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Abstract

In this paper, I test the savings accumulation conjecture that is used to rationalize return migration decisions in the context of immigrants in Germany. Using cross-country and time variation in purchasing power parity, I distinguish between the two competing capital accumulation conjectures (human capital vs. savings accumulation) and uncover evidence for the savings accumulation conjecture. In addition, I examine how labor market outcomes influence return decisions. A key finding here is that unlike previous studies which find a positive impact of unemployment on return migration, I find that the direction of the impact of unemployment changes by the spell length.

JEL Classification Codes: C41, F22, J61

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1 Introduction

The level of return migration has been high both in North America and in Europe. Jasso and Rosenzweig (1982) report that of the 1971 cohort of immigrants in the U.S., the fraction that returned by 1979 could be as high as fifty percent.[1] According to the German Federal Statistics Office, while almost eight hundred thousand immigrants entered Germany on average annually between 1962 and 2005, more than 560 thousand left each year on average.[2] Moreover, many of these immigrants return to countries where wages are lower than those in the host countries.

The question, then, is why so many immigrants return despite higher earnings in the host country. Borjas (1994) explains return migration as a part of optimal life-cycle location decisions. At the time they immigrate, immigrants realize that after they acquire physical or human capital in the host country, it may be optimal for them to return because the returns to that type of capital are higher in the home country. The savings that immigrants accumulate in Germany have higher purchasing power in their home country due to the lower prices there. Djajic (1988), Dustmann (1997, 2003), and Stark et al. (1997) uses this fact as a motivation for return migration. Mesnard (2004) examines a model of joint optimal migration duration and occupational choice after return where migrants accumulate savings in the host country to overcome liquidity constraints in their home country. In the life-cycle optimal location decisions, it may also be the higher returns in the home country to the human capital acquired in the host country that rationalize the return migration decision. Return migration may also be the result of unexpected events, either in the host or home country (Berninghaus and Siefer-Vogt, 1992; Tunalı, 2000). Even when it is optimal to

immigrate ex-ante, it may be optimal to return after the realization of negative shocks in the host country like unemployment. Another explanation used in a number of studies (Hill, 1987; Djajic and Milbourne, 1988) is that migrants prefer to live in their home country.[3] According to this, in a model where immigrants choose lifetime consumption and time in the home country given the wages in the home and host countries, the remaining worklife and the cost of migration, it may be optimal to immigrate and then return depending on the preferences of the potential immigrant.

The findings of the empirical literature on immigrants in Germany, in fact, suggest a savings accumulation motivation for immigrants in this country. Using a survey of Turkish emigrants from Germany in Turkey, Dustmann and Kirchkamp (2002) report that only 6 percent worked as salaried workers after return whereas 51 percent of the returners were self-employed. The other 43 percent were retired. The facts that half of these migrants engaged in entrepreneurial activities after return and that most of the rest lived as rentiers suggest a savings motive for immigrating to Germany. If the goal of immigrants was to accumulate savings, we would expect their saving rates to be high. Based on a empirical investigation of Turkish immigrants – the largest immigrant group in Germany –, Kumcu (1989), in fact, finds evidence for very high savings rates.[4] On the other hand, McLean Petras and Kousis (1986) find that labor market opportunities are very limited for Greek immigrants once they return from Germany. Most are forced to choose from unemployment, informal sector, and scatter jobs. This makes it unlikely that their return was motivated by the higher returns to the human capital they acquired in Germany.[5] Therefore, I focus on the savings accumulation conjecture as the potential explanation for return migration from Germany and test this conjecture in this paper.

There exist few studies that empirically test the conjectures rationalizing return migration. These few exceptions are Klinthall (1999), who finds no evidence for the savings accumulation motive for Greek migrants in Sweden, and a recent paper by Yang (2006). Yang distinguishes between what he calls target-earnings motivation – where immigrants stay in the home country until their accumulated savings reach a threshold – and life cycle considerations – where immigrants stay in the host country as long as the marginal benefit of higher savings there exceed the marginal cost of staying. He concludes that overall the evidence supports the life cycle hypothesis. On the other hand, I distinguish between two alternative life cycle considerations in order to test the savings accumulation conjecture.

The challenge in testing the savings accumulation conjecture is in distinguishing it from the human capital accumulation conjecture. The novel feature of the approach taken in this paper is to use the variation in purchasing power parity to distinguish between the two hypothesis. While an increase in purchasing power parity increases the value of accumulated savings in Germany after return to the home country, it does not change the value of German human capital after return. Therefore, by using the variation in purchasing power parity, I am able to vary the value of accumulated savings while holding the value of accumulated human capital constant, and, therefore, test the savings accumulation conjecture.

Both micro and macro data are used in the estimation. The micro level data I use come from the German Socioeconomic Panel which contains rich information on demographic as well as labor market outcomes of immigrants in Germany from various source countries. The sample is restricted to first-generation male immigrants. In addition, I employ macro data pertaining to immigrants' return decision. These macro data display variation both at the country level and over time.

A key issue with the micro level data utilized in this study is that it is a stock-sample of immigrants in Germany in 1984 from certain source countries. Like all stock-sample data, it is more likely to include immigrants with longer duration of residence. Not accounting for this would clearly result in biased estimates. However, my estimation strategy, which is based on duration analysis, accounts for the fact that the immigrants in the sample are those who survived long enough to be in the sample in 1984.

There also exist very neat features of the micro level data. First, it is a household survey that oversamples immigrants. Moreover, there exist immigrants from different source countries which exhibit important differences in characteristics pertaining to immigrants' return migration decisions. Finally, information on immigrants' return migration is directly available; it is not inferred from attrition.

The estimation results indicate that purchasing power parity is, in fact, an important factor that determines return migration behavior. A higher purchasing power parity decreases the return propensity of younger immigrants while increasing it for the older ones. These findings confirm the savings accumulation framework. Therefore, return migration in this context can be seen part of optimal life-cycle decisions in which immigrants are in Germany to save.

This paper also characterizes the level and timing of return migration as well as the selection in it with respect to labor market outcomes and discusses a number of implications of these on both the host and source countries as well as their policy implications.[6] For instance, the impact of immigrants on the host country fiscal system would depend on the timing of return of immigrants as well as the selection in return in terms of labor market outcomes.[7] The high unemployment rates of immigrants in Germany makes understanding

the impact of unemployment on return migration even more important.

I find that labor market outcomes are important determinants of return migration behavior. Bellemare (2003) as well as Constant and Massey (2003) report negative selection in terms of employment outcomes in return migration from Germany. However, my findings indicate that selection in return migration in terms of employment outcomes can not be characterized independent of the length of unemployment spells. For immigrants who have been unemployed for less than a year, unemployment increases the return propensity. On the other hand, immigrants with longer unemployment spells are more likely to stay in Germany. That long-term unemployed immigrants are more likely to stay suggests that return policies targeting this group of immigrants such as financial bonuses conditional on return could be less of a burden on the German unemployment insurance system than the unemployment benefits that will be paid for many coming years in the generous German benefit system with relatively high replacement rates and long durations of entitlement. In fact, the estimation results indicate that a similar return policy implemented by the German government in 1984 brought about a major increase in the return rates of Turkish immigrants at that year.

I also find that retirement increases the return migration rates remarkably. Its positive impact is also reported by Constant and Massey (2003). This study further qualifies this finding by showing that retirement matters only within two years of qualification and by quantifying its impact. Qualification for retirement increases the odds of returning sixfold within the first year of qualification. This finding implies that return migration significantly lowers the burden that immigrants exert on the health insurance system of Germany.[8]

Next section discusses the conceptual framework. The data are described in section 3 and the estimation method in section 4. Section 5 presents the results and section 6 concludes.

2 Conceptual Framework

In this section, I discuss the two capital accumulation conjectures and outline the identification strategy that is taken to distinguish the savings accumulation conjecture from the human capital accumulation conjecture.

