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ABSTRACT

Transferability of Human Capital and Immigrant Assimilation: An Analysis for Germany*

This paper investigates the transferability of human capital across countries and the contribution of imperfect human capital portability to the explanation of the immigrant-native wage gap. Using data for West Germany, our results reveal that, overall, education and labor market experience accumulated in the home countries of the immigrants receive significantly lower returns than human capital obtained in Germany. We further find evidence for heterogeneity in the returns to human capital of immigrants across origin countries. Finally, imperfect human capital transferability appears to be a major factor in explaining the wage differential between natives and immigrants.

JEL Classification: J61, J31, J24

Keywords: human capital, rate of return, immigration, assimilation

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1 Introduction

The existing literature on the economic performance of immigrants concentrates on the wage differential between migrants and natives with comparable characteristics. The common framework of these analyses is the human capital theory, wherein wage disparities between groups are attributed to the mean differences in productivity-relevant characteristics. Following Chiswick (1978) and Borjas (1985), numerous studies have shown that immigrants have an earnings disadvantage upon arrival in the destination country, which is explained by the immigrant's lack of human capital that is specifically suited to the labor market of the receiving country. With time of residence in the host country, however, they accumulate country-specific human capital, thereby narrowing the initial earnings gap.

The majority of the existing studies on the wage assimilation of immigrants treat education and labor market experience obtained in different countries as perfect substitutes. They ignore the possibility that skills valuable in one labor market may not raise productivity in another labor market (Schmidt, 1997), and hence may not be rewarded equally in terms of earnings. Only a few studies allow the returns to human capital to vary not only for immigrants and natives, but also according to where the human capital has been obtained. Distinguishing between foreign and domestic education and allowing for their rates of return to differ, Schoeni (1997) and Bratsberg and Ragan (2000) find that the returns to education for immigrants with US schooling are substantially higher than for those who only have foreign schooling.

Some studies allow the returns to schooling and labor market experience to both vary (Beggs and Chapman, 1988; Kossoudji, 1989; Friedberg, 2000; Schaafsma and Sweetman, 2001; San Roma *et al.*, 2009). The results of Kossoudji (1989), for example, indicate almost zero returns to labor market experience accumulated outside the US and small difference in the returns to pre- and post-immigration schooling. Studying immigrants in Canada, Schaafsma and Sweetman (2001) confirm that work experience from abroad yields virtually no return and, in addition, find that the return to education varies with age at immigration. Friedberg (2000) finds that education and labor market experience acquired abroad are significantly less valued than human capital obtained in Israel, and that this difference can fully account

for the earnings disadvantage of immigrants relative to their Israeli counterparts. Cohen-Goldner and Eckstein (2008) confirm the results of Friedberg (2000), finding substantial returns to training and experience undertaken by immigrants in Israel and zero returns to imported skills. Similar patterns of the returns to education obtained in different countries also appear in Spain (San Roma *et al*, 2009).

Germany, a major immigrant destination in the European Union, represents an excellent case study for the investigation of the transferability of human capital across countries. The history of immigration to Germany has generated different types of migrants in terms of their human capital composition. For almost a decade until the early 1970s, a large number of guest-workers were encouraged to migrate to Germany as a reaction to a perceived shortage of unskilled labor. At the time of immigration, most of the guest-workers had already completed their schooling and accumulated some labor market experience in their home countries. In addition, since the work arrangement under the guest-worker program was intended to be predominantly short-term, these immigrants did not have pronounced incentives to invest in German-specific human capital. However, many of them ended up staying in Germany permanently.

As the recruitment of guest-workers was stopped in 1973, family reunification, humanitarian immigration in the form of asylum seekers and war refugees, and the immigration of ethnic Germans from Eastern Europe became the major avenues of legal immigration to Germany thereafter (Fertig and Schmidt, 2001; Bauer *et al.*, 2005). Some of these immigrants entered at very young ages and were likely to have obtained virtually all of their skills in Germany or have a combination of foreign- and domestically-acquired human capital. Furthermore, with the series of expansions of the European Union, labor mobility within Europe has been made easier, and more recently, programs were implemented to encourage the admission of highly-skilled professionals (Martin, 2002). In short, the different immigration regimes have brought forth immigrants who vary in the configurations of the regional sources of their human capital allowing us to gain further insights on the role of human capital transferability to explain the native-immigrant wage gap.

