>Home Country</i>	<i>Ratio Home vs Total</i>
Temporary	6718.334	-29173.987**	28606.677**	0.133*
(Std.E.)	(15522.831)	(10146.918)	(10310.560)	(0.060)
<i>Tobit</i>				
<i>Amount Asset Holdings</i>				
	<i>Total</i>	<i>Host Country</i>	<i>Home Country</i>	<i>Ratio Home vs Total</i>
Temporary	3510.74	-17238.395*	25472.782**	0.140*
(Std.E.)	(12167.750)	(6714.548)	(8603.728)	(0.068)
Observations	432	546	531	432
<i>OLS conditional on positive asset holdings</i>				
<i>Amount Asset Holdings</i>				
	<i>Total</i>	<i>Host Country</i>	<i>Home Country</i>	<i>Ratio Home vs Total</i>
Temporary	11934.317	-39926.684**	35370.343*	0.107*
(Std.E.)	(18033.572)	(13546.568)	(13945.360)	(0.048)
Observations	368	407	391	302

\* significant at 5%; \*\* significant at 1%

Note: GSOEP data (1988). Household level. All specifications include time and country dummies and condition on age, years since migration (and its square), education, marital status, household income, employment status and number of adults and children in the host country household. Asset holdings refer to the total amount of asset holdings net of financial obligations, including cash, savings, property, etc., in the host and in the home country. Tobit results show unconditional marginal effects. Reported coefficients correspond to the average intention to return up to 1988 (1984-1988).

Table 4.6: Total Savings

	<i>Total Savings</i>		
	<i>(=1 Yes, =0 No)</i>	<i>Amount</i>	
	<i>LPM</i>	<i>OLS</i>	<i>TOBIT</i>
Age/10	-0.001	20.828	15.043
<i>(Std.E.)</i>	<i>(0.002)</i>	<i>(20.377)</i>	<i>(10.888)</i>
Years Since Migration/10	0.063	-72.385	-44.678
<i>(Std.E.)</i>	<i>(0.100)</i>	<i>(954.475)</i>	<i>(579.814)</i>
YSM-Squared/100	-0.019	-131.676	-92.917
<i>(Std.E.)</i>	<i>(0.024)</i>	<i>(197.844)</i>	<i>(133.413)</i>
Log HH Income	0.286***	2691.025***	4072.837***
<i>(Std.E.)</i>	<i>(0.089)</i>	<i>(935.280)</i>	<i>(255.809)</i>
Number Adults HH Host	-0.047**	-280.394	-469.503***
<i>(Std.E.)</i>	<i>(0.021)</i>	<i>(219.850)</i>	<i>(107.843)</i>
Number Children HH Host	-0.073***	-352.268***	-433.709***
<i>(Std.E.)</i>	<i>(0.014)</i>	<i>(118.826)</i>	<i>(79.531)</i>
Employment Head HH	0.152***	62.768	642.021***
<i>(Std.E.)</i>	<i>(0.038)</i>	<i>(292.701)</i>	<i>(233.220)</i>
Number Employed HH	0.002	236.447	-212.843
<i>(Std.E.)</i>	<i>(0.029)</i>	<i>(282.581)</i>	<i>(129.628)</i>
Number Years Education	0.003	-57.785	-57.937
<i>(Std.E.)</i>	<i>(0.007)</i>	<i>(51.418)</i>	<i>(38.930)</i>
Male Head HH	0.019	167.13	97.344
<i>(Std.E.)</i>	<i>(0.040)</i>	<i>(469.024)</i>	<i>(234.473)</i>
Non Single	-0.107**	-829.918**	-889.294***
<i>(Std.E.)</i>	<i>(0.049)</i>	<i>(357.352)</i>	<i>(288.561)</i>
Native Partner	0.072	397.2	369.201
<i>(Std.E.)</i>	<i>(0.053)</i>	<i>(403.186)</i>	<i>(269.934)</i>
Spouse Abroad	0.084	947.252	1127.213***
<i>(Std.E.)</i>	<i>(0.083)</i>	<i>(623.977)</i>	<i>(432.572)</i>
Children Abroad	-0.067	529.332	213.764
<i>(Std.E.)</i>	<i>(0.064)</i>	<i>(665.530)</i>	<i>(343.230)</i>
Rural Childhood	0.047*	238.197	354.596**
<i>(Std.E.)</i>	<i>(0.028)</i>	<i>(230.128)</i>	<i>(154.448)</i>
Temporary	0.044	14.09	179.181
<i>(Std.E.)</i>	<i>(0.028)</i>	<i>(233.296)</i>	<i>(166.524)</i>
Number of Observations	1659	1659	1659
R-squared	0.142	0.151	0.024

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Note: GSOEP data (1992 and 1994). Household level. All specifications include time and country dummies. Standard errors are clustered by household.



Table 4.7: Total Property and Asset Holdings

	<i>Total Property</i>			<i>Total Asset Holdings</i>		
	<i>(=1 Yes, =0 No)</i>	<i>Amount</i>		<i>(=1 Yes, =0 No)</i>	<i>Amount</i>	
	<i>LPM</i>	<i>OLS</i>	<i>TOBIT</i>	<i>LPM</i>	<i>OLS</i>	<i>TOBIT</i>
Age/10	0.065*	6992.39	8167.744*	0.066**	20423.945**	19354.011**
<i>(Std.E.)</i>	(0.026)	(4123.640)	(3567.110)	(0.025)	(7165.884)	(5616.612)
Years Since Migration/10	0.439*	13363.174	42990.847	0.084	-40474.467	-21355
<i>(Std.E.)</i>	(0.223)	(35502.003)	(31944.141)	(0.228)	(66282.065)	(52034.042)
YSM-Squared/100	-0.104	-1594.633	-9021.404	-0.035	12131.839	5675.163
<i>(Std.E.)</i>	(0.055)	(8818.495)	(7884.666)	(0.057)	(16414.831)	(12929.400)
Log HH Income	0.344**	57212.046**	58354.315**	0.342**	108771.151**	100564.981**
<i>(Std.E.)</i>	(0.061)	(9691.445)	(8676.121)	(0.062)	(18119.010)	(14485.252)
Number Adults HH Host	-0.028	-6545.521*	-6026.319**	-0.03	-5194.61	-5626.295
<i>(Std.E.)</i>	(0.016)	(2666.964)	(2269.345)	(0.016)	(4546.187)	(3557.839)
Number Children HH Host	-0.027	-932.913	-1940.823	-0.007	-79.446	-266.035
<i>(Std.E.)</i>	(0.018)	(2948.062)	(2504.003)	(0.017)	(4933.143)	(3833.999)
Employment Head HH	0.021	-1801.02	1709.037	0.028	14874.005	13933.759
<i>(Std.E.)</i>	(0.058)	(9181.844)	(7806.949)	(0.056)	(16136.560)	(12670.834)
Number Employed HH	-0.013	-2358.308	-3104.786	-0.032	-15353.334*	-13211.824*
<i>(Std.E.)</i>	(0.029)	(4635.975)	(3859.390)	(0.027)	(7779.869)	(6112.197)
Number Years Education	-0.014	2321.072	366.429	-0.012	7329.063**	4813.823*
<i>(Std.E.)</i>	(0.010)	(1568.693)	(1330.714)	(0.009)	(2737.697)	(2151.789)
Male Head HH	0.172	18773.464	25832.981	-0.007	29624.491	19496.307
<i>(Std.E.)</i>	(0.094)	(15077.112)	(15119.807)	(0.127)	(36803.571)	(28689.586)
Native Partner	0.015	25354.86	17984.492	-0.025	66389.392*	51424.168*
<i>(Std.E.)</i>	(0.081)	(13105.281)	(11312.488)	(0.101)	(29301.068)	(22861.355)
Spouse Abroad	-0.068	-9697.935	-8631.509	-0.084	-19941.21	-19590.228
<i>(Std.E.)</i>	(0.087)	(13894.105)	(11827.956)	(0.081)	(23635.383)	(18863.518)
Children Abroad	0.128*	13884.182	15725.938*	0.006	25068.459	19478.381
<i>(Std.E.)</i>	(0.057)	(9335.730)	(7599.675)	(0.052)	(15167.549)	(11837.909)
Rural Childhood	-0.01	5437.249	3562.898	-0.006	6965.387	4994.18
<i>(Std.E.)</i>	(0.037)	(5901.585)	(4932.460)	(0.034)	(9993.592)	(7791.598)
Temporary	0.122*	7456.369	11678.86	-0.036	6718.334	3510.74
<i>(Std.E.)</i>	(0.055)	(8832.433)	(7608.978)	(0.053)	(15522.831)	(12167.750)
Number of Observations	738	718	718	432	432	432
R-squared	0.138	0.117	0.011	0.131	0.18	0.01

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Note: GSOEP data (1992 and 1994). Household level. All specifications include time and country dummies. Standard errors are clustered by household.

**Chapter 5**

**Migrant Selection to the U.S.:**

**Evidence from the Mexican Family**

**Life Survey**

## 5.1 Introduction

Migrants constitute a self-selected group in terms of skills with respect to the non-migrant populations of their origin countries. This selection has been long of interest because of its important implications both for host and home countries. In the host country, migrants' impact on natives' labour market outcomes depends on their skill composition. In particular, migrants' skill selection affect which natives are affected and in which way.

In the home country, the impact of migration on non-migrants depends as well on the skill selection of those who emigrate relative to those who stay. Relative wages between low and high skilled in the origin country are affected by the composition of those who leave. For the case of Mexico, Mishra (2007) has shown the positive correlation between Mexican wages and emigration. Aydemir & Borjas (2007) has also shown how labour supply shifts are associated with wage changes of the opposite sign in Mexico. In addition, migration has also welfare implications in the home country and might help reduce inequalities (McKenzie & Rapoport (2010)).