According to both physical capital (savings) and human capital accumulation conjectures, return migration of immigrants is rationalized by the higher purchasing power in the home country than in the host country of capital accumulated in the host country. According to this, when workers in their home countries make their in-migration decision to the host country, they realize that it might be optimal for them to return after some time once they accumulate a certain amount of capital in the host country. The physical capital accumulated in the host country would have a higher purchasing power in the source country due to lower prices there. Similarly, the higher return to the human capital acquired in the host country after returning to the home country, due to relative scarcity of that factor there, could make it optimal to return once a sufficient level is acquired.

Because of this similarity of the human and physical capital accumulation conjectures, the empirical challenge in testing the savings accumulation conjecture is in distinguishing it from the human capital accumulation conjecture: Most factors that bring about a change in one type of capital do so in the other as well. For instance, accumulated savings, which one would normally use as a measure for physical capital, could also stand for human capital as people with higher human capital could earn and save more. We could try to net out the impact of human capital by including other measures for human capital like schooling, experience, etc. However, unobservable factors influencing human capital – a variable that is hard to measure

– would also influence our measure of physical capital, accumulated savings. Therefore, it is hard to distinguish the impact of two types of capital. The novel feature of my identification strategy is that I use the exogenous variation in purchasing power parity between the source countries and Germany to distinguish between the two conjectures. Using this variation in purchasing power parity, it is possible to bring about a change in the value of accumulated savings after return to the home country while holding the value of human capital acquired in Germany after return constant and, thereby, test the savings accumulation conjecture.

While the value of accumulated savings in Germany after return depends on the level of savings and purchasing power parity, the value of human capital acquired in Germany after return depends on the level of human capital, the price of a unit of German human capital in the home country as well as the aggregate price level in the home country. In order to understand whether a change in ppp affects the value of human capital after return, we need to examine the potential sources of the change in ppp. A change in purchasing power parity could be caused by a change in the exchange rate between the two countries as well as a change in prices in either country. A change in the exchange rate or in prices in Germany (ceteris paribus) would not alter the value of German human capital after return because neither the price of German human capital in the home country nor the home country aggregate price level changes. However, if the change in ppp is brought about by a change in aggregate prices in the home country, we could expect a change in what German human capital can purchase in the home country. Nonetheless, a change in prices in the home country is also likely to be accompanied by a similar change in the wages in the home country. Therefore, unless aggregate prices in the home country change differentially from the price of German human capital in the home country, the purchasing power of the return

to German human capital in home country would still stay constant.

In the savings accumulation conjecture, we would also expect the impact of purchasing power parity to vary by age. A higher ppp would have two competing effects: On one hand, it increases the value of already accumulated savings after return to the home country, thereby increasing the return probability. On the other hand, it increases the opportunity cost of returning because the value of extra savings that could be accumulated by staying longer would also increase. While the former effect would dominate for older immigrants who are likely to have higher levels of accumulated savings, the latter effect would dominate for younger immigrants who have lower accumulated savings and a longer worklife horizon during which they can save. Therefore, we would expect a higher ppp to make younger immigrants more likely to stay while increasing the return propensity of older ones.

Another important factor in the savings accumulation framework is the wage difference between the home countries and Germany, which determine the opportunity cost of returning. (In fact, it is the purchasing power parity of the wage differential that matters because part of the earnings in Germany will be kept in the form of savings.) This opportunity cost would especially be high for younger immigrants who face a longer horizon of foregone earnings in the case of a return migration decision. Even though this opportunity cost is an important reason that induces immigrants to stay, we observe that some immigrants stay in Germany even after retirement – when this opportunity cost would be zero – despite the fact that they can receive their pension benefits in their home country. As immigrants stay in Germany, obviously their preferences about staying in Germany change. Presumably, year after year, they acclimatize to their new surroundings more and more. In fact, some of them prefer to stay in Germany even after retirement because although there is no monetary opportunity

cost of returning, there exists a positive psychic opportunity cost of returning.

Within this framework, obviously not all returners are those that were able to accumulate savings at a fast enough pace that would dominate their increasing acclimatization to Germany. While some immigrants return because they think that the value of their accumulated savings in the home country dominate the value of foregone earnings, some other immigrants return due to negative realizations in Germany. For instance, immigrants who realize early negative labor market outcomes could return because they realize that the benefits of staying in Germany – the higher purchasing power of savings that can be accumulated – are not high enough to counteract the cost of staying (like psychic costs). In other words, even though it was optimal for these immigrants to in-migrate ex ante, it becomes optimal to return ex-post once they realize negative labor market outcomes.

Given that in this framework these immigrants are in Germany to work and to save, their labor market outcomes would be critical determinants of their return migration decisions. Retirement would be one critical edge because, as mentioned above, the opportunity cost of returning after retirement is zero and immigrants can receive their benefits in the home country. Unemployment status would also be important because this determines whether and how much immigrants can save. Moreover, given the strong state dependence in unemployment in Germany, it also provides substantial information about future ability to save.

3 Data

The data set I use is the German Socio-Economic Panel (GSOEP). This is a longitudinal data set of households in Germany that contains an oversampled group of immigrants from five Mediterranean countries, of which three are members of the European Union (Greece, Italy and Spain) and two are not (Turkey and ex-Yugoslavia).[9] This is a stock sample of immigrants from these five countries in Germany in 1984. Most of these immigrants are guestworkers who entered Germany in the 1960's and 70's. I use the 2000 version of the GSOEP, which contains annual information from 1984 to 2000 on return migration choices as well as demographic characteristics and labor market outcomes.

I restrict the sample to males who entered Germany after the age of 18. I want to analyze the behavior of immigrants who made the choice to immigrate to Germany. That is why I drop the immigrants who were younger than 18 at the time of entry to Germany, who presumably could not have made the decision to migrate themselves but were tied-movers along with their family. In addition, I drop ex-Yugoslavian immigrants because it is quite hard to find reliable macro data for the corresponding time period. Moreover, the country was split to many new countries and I do not have the information as to which new country each immigrant is originated from.

The pieces of information I use include demographic characteristics like marriage status at arrival, age at arrival, age, schooling status, country of origin and labor market information like employment status and whether the immigrant is qualified to retire as well as return migration outcomes. Return migration information is directly available in the data set; it is not inferred from attrition. As reported by Constant and Massey (2002), special efforts

are made in GSOEP in order to track people who move, including those who return from temporary stays in their home country.[10]

The information on return migration could still be noisy because it might not be easy to distinguish return migration from panel attrition that occurs due to certain other reasons as reported by Dustmann (1996), who also argues that the return migration rate in the data is likely to be an underestimate of the actual level of return migration (which, I presume, is due to the fact that attrition that is not accounted for in any way in the data could be due to return migration for the immigrant sample). However, there is also a countervailing fact that brings about overestimation of the actual return migration level: The way return migration can be misclassified causes an overestimate of the actual level. Unlike many other binary outcomes like employment status for which classification error can exist in all states (a person could be misclassified as employed when he/she is in fact unemployed and vice versa), a classification error for return migration status can exist only if the observed outcome for return migration is 1 (i.e., that return migration took place is registered in the data). That a migrant was interviewed leaves no doubt that he was in fact in Germany at the time of survey; on the other hand, a migrant whose status is registered as "moved out of country" could very well be somewhere else in Germany. Therefore, there is no a priori reason to think that registered return migration in the data is underestimated or overestimated because there are channels that cause. On the other hand, this piece of data could obviously be noisy which would cause a bias in my estimation results only if the classification error is correlated with the control variables. The other potential problem with the noise in the return migration data would be large standard errors; in the extreme case of noise, the data would be simply useless. However, the estimation results indicate that the data on return migration, which

confirms many theoretical expectations, is clearly very useful.