In this paper, we investigate whether human capital accumulated in different countries are rewarded differently in the German labor market – an aspect that hitherto has not been dealt in detail for Germany. Using data from the German

Socio-Economic Panel, we are able to approximate the years of education and labor market experience undertaken abroad and in Germany in order to analyze this issue. While most of the earlier studies only consider male immigrants, we also carry out the analysis for females. Given the immigration history of Germany, we examine immigrants by region of origin, arrival cohort and whether they consider themselves as temporary or permanent migrants.

Our results suggest that the native-immigrant earnings gap at the time of arrival can largely be explained by the different regional sources of human capital. Overall, education and labor market experience obtained outside of Germany receive significantly lower returns than human capital obtained in Germany. We further find evidence for heterogeneity in the returns to human capital of immigrants across origin countries, with immigrants from countries that are very similar to Germany with respect to their level of economic development earning similar returns than natives.

The paper is structured as follows. Section 3 describes the data set and discusses the empirical strategy. Section 3 presents the basic estimation results, while Section 4 investigates heterogeneity in the returns to human capital in more detail. Section 5 concludes.

2 Empirical Strategy and Data

2.1 Empirical Strategy

Following the seminal paper on immigrants' earnings assimilation by Chiswick (1978), we estimate wage equations of the form:

$$w_i = \beta_0 + \beta_1 S_i + \beta_2 EXP_i + \beta_3 I_i + \beta_4 YSM_i + \beta_5' X_i + \epsilon_i, \text{ for } i = 1, \dots, N, \quad (1)$$

where w_i represents the log real hourly wage of individual i , S_i refers to years of schooling, EXP_i to years of potential labor market experience, and YSM_i to the number of years since an immigrant's arrival in Germany. I_i is a dummy variable for immigrant status. In equation (1), the coefficient β_3 shows the wage gap between immigrants and comparable natives upon the arrival of the immigrants in

Germany. The coefficient β_4 captures the rate at which this native-immigrant wage gap diminishes with time of residence in Germany.

Other individual characteristics that potentially affect the wage are subsumed in the vector X_i . It includes information on the individual's marital status and number of children, state of residence and industry of employment. Since we apply pooled Ordinary Least Squares (OLS) to panel data covering the period 1984-2007, X_i also includes a set of year-specific effects, which are assumed to be the same for both natives and immigrants. While most of the literature focus on the wage assimilation of male immigrants, we carry out our analysis for both males and females.

Based on the standard specification shown in equation (1) it is not possible to estimate different returns to foreign and domestic human capital because human capital (S_i and EXP_i) acquired by immigrants in their home and host countries is treated as homogeneous. As Friedberg (2000) points out, equation (1) makes several restrictive implicit assumptions. First, it is assumed that the returns to immigrants' education and labor market experience obtained abroad equals the returns to education and labor market experience they accumulate in the destination country. Second, the *relative* return to immigrants' human capital obtained in their home and in the host country is the same for education and experience.

There are several arguments why these assumptions may not hold. Firstly, the quality of education varies substantially across countries (Friedberg, 2000). Education acquired in poorer countries may obtain lower returns in the host country as this education may be of (real or perceived) lower quality due to limited resources that these countries are able to devote to their educational systems. As a consequence of the various immigration regimes, for example, the non-German born population is a mixture of immigrants who originated from countries that are highly diverse in terms of their levels of economic development, as well as linguistic, institutional and cultural backgrounds. Secondly, training and work experience accumulated in less developed economies may not be suited to the needs of the often more technologically-advanced labor markets of the host countries. Hence, training and work experience obtained abroad may be discounted compared to human capital collected in the host country.

The returns to education and experience acquired in the host country, on the other hand, may be lower or higher for immigrants than natives. As Friedberg (2000)

asserts, since natives have country-specific skills – predominantly greater proficiency in the language – each year of education or experience could translate to an earnings potential higher than what immigrants could achieve. On the other hand, immigrants may get additional benefits in terms of language training, familiarization with institutions, work etiquettes, etc. Therefore, each year of German schooling or experience could have compounded benefits.