Given those important implications, it is not surprising that migrant selection has been an extensive subject of analysis in the migration literature. From the seminal works of Sjaastad (1962) and Borjas (1987) to the more recent study of Chiquiar & Hanson (2005), the selection of migrants and its implications have been debated. Borjas (1987) argued that in those countries with high relative returns to skills, those who are relatively low skilled will migrate to countries with lower relative returns. This negative selection hypothesis has been contested by Chiquiar & Hanson (2005), who had found a positive or intermediate selection of migrants. Chiswick (1999) and Orrenius & Zavodny (2005) have supported as well this positive or intermediate selection. Recent papers by Ibarra & Lubotsky (2005) and Fernandez-Huertas (2009) have found negative selection using Mexican-based surveys. McKenzie & Rapoport (2007) have used networks to reconcile both results, arguing that positive selection is observed for those individuals that do not rely on networks while negative selection is found for those who do.

Our study contributes to this literature on migrant selection on several dimen-

sions. First of all, it emphasizes the importance of differentiating between age cohorts in order to establish migrant selection and its implications. Secondly, it analyzes migrant selection among three components: education, wages and test scores. Finally, it evaluates recent Mexican migrant selection to the United States using a unique dataset representative of the overall Mexican population at a point in time and that follows those individuals that migrate afterwards. To our knowledge, this is the first study that uses this well-suited dataset to analyze migrant selection in Mexico.

Our results show that studying migrant selection without differentiating between age cohorts might be misleading if most migrants belong to a particular age group. Without differentiating between age cohorts, negative selection in education is found for males and positive selection for females. However, given the strong age gradient, these results change when focusing only on the young cohort, where almost the totality of migrants belong. Among the young, migrants are always negatively selected with respect to education, both overall and differentiating between men and women. In this sense, the negative selection of young migrants found is in line with the basic Borjas model<sup>1</sup>, since the relative returns to education are higher in Mexico than in the US.

The fact that most emigrants belong to the young cohort is important because, if age cohorts are imperfect substitutes between each other, the effects of migration on different cohorts of non-migrants in the home country will differ. Emigration of young low skilled might lead to higher relative wages of low-skilled young (compared to the high-skilled young), with no effect on the old cohort. This result will differ to what we would predict not distinguishing between age groups, first because we will not identify adequately self-selection (the issue addressed in this paper), and secondly because the groups affected will be different (Card & Lemieux (2001)).

The importance of differentiating between age cohorts analyzed in this chapter has been also highlighted in the previous chapters while analyzing the temporariness of migration and how it is related to migrants' behaviour. We have seen in chapter 2 that migrants have different intentions to stay in the host country at different ages (see, for

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<sup>1</sup>Borjas (1987)

example, Figures 2.7, 2.8 and 2.9). Migrants also modify differently their intentions to stay at different age cohorts as a reaction to the same shock. For example, changes in relative income between home and host countries have a much higher impact on the intentions to stay in the country for younger migrants with a potentially longer working life than for older migrants.

This chapter studies migrant skill selection among emigrants from the home to the host country. Migrants with different educational levels might have different expected length of stay in the host country. For example, highly-educated migrants might leave their home country for a short period to acquire further skills. Lower-educated migrants, on the other hand, might have longer migrations planned in the host country. In addition to the expected length of migration, migrants with different educational levels behave differently in many other aspects, like remitting behaviour (chapter 3) or saving and asset accumulation (chapter 4). For all these reasons, it is important to properly identify migrant selection to the host country.

The structure of this paper is as follows. Section 2 describes the Mexican Family Life Survey (MxFLS) dataset, its advantages with respect to previous datasets and summarizes the sample used. Section 3 explains the important age gradient of migration in Mexico and the implication it has given the educational changes occurred in that country. Section 4 shows migrant selection results in terms of education, wages and test scores and finally, section 5 concludes.

## **5.2 Data**

### **5.2.1 The Mexican Family Life Survey**

We use the MxFLS data, a longitudinal survey representative of all Mexican population, including both urban and rural areas, similar to other family life surveys like the Indonesia Family Life Survey. It includes information regarding the individual, the household as well as their communities. The first wave was conducted in 2002 and a sample of 8,440 households (over 35,000 individuals) were interviewed. The second wave was conducted in 2005, when 8,434 households (almost 37,000 individuals) were interviewed.

This dataset is ideal to study the migration process because a special emphasis was made in tracking down the individuals that moved to another locality, state or country between 2002 and 2005. Individuals provide details of family and friends to be contacted in case they are not living in the same household in following rounds. Thus, it was possible to differentiate between those individuals that migrated to the United States from other types of moves or non-response. Individuals that migrated to the United States, in addition, were re-contacted there, with a successful re-contact rate of 91 percent.<sup>2</sup>

The dataset is not only adequate to study the migration process per se but also to study the migrant selection in particular, as it contains information of all the population in the home country at one point in time and has as well an indicator of those who moved to the host country during the period after. The MxFLS includes those individuals living in Mexico in the first wave that migrated to the United States by the time of the second round in 2005 (and stayed there for at least one year<sup>3</sup>). Around 2.4% of the sample (854 individuals) in 2002 were identified as migrants in the US during the second wave of MxFLS in 2005.<sup>4</sup>

The dataset provides as well measures of educational attainment, wages and individual skill level on which the selection is based. With respect to education, both the number of years in education and the educational level attained are available in the data. Years of education correspond to the difference between the age the individual started school and the age it finished school (or his actual age if still in schooling).

Wage information corresponds to the 2002 hourly wage earned in Mexico prior to migration, constructed in a similar way that Chiquiar & Hanson (2005) did. Those 0.5% individuals with the lowest wage and those 0.5% individuals with the highest

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<sup>2</sup>See Rubalcava & Teruel (2006, 2008) for a detailed description of the dataset and its construction.

<sup>3</sup>Those individuals that migrated after their interview in 2002 and returned before the second interview are not considered in our study given that they only leave Mexico for a short period before returning. In any case, they represent only a small fraction of all the population. In 2005, for example, 0.2% of the sample had migrated temporarily to Mexico for less than 12 months in the previous two years.

<sup>4</sup>Of those, more than 90 percent (774 individuals) were successfully re-interviewed.

wage were excluded.

In addition, Raven cognitive tests are performed to both adults and children. These tests are an alternative measure of their skill levels (independently of their educational level) and do not require literacy of those who perform the test. The scores range from 0 to 100 points. This skill measure will be used in addition to educational achievement and wages to study migrant selection. Please see the data appendix for further details on the variables definitions and construction.

### **5.2.2 Comparison with previous datasets used in the literature**

A first candidate to study the selection of Mexican migrants in the United States is the U.S. Census (as used by Borjas (1987) and Chiquiar & Hanson (2005)). However, the existing sample in the Census has been recognized as being a non-random sample of the overall migrant Mexican population in the United States (Ibarraran & Lubotsky (2005), Fernandez-Huertas (2009)). It undercounts illegal migrants which constitute an important share of all migrants and which are likely to be less educated.

In addition, it overreports the educational attainment of those migrants whose education is not observed (Ibarraran & Lubotsky (2005), as the educational level used for the imputation come from the native-born population (who have higher attainment educational levels than their foreign-born counterparts). Both facts increase the likelihood of overreporting the actual educational attainment of Mexican migrants in the US.

Alternatively, the Mexican census can be used as it identifies those households that have an individual household member in the US. Ibarraran & Lubotsky (2005) used it in conjunction with the US Census to study the migrant selection. However, it is not possible to know the educational attainment of those migrants that left the household. In addition, the Census does not record those households where all migrants moved to the US, and thus they are not included in the migrant group.

Another survey that has been widely used to study migrant selection is the Mexican Migration Project (Orrenius & Zavodny (2005)). However, as the sample includes

only a particular set of rural communities in Mexico, it is not representative of neither all non-migrant nor all migrant population.

Finally, two other Mexican surveys that have been recently used to study migrant selection are ENADID (McKenzie & Rapoport (2010)) and ENET (Fernandez-Huertas (2009)). Both surveys cover all non-migrant Mexican population, but include only those migrants that have returned or that have at least one household member still living in Mexico. There is no information on those households where all the members moved to the United States. As Fernandez-Huertas (2009) explains, if those households that move all members to the US are more educated, this might bias the study of migrant selection towards negative selection.

The MxFLS has advantages over all previous datasets mentioned before in order to analyze migrant selection in Mexico. Unlike the MMP, the MxFLS covers all regions in Mexico and is constructed to be a nationally representative sample. In addition, it is a representative sample of all the Mexican population at a point in time (2002), before migration occurs, that collects re-contact information for the household as well as for relatives that can be contacted if they move. Thus, it has few undercounting of illegal and young Mexican migrants in US unlike the US Census. Furthermore, it allows to identify those households that moved all their members to the US (unlike the Mexican Census the ENET and the ENADID datasets).

The MxFLS has also an additional advantage, as both migrants and non-migrants report not only their educational attainment, but also their wages and other individual characteristics. Thus, it is possible to analyze migrant selection not only based on education but also based on wages and cognitive skills.

The MxFLS has however the two main shortcomings. The dataset is a survey, with a smaller sample size than the Census (although the sample size is similar to ENET). Secondly, it covers only recent migrants that migrated after 2002, stayed over 1 year in U.S. and did not return by 2005. It does not include thus those who migrated prior to 2002.