Another issue with the return migration information is that it is in fact emigration information since immigrants who move out of Germany are reported. The question, then, is that could these immigrants have moved to a third country? This is institutionally not possible for Turkish immigrants, who are not citizens of a EU member country. It is also quite unlikely for immigrants of EU countries because Germany has one of the highest real wages in Europe. (According to U.S. Bureau of Labor Statistics, only Denmark and Switzerland had slightly higher hourly direct pay in manufacturing in the 1990s.) Moreover, there are not many EU countries where social networks of immigrants originating from these three EU countries are as strong as they are in Germany.

Finally, the majority of the immigrants in my sample are guestworkers who arrived Germany in the 1960s and early 70s under bilateral agreements signed by the German government with a number of countries that include the four where the immigrants in my sample originate from. The guestworker recruitment system aimed to have these migrants work in Germany for a limited number of years and replace them with new ones once their permit expired. In 1973, after the oil price shocks, recruitment of new immigrant workers came to a halt. While most of the guestworkers in fact returned as planned, some stayed longer (and those who stayed until 1984 are represented in the data used in this study). Then, could there be a direct effect of being a guestworker on their return migration behavior compared to other economic immigrants? Restrictions for duration of residence could be an example to this. For instance, the return rates in the first few years after arrival would be higher under contract migration. However, since the first return in the sample is observed in 1984, which would be eleven years after the last guestworker entered Germany, we would

not have any institutional restrictions on their residence. In fact, Paine (1974) reports that these guestworkers were virtually able to stay in Germany once they survived for a couple of years. Therefore, there is no reason to expect a different return migration behavior from the guestworkers in my sample than other economic immigrants.

3.1 Descriptive Statistics

Table 1 presents the mean values of the micro data used in the estimation by country of origin. The first panel covers the demographic characteristics in the initial sample (in 1984) and the second one demographic as well as labor market characteristics in the full sample (over 17 years). The initial sample contains 824 immigrants, of which 310 are Turkish, 156 are Greek, 210 are Italian and 148 are Spanish. As can be seen in the table, while 55.7 percent of the Turkish immigrants are married at entry, this percentage is much lower for EU immigrants. For instance, only 26.1 percent of Italian immigrants are married at entry. This could be partly explained by the lower age at entry of Italian immigrants, which is 25.4. On the other hand, the average age at entry of Turkish is immigrants is 28.8. With regard to schooling, there is no significant variation according to country of origin. High school graduation rates are low for all nationalities at around twenty percent. College graduation rates for all nationalities are very low. The percentage of immigrants who entered Germany after 1973, the last year of guestworker recruitment, is just over 15 percent in the sample.

TABLE 1 ABOUT HERE

The second panel of Table 1 presents the mean values of the time-varying variables in the full sample. While the average duration of residence of Turkish immigrants is 19.3 years,

it is longer for EU immigrants at 21.9 years for Greek, 21.7 years for Italian and 23.3 years for Spanish immigrants. The average age of Turkish and Italian immigrants is more than 2 years lower, at just above 47 years, than that of Spanish or Greek immigrants. Turkish immigrants are younger on average because of their shorter duration of residence, the Italian ones because of their earlier age of arrival. There is significant variation in unemployment rates by nationality. Turkish immigrants have higher unemployment rates. The average unemployment rate of Turkish immigrants over the 17 years in the sample is 13.1 percent while it is just above 4 percent for Spanish immigrants. The highest unemployment rate among the EU groups is for Italian immigrants at 6.8 percent. The mean unemployment spell length of all immigrants is 1.4 years. There are different potential paths into retirement in Germany. (See Börsch-Supan and Schnabel, 1999)[11] According to these, 8.4 percent of Greek, 7.6 percent of Italian and 5.5 percent of Spanish and 3.9 percent of Turkish immigrants are qualified to retire. For immigrants that are qualified to retire, the average duration since qualification is 3.1 years.

Macro data pertaining to immigrants' return decision are also a key part of this investigation. Having four different source countries allows the use cross-country variation in identifying the influence of these macro variables. Moreover, these macro data provide exogenous time variation in the environment. The two pieces of macro data that are utilized are purchasing power parity and the ratio of expected wages in the home country to that in Germany at purchasing power parity. Figure 1 in the Appendix displays the purchasing power parity of the four source countries with Germany from 1984 to 1999.[12] For Italy and Spain, ppp values lie between 1 and 1.5 for all years and they average around 1.2 for Italy and 1.3 for Spain. For Greece there is a downward trend over time from 1.8 to 1.4 and it

averages around 1.6. For Turkey, it is the most volatile and ppp averages at a much higher level at around 2.4. Relative expected wages at purchasing power parity in the manufacturing sector are shown in Figure 2 in the Appendix.[13] In calculating the expected wages, the variation in unemployment rates as well as the replacement rates of the unemployment insurance systems across countries are also accounted for.[14] Relative wages in all source countries but Spain exhibit a declining trend over time. There is significant variation in the levels of relative expected wages at ppp. While in Italy they average at around 84 percent of the German level over the 17 years, this average drops to 48 percent for Turkey.

3.1.1 Level and Timing of Return Migration Behavior

Table 2 shows the number of returns, time at risk and incidence rates for return migration according to country of origin. (Incidence rate is the probability of return at any given period in the data, i.e. it is number of returns divided by time at risk.) The incidence rate is 0.0293 for Turkish and 0.024 for Italian immigrants. The values are higher for Greek and Spanish immigrants at 0.0365 and 0.046, respectively. However, incidence rates do not condition on the period, which is age in this case. Yet, there exist important differences in the age distribution of immigrants in the sample according to the country of origin. Therefore, I present the lifetime survivor rates after certain ages according to country of origin in Table 3.[15] Of all the 30 year-old Turkish immigrants, 34.2 percent stay in Germany throughout their lives whereas this percentage drops to 21.7 percent for Italian immigrants. Only 7.7 percent of the Greek 30-year-olds and 10.1 percent of the Spanish 30-year-olds stay in Germany until the end of their lives. Therefore, I can claim that the level of return migration is high for immigrants from these four source countries in Germany. Moreover,

it is higher for the three EU source countries in the sample.[16] This could be due to the institutional differences in that Turkish immigrants can not engage in repeat migration whereas immigrants from EU countries can. It could also be due to the fact that Turkey is a less attractive source country due to its economic conditions (like lower wages and more limited welfare programs). Finally, it could be due to the differences in the mean values of certain personal characteristics across country of origin groups. (For instance, Turkish immigrants on average are much more likely to be married at arrival.)

TABLE 2 ABOUT HERE

TABLE 3 ABOUT HERE

My finding that the level of return migration is high actually seems to differ from the findings of Constant and Massey (2003), who report that the probability of return is low for the average immigrant. However, they used a different sample that included all individuals over the age of 16. On the other hand, my sample is limited to only first-generation male household heads (who entered Germany at or after the age of 18). Therefore, my immigrant sample does not include the children of immigrants, who would be less likely to go back to the home countries of their parents. Moreover, my sample excludes ex-Yugoslavian immigrants who have a lower return migration level.

An interesting feature of immigrants' return behavior is illustrated in Table 4 which reports the variation in the timing of return according to country of origin by listing the cumulative hazard rates for five-year age intervals (which is the percentage of immigrants that return within a five-year period). While return migration rates display a U-shaped

pattern over age for EU immigrants, for Turkish immigrants it is just the opposite. The five-year cumulative hazard rate for Turkish immigrants before the age of 45 is always below 7.3 percent. It increases to 19.7 percent in the 45-49 age interval and to 18.5 percent in the 50-54 age interval before falling again to 9.0 percent in the 55-59 age interval. In other words, it displays a hump-shaped profile before the retirement age. Even in the retirement transition age interval of 60 to 69, the percentage of immigrants that return is not as high as that in the 45-54 age interval.