To relax the above-mentioned restrictions, we follow Friedberg (2000) and estimate the following model:

$$\begin{aligned}
 w_i = & \gamma_0 + \gamma_1 I + \gamma_2 S_i^f + \gamma_3 S_i^d + \gamma_4 (S_i^d * I_i) \\
 & + \gamma_5 EXP_i^f + \gamma_6 EXP_i^d + \gamma_7 (EXP_i^d * I_i) + \gamma_8' X_i + \varepsilon_i,
 \end{aligned}
 \tag{2}$$

where the superscripts f and d refer to foreign- and domestically-acquired human capital, respectively. This model allows the returns to foreign- and domestically-acquired human capital to vary. Based on estimations of equations (1) and (2), one can test the validity of the various implicit restrictions of equation (1) discussed above. A more comprehensive model also allows for interaction effects where the returns to foreign human capital are allowed to vary with the accumulation of domestic human capital. We will present results of such a specification in Section 4.

2.2 Data Description

The data used in this study are drawn from the German Socio-Economic Panel (GSOEP) for the years 1984 to 2007.¹ As immigrants living in East Germany comprise less than two percent of the population, we restrict our analysis to West Germany. We further restrict our sample to individuals aged 16 to 64 years who are in wage and salaried employment and excluded those who are in the military or civil service or undergoing full-time training. Unlike previous studies, which focus only

¹The data was extracted from the GSOEP Database provided by the DIW Berlin (<http://www.diw.de/GSOEP>) using the Add-On package PanelWhiz v1.0 (October 2006) for Stata®. PanelWhiz was written by Dr. John P. Haisken-DeNew (john@PanelWhiz.eu). The PanelWhiz-generated DO file used to retrieve the GSOEP data and any Panelwhiz Plugins are available upon request. Any data or computational errors in this paper are those of the authors. Haisken-DeNew and Hahn (2006) describe PanelWhiz in detail.

on male immigrants, we also examine the assimilation of female immigrants. Pooled OLS estimations are implemented for full-time workers, separately by gender.²

After applying our selection criteria, we are left with 72,810 person-year observations of full-time workers (11,867 unique respondents), of which 75% are males. Immigrants comprise about 24% of the sample for either gender. We categorize immigrants into regions of origin, namely: high-income OECD³, Turkey, Eastern Europe and the former Soviet Union (fSU), Ex-Yugoslavia, and a heterogeneous group *Others*, which consists of immigrants coming from countries other than the four regions specified. We further split the sample into three immigration cohorts: pre-1974, which is predominantly a period of manpower recruitment; 1974-1988, an era in which mainly family migrants entered Germany; and 1989-2006, which covers the period of the dissolution of socialism and its aftermath, which was characterized mainly by the immigration of ethnic Germans from Eastern Europe, asylum seekers and war refugees. Finally, we classify immigrants as permanent and temporary migrants based on whether or not they claim that they wish to stay permanently in Germany in the three years preceding the respective survey year.

In constructing our dependent variable, log real hourly wages, we use information on individual annual earnings and annual hours of work generated for the Cross-National Equivalent File of the GSOEP. We take the reported completed years of schooling as the measure of education. In order to disaggregate the years of schooling obtained in the country of origin and in Germany, we follow the procedure of Friedberg (2000), i.e. we assume that children start school at age six and undertake education continuously until they complete their total years of schooling. Since we know the age at which the immigrant arrived in Germany, we can calculate the

²In carrying out OLS estimations, we took into account the survey design of the dataset. Since we observe an individual multiple times, there is obviously a violation of independence among observations. We address this issue by clustering our estimations at the individual level. This adjusts the error term to the lack of independence without explicitly modeling the correlation among individuals.

³This excludes Turkey, Slovakia, Poland, Mexico, Hungary and the Czech Republic based on the World Bank (2006) classification of economies (as of July 2006).

years of schooling that would have been completed before and after the individual's migration to Germany. We use potential labor market experience defined as current age minus years of schooling minus 6. Again, we assume that the employment history of the individual is continuous after completing his or her education.⁴

Appendix-Table A1 defines all variables used in our analysis, and Appendix-Tables A2 and A3 present some descriptive statistics for the samples of males and females, respectively.