### 5.2.3 Basic Descriptives

This section analyzes the characteristics of recent Mexican migration to the United States as well as of those who remain in Mexico. The sample used in this study represents all Mexican population aged 12 to 62 in 2002 (that is, those of working-age 15-65 when they are re-interviewed in the following wave (2005)). Table 1 shows the main descriptives for all the population as well as migrants and non-migrant populations.<sup>5</sup>

Around 2.4% of the sample migrated to the United States between 2002 and 2005 and were still in the U.S. in 2005. While individuals in the sample are on average 31 years old, migrants are more than 6 years younger than non-migrants. The average educational attainment is 8.6 years, with small overall difference between migrants and non-migrants<sup>6</sup>. Almost 35 percent of the population have primary education (or no schooling). Around half have secondary education and 15 percent have tertiary education. Migrants to the US are more likely to have a lower secondary degree, but less likely to have a college university degree. Migrants are more likely to have an indigenous or a rural background than for non-migrants, and they are also more likely to work. However, a similar percentage of migrants and non-migrants receives labour income (around 41 percent). Unconditional on working or not, average income is almost 1300 dollars, although migrants to the US earned a substantially lower amount (around 850 dollars) in Mexico before migrating to the U.S.. In terms of wealth holdings, around 81 percent of the households seem to own the home where they live. Migrants seem to live in households with lower savings and lower financial assets than non-migrants. However, both type of households have a similar proportion of debts.

Migration is present in Mexicans' everyday life, even for those that do not directly migrate. One in three Mexicans has a direct relative that migrated to the United States (one in two has someone in the household that has a relative in the United States). The proportion of individuals with direct links to relatives that migrated to the U.S. is even higher for those who migrated after being interviewed: almost two in three have a direct relative that migrated to the U.S. (four in five have someone in the household who has relatives that migrated there).

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<sup>5</sup>See Annex 1 and 2 for the main descriptives by gender and age cohort

<sup>6</sup>In section 4, a detailed analysis of migrants and non-migrants educational attainment is performed

Around 20 percent of the Mexican population plans to migrate to another locality, state or country (although only 3.4 percent plans to move to another country). Those who migrated between 2002 and 2005 declared in 2002 a much higher intention to migrate: almost one in three planned to move to another locality, state or country, and almost 14 percent declared that they plan to move to another country. Finally, 5.8 percent of all the population have an earlier migration experience, but only 0.9 percent of all the population have migratory experience outside Mexico. Those individuals that migrated between 2002 and 2005 have only a slightly higher migration experience in 2002 than those that did not migrate.

### 5.3 Age, Education and Recent Emigration in Mexico

Educational attainment in Mexico has increased dramatically in the last forty years. This increase is due both to educational reforms that increased the minimum schooling age and to the expansion in access to education.<sup>7</sup> In graph 2, using IPUMS Mexican Census data<sup>8</sup>, we show the educational attainment from 1970 to 2005 for different age groups. Overall, the average number of years in education has increased from 3.4 in 1970 to 6.2 in 1990, 7.5 in 2000 and 8.1 in 2005. This increase in educational attainment has been seen in all age groups, and both for males and females. Given this increase in educational attainment over time, younger individuals have been in education for a longer period than older individuals. For example, in 2005 an average individual aged 25 to 29 had been in school on average almost two years more than an individual aged 45 to 49 (9.6 years instead of 7.7).

On the other hand, the age gradient of those who leave Mexico is particularly acute: individuals that migrate are much younger than those that do not. Graph 1 shows the age distribution boxplot of migrants and non-migrants aged 12 to 62 in 2002, both for the overall population and for males and females separately. In all graphs we can observe that leavers are much younger than stayers. Only 25 percent of

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<sup>7</sup>See for example Paul Gertler & Codina (2007) for a summary of education policy reforms in Mexico and the expansion in access to education in the past decades.

<sup>8</sup>Minnesota Population Center. *Integrated Public Use Microdata Series (IPUMS)* (2010).

future migrants are over 28 years old in 2002, compared to more than 50 percent of non-migrants. The median age of migrants is 22 years, eight years younger than non-migrants. In comparison with male migrants, female migrants seems to leave Mexico at a later age. This might be due to the fact that many women are tied movers, only moving to the United States some years after their husbands have been established in the country.

This different age gradient between those individuals that migrate between 2002 and 2005 and those who do not is important given the change in educational attainment that occurred over time in Mexico described before. A comparison between migrants from a younger cohort to non-migrants mostly belonging to an older cohort in terms of years of education could show a misleading positive difference between the two groups due to the structural changes in educational attainment in Mexico occurred in the last three decades. It is important to study the selection of migrants with respect to education for similar age groups. This is the analysis performed in the following section.

## **5.4 Migrant Selection**

### **5.4.1 Education**

Table 2 shows the average number years of education as well as selected percentiles of the distribution for migrants and non-migrants, overall and differentiating by age cohort. The first panel shows the overall distribution, while the second and third show the distributions for males and females respectively. Young cohorts correspond to those individuals aged 12 to 29 in 2002 (and thus of working age at the moment they are re-contacted, in 2005), while old cohorts correspond to those individuals aged 30 to 62 in 2002 (33 to 65 in 2005).

Without differentiating between age cohorts, it would seem then that migrants and non-migrants have a similar educational attainment (first and second rows). Non-migrants have on average 8.6 years of schooling while migrants have 8.5 years. However, when separating between young and old cohorts, the results change substantially. As it can be observed in the third and fourth rows, young migrants are negatively se-

lected, with an average of 9 years of education, 0.8 years less than young non-migrants. Old migrants are also negatively selected with respect to non-migrants, with an average educational attainment of 7.4 years, half a year less than non-migrants (fifth and sixth rows). These different results show how important is to study migrant selection among those groups with similar ages, and the incorrect results we might arrive to without doing so.

However, given the different educational attainment between genders in Mexico (see graph 2), we describe the results for males and females separately in the second and third panels. When analyzing migrant selection separately between males and females, there seems to be a negative selection for males and a positive selection for females. However, these results change separating young and old cohorts. For the young cohort, migrants have a lower educational attainment than non-migrants, both for the case of males and females. The third and fourth rows of the second panel show that young males that will migrate have 8.9 years of education, compared to 10.1 of non-migrants. The third and fourth rows of the third panel show that young females went to school for an average of 9.1 years, compared to 9.7 for their non-migrant counterparts.

It should be emphasized that even if young migrants are negatively selected with respect to young non-migrants, they have a higher educational attainment than the old cohorts, both compared to non-migrants and migrants (fifth and sixth rows of the second and third panel respectively).

The comparison of migrants and non-migrants at the young cohort where most migrants belong gives a negative migrant selection result in terms of years of education, both for males and females.<sup>9</sup> Alternatively, we analyze the educational levels attained among migrants and non-migrants and differentiating between age cohorts and reach the same conclusion (see graph 3).<sup>10</sup> The increase in educational attainment between age cohorts in Mexico described in the previous section can be observed in the first col-

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<sup>9</sup>This result contrasts with Chiquiar & Hanson (2005) when they considered analyzing migrant selection of only those in a young cohort, aged 26-35, and found a positive selection (table 3, p.251). As mentioned in section 2, their sample was a non-random sample of Mexican migrants, positively biased in terms of educational attainment of migrants.

<sup>10</sup>Educational levels correspond to ISCED levels 0, 1 and 2 for Primary education, ISCED levels 3 and 4 for Secondary and ISCED levels 5 and 6 for Tertiary.

umn's graphs. The proportion of individuals with a primary degree is much higher for the old cohort, while the proportion of individuals with secondary and tertiary degrees is much higher for the young cohort, both for migrants and non-migrants. This change among cohorts can be observed as well differentiating between male (second column) and female (third column), where young and old cohorts have very different educational level distributions. Young male and female migrants have a lower educational attainment than their young non-migrant counterparts (but a higher educational attainment than older cohorts). The same negative selection conclusion for both young male and female migrants is obtained using educational levels than using years of education.

### 5.4.2 Wages

Now we discuss the selection with respect to wage earnings, locating young Mexican migrants in the wage distribution in 2002 for individuals in the same age cohort. In order to do so, we compare wages earned in 2002 by migrants and non-migrants before migrating.<sup>11</sup> A further concern in this comparison is that migrants might have suffered a negative income shock prior to the departure from their origin country (for example, bad weather severely affected the amount of income they earned) and their observed wages might be exceptionally low following the negative shock (Ashenfelter dip).<sup>12</sup> Having this caveat in mind, it is still interesting to compare the wage distributions between these two populations and see if the different results obtained differ with respect to those of educational attainment.

Table 3 shows the average wage as well as selected percentiles of the distribution for migrants and non-migrants, overall and differentiating by age cohort, for all and for males and females separately, using the same structure than in table 2.

Overall, migrants are negatively selected with respect to wages, both at the mean as well as in all points of the distribution. However, when we differentiate among age cohorts, this selection is less clear. This is particularly the case for the young

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<sup>11</sup>Unfortunately, wages in the United States in 2005 for those that migrate are not reported in the data, and thus we are not able to compare them with wages of non-migrants, both in Mexico and in the United States

<sup>12</sup>Nevertheless, Fernandez-Huertas (2009) showed that those individuals in Mexico that migrate did not seem to suffer a negative shock prior to migration during the period 2000 to 2004, using the ENADID data.

cohort, where both the mean and the percentiles of the wage distribution are quite similar between migrant and non-migrant young populations.