TABLE 4 ABOUT HERE

On the other hand, for EU immigrants, the level of return migration before the age of 45 and after age 60 is much higher than that between the ages of 45 and 59, just the opposite of the case for Turkish immigrants. The five-year cumulative hazard rates for EU immigrants before the age of 45 are always above 9.4 percent and many times above 20 percent, which is in stark contrast to the case for Turkish immigrants for whom they are always less than 7.3 percent. However, between the ages of 45 and 54, EU immigrants have much lower hazard rates. For instance, the cumulative hazard rates of Greek and Italian immigrants average less than 2 and 5 percent, respectively, compared to more than 18 percent for Turkish immigrants as reported above.[17] There is a reversal after retirement again; hazard rates of EU immigrants are much higher after retirement, especially for Greek and Spanish immigrants.

4 Estimation

Duration analysis is used in the estimation as return migration outcomes fit well into the framework of modeling time-to-event data. Jenkins (2004) reports a number of advantages of using duration analysis compared to standard binary choice analysis, like a probit or logit. First, it allows the examination of not only whether or not immigrants return but also the timing of their return. Moreover, the censoring in the data – both the right censoring as well as the left truncation due to the stock sample nature of the data – can be accounted for. Finally, it also allows for the use of time-varying variables, i.e., the impact of variables can change over the waiting time concept.

My estimation method properly addresses the fact that the data is a stock sample of immigrants in Germany in 1984 from five different source countries that is followed up. Therefore, the estimation results are not affected by the fact that several immigrants already returned to their home country by 1984. This issue is similar to a selection bias in the sense that immigrants with longer duration of residence are more likely to be in the data set. A standard discrete choice analysis, like a probit or logit, would not be able to address this issue; however, duration analysis – by conditioning on the waiting time – can. The basic idea to overcome this selection type of bias is to acknowledge the fact that people in this data set survived long enough to be in it when writing the likelihood function.

Since the survey starts in 1984, several years after some of these immigrants enter Germany, there is delayed entry into the risk set. However, since I know immigrants' year of arrival to Germany, I can calculate the time at which these immigrants enter the risk set as well as the total time spent in the risk set. Let t_i^0 denote the time of entry into the data

set and T_i the last period in the sample for person i. The likelihood contribution of the ith person, $\pounds_i$, which conditions on the survival of the individual until period t_i^0, is shown below in equation 1. This conditioning on the survivor rate at period t_i^0, $S_i(t_i^0)$, is specific to left-truncated data where persons enter the risk set with delay.

$$\pounds_i = \frac{\left(\frac{h_{iT_i}}{1-h_{iT_i}}\right)^{d_i} \prod_{t=1}^{T_i}(1-h_{it})}{S_i(t_i^0)} \tag{1}$$

Above, h_{it} is the hazard rate at period t, $d_i = 1$ if the migrant returns and zero otherwise, and

$$S_i(t_i^0) = \prod_{t=1}^{t_i^0}(1-h_{it})$$

The above likelihood can be simplified and written in the following way after taking its logarithm.

$$\log \pounds_i = \sum_{t=t_i^0+1}^{T_i} [d_{it} \log h_{it} + (1-d_{it}) \log(1-h_{it})]$$

Above, d_{it} can obviously be equal to 1 only in the last period in the sample ($t = T_i$).

In accordance with this likelihood function, the data is first organized in person-period format and then all the observations until period t_i^0 are dropped. The waiting time concept is age. Therefore, t_i^0 is in fact the age of immigrant i at the time of his arrival to Germany. A logistic form is chosen for the hazard function, which is given in equation 2 where $h_0(.)$ denotes the baseline hazard function, X the vector of control variables and β the parameters of interest.

$$\frac{h(age, X)}{1-h(age, X)} = \frac{h_0(age, married\_at\_entry)}{1-h_0(age, married\_at\_entry)} \exp(\beta' X) \tag{2}$$

$$where \quad \exp(\beta' X) = \exp(\beta_1 x_1(age) + ... + \beta_k x_k(age) + \beta_{k+1} x_{k+1} + ... + \beta_m x_m)$$

A flexible baseline hazard function, $h_0(.)$ – that varies as a cubic polynomial age (the waiting time concept) and marriage status at arrival – is chosen.[18] The baseline hazard is allowed to vary according to marriage status at entry because preliminary examination of the data revealed that baseline hazard could potentially be quite different according to this characteristic.[19] In addition, due to theoretical reasons, the impact of several variables – including purchasing power parity, expected wage ratio, unemployment – are allowed to vary over age, the waiting time concept. Above, x_1 to x_k denote the time-varying variables and x_{k+1} to x_m the time-invariant ones.

Finally, I should note that one key assumption that is made in handling the left-truncated data in this way is that year-of-birth cohort does not have a direct impact on the hazard rates. For instance, the information on return behavior at younger ages tend to come from later birth cohorts whereas the information for older ages are likely to come from earlier birth cohorts. If there was a direct impact of year-of-birth cohorts, the information at older ages may be not be representative for younger birth cohorts.

5 Results

Table 5 displays the estimation results, where the control variables are grouped under the following titles: purchasing power parity, wage ratio, retirement, unemployment status, return policy, demographic characteristics, and baseline hazard.[20] A number of other variables that may be correlated with return migration behavior like work effort and earnings, fluency in German, the location of the spouse and children, and remittance behavior are not used in the specification because these are choice variables jointly determined with the return

migration decision. For instance, an immigrant with stronger return intentions might work harder, be less willing to invest in learning German, more likely to keep his children in his home country and remit. The goal of the specification chosen is to uncover the exogenous underlying forces that determine the return migration decision and that would also determine related choices like remittance decision.[21] Here, I should acknowledge that in general unemployment status could also result from the choices of immigrants. However, given that these immigrants are in Germany to work and save, I believe it is rather safe to assume that these immigrants' unemployment status is not a result of choice.[22] For the same reason, I use qualification for retirement – which is determined by the institutional structure – rather than the actual retirement decision. Next, I will go over the effect of the control variables one by one.

TABLE 5 ABOUT HERE

5.1 Purchasing Power Parity

Table 6 presents the joint significance of purchasing power parity variables according to the age of immigrants. A higher purchasing power parity decreases the hazard rate for young immigrants while increasing the hazard rates of older immigrants. As can be seen from the table, there is evidence, statistically significant at five percent level, that hazard rates increase with purchasing power parity for eighteen-year-old immigrants. There is in fact evidence, at a lower level of ten percent statistical significance, that at all ages below twenty-two a higher purchasing power parity decreases the hazard rate. On the other hand, there also exists evidence, statistically significant at five percent level, that a higher purchasing power

parity increases the hazard rates for immigrants between the ages of forty-five and fifty-one. This age interval for which there is evidence of a positive impact of purchasing power parity on hazard rates widens to all ages between forty-two and fifty-three when the statistical significance is taken at ten percent level.

TABLE 6 ABOUT HERE

These findings are consistent with the implications of the savings accumulation conjecture in that a higher purchasing power parity makes younger immigrants more patient in staying in Germany in order to take advantage of the higher purchasing power parity of the savings that they could accumulate with a longer duration of residence, thereby decreasing their hazard rates. This effect, on the other hand, is overwhelmed by the effect of the increased purchasing power of savings already accumulated for older immigrants. As a result, the effect of purchasing power parity turns positive after a certain age (between thirty-five and forty). On the other hand, as immigrants age, a rise in purchasing power parity and, therefore, in the value of accumulated savings after return to the home country also become less important because there is a much shorter remaining lifetime during which these accumulated savings can be utilized. Therefore, the magnitude of the ppp coefficient declines after a second age threshold (after age forty-five).[23]

The magnitude of the impact of purchasing power parity on return migration is displayed by the odds ratios for selected amount of changes in purchasing power parity in Table 6. The impact of purchasing power parity on return migration is strong. For instance, even a 0.1 unit increase in ppp decreases the odds of returning for eighteen-year-old immigrants by a

factor of 0.63. (In order words, the odds of returning fall by 37 percent.) A 0.5 unit increase in ppp decreases the odds of returning to the home country to ten percent of its original value and a one unit increase in ppp decreases the odds to one percent of its original value for eighteen-year-old immigrants. (Even though an increase of 0.5 or 1 unit increase in ppp is high for EU countries, the range of ppp within the time period of this study for Turkey is even above these values.) For forty-five-year-old immigrants, the odds of returning increase by almost fifty percent with a 0.25 unit increase in ppp, by more than twice with a 0.5 unit rise in ppp, and by more than four and a half times by a one unit increase.