3 General Results

Table 1 shows the pooled OLS estimation results for the full sample of males and females⁵ respectively. Columns (1) and (4) depict the results of estimating equation (1). As expected, schooling and labor market experience positively and significantly affect wages. An additional year of schooling is associated with a wage increase of about 7% for both males and females, while an additional year of potential labor market experience is associated with a 0.9% wage increase for males and 0.6% wage increase for females. Male immigrants earn about 28.8% and female immigrants about 17.3% less than their native counterparts upon arrival in Germany. This initial wage disadvantage diminishes, albeit modestly, as male (female) immigrants' relative wages increase by 0.8% (0.5%) each year after migration.

Columns (2) and (5) of Table 1 decomposes the total education of immigrants into education prior- and post-migration, and similarly for experience. The results indicate that the equality of returns to foreign and domestic-source human capital is easily rejected, at least for male immigrants. An additional year of schooling in Germany increases their wage by 7%, while each year of schooling obtained in the home

⁴Bauer and Haisken DeNew (2001) estimated wage equations for German male full-time workers using actual work experience and potential experience separately employing data also drawn from the GSOEP. They found that using either variable leads to virtually identical results.

⁵Results using a Heckman-selection procedure to account for the selective labor supply decision of females, which are available upon request from the authors, do not differ substantially from the OLS findings.

country yields only 5.5%. For female immigrants, however, the returns to schooling abroad and in Germany are not significantly different from each other. The returns to labor market experience abroad, however, are significantly lower than the returns to labor market experience in Germany for both males and females. In both cases, the return to an additional year of labor market experience in Germany is about 0.6 percentage points higher than the return to foreign labor market experience, the latter being not rewarded at all for females.

The results for the fully unrestricted model (2) are reported in columns (3) and (6) of Table 1. They suggest that the implicit restrictions of equation (1) could be rejected for males. The marginal returns to a year of schooling and labor market experience acquired in Germany are significantly higher than the marginal returns to human capital obtained in the home country. It is worth noting that the returns to labor market experience obtained prior to immigration are only statistically significant at the 10%-level. Overall, these results are in accordance with the existing evidence for the US and Canada (Kossoudji, 1989; Schaafsma and Sweetman, 2001).

Results also show that male immigrants yield lower returns to education undertaken in Germany, with a 1.7 percentage point discount over natives. As indicated by Friedberg (2000), this may be explained by the inadequacy of immigrants' country-specific skills, including a relatively weak command of the German language, which prevents them from extracting full productive benefits from each year of schooling. On the other hand, male immigrants enjoy slightly higher returns to labor market experience accumulated in Germany, a 0.4 percentage points advantage over natives, suggesting that the time spent at work in Germany gives them compound benefits. That is, in addition to acquiring job skills from work experience, immigrants improve their German language proficiency, acquire more information about domestic institutions and work standards, among others. Note that after controlling for the differences in the returns to foreign and domestic human capital, the initial 28.8% native-immigrant wage gap found for men vanishes.

Column (6) of Table 1 reveals that the results slightly differ when considering females. In this fully unrestricted model, we could neither reject the hypothesis that the returns to education obtained abroad and the returns to education obtained in Germany are equal, nor could we reject the hypothesis that the returns to education obtained in Germany are equal for natives and immigrants. Only the hypothesis that labor market experience obtained in Germany and abroad yields equal returns could be rejected for the females. Note, however, that the wage differential at the time of arrival, which is estimated to be 17.3% when estimating equation (1), also becomes insignificant for the females, as soon as we allow the returns to human capital to differ depending on where this human capital has been obtained.

Overall, the estimation results reported in Table 1 are consistent with the view of imperfect transferability of human capital across different labor markets. They further show that allowing for imperfect transferability of human capital appears to be able to explain the immigrant-native wage gap at the time of arrival. The results finally clearly indicate that the standard model used in the literature on the wage assimilation of immigrants is misspecified.

4 Heterogeneity in the Returns to Human Capital

4.1 Region of Origin

While the above analysis permits the distinction between domestic and foreign human capital, it assumes that foreign human capital across different immigrant groups is rewarded homogenously. Foreign human capital, however, could be valued differently in the German labor market depending on the quality of education or work training in the source country and the transferability of these qualifications. Transferability, in turn, depends on how closely the country of origin compares to Germany

in terms of economic conditions, educational systems, industrial structure, institutional settings, language, etc. For instance, developed countries are able to devote more resources to their educational systems and, hence, are more likely to have a higher general quality of education. Similarly, developed countries would use more advanced machineries and complex processes that enhance human capital accumulation faster for each year of labor market experience. In this sense, human capital acquired in developed countries would have a higher degree of substitutability with human capital obtained in Germany.