In order to better appreciate the differences between males and females shown in the second and third panels, we show the distribution functions of migrant and non-migrant Mexicans, by gender and age cohort, in graph 4. Additionally, the difference in the distribution functions between migrant and non-migrant populations is shown in graph 5. For example, let's focus on the middle graphs that correspond to the young cohorts where the majority of the migrants belong. For males (middle-top figures in graphs 4 and 5), it is clear that migrants are negatively selected compared to non-migrants. The positive mass on the left of the median (shown as a vertical line) in graph 5 shows that there is a greater proportion of migrants below that point, while the negative mass on the right of the median signals the opposite. For females (middle-bottom figures in graphs 4 and 5), we can observe a positive mass at the extremes of the wage distribution, and a negative mass at the middle. This signals a mixed selection, where female migrants are more likely to be located at the bottom or at the top of the wage distribution (and less likely at the middle). Nevertheless, selective participation into the labour market is more acute for females (only 30.8% of females work in 2002 (Table 5.7), a much lower proportion than for males (63.9%, Table 5.6). Thus, measures of selection using education and skills might be more reliable, as they not suffer from this selective participation into the labour market.

### 5.4.3 Test Scores

Finally, the MxFLS provides us with an alternative way to measure migrant selection in terms of skills by using individual test scores. This additional skill measure has not been used in the literature, in particular because standard datasets do not have it available. All individuals that took part in the survey did a Raven test used to establish their cognitive abilities. Table 4 shows the mean test scores (the score goes from zero (minimum) to 100 (maximum)) as well as the scores at several percentiles of the distribution, for all and differentiating between gender and age cohort. The structure is identical to that of tables 2 (years of education) and 3 (wages). If we focus our attention to the young cohort, to which most of the migrants belong, we can observe a negative migrant selection at the mean as well as at all percentiles of the distribution. The same

negatives selection result is found separating between young males and young females.

As the ability to answer the cognitive test could different among the individual life cycle, we control for the age effects by doing a simple ordinary least squares regressions of test scores with respect to age and an indicator of migration between 2002 and 2005. Results shown in table 5.8 confirm the negative selection in terms of skills of those migrants that decide to migrate, even after controlling for age effects. Male migrants have a test score 6.2 points lower than their non-migrant counterparts and female migrants 5.8 points lower.

#### **5.4.4 Robustness Tests**

Several robustness checks have been performed using alternative age cohort definitions. In table 5.9, we show the results of using an young cohort definition corresponding to those aged 12 to 36. While the average education, wage and test scores are different than before, the same patterns are observed: negative selection among young cohorts in terms of years of education and test scores, and to a lesser extent, on wages.

Alternatively, we use a young cohort of older age, corresponding to those aged 20-29 in 2002 (aged 23-32 in 2005), in order to avoid including individuals still in education. Using this cohort, as described in section 3, many migrants that migrate at younger ages are excluded. In any case, as we can observe in table 5.10, the main results remain unchanged.

## **5.5 Conclusion**

This study has analyzed migrant skill selection of recent migrants to the United States using the Mexican Family Life Survey (MxFLS). We showed the important age gradient of migration and the different education attainment between age cohorts in Mexico, and highlighted the importance of studying migrant selection for comparable age cohorts. Contrary to recent findings, we show that there is a migrant negative selection for young males, both in terms of years of education, wages and test scores. Young females are also negatively selected in terms of years of education and test scores, while they have very-negative and very-positive selection in terms of wages. Our study

shows that focusing on the relevant age cohort can change the results found regarding migrant selection, and thus, modify its effects in both host and home countries.



## 5.6 Data Construction Appendix

Migrants are defined in this study as those individuals that moved to the United States between 2002 and 2005 and were still there in 2005 (with a minimum stay of 12 months). A re-contact directory was created with up to two different contact persons that might know their future location and contact details in case they move. This allowed to re-contact most of those migrants in the United States in 2005 as well.

Years of education are constructed as the difference between the age the individual started and finished school. In case the individual is still attending school, years of education are defined as the difference in years between the start age and the actual age. For those individuals that do not declare the age they started or finished, the equivalent years of education corresponding to their education level are used. Educational levels correspond to ISCED levels 0, 1 and 2 for Primary education, 3 and 4 for Secondary and 5 and 6 for Tertiary.

Wage refers to the net hourly wage earned in 2002 in Mexico, in 2002 dollars, constructed in a similar way as Chiquiar & Hanson (2005). It corresponds to the reported monthly work-related net income in the previous month divided by the number of hours worked last week times 4.5. Those 0.5% individuals with the lowest wage and those 0.5% individuals with the highest wage are excluded as well. Wage is only defined for those individuals that had a job the month before they were interviewed and reported both their monthly earnings and the number of hours worked last week.

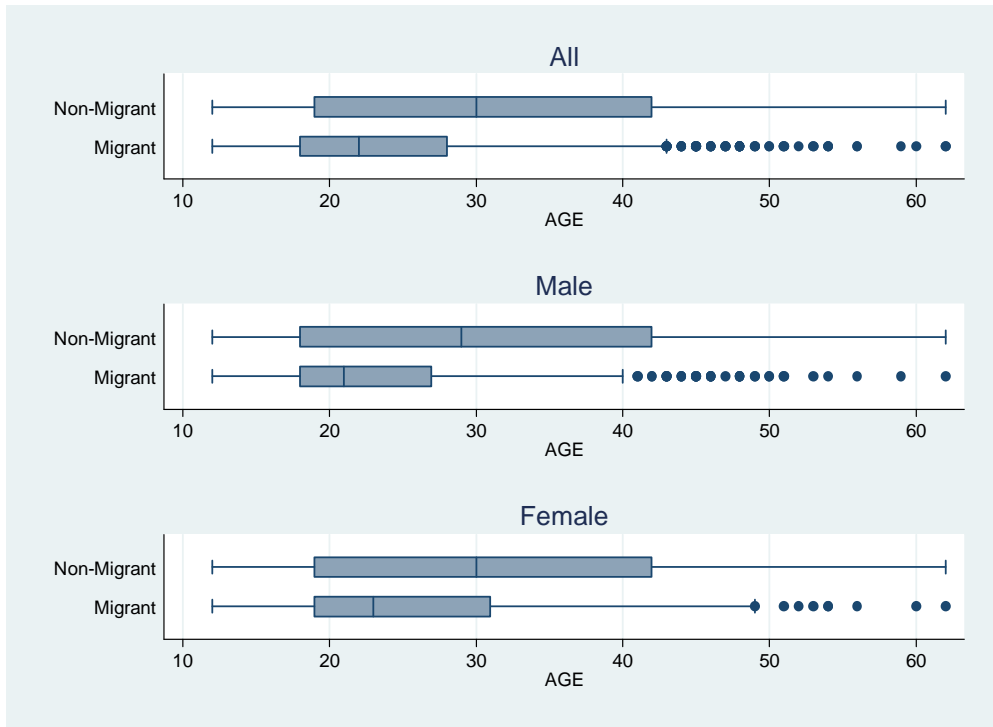
The test scores correspond to the results of a Raven's progressive matrix test. These tests are designed to measure the individual's cognitive ability and do not require literacy of those who perform the test. The scores range from 0 to 100 points; individuals that answered all questions successfully have a score of 100. More details regarding the test and their precise questions and answers can be found in Rubalcava & Teruel (2006).

Table 5.1: Summary Statistics

	All		Non Migrant US		Migrant US	
	<i>Mean</i>	<i>St.Dev.</i>	<i>Mean</i>	<i>St.Dev.</i>	<i>Mean</i>	<i>St.Dev.</i>
<b>Migration US</b>	2.4%	15.2%				
<b>Age</b>	31.2	14.0	31.3	14.1	24.8	9.5
<b>Female</b>	56%	50%	56%	50%	38%	49%
<b>Years Education</b>	8.6	3.6	8.6	3.7	8.5	3.0
<b>Primary</b>	40%	49%	41%	49%	39%	49%
<b>Secondary</b>	48%	50%	48%	50%	57%	49%
<b>Tertiary</b>	12%	32%	12%	32%	4%	20%
<b>Spanish Speaker</b>	98.2%	13.4%	98.2%	13.3%	97.6%	15.2%
<b>Indigenous</b>	12.6%	33.2%	12.3%	32.9%	22.2%	41.6%
<b>Rural</b>	41.1%	49.2%	40.5%	49.1%	68.3%	46.5%
<b>Employed</b>	45.4%	49.8%	45.4%	49.8%	48.0%	50.0%
<b>Receives Income</b>	40.6%	49.1%	40.5%	49.1%	41.2%	49.2%
<b>Amount Income</b>	1283	2372	1293	2385	844	1649
<b>Previous Migration</b>	5.8%	23.4%	5.8%	23.4%	6.2%	24.1%
<b>-"- outside Mexico</b>	0.9%	9.3%	0.8%	9.1%	2.3%	15.0%
<b>Potential Migration</b>	20.5%	40.3%	20.2%	40.1%	31.4%	46.4%
<b>-"- outside Mexico</b>	3.3%	17.9%	3.1%	17.2%	13.9%	34.6%
<b>Relatives in USA</b>	33.8%	47.3%	33.0%	47.0%	64.7%	47.8%
<b>Anyone in Household(HH) -"</b>	48.7%	50.0%	47.9%	50.0%	79.9%	40.1%
<b>HH Home Ownership Indicator</b>	80.7%	39.5%	80.7%	39.5%	82.6%	37.9%
<b>HH Financial Assets Indicator</b>	17.2%	37.7%	17.3%	37.8%	12.3%	32.9%
<b>HH Savings Indicator</b>	16.9%	37.5%	17.1%	37.6%	11.6%	32.0%
<b>HH Debts Indicator</b>	37.1%	48.3%	37.1%	48.3%	37.2%	48.3%
<b>Number Observations</b>	25,820		25,076		744	
<b>Number Equivalent Observations</b>						
<b>in Mexican Population</b>	69,900,000		68,200,000		1,657,447	

Note: Mexican Family Life Survey (MxFLS), 2002. Weighted Statistics. Migrant US identifies those Mexican migrants in the United States in 2005 that migrated after 2002 and have stayed over 1 year. Population Aged 12-62 in 2002 (15-65 in 2005).