5.2 Wage Ratio at PPP

The joint significance of wage ratio at ppp variables is given in Table 7 according to the age of immigrants. There is weak evidence, at ten percent level statistical significance, that a higher expected wage level in the home country relative to that in Germany increases hazard rates at younger ages. This evidence exists at ages twenty, thirty, and forty but not at age fifty. The wage ratio determines the opportunity cost of returning to the home country in terms of foregone earnings. Therefore, it is no surprise that for younger immigrants, for whom the level of foregone earnings would be higher, the wage ratio matters more.

TABLE 7 ABOUT HERE

Despite the weak statistical significance for this fact, the magnitude of the impact of an increase in relative wages at ppp on hazard rates is strong for young immigrants as can be seen from the odds ratios in Table 7 given for selected amount of changes in the wage ratio

(which can lie between zero and one). For instance, a 0.1 point increase in the wage ratio (for instance an increase from sixty percent of German wages to seventy percent) increases the odds of returning by a factor of 2.83 for 20-year-old immigrants, by a factor of 2.15 for 30-year-old immigrants, and by a factor of 1.63 for 40-year-old immigrants. For a 0.2 point increase, the factors by which the odds of returning increase for the same three age groups are 8.02, 4.60, and 2.64, respectively.[24]

5.3 Labor Market Outcomes

5.3.1 Retirement

The impact of qualification for retirement on return migration is reported in Table 8 according to the time that has elapsed since qualification. There is strong evidence that qualification for retirement increases hazard rates within two years after qualification (at one percent level within a year after qualification, and at five percent level between one and two years after qualification). The magnitude of the impact is quite strong, too. The odds of returning to the home country increases by a factor of six within a year of qualification. Even after a year of qualification but before two years, qualification still increases the odds of returning by a factor of 3.7. However, there is no evidence that retirement increases hazard rates after two years of qualification.[25]

TABLE 8 ABOUT HERE

Since return migrants can receive their pension benefits even after returning to their home country, the increased rates of return after retirement do not make a difference in terms of

immigrants' net contributions to the German pension insurance system. On the other hand, the period of retirement is when the health expenditures are the highest. When immigrants spend this period in their home country, the burden they impose on the German health insurance system would be lower even when their health expenses in their home country are paid by the German health insurance system because health costs are lower in the source countries.

5.3.2 Unemployment

Table 9 reports the impact of unemployment on the return migration decision according to the length of the unemployment spell. The direction of the impact of unemployment varies by the length of the unemployment spell. While immigrants with shorter unemployment spells are more likely to return, immigrants with longer unemployment spells are more likely to stay. (While the evidence is at five percent level statistical significance for immigrants with an unemployment spell that is longer than three years, the evidence for immigrants with shorter unemployment spells is weaker at ten percent level statistical significance.)

TABLE 9 ABOUT HERE

Moreover, the magnitude of the impact is remarkable in most cases. For instance, for a 25-year-old immigrant, an unemployment spell that is shorter than a year increases the odds of returning by a factor of 7.5. The magnitude of the positive impact of a shorter unemployment spell on hazard rates diminishes by age; however, for a 40-year-old immigrant, a less-than-a-year long unemployment spell still increases the odds of returning by a factor

3. This picture is reversed for longer unemployment spells. For instance, for a 25-year-old immigrant, an unemployment spell that is longer than three years decreases the odds of returning to 0.1 percent of its original value. The magnitude of this negative impact also diminishes by age. An equally long unemployment spell decreases the odds of returning to 0.8 percent of its original value for a 35-year-old and to 5.6 percent of its original value for a 45-year-old immigrant.

Given the evidence that one major reason of immigration to Germany for these immigrants was savings accumulation, it is no surprise that immigrants who realize that they will not be able to achieve this goal due to their unemployment status are more likely to return. These immigrants would rather go back to their home country and seek employment there. The higher odds of returning for younger immigrants among the relatively shorter-term unemployed attest to this fact. The picture is reversed for the longer-term unemployed because these immigrants are likely to be different in terms of their labor market ability and preferences for living in Germany. That they have been unemployed for long periods of time suggests that they are likely to be of lower labor market ability. For lower labor market ability immigrants, the difference between the attractiveness of Germany– with its generous unemployment insurance systems and welfare benefits – and their home country– which provides no or more limited such benefits – would be far greater. More importantly, given the finding that less-than-a-year long unemployed immigrants are more likely to return, the fact that these long-term unemployed immigrants chose to stay despite being unemployed suggests that they have a stronger preference for living in Germany.

Table 10 presents the distribution of unemployment spell lengths for immigrants in Germany, which allows us to compare the fraction of immigrants whose hazard rates increase

with unemployment to the fraction of immigrants whose hazard rates decrease with unemployment. 42.5 percent of the unemployed have a spell length that is less than a year for whom there is evidence of a positive impact of unemployment on hazard rates. On the other hand, 21.5 percent of the unemployed have a spell length that is longer than two years, for whom evidence for an impact of unemployment with an opposite direction exists. Therefore, we can conclude that the percentage of unemployed immigrants for whom unemployment brings about a higher return rate is higher. This would explain why Bellemare (2003) and Constant and Massey (2003) find a positive impact of unemployment on return migration when not accounting for the length of the unemployment spell.

TABLE 10 ABOUT HERE

5.4 Return Policy

In 1984, the German government implemented a return policy in which financial bonuses were given to immigrants conditional on return.[26] The 1984 dummy and its interaction with the Turkish dummy are meant to capture the effect of this policy. The interaction term allows us to see whether the policy had a differential impact on Turkish immigrants compared to the immigrants from EU countries.

As can be seen in Table 5, the 1984 year dummy by itself is not statistically significant; therefore, there is no evidence for an impact of the policy on EU immigrants. On the other hand, the joint statistical significance of the year dummy and its interaction term with the Turkish dummy is at five percent level. In other words, the return policy did increase the hazard rates of Turkish immigrants. In fact, the coefficient estimate for the joint terms

indicates that the odds of returning for Turkish immigrants was 2.5 times higher in this year.

We should be careful, though, in interpreting this result. That the odds of returning increased in the policy year does not necessarily mean that the policy was successful in terms of improving the fiscal balance. It could be that the extra-returners in the policy year could be those who would return in a few years anyway. In this sense, it is important to know how the labor market outcomes of the extra-returners would be were they to stay and for how many more years they would stay in the absence of the policy.

5.5 Demographic Characteristics

The estimates for the demographic characteristics can be seen in Table 5. After accounting for the variation in immigrants' characteristics as well as in purchasing power parity and differences in expected wage ratios across countries, there is no evidence for a difference in hazard rates across country of origin groups. Nor does any evidence exist for an impact of entering Germany after 1973 – when guestworker recruitment ended – on hazard rates conditional on age. Indicators of educational attainment of immigrants turn out to be statistically insignificant as well. The only demographic characteristic that turns out be statistically significant is age-at-arrival. A higher age-at-arrival is associated with a higher hazard rate. (This is statistically significant at 1 percent level.) A ten year increase in age-at-arrival increases the odds of returning by a factor of 3.1.[27]

5.6 Baseline Hazard Function

The baseline hazard variables (age, age squared, and age cubed) are jointly statistically significant at five percent level and the interactions of married-at-arrival variable with these baseline age variables are jointly statistically significant at one percent level. Even though a cubic specification is taken, the baseline hazard functions for both marriage-status-at-arrival groups are parabolic where the baseline hazard levels are the lowest just before age forty for both groups.