To allow for the returns to education and experience to vary across immigrant groups, we estimate equation (2) separately according to immigrants' region of origin. We distinguish immigrants coming from developed countries by excluding non-high income economies from the OECD group. Turkey, which is a major sending country and has the biggest share of immigrants to Germany, is given its own category.

The results for males and females are shown in Table 2. The estimates for male immigrants, taken as a whole, confirm the findings reported in Table 1. Education obtained in Germany receives significantly higher returns than foreign education, and the returns to labor market experience in Germany are higher than the returns to foreign labor market experience, which are virtually zero. We, nevertheless, find evidence for heterogeneity across regions of origin. Immigrants originating from East Europe/fSU yield returns to foreign education that are higher than the returns to their German schooling. All other immigrants yield lower returns to their foreign education relative to education acquired in Germany, but those from OECD countries are not far behind. Education from Turkey translates to the least earnings potential. These differences though are not statistically significant except for the heterogeneous and small immigrant group *Others*. This significant difference is not surprising given that they receive one of the lowest returns to their foreign education while obtaining the highest returns to German schooling among all groups.

For males, only labor market experience accumulated in high-income OECD generates significant positive returns in Germany, while foreign experience obtained elsewhere appears not to be valued at all. This result is quite intuitive. On average, we expect the industrial structures and technology to be comparable between Germany and high-income OECD countries. Hence, work experience accumulated in these countries is more easily transferable to the German labor market than labor market experience obtained in other regions. Immigrants from Turkey, East Europe/fSU, and ex-Yugoslavian countries earn about 1.3-1.8% in wage increment with every year spent in the German labor market. The returns to foreign and domestic experience of these immigrants differ significantly.

For females, we find that the returns to German education are higher than those to foreign education regardless of region of origin. However, these differences are again not significant at conventional levels. Similar to what we found for males, only the foreign labor market experience of immigrants from high-income OECD receive positive returns in the German labor market. All others obtain zero returns.

4.2 Immigration Cohort

Table 3 shows the results of estimating equation (2) separately by cohort of arrival. Among male immigrants, those who arrived in Germany in the period 1974-1988 receive slightly higher returns to domestic education than the other immigration cohorts, while the latest cohorts yield the highest returns to foreign education and to domestic experience. While there is a higher premium to German vis-a-vis foreign schooling for most cohorts, we again find that the difference is not statistically significant. On the other hand, we can reject the equality of the returns to domestic and foreign labor market experience. This result confirms our previous findings that experience accumulated in Germany matters significantly while foreign experience yield essentially zero returns.

For females, we find that education markedly influences the wages of the earli-

est wave of migrants, while labor market experience does not appear to translate significantly to an increase in earnings. For the rest of the immigrants, it is again German work experience that matters.

4.3 Temporary vs. Permanent Migrants

We next make a distinction between temporary and permanent immigrants. For our purpose, we classify immigrants as temporary if they claimed that they do not wish to stay permanently in Germany over the three years preceding the respective survey year. Temporary migrants might have weaker incentives to accumulate new skills and rely more on the human capital they have brought with them upon migration, while permanent migrants have more incentives to invest in skills suited to the German labor market, since they will have a longer time horizon to extract benefits from this investment. In this respect, the skill components of these two groups might differ.

Table 4 reports the results of estimating an extended version of equation (2), in which we included interaction variables between the different human capital indicators and a dummy variable, that takes the value 1 for temporary migrants. For male immigrants who intend to stay in Germany permanently, the results are consistent with our previous evidence: domestically-acquired human capital is valued higher than foreign human capital; there is no significant difference in the returns to education obtained abroad and in Germany; and, while work experience in Germany generates returns of about 7.5%, experience abroad yields zero returns. Temporary migrants earn about 44% less than permanent migrants. Their respective returns to human capital acquired in Germany do not differ significantly from those of permanent migrants. However, we find that education and experience of temporary migrants obtained abroad yield slightly higher returns (by 3.0 and 1.3 percentage points, respectively). The estimation results may be explained by a different selection of permanent and temporary migrants into jobs with the latter selecting

themselves predominantly into low-paid jobs that offer relatively high returns to their human capital accumulated prior to migration and without requiring them to invest in host country-specific human capital. For females, we find no significant differences between permanent and temporary migrants.