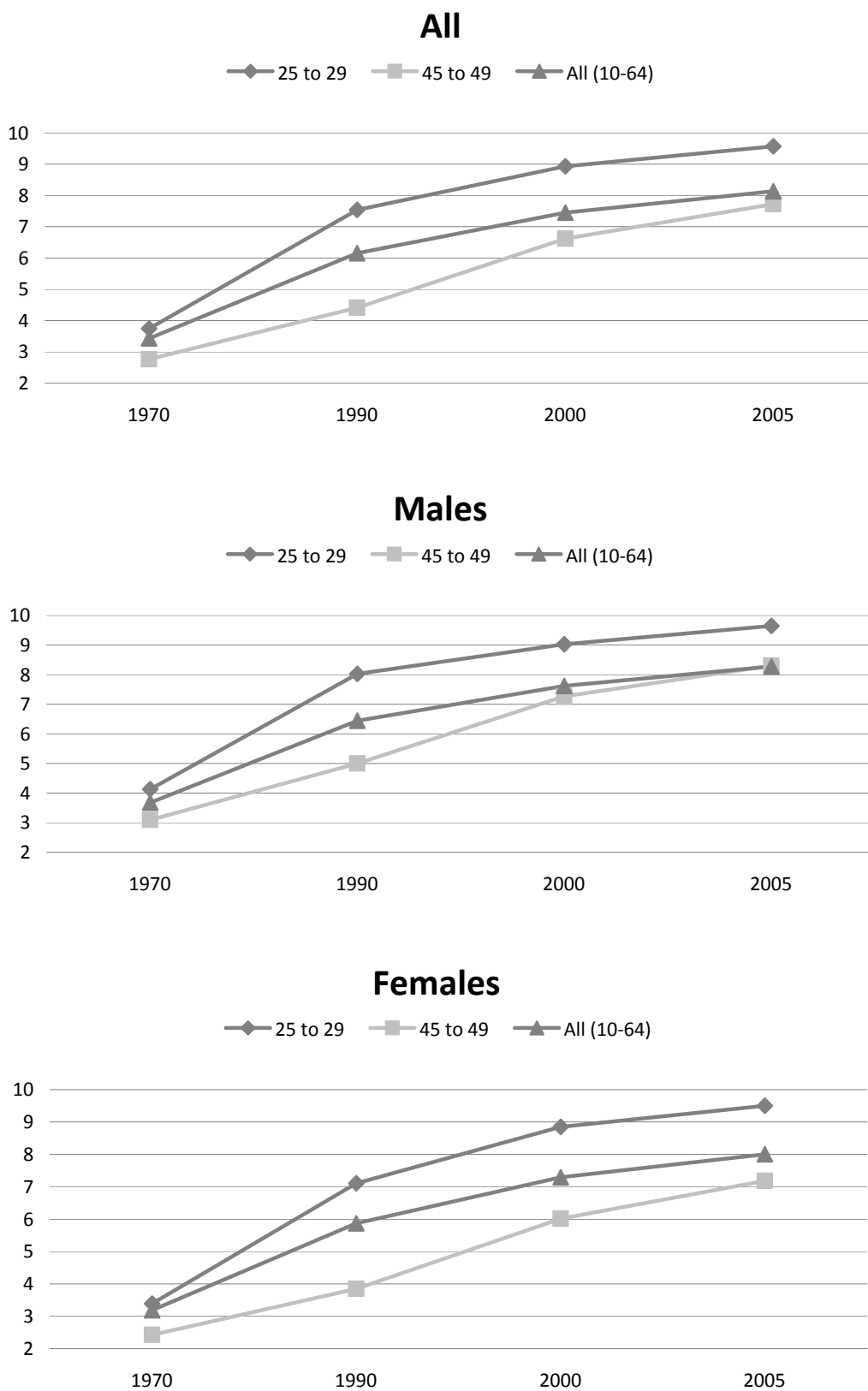
Figure 5.1: Age Distribution Boxplot - Mexican Non-Migrant vs. Migrant



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Note: Mexican Family Life Survey (MxFLS), 2002. Weighted Statistics. Migrant US identifies those Mexican migrants in the United States in 2005 that migrated after 2002 and have stayed over 1 year. Population Aged 12-62 in 2002 (15-65 in 2005).

Figure 5.2: Educational Attainment in Mexico over time (1970-2005), by age groups.



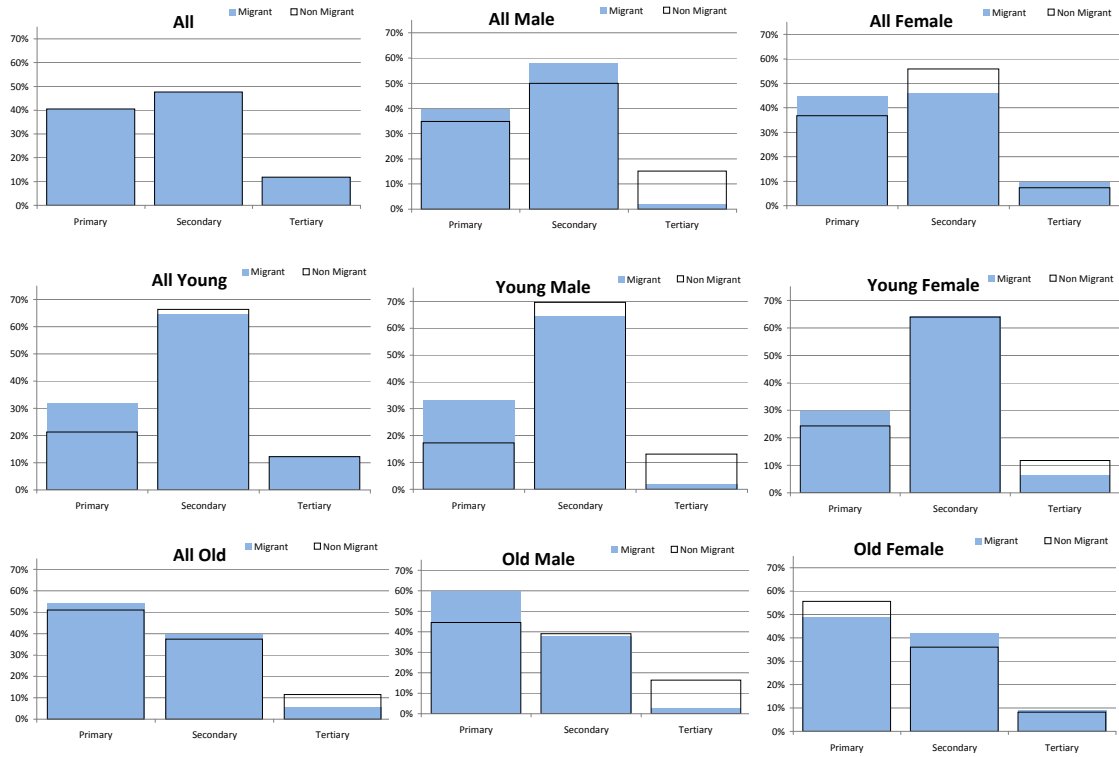
Note: Mexican Census, 1970, 1990, 2000 and 2005. "All" refers to all population aged 10 to 64, while "25 to 29" and "45 to 49" refers to those populations aged 25 to 29 and 45 to 49 respectively in each Census.

Table 5.2: Number of Years of Education - Distribution Among Migrant and Non-Migrant Mexicans

	Mean	p10	p25	p50	p75	p90
<b>All</b>						
Non-Migrant	8.6	6	6	9	12	14
Migrant	8.5	6	6	9	10	12
Young (12-29) Non-Migrant	9.8	6	9	9	12	14
Young (12-29) Migrant	9.0	6	7	9	11	12
Old (30-62) Non-Migrant	7.9	6	6	6	9	14
Old (30-62) Migrant	7.4	6	6	6	9	12
<b>Male</b>						
Non-Migrant	9.1	6	6	9	12	14
Migrant	8.5	6	6	9	10	12
Young (12-29) Non-Migrant	10.1	6	9	9	12	14
Young (12-29) Migrant	8.9	6	6	9	11	12
Old (30-62) Non-Migrant	8.6	6	6	9	12	14
Old (30-62) Migrant	7.1	6	6	6	9	12
<b>Female</b>						
Non-Migrant	8.2	6	6	9	11	13
Migrant	8.6	6	6	9	11	12
Young (12-29) Non-Migrant	9.7	6	9	9	12	14
Young (12-29) Migrant	9.1	6	7	9	12	12
Old (30-62) Non-Migrant	7.4	0	6	6	9	12
Old (30-62) Migrant	7.7	6	6	9	9	12

Note: Mexican Family Life Survey (MxFLS), 2002. Weighted Statistics. Migrant US identifies those Mexican migrants in the United States in 2005 that migrated after 2002 and have stayed over 1 year. Population Aged 12-62 in 2002 (15-65 in 2005). "Young" refers to those individuals aged 12-29 in 2002 (15-32 in 2005); "Old" refers to

Table 5.3: Educational Level - Distribution Among Migrant and Non-Migrant Mexicans