Table 11 presents the impact of marriage status at arrival on baseline hazard rates. There is evidence, statistically significant at five percent level, that immigrants who are married at arrival are less likely to return between the ages of thirty and fifty-five. This negative impact of being married at arrival is especially strong for younger immigrants. Being married at arrival decreases the odds of returning by almost eighty percent for thirty-year-old immigrants.[28]

TABLE 11 ABOUT HERE

6 Conclusions

I test the savings accumulation conjecture proposed in rationalizing return migration decisions in the context of immigrants in Germany. I distinguish it from the human capital accumulation motivation using the exogenous variation in purchasing power parity. In addition, I examine how labor market outcomes like unemployment and retirement influence the return migration decision. Finally, I characterize the level, timing, and selection of the

return migration behavior and derive a number of implications of these regarding the impact of immigrants. The empirical analysis uses a rich micro level data set (German Socioeconomic Panel) as well as macro level data that display both cross-country and time variation. In the estimation, I use a flexible duration analysis method.

I find that purchasing power parity is in fact an important determinant of return migration behavior from Germany. Moreover, as implied by the savings accumulation framework, a higher ppp decreases the return propensity of younger immigrants while increasing it for older ones. This confirms the conjecture that an important motivation of these immigrants residence in Germany is to accumulate savings. Therefore, return migration, in this context, can be seen part of the optimal life-cycle problem in which the reason to immigrate was to accumulate savings. Moreover, this implies that the return of the accumulated savings in Germany along with the returning migrants could make an important contribution to the source country economies.

Another contribution of the paper is with regard to the impact of unemployment on return migration decisions. The previous empirical literature uncovered negative selection in terms of employment status in return migration from Germany. However, what I find is that the answer to this question depends on the length of the unemployment spell. Immigrants whose unemployment spells are shorter than a year are in fact more likely to return. On the other hand, those with longer unemployment spells are more likely to stay. Given the generosity of the German unemployment insurance system in terms of the duration of the benefits, it is no surprise that older long-term unemployed immigrants with a small chance of finding employment in either country prefer to stay in Germany whereas younger short-term unemployed immigrants are more likely to return once they realize that they will not be able

to attain their savings accumulation goal due to poor employment prospects. Examining the distribution of unemployment spells of immigrants in Germany, I find that the proportion of unemployed immigrants for whom unemployment decreases return migration probability is higher. That the long-term unemployed immigrants are more likely to stay and that there is very strong state dependence in unemployment suggest that return policies targeted toward this group, such as financial bonuses conditional on return, could be beneficial for the German unemployment insurance system. The amount of financial bonuses which would encourage these immigrants to return could be less than the total amount of unemployment benefits that are going to be paid in many years. In fact, the results of this study also indicate that a similar policy that was implemented in 1984 to encourage immigrants return home increased the return rates of Turkish immigrants significantly at that year.

Retirement has a strong impact on return migration of immigrants from Germany. The return probability within the first year after qualification for retirement increases sixfold. This implies that return migration significantly alleviates the potential burden an aging immigrant population would exert on the health insurance system in Germany.[29]

This paper also characterizes the level and timing of return behavior. The level of return migration is quite high and exhibits significant variation according to country of origin. Immigrants from wealthier countries are more likely to return. However, the evidence for differences across the country of origin groups vanishes once the variation in the purchasing power parities and wage ratios with Germany as well as in individual characteristics are accounted for.

The timing of return exhibits interesting differences by country of origin. The hazard function over age for Turkish immigrants has a hump-shaped profile that reaches its peak

between the ages of 45 and 54. On the other hand, the hazard function of immigrants from EU countries are parabolic. Their hazard rates are higher at early ages and after retirement. Unemployment rates of Turkish immigrants in their fifties are very high. That many choose to return between the ages of 45 and 54 implies that return migration behavior brings about a much less take-up of unemployment benefits.[30] Return migration at these ages also increases the net contributions to the pension insurance system for Turkish immigrants as periods of unemployment count toward the pension qualifying period while immigrants make no contributions at these periods.

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APPENDIX

Figure 1: Purchasing Power Parity with Germany

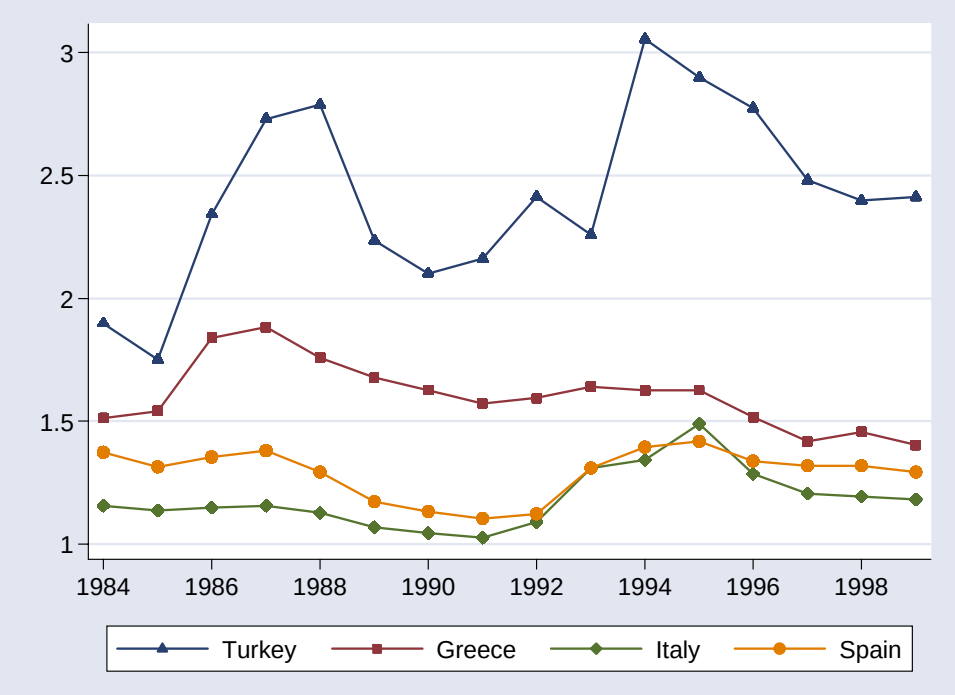
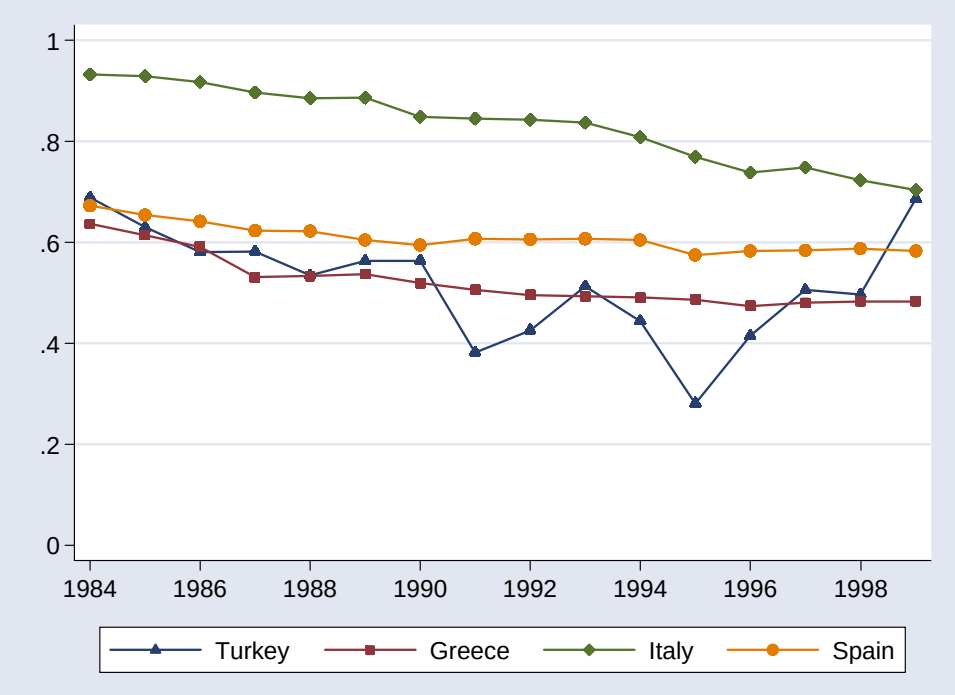


Figure 2: Expected Wage in Manufacturing as a Fraction of German Expected Wage (at PPP)



Notes

[1]Borjas and Bratsberg (1996) find that 17.5 percent of all immigrants who entered the U.S. between January 1, 1975 and April 1, 1980 returned by the end of the same period. For working-age male immigrants in Canada, Aydemir and Robinson (2006) find an out-migration rate of 35 percent by 20 years of residence.