4.4 Complementarity of Human Capital

Upon arrival, immigrants may be constrained in their job opportunities and forced to take on low-paying jobs that do not require much of local-specific skills. Thus, they may not be able to extract the full benefits for the qualifications they have previously obtained in their home countries. However, over time, as they gain these country-specific skills – by e.g. attending school in Germany or on-the-job training – they may be able to find better-paying jobs to which they will be able to apply their pre-migration qualifications more efficiently. Hence, potential complementarities between pre- and post-immigration human capital investments may result in the returns to the pre-migration stock of human capital to increase with human capital investments in the receiving country.

To examine whether there are such complementarities, we estimate equation (2) augmented with variables interacting foreign and domestic human capital. The results of this specification are presented in Table 5. Overall, they show that the interaction effects are statistically insignificant both for the male and female samples, suggesting that the returns to foreign human capital do not vary significantly with the accumulation of human capital in Germany. Only for male immigrants from Turkey we find that the returns to education obtained in Turkey are increasing with experience in Germany while the returns to labor market experience obtained in Turkey appears to decrease with increasing experience in Germany.

4.5 Non-linear Returns to Schooling

So far, our analyses assume linearity in the returns to schooling. That is, each year of schooling earns the same returns irrespective of whether it was at the primary, secondary, university or post-graduate level. However, if returns to schooling are decreasing over levels, then the returns to German education of immigrants may be biased downwards. To investigate this potential bias, we split education into three levels, namely: Primary (years 1-9), Secondary (10-13) and University or post-secondary (14 and above). To investigate the returns to education at different schooling levels, we estimate a piecewise linear function using the mentioned educational levels as knots, i.e. we estimate the model

$$\begin{aligned}
 w_i = & \gamma_0 + \gamma_1 I + \gamma_2 S_i^f + \gamma_3 [(S_i^f - S(9)) * d_9] + \gamma_4 [(S_i^f - S(13)) * d_{13}] + \\
 & + \gamma_5 S_i^d + \gamma_6 [(S_i^d - S(9)) * d_9] + \gamma_7 [(S_i^d - S(13)) * d_{13}] + \\
 & + \gamma_8 EXP_i^f + \gamma_9 EXP_i^d + \gamma'_{10} X_i + \varepsilon_i
 \end{aligned} \tag{3}$$

where $S(9)$ and $S(13)$ are structural breaks at 9 and 13 years of schooling, respectively, and d_9 and d_{13} are the respective break dummies.

Table 6 shows that there are indeed non-linearities in the returns to education. For natives, primary education does not generate significant returns, while an additional year of secondary education increases wages by 10.7% (11.8%) for males (females) and university education by 5.1% (3.1%). For immigrants, university education has the highest returns. In general, primary and secondary education are equally valued regardless of where they were obtained. This could indicate that the skills incorporated in lower levels of education are quite transferable across different labor markets. The only exception to this finding are immigrants from East Europe, whose returns to secondary education from abroad are slightly higher than those obtained in Germany. University education obtained abroad generates lower returns than university education obtained in Germany.

5 Conclusion

This paper examines whether the returns to human capital differ for natives and immigrants, and if they depend on where the qualifications were acquired. Human capital obtained from the origin country may not be equivalent to those obtained in the host country due to limited transferability of skills and imperfect compatibility of home and host country labor markets. The returns to domestic human capital may differ for natives and immigrants depending on who derives compound benefits from each year of human capital. For instance, immigrants may yield higher returns to German labor market experience because each year of work experience does not only allow them to gain occupational skills but also gain language proficiency and local knowledge.

We find that, for immigrants taken as a whole, foreign schooling is valued lower in the German labor market than domestic schooling. Remarkably, foreign labor market experience yields virtually zero returns. The returns to schooling obtained in Germany also appear to be lower for immigrants if compared to natives, at least for the males. Our results further indicate that the wage differential between natives and immigrants can be sufficiently explained by the lower value attached to immigrants' foreign human capital.