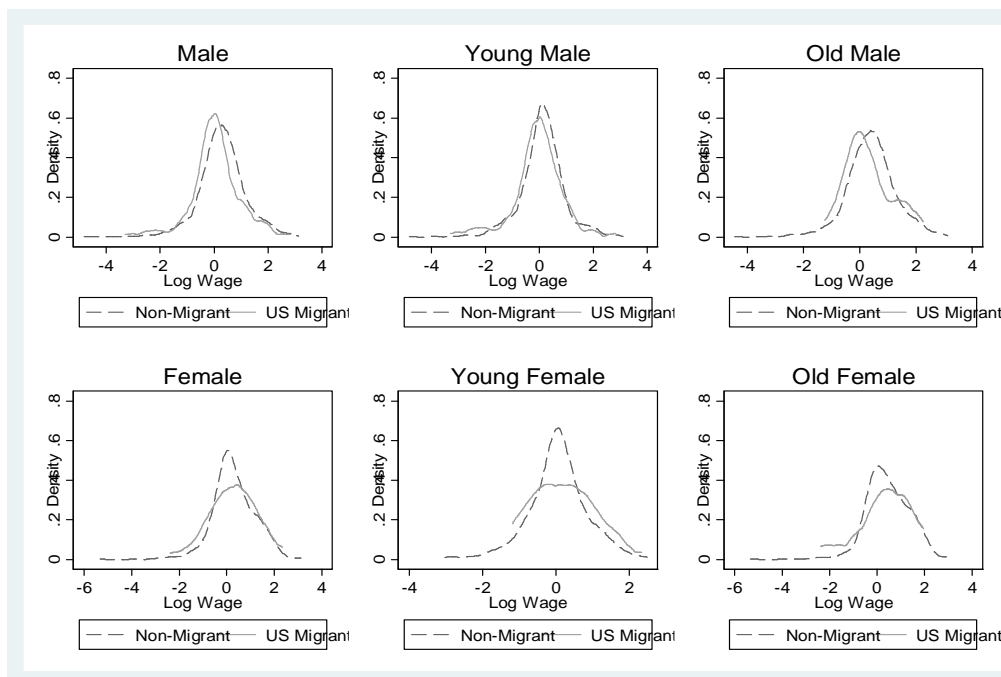
Note: Mexican Family Life Survey (MxFLS), 2002. Weighted Statistics. Migrant US identifies those Mexican migrants in the United States in 2005 that migrated after 2002 and have stayed over 1 year. Population Aged 12-62 in 2002 (15-65 in 2005). "Young" refers to those individuals aged 12-29 in 2002 (15-32 in 2005); "Old" refers to those aged 30-62 in 2002 (33-65 in 2005).

Table 5.4: Wages in Mexico in 2002 - Distribution Among Migrant and Non-Migrant Mexicans

	Mean	p10	p25	p50	p75	p90
<b>All</b>						
Non-Migrant	2.2	0.5	0.9	1.4	2.5	4.6
Migrant	1.8	0.4	0.7	1.0	1.7	3.3
Young (12-29) Non-Migrant	1.6	0.4	0.7	1.1	1.8	3.1
Young (12-29) Migrant	1.7	0.5	0.7	1.0	1.4	2.9
Old (30-62) Non-Migrant	2.5	0.6	1.0	1.6	2.9	5.4
Old (30-62) Migrant	2.1	0.3	0.6	1.2	3.0	5.9
<b>Male</b>						
Non-Migrant	2.2	0.5	0.9	1.4	2.5	4.6
Migrant	1.8	0.5	0.7	1.0	1.5	3.1
Young (12-29) Non-Migrant	1.7	0.4	0.8	1.2	1.8	3.1
Young (12-29) Migrant	1.7	0.4	0.7	0.9	1.4	2.9
Old (30-62) Non-Migrant	2.4	0.6	1.0	1.7	2.8	5.2
Old (30-62) Migrant	2.1	0.5	0.6	1.1	3.0	5.9
<b>Female</b>						
Non-Migrant	2.2	0.5	0.8	1.3	2.6	4.9
Migrant	1.8	0.4	0.7	1.4	1.8	5.2
Young (12-29) Non-Migrant	1.5	0.4	0.7	1.1	1.7	3.1
Young (12-29) Migrant	1.6	0.7	0.8	1.4	1.8	3.2
Old (30-62) Non-Migrant	2.6	0.6	1.0	1.5	3.1	5.7
Old (30-62) Migrant	2.1	0.1	0.5	1.5	3.3	5.2

Note: Mexican Family Life Survey (MxFLS), 2002. Weighted Statistics.  
Migrant US identifies those Mexican migrants in the United States in 2005 that migrated after 2002 and have stayed over 1 year. Population Aged 12-62 in 2002 (15-65 in 2005). "Young" refers to those individuals aged 12-29 in 2002 (15-32 in 2005); "Old" refers to those aged 30-62 in 2002 (33-65 in

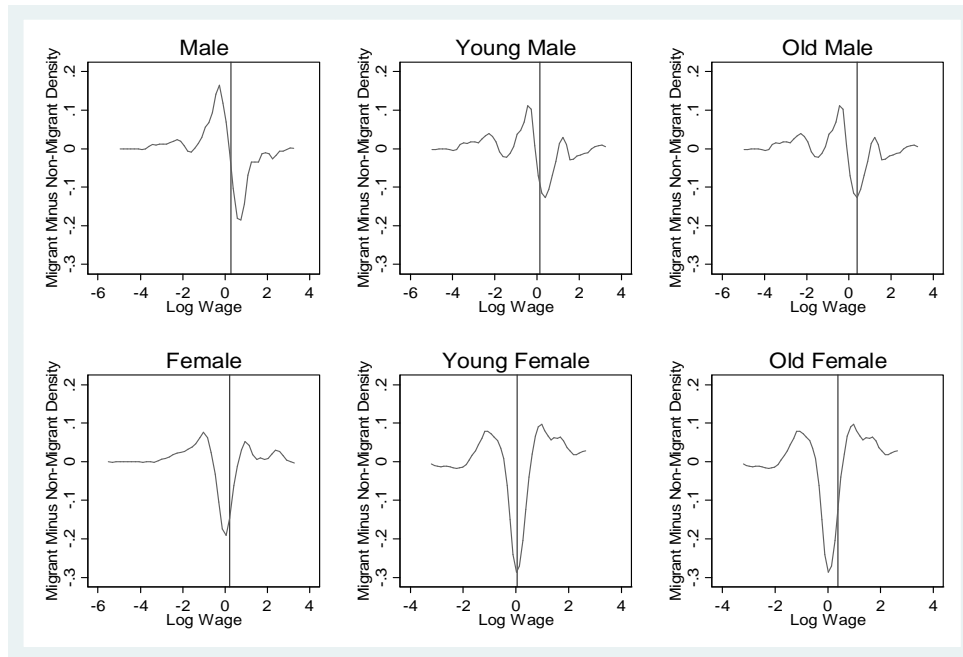
Figure 5.3: Wages in Mexico in 2002 - Distribution Functions of Migrant and Non-Migrant Mexicans



Note: Mexican Family Life Survey (MxFLS), 2002. Migrant US identifies those Mexican migrants in the United States in 2005 that migrated after 2002 and have stayed over 1 year. Population Aged 12-62 in 2002 (15-65 in 2005). "Young" refers to those individuals aged 12-29 in 2002 (15-32 in 2005); "Old" refers to those aged 30-62 in 2002 (33-65 in 2005). Log wages correspond to the log hourly wage earned in Mexico in 2002 in dollars.



Figure 5.4: Wages in Mexico in 2002 - Differences in Distribution Functions between Migrant and Non-Migrant Mexicans



Note: Mexican Family Life Survey (MxFLS), 2002. Migrant US identifies those Mexican migrants in the United States in 2005 that migrated after 2002 and have stayed over 1 year. Population Aged 12-62 in 2002 (15-65 in 2005). "Young" refers to those individuals aged 12-29 in 2002 (15-32 in 2005); "Old" refers to those aged 30-62 in 2002 (33-65 in 2005). Log wages correspond to the log hourly wage earned in Mexico in 2002 in dollars.

Table 5.5: Raven's Test Score - Distribution Among Migrant and Non-Migrant Mexicans

	Mean	p10	p25	p50	p75	p90
<b>All</b>						
Non-Migrant	51.2	25.0	33.3	50.0	66.7	75.0
Migrant	48.7	16.7	33.3	50.0	66.7	75.0
Young (12-29) Non-Migrant	55.8	25.0	41.7	58.3	75.0	83.3
Young (12-29) Migrant	50.6	16.7	33.3	50.0	66.7	75.0
Old (30-62) Non-Migrant	48.0	16.7	33.3	50.0	66.7	75.0
Old (30-62) Migrant	43.7	16.7	25.0	41.7	66.7	75.0
<b>Male</b>						
Non-Migrant	53.0	25.0	33.3	58.3	66.7	83.3
Migrant	49.9	16.7	33.3	50.0	66.7	75.0
Young (12-29) Non-Migrant	56.7	25.0	41.7	58.3	75.0	83.3
Young (12-29) Migrant	51.5	16.7	33.3	58.3	66.7	75.0
Old (30-62) Non-Migrant	50.4	16.7	33.3	50.0	66.7	75.0
Old (30-62) Migrant	44.0	16.7	25.0	41.7	66.7	75.0
<b>Female</b>						
Non-Migrant	49.8	16.7	33.3	50.0	66.7	75.0
Migrant	47.0	16.7	33.3	50.0	66.7	75.0
Young (12-29) Non-Migrant	55.1	25.0	41.7	58.3	75.0	83.3
Young (12-29) Migrant	48.9	16.7	33.3	50.0	66.7	75.0
Old (30-62) Non-Migrant	46.3	16.7	33.3	50.0	66.7	75.0
Old (30-62) Migrant	43.3	16.7	25.0	33.3	66.7	75.0