[2]Dustmann (1996) reports high return migration levels for other European countries like Belgium, France, the Netherlands and Switzerland.

[3]Tsuda (1999) draws attention to the importance of preferences on location, caused by ethnic and socio-cultural forces, in explaining Japanese-Brazilian return migration to Japan rather than to other developed countries.

[4]In fact, as Martin (1992) reports, the Turkish government implemented several policies to attract Turkish immigrants' savings.

[5]A similar finding is reported by Enchautegui (1993) for Peurto-Rican return migrants from the U.S., for whom the author finds no additional earnings due to their labor market experience in the U.S.

[6]Borjas (1989) discusses the underlying forces that determine the type of selection in immigrant flows.

[7]Storesletten (2003) draws attention to the importance of age and labor market outcomes on the fiscal impact of immigrants.

[8]Even when the German social security system covers the health expenditures of immigrants after return, it would be less expensive becuase health costs are lower in the source countries.

[9]See Zimmermann (1995) or Dustmann (1996) for more background information on immigrants from these source countries in Germany.

[10]Return migration information is gathered from the neighbors and family members of the returning household and is classified as "moved out of country" in the dataset.

[11]Retirement is possible i) after age 65, ii) after age 63 conditional on a long service period (35 years) iii) after age 60 conditional on an unemployment spell of at least 52 weeks and a service period of at least 15 years.

[12]The source for purchasing power parity data is OECD (2002).

[13]The wage data for the three EU countries are taken from the U.S. Bureau of Labor Statistics. The wage

data for Turkey are calculated using the data provided by Freeman and Oostendorp (2000).

[14]The source for data on replacement rates is OECD (2002).

[15]I provide the survivor rates for 30-year-olds because the sample size at lower ages is small.

[16]This finding that immigrants are more likely to return to wealthier countries is consistent with that of Borjas and Bratsberg (1996) for the immigrants in the U.S.

[17]The notable exception is Spanish immigrants. Even though the cumulative hazard function also displays a U-shaped profile over age, it starts the rise before retirement, in fact after the age of 50.

[18]My specification does not allow for unobserved heterogeneity because my attempts to do so resulted in convergence problems. However, Jenkins (2004) reports that the recent empirical literature suggests that using a flexible baseline hazard function – which I do – mitigates the impact of unobserved heterogeneity.

[19]When a continouous time Cox estimation is used, marriage status at entry consistently fails the proportionality assumption – that the impact of the variable does not change over the waiting time concept – in various specificiations. However, once stratification is imposed according to marriage status at arrival, the proportionality assumption holds.

[20]Constant and Massey (2002, 2003), Dustmann (1996) are examples to other studies investigating the determinants of return migration of immigrants in Germany.

[21]To the degree that the individual-level control variables reflect unobserved permanent characteristics of immigrants – which could also affect their return migration decision –, the exogeneity assumption would fail. Allowing for unobserved heterogeneity would solve this problem; however, specifications with unobserved heterogeneity components resulted in convergence failures.

[22]Moreover, under certain conditons, the refusal of a job offer affect the receipt of unemployment benefits.

[23]Despite a fall in magnitude, we would expect the sign of the ppp coefficient to stay positive at older ages. That it turns negative after age sixty is a result of the particular specification chosen – second degree polynomial in age.

[24]Reyes (2001) also finds that economic opportunities in the home country are important determinants of return migration of Mexican immigrants in the U.S..

[25]Klinthall (2006) reports a similar increase in return migration rates with retirement in Sweden.

[26]Similar programs were implemented before by the German government as well as the French government (Zimmermann, 1994; Dustmann, 1996).

[27]The qualitative findings regarding education and age-at-arrival are in line with those of Dustmann (1996), who uses the same data set. Reagan and Olsen (2000) report the same finding regarding the impact of age-at-arrival for return migration from the U.S..

[28]In this sense, marriage status at arrival is an important factor explaining the lower return rates of Turkish immigrants compared to EU immigrants. (As it was shown in Table 1, Turkish immigrants were much more likely to be married at arrival.)

[29]Even when the German government has to pay the health expenses of an immigrant after return, it will be relatively less costly as health-care expenses are cheaper in the source countries than in Germany.

[30]The unemployment rates of Turkish immigrants between the ages of 50 and 59 average over 20 percent over the 17 years of data. Given that the replacement rate of benefits is 60 percent and the contribution rate to the unemployment insurance system is 2.15 percent, net contributions of the Turkish immigrants at these ages are clearly negative. With a conservative unemployment rate of 20 percent, the contribution rate to the unemployment insurance system would have to be 12.5 percent to break even.

Table 1: Descriptive Statistics by Country of Origin (Mean Values)

Individual Level Variables Used in Estimation					
	Turkish	*Greek*	*Italian*	*Spanish*	*Total*
Initial Sample					
# Observations	310	156	210	148	824
Age At Arrival	28.79	28.50	25.38	27.87	27.81
Married At Arrival (%)	55.73	41.99	26.12	39.38	45.28
High School (%)	20.04	20.26	20.29	16.10	19.85
College (%)	3.29	11.93	1.26	6.17	4.01
Cohort 1974-83 (%)	13.16	11.55	26.55	3.22	15.69
Full Sample					
# Observations	2892	1423	1902	1062	7279
Years of Residence	19.27	21.92	21.74	23.30	20.48
Age	47.38	49.63	47.20	49.85	47.76
Qualifed to Retire (%)	3.89	8.44	5.54	7.55	5.10
Years Qualified	3.61	1.97	3.22	2.78	3.09
Unemployed (%)	13.13	5.98	6.82	4.10	10.08
Unemployment Spell Length	1.38	1.79	1.41	0.96	1.41

Table 2: Incidence Rates of Return Migration

	Turkish	*Greek*	*Italian*	*Spanish*	*Total*
# Observations	310	156	210	148	824
# Returns	64	49	48	54	242
Time At Risk	2892	1423	1902	1062	7279
Incidence Rate	*0.0293*	*0.0365*	*0.0240*	*0.0460*	*0.0299*

Incidence rate is not exactly equal to # returns divided by time at risk due to weighted structure of the data

Table 3: Lifetime Survivor Rates After Certain Ages

	Turkish	*Greek*	*Italian*	*Spanish*	*Total*
Age					
30	34.2%	7.7%	21.7%	10.1%	19.8%
40	37.6%	10.5%	31.0%	13.4%	24.6%
50	53.0%	13.0%	35.5%	17.6%	32.7%

Table 4: Cumulative Hazard Rates by Age Intervals[3132]

	Turkish	*Greek*	*Italian*	*Spanish*	*Total*
Age-Interval					
25-29					15.7%
30-34	2.2%		10.1%		4.9%
35-39	7.0%	18.8%	22.8%	17.7%	15.8%
40-44	7.3%	27.0%	9.4%	19.6%	10.5%
45-49	19.7%	0.0%	4.2%	4.6%	14.4%
50-54	18.5%	1.5%	2.3%	12.1%	12.6%
55-59	9.0%	5.0%	4.1%	29.9%	9.3%
60-64	17.0%	41.2%	14.5%	43.6%	25.8%
65-69	18.0%	76.4%	47.4%	50.1%	41.0%
70-74					8.7%