We, nevertheless, find evidence for heterogeneity across immigrant groups. In particular, immigrants from high-income countries tend to earn the highest returns to their foreign human capital than the other groups. This lends support to the importance of compatibility of the immigrants' home and host countries for the transferability of human capital.

References

- Bauer, Thomas and John Haisken-DeNew 2001. "Employer Learning and the Returns to Schooling" *Labour Economics* 8 (2): 161-180.
- Bauer, Thomas, Dietz, Barbara, Zimmermann, Klaus F. and Eric Zwiintz 2005. "Migration: Development, Assimilation, and Labor Market Effects" In *European Migration: What do we know?*, edited by Klaus F. Zimmermann. Oxford: Oxford University Press.
- Beggs, John and Bruce Chapman 1988. "The International Transferability of Human Capital: Immigrant Labor Market Outcomes in Australia" In *The Economics of Immigration: proceedings of a conference at the Australian National University 22-23 April 1987*, edited by Lyle Baker and Paul Miller. Canberra: Australian Government Publishing Service.
- Borjas, George J. 1985. "Changes in Cohort Quality and the Earnings of Immigrants" *Journal of Labor Economics* 3 (October): 463-489.
- Bratsberg, Bernt and James Ragan, Jr 2000. "The Impact of Host-Country Schooling on Earnings: A Study of Male Immigrants in the United States" *Journal of Human Resources* 37 (1): 63-105.
- Chiswick, Barry 1978. "The Effect of Americanization on the Earnings of Foreign-born Men" *Journal of Political Economy* 86: 897-922.
- Cohen-Goldner, Sarit and Zvi Eckstein 2008. "Labor Mobility of Immigrants: Training, Experience, Language, and Opportunities" *International Economic Review* 49 (3): 837-872.
- Fertig, Michael and Christoph M. Schmidt 2001. "First- and Second-Generation Migrants in Germany - What Do We Know and What Do People Think?" In *Migration Policy and the Economy: International Perspectives*, edited by Ralph Rotte and Peter Stein. Munich: Hanns-Seidel-Stiftung.
- Friedberg, Rachel 2000. "You Can't Take It with You? Immigrant Assimilation and the Portability of Human Capital" *Journal of Labor Economics* 18 (2): 221-251.

- Haisken-DeNew, John P. and Markus Hahn 2006. "PanelWhiz: A Menu-Driven Stata/SE Interface for Accessing Panel Data" Manuscript, RWI Essen.
- Heckman, James 1979. "Sample Selection Bias as a Specification Error" *Econometrica* 47: 153-161.
- Kossoudji, Sherrie 1989. "Immigrant worker assimilation: is it a labor market phenomenon?" *Journal of Human Resources* 24 (3): 494-527.
- Martin, Philip L. 2002. "Germany: Managing Migration in the 21st Century" *CIIP-1 Working Paper*, University of California, Berkeley.
- Pindyck, Robert and Daniel Rubinfeld 1991. "Econometric Models and Economic Forecasts" New York: McGraw-Hill/Irwin.
- San Roma, Esteve, Raul Ramos and Hipolito Simon 2009. "Immigrant Wages in the Spanish Labour Market: Does the Origin of Human Capital Matter" *IZA Discussion Paper* 4157.
- San Roma, Esteve, Raul Ramos and Hipolito Simon 2008. "The Portability of Human Capital Immigrant Assimilation: Evidence for Spain" *IZA Discussion Paper* 2649.
- Schaafsma, Joseph and Arthur Sweetman 2001. "Immigrant Earnings: Age at Immigration Matters" *The Canadian Journal of Economics* 34 (4): 1066-1099.
- Schoeni, Robert 1997. "New Evidence on the Economic Progress of Foreign-Born Men in the 1970s and 1980s" *Journal of Human Resources* 32 (4): 683-740.
- Schmidt, Christoph 1997. "Immigrant Performance in Germany: Labor Earnings of Ethnic German Migrants and Foreign Guest-Workers" *The Quarterly Review of Economics and Finance* 37 (Special Issue): 379-397.
- Spence, Michael 1973. "Job Market Signaling" *Quarterly Journal of Economics* 87 (3): 355-374.
- StataCorp 2009. *STATA Base Reference Manual Release 11* TX: StataCorp LP, 1053-1055.

Williams, Richard 2009. "Nonlinear relationships" <http://www.nd.edu/~rwilliam/stats2/syl63993.pdf>. Last accessed: 9 December 2009.