Note: Mexican Family Life Survey (MxFLS), 2002. Weighted Statistics. Migrant US identifies those Mexican migrants in the United States in 2005 that migrated after 2002 and have stayed over 1 year. Population Aged 12-62 in 2002 (15-65 in 2005). "Young" refers to those individuals aged 12-29 in 2002 (15-32 in 2005); "Old" refers to those aged 30-62 in

Table 5.6: Male Descriptives

	All		US		Migrant US		Young (12-29)				Old (30-62)			
	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.
<b>Migration US</b>	3.3%	17.9%												
<b>Age</b>	30.7	14.2	30.9	14.3	24.1	9.4	18.9	5.0	20.2	4.0	43.4	9.2	40.1	7.9
<b>Years Education</b>	9.1	3.6	9.1	3.6	8.5	2.8	10.1	3.0	8.9	2.6	8.6	3.8	7.1	3.1
<b>Primary</b>	35%	48%	35%	48%	40%	49%	17%	38%	33%	47%	45%	50%	60%	49%
<b>Secondary</b>	50%	50%	50%	50%	58%	49%	70%	46%	65%	48%	39%	49%	38%	48%
<b>Tertiary</b>	15%	35%	15%	36%	2%	14%	13%	34%	2%	14%	16%	37%	2%	15%
<b>Spanish Speaker</b>	98.7%	11.5%	98.7%	11.5%	98.4%	12.4%	99.3%	8.6%	98.2%	13.4%	98.3%	12.8%	99.2%	8.8%
<b>Indigenous</b>	12.7%	33.3%	12.2%	32.8%	25.8%	43.8%	9.8%	29.7%	26.8%	44.3%	13.6%	34.3%	22.9%	42.0%
<b>Rural</b>	40.9%	49.2%	39.9%	49.0%	69.9%	45.9%	42.2%	49.4%	70.1%	45.8%	37.4%	48.4%	68.9%	46.3%
<b>Employed</b>	63.9%	48.0%	64.1%	48.0%	58.6%	49.3%	33.6%	47.2%	48.9%	50.0%	95.5%	20.8%	98.6%	11.8%
<b>Receives Income</b>	59.1%	49.2%	59.4%	49.1%	51.8%	50.0%	28.6%	45.2%	42.4%	49.4%	94.5%	22.8%	98.1%	13.6%
<b>Amount Income</b>	2034	2792	2068	2814	1038	1772	719	1586	658	1248	3607	3105	2900	2591
<b>Previous Migration</b>	7.5%	26.3%	7.5%	26.3%	6.9%	25.3%	3.2%	17.6%	4.0%	19.6%	9.9%	29.8%	15.6%	36.3%
<b>-"- outside Mexico</b>	1.6%	12.6%	1.6%	12.4%	3.3%	17.8%	0.8%	9.0%	2.4%	15.2%	2.1%	14.5%	6.6%	24.9%
<b>Potential Migration</b>	22.4%	41.7%	22.1%	41.5%	30.3%	45.9%	27.2%	44.5%	35.0%	47.7%	19.2%	39.4%	15.7%	36.4%
<b>-"- outside Mexico</b>	4.2%	20.0%	3.9%	19.3%	12.6%	33.2%	5.7%	23.1%	15.1%	35.8%	2.9%	16.8%	4.9%	21.6%
<b>Relatives in USA</b>	32.8%	46.9%	31.9%	46.6%	55.5%	49.7%	33.3%	47.1%	55.5%	49.7%	31.1%	46.3%	55.6%	49.7%
<b>Anyone in Household(HH) -"</b>	48.6%	50.0%	47.7%	49.9%	74.1%	43.8%	47.8%	50.0%	74.1%	43.8%	47.5%	49.9%	74.2%	43.7%
<b>HH Home Ownership Indicator</b>	81.2%	39.1%	81.1%	39.1%	83.3%	37.3%	81.0%	39.2%	83.6%	37.0%	81.2%	39.0%	81.7%	38.7%
<b>HH Financial Assets Indicator</b>	17.0%	37.6%	17.2%	37.7%	12.5%	33.0%	15.5%	36.2%	13.3%	33.9%	19.0%	39.2%	9.3%	29.0%
<b>HH Savings Indicator</b>	17.2%	37.8%	17.4%	38.0%	10.9%	31.1%	16.1%	36.7%	10.9%	31.2%	18.9%	39.1%	10.7%	30.9%
<b>HH Debts Indicator</b>	37.9%	48.5%	37.9%	48.5%	38.0%	48.6%	39.2%	48.8%	36.9%	48.3%	36.5%	48.2%	42.8%	49.5%
<b>Number Observations</b>	12,315		11,852		463		5,978		339		5,874		124	
<b>Observations in Mexican</b>														
<b>Population</b>	30,900,000		29,900,000		1,026,410		15,300,000		826,177		14,600,000		200,233	

Note: Mexican Family Life Survey (MxFLS), 2002. Weighted Statistics. Migrant US identifies those Mexican migrants in the United States in 2005 that migrated after 2002 and have stayed over 1 year. Population Aged 12-62 in 2002 (15-65 in 2005). "Young" refers to those individuals aged

Table 5.7: Female Descriptives

	All		US		Migrant US		Young (12-29)				Old (30-62)			
							Non Migrant		Migrant US		Non Migrant		Migrant US	
	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.
<b>Migration US</b>	1.6%	12.6%												
<b>Age</b>	31.6	13.8	31.7	13.9	26.0	9.6	19.4	5.1	20.7	4.0	43.0	8.9	38.2	7.2
<b>Years Education</b>	8.2	3.7	8.2	3.7	8.6	3.2	9.7	3.2	9.1	3.0	7.4	3.7	7.7	3.5
<b>Primary</b>	45%	50%	45%	50%	37%	48%	24%	43%	30%	46%	56%	50%	49%	50%
<b>Secondary</b>	46%	50%	46%	50%	56%	50%	64%	48%	64%	48%	36%	48%	42%	49%
<b>Tertiary</b>	9%	29%	9%	29%	7%	26%	12%	32%	6%	24%	8%	27%	9%	29%
<b>Spanish Speaker</b>	97.8%	14.6%	97.8%	14.6%	96.4%	18.6%	98.3%	12.8%	94.2%	23.3%	97.6%	15.4%	100.0%	0.0%
<b>Indigenous</b>	12.5%	33.0%	12.4%	33.0%	16.5%	37.1%	12.1%	32.7%	20.3%	40.2%	12.5%	33.1%	10.3%	30.4%
<b>Rural</b>	41.3%	49.2%	40.9%	49.2%	65.7%	47.5%	43.6%	49.6%	68.5%	46.5%	38.4%	48.6%	59.3%	49.1%
<b>Employed</b>	30.8%	46.2%	30.8%	46.2%	30.6%	46.1%	18.6%	38.9%	25.3%	43.5%	41.9%	49.3%	42.5%	49.4%
<b>Receives Income</b>	26.8%	44.3%	26.8%	44.3%	25.1%	43.4%	15.9%	36.6%	21.9%	41.4%	37.2%	48.3%	33.1%	47.1%
<b>Amount Income</b>	726	1814	729	1820	549	1390	325	1010	386	1053	1113	2277	956	1940
<b>Previous Migration</b>	4.5%	20.8%	4.5%	20.8%	5.1%	22.1%	1.0%	9.9%	3.0%	17.2%	6.4%	24.5%	8.7%	28.1%
<b>-"- outside Mexico</b>	0.3%	5.3%	0.3%	5.2%	0.7%	8.3%	0.1%	3.5%	0.4%	6.0%	0.4%	6.2%	1.4%	11.7%
<b>Potential Migration</b>	19.0%	39.2%	18.8%	39.1%	33.1%	47.0%	27.2%	44.5%	34.7%	47.6%	14.2%	35.0%	30.4%	46.0%
<b>-"- outside Mexico</b>	2.7%	16.1%	2.5%	15.5%	15.9%	36.6%	3.8%	19.0%	12.7%	33.3%	1.7%	13.1%	21.2%	40.8%
<b>Relatives in USA</b>	34.5%	47.5%	33.8%	47.3%	79.1%	40.6%	33.3%	47.1%	75.6%	42.9%	34.0%	47.4%	85.1%	35.6%
<b>Anyone in Household(HH) -"</b>	48.8%	50.0%	48.1%	50.0%	89.3%	31.0%	49.1%	50.0%	87.4%	33.2%	47.3%	49.9%	93.5%	24.7%
<b>HH Home Ownership Indicator</b>	80.3%	39.8%	80.3%	39.8%	81.5%	38.8%	79.2%	40.6%	81.6%	38.7%	81.3%	39.0%	81.2%	39.1%
<b>HH Financial Assets Indicator</b>	17.4%	37.9%	17.4%	37.9%	12.1%	32.6%	17.1%	37.6%	10.3%	30.4%	17.8%	38.2%	16.2%	36.9%
<b>HH Savings Indicator</b>	16.7%	37.3%	16.8%	37.4%	12.6%	33.2%	16.5%	37.1%	8.5%	28.0%	17.0%	37.6%	21.9%	41.4%
<b>HH Debts Indicator</b>	36.4%	48.1%	36.5%	48.1%	35.9%	48.0%	37.4%	48.4%	32.9%	47.0%	35.6%	47.9%	42.6%	49.4%
<b>Number Observations</b>	13,505		13,224		281		6,468		198		6,756		83	
<b>Observations in Mexican</b>														
<b>Population</b>	39,000,000		38,300,000		631,037		18,400,000		438,232		19,900,000		192,805	