Table 5: Estimation Results

	Coefficient	Std. Error	
Purchasing Power Parity			
PPP	-14.9603	4.6063	***
PPP * Age	0.7200	0.1832	***
PPP * Age * Age	-0.0079	0.0019	***
Wage Ratio			
Home Country Wage / German Wage	15.9550	8.0684	**
(Home Country Wage / German Wage) * Age	-0.2774	0.1373	**
Retirement			
Qualified to Retire	1.8004	0.5955	***
Years Since Qualification	-0.5010	0.1726	***
Unemployment Status			
Unemployed	3.5212	2.3360	
Unemployed * Age	-0.0601	0.0459	
Unemployment Spell Length	-5.0895	1.6289	***
Unemployment Spell Length * Age	0.0857	0.0261	***
Return Policy			
1984	0.2396	0.2893	
1984 * Turk	1.0266	0.5423	*
Demographic Characteristics			
Age at Arrival	-0.1125	0.0237	***
Greek	0.7632	0.6030	
Italian	0.0858	0.7758	
Spanish	1.0250	0.6780	
Cohort 1974-83	-0.0400	0.3720	
High School Degree	0.2293	0.2714	
College Degree	-0.1891	0.5304	
Baseline Hazard			
Age	-0.0407	0.5599	
(Age * Age)$_a$	-0.3425	1.0568	
(Age * Age * Age)$_b$	0.9781	0.7660	
Married At Entry * Age	-0.0990	0.1440	
(Married At Entry * Age * Age)$_a$	0.1621	0.5404	
(Married At Entry * Age * Age * Age)$_b$	-0.0147	0.5142	
Constant	-6.7463	13.4038	
Number of Strata	4		
Number of PSUs	198		
Number of Subjects	824		
Number of Failures	215		
Time at Risk	7279		
F(26,169)	5.5300		
Significance	0.0000		

Note: The complex survey design (stratification, clusters, weights) is accounted for in the estimatic
* significant at 10%; ** significant at 5%; *** significant at 1%
a: variable divided by 100; b: variable divided by 10,000.

Table 6: Effect of Purchasing Power Parity on Return Migration

	Coeff	*SE*	*Odds Ratios for Selected Amount of Changes*			
			0.1	*0.25*	*0.5*	*1*
Age=18	-4.546	2.136 **	0.63	0.32	0.10	0.01
Age=20	-3.703	1.945 *	0.69	0.40	0.16	0.02
Age=22	-2.923	1.771 *	0.75	0.48	0.23	0.05
Age=30	-0.432	1.240	0.96	0.90	0.81	0.65
Age=35	0.615	1.026	1.06	1.17	1.36	1.85
Age=40	1.268	0.876	1.14	1.37	1.89	3.55
Age=42	1.420	0.827 *	1.15	1.43	2.03	4.14
Age=45	1.529	0.762 **	1.17	1.47	2.15	4.61
Age=51	1.323	0.656 **	1.14	1.39	1.94	3.76
Age=53	1.129	0.632 *	1.12	1.33	1.76	3.09
Age=55	0.872	0.619	1.09	1.24	1.55	2.39
Age=60	-0.046	0.670	1.00	0.99	0.98	0.96

* Significance at 10 percent; ** Significance at 5 percent, *** Significance at 1 percent

Table 7: Effect of Wage Ratio (at ppp) on Return Migration

	Coeff	*SE*	*Odds Ratios for Selected Amount of Changes*			
			0.1	0.2	0.3	0.4
Age=20	10.407	5.414 *	2.83	8.02	22.70	64.26
Age=30	7.633	4.132 *	2.15	4.60	9.87	21.19
Age=40	4.859	2.934 *	1.63	2.64	4.30	6.98
Age=50	2.085	1.977	1.23	1.52	1.87	2.30
Age=60	-0.688	1.727	0.93	0.87	0.81	0.76

* Significance at 10 percent; ** Significance at 5 percent, *** Significance at 1 percent

Table 8: Effect of Retirement on Return Migration

	Odds Ratio	*Coeff*	*SE*
Qualified to Retire			
Years Qualified = 0	6.052	1.8004	0.5955 ***
Years Qualified = 1	3.667	1.2994	0.5798 **
Years Qualified = 2	2.222	0.7983	0.6142
Years Qualified = 3	1.346	0.2974	0.6913

* Significance at 10 percent; ** Significance at 5 percent, *** Significance at 1 percent

Table 9: Effect of Unemployment on Return Migration

Spell Length=0				*Spell Length=1*			
	Odds Ratio	***Coeff***	***SE***		***Odds Ratio***	***Coeff***	***SE***
Age=20	10.172	2.320	1.442	Age=20	0.348	-1.056	1.774
Age=25	7.532	2.019	1.223 *	Age=25	0.395	-0.928	1.527
Age=30	5.578	1.719	1.010 *	Age=30	0.449	-0.800	1.283
Age=35	4.131	1.418	0.806 *	Age=35	0.511	-0.672	1.044
Age=40	3.058	1.118	0.621 *	Age=40	0.581	-0.544	0.814
Age=45	2.265	0.818	0.475 *	Age=45	0.660	-0.416	0.603
Age=50	1.677	0.517	0.414	Age=50	0.750	-0.287	0.441
Age=55	1.242	0.217	0.471	Age=55	0.853	-0.159	0.394

Spell Length=2				*Spell Length=3*			
	Odds Ratio	***Coeff***	***SE***		***Odds Ratio***	***Coeff***	***SE***
Age=20	0.012	-4.432	2.588 *	Age=20	0.000	-7.807	3.569 **
Age=25	0.021	-3.875	2.262 *	Age=25	0.001	-6.822	3.139 **
Age=30	0.036	-3.318	1.938 *	Age=30	0.003	-5.837	2.711 **
Age=35	0.063	-2.762	1.617 *	Age=35	0.008	-4.852	2.286 **
Age=40	0.110	-2.205	1.302 *	Age=40	0.021	-3.867	1.867 **
Age=45	0.192	-1.649	0.999 *	Age=45	0.056	-2.882	1.458 **
Age=50	0.336	-1.092	0.721	Age=50	0.150	-1.897	1.070 *
Age=55	0.585	-0.536	0.513	Age=55	0.402	-0.912	0.740

* Significance at 10 percent; ** Significance at 5 percent, *** Significance at 1 percent

Table 10: Distribution of the Length of Unemployment Spells

Length of Unemployment Spell (Years)	*Percent*	*Cumulative*
0	42.49	42.49
1	21.68	64.16
2	14.31	78.47
3	8.38	86.85
4	5.78	92.63
5	3.18	95.81
6	1.73	97.54
7	1.16	98.70
8	0.29	98.99
9	0.14	99.13
10	0.14	99.28
11	0.14	99.42
12	0.14	99.57
13	0.14	99.71
14	0.14	99.86
15	0.14	100.00

Table 11: Effect of Being Married at Arrival on Return Migration

	Odds Ratio	*Coeff*	*SE*
Age=20	0.2611	-1.3428	1.0692
Age=25	0.2267	-1.4843	0.9600
Age=30	0.2122	-1.5503	0.7818 **
Age=35	0.2140	-1.5418	0.5807 ***
Age=40	0.2322	-1.4601	0.4123 ***
Age=45	0.2708	-1.3062	0.3337 ***
Age=50	0.3392	-1.0811	0.3316 ***
Age=55	0.4556	-0.7862	0.3278 **
Age=60	0.6555	-0.4224	0.3366
Age=65	1.0092	0.0092	0.5567

* Significance at 10 percent; ** Significance at 5 percent, *** Significance at 1 percen