Note: Mexican Family Life Survey (MxFLS), 2002. Weighted Statistics. Migrant US identifies those Mexican migrants in the United States in 2005 that migrated after 2002 and have stayed over 1 year. Population Aged 12-62 in 2002 (15-65 in 2005). "Young" refers to those individuals aged

Table 5.8: Raven's Test Score - OLS Regression

	<i>All</i>	<i>Male</i>	<i>Female</i>
Dependent Variable: <i>Raven's Test Score</i>			
Age	-0.378** (0.017)	-0.341** (0.025)	-0.406** (0.024)
Migrant	<b>-5.635**</b> <b>(1.236)</b>	<b>-6.232**</b> <b>(1.606)</b>	<b>-5.805**</b> <b>(1.923)</b>
Constant	64.182** (0.623)	64.678** (0.900)	63.802** (0.861)
Number of Observations	18461	8205	10256
R-Square	0.051	0.044	0.056

Note: Dependent Variable: Raven's Test Score (from 0 to 100). Data: Mexican Family Life Survey (MxFLS), 2002. Weighted Regression. Migrant US identifies those Mexican migrants in the United States in 2005 that migrated after 2002 and have stayed over 1 year. Population Aged 12-62 in 2002 (15-65 in 2005). \* p<0.05, \*\* p<0.01.

Table 5.9: Alternative Young Definition (12-36) - Number of Years of Education, Log Wages and Ravens Test Scores Distributions Among Migrant and Non-Migrant Mexicans

	Mean	p10	p25	p50	p75	p90
<i>Years of Education</i>						
<b>Male</b>						
Young (12-36) Non-Migrant	9.9	6	9	9	12	14
Young (12-36) Migrant	8.8	6	6	9	11	12
Old (37-62) Non-Migrant	8.2	6	6	6	12	14
Old (37-62) Migrant	6.8	0	6	6	9	12
<b>Female</b>						
Young (12-36) Non-Migrant	9.3	6	6	9	12	14
Young (12-36) Migrant	9.0	6	6	9	12	13
Old (37-62) Non-Migrant	6.9	0	6	6	9	12
Old (37-62) Migrant	6.6	0	6	6	9	9
<i>Log Wage</i>						
<b>Male</b>						
Young (12-36) Non-Migrant	1.9	0.5	0.8	1.3	2.1	3.3
Young (12-36) Migrant	1.9	0.5	0.7	1.0	1.5	3.1
Old (37-62) Non-Migrant	2.6	0.6	1.0	1.7	2.9	5.7
Old (37-62) Migrant	1.5	0.3	0.5	1.0	2.0	3.0
<b>Female</b>						
Young (12-36) Non-Migrant	1.8	0.5	0.8	1.1	2.0	4.0
Young (12-36) Migrant	1.8	0.3	0.7	1.4	2.6	3.4
Old (37-62) Non-Migrant	2.7	0.7	1.0	1.8	3.4	6.2
Old (37-62) Migrant	1.9	0.5	0.5	1.5	1.7	6.3
<i>Skills</i>						
<b>Male</b>						
Young (12-36) Non-Migrant	56.1	25.0	41.7	58.3	75.0	83.3
Young (12-36) Migrant	50.8	16.7	33.3	50.0	66.7	75.0
Old (37-62) Non-Migrant	48.5	16.7	33.3	50.0	66.7	75.0
Old (37-62) Migrant	43.8	16.7	25.0	41.7	66.7	75.0
<b>Female</b>						
Young (12-36) Non-Migrant	53.5	25.0	41.7	58.3	66.7	75.0
Young (12-36) Migrant	48.1	25.0	33.3	50.0	66.7	75.0
Old (37-62) Non-Migrant	44.5	16.7	25.0	41.7	58.3	75.0
Old (37-62) Migrant	40.7	16.7	25.0	33.3	58.3	66.7

Note: Mexican Family Life Survey (MxFLS), 2002. Weighted Statistics. Migrant US identifies those Mexican migrants in the United States in 2005 that migrated after 2002 and have stayed over 1 year. Population Aged 12-62 in 2002 (15-65 in 2005). "Young" refers to those individuals aged 12-36 in 2002 (15-39 in 2005); "Old" refers to those aged 37-62 in 2002 (40-65 in 2005). Wages correspond to the hourly wage

Table 5.10: Alternative Young Definition (20-29) - Number of Years of Education, Log Wages and Ravens Test Scores Distributions Among Migrant and Non-Migrant Mexicans

	Mean	p10	p25	p50	p75	p90
<i>Years of Education</i>						
<b>Male</b>						
Young (20-29) Non-Migrant	10.4	6	9	10	12	14
Young (20-29) Migrant	9.0	6	6	9	11	12
Old (30-62) Non-Migrant	8.6	6	6	9	12	14
Old (30-62) Migrant	7.1	6	6	6	9	12
<b>Female</b>						
Young (20-29) Non-Migrant	9.9	6	8	9	12	14
Young (20-29) Migrant	9.1	6	6	9	12	13
Old (30-62) Non-Migrant	7.4	0	6	6	9	12
Old (30-62) Migrant	7.7	6	6	9	9	12
<i>Log Wage</i>						
<b>Male</b>						
Young (20-29) Non-Migrant	1.8	0.5	0.8	1.2	1.8	3.1
Young (20-29) Migrant	1.8	0.5	0.7	1.0	1.4	2.9
Old (30-62) Non-Migrant	2.4	0.6	1.0	1.7	2.8	5.2
Old (30-62) Migrant	2.1	0.5	0.6	1.1	3.0	5.9
<b>Female</b>						
Young (20-29) Non-Migrant	1.5	0.5	0.7	1.1	1.7	3.1
Young (20-29) Migrant	1.6	0.7	0.8	1.4	1.8	3.2
Old (30-62) Non-Migrant	2.6	0.6	1.0	1.5	3.1	5.7
Old (30-62) Migrant	2.1	0.1	0.5	1.5	3.3	5.2
<i>Skills</i>						
<b>Male</b>						
Young (20-29) Non-Migrant	57.6	25.0	41.7	58.3	75.0	83.3
Young (20-29) Migrant	53.9	25.0	41.7	58.3	75.0	75.0
Old (30-62) Non-Migrant	50.4	16.7	33.3	50.0	66.7	75.0
Old (30-62) Migrant	44.0	16.7	25.0	41.7	66.7	75.0
<b>Female</b>						
Young (20-29) Non-Migrant	55.0	25.0	41.7	58.3	75.0	83.3
Young (20-29) Migrant	49.0	16.7	33.3	50.0	66.7	75.0
Old (30-62) Non-Migrant	46.3	16.7	33.3	50.0	66.7	75.0
Old (30-62) Migrant	43.3	16.7	25.0	33.3	66.7	75.0

Note: Mexican Family Life Survey (MxFLS), 2002. Weighted Statistics. Migrant US identifies those Mexican migrants in the United States in 2005 that migrated after 2002 and have stayed over 1 year. Population Aged 20-62 in 2002 (23-65 in 2005). "Young" refers to those individuals aged 20-29 in 2002 (23-32 in 2005); "Old" refers to those aged 30-62 in 2002 (33-65 in 2005). Wages correspond to the hourly wage earned in Mexico in 2002 in dollars.

## Chapter 6

# Concluding Remarks

Migration is not a unidirectional movement: there is increasing evidence that many migrants leaving their home countries return after some years (OECD (2008)). This thesis dissertation has studied the temporariness of migration and the role it plays in several dimensions.

Migrants do not know if and when they will return just after emigrating, they update their intentions to return to their home country throughout their stay in the host country. Chapter 2 has analyzed the formation of migrants' intentions to stay in the host country using a dynamic model and how they are modified during the migration history. This modelisation allowed to perform several policy simulations and show their impact modifying migrant return intentions.

Migrant return intentions are however not important only per se. The following chapters have shown the importance of considering migrants' return plans to study migrant behaviour. Return plans are associated with different migrant actions while in the host country. Chapter 3 has shown how changes in return plans modify greatly remittance behaviour. Those migrants that plan to return are more likely to remit, and remit a higher amount, in particular to support their families. These results imply that migration policies that encourage temporary flows will lead to higher remittance flows than those that encourage a more permanent stay.

Not only remittances are related to return plans, but many other migrant behaviours while abroad. Chapter 4 has shown how savings and asset accumulation, both



in the home and in the host country, are related to return plans. Migrants that plan to return place a higher proportion of savings and assets in the home country. The particular distribution of assets, in particular property holdings, between home and host countries might have important implications for asset and housing markets of both economies. Several countries are trying to attract investments from their diasporas abroad issuing specific diaspora bonds. The results obtained in this thesis suggest that the success of these policies is not only dependent on the returns of the investments or the economic prospects of the home country economies, but also on the temporariness of these diaspora migration movements.

Migrants intentions to stay in the host country are modified during the life cycle. At different ages, migrants expect to stay in the host country different lengths of time. In addition, migrants might have different expected migration durations depending on their skill level. Chapter 5 has analyzed a related aspect: migrants' skill selection and the age gradient of migration. The impact of migration on both home and host societies depends in a great extent to the migrants' skill selection. The chapter has discussed the importance of studying migrant selection for comparable age groups. The results have shown a negative skill selection when properly comparing migrants to those non-migrants of the same age cohort. Young Mexican migrants to the United States seem negatively selected in terms of education, wages and cognitive skills.

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