World Bank 2006. "List of economies (July 2006)" <http://siteresources.worldbank.org/DATASTATISTICS/Resources/CLASS.XLS>. Last accessed: 9 December 2009.

Tables

**Table 1: Returns to Human Capital:
Foreign versus Domestically-acquired Skills, 1984-2007, OLS**

	MALES			FEMALES		
	(1)	(2)	(3)	(4)	(5)	(6)
Immigrant	-0.288*** (0.033)	0.054 (0.034)	0.108 (0.085)	-0.173*** (0.040)	-0.024 (0.055)	-0.029 (0.165)
Education	0.068*** (0.002)	–	–	0.067*** (0.005)	–	–
Education abroad	–	0.055*** (0.004)	0.045*** (0.006)	–	0.066*** (0.008)	0.062*** (0.013)
Education in Germany	–	0.070*** (0.002)	0.072*** (0.002)	–	0.067*** (0.005)	0.068*** (0.005)
Experience	0.009*** (0.001)	–	–	0.006*** (0.001)	–	–
Experience abroad	–	0.004** (0.001)	0.003* (0.002)	–	0.001 (0.002)	0.001 (0.002)
Experience in Germany	–	0.010*** (0.001)	0.009*** (0.001)	–	0.007*** (0.001)	0.006*** (0.001)
YSM	0.008*** (0.001)	–	–	0.005*** (0.002)	–	–
Education Germany x Immig	–	–	-0.017** (0.007)	–	–	-0.006 (0.014)
Experience Germany x Immig	–	–	0.004*** (0.002)	–	–	0.003 (0.002)
Constant	1.183*** (0.046)	1.146*** (0.046)	1.136*** (0.047)	1.050*** (0.080)	1.042*** (0.080)	1.037*** (0.083)
R-squared	0.347	0.348	0.349	0.354	0.354	0.354
Observations	51,821	51,821	51,821	17,185	17,185	17,185
Tests (p-value):						
$\gamma_{FYOS} = \gamma_{GYOS}$	–	0.000	0.000	–	0.886	0.669
$\gamma_{FLX} = \gamma_{GLX}$	–	0.000	0.001	–	0.012	0.020

Notes: * (**, ***) Significant at 10% (5%, 1%). Weighted OLS using weights provided by the GSOEP. Standard errors, which are reported in parentheses, are adjusted in order to take repeated observations into account. The regression further includes information on the individual's marital status and number of children, and dummies for state of residence, industry of employment and year of observation. *FYOS* and *FLX*, respectively, refer to education and labor market experience obtained in the home country, while *GYOS* and *GLX* refer to education and labor market experience accumulated in Germany.

Table 2: Returns to Human Capital, by Region of Origin

	A. MALES						
	Natives	All Immigrants	OECD	Turkey	East Europe/ fSU	Ex- Yugoslavia	Others
Education abroad	-	0.043*** (0.005)	0.046*** (0.009)	0.024** (0.010)	0.050*** (0.010)	0.029*** (0.010)	0.028* (0.016)
Education in Germany	0.072*** (0.002)	0.052*** (0.006)	0.052*** (0.010)	0.030*** (0.011)	0.043*** (0.017)	0.033*** (0.012)	0.057*** (0.020)
Experience abroad	-	0.001 (0.001)	0.007** (0.003)	-0.007*** (0.003)	0.002 (0.002)	-0.010*** (0.003)	0.010 (0.007)
Experience in Germany	0.009*** (0.001)	0.013*** (0.002)	0.004 (0.003)	0.015*** (0.002)	0.018*** (0.004)	0.013*** (0.002)	0.016*** (0.005)
Constant	1.127*** (0.049)	1.374*** (0.121)	1.440*** (0.249)	1.335*** (0.170)	1.286*** (0.196)	1.703*** (0.174)	1.493*** (0.281)
R-squared	0.353	0.304	0.440	0.319	0.306	0.351	0.532
Observations	39,330	12,491	4,507	3,756	1910	2077	241
Tests (p-value):							
$\gamma_{FYOS} = \gamma_{GYOS}$	-	0.025	0.347	0.221	0.540	0.541	0.013
$\gamma_{FLX} = \gamma_{GLX}$	-	0.000	0.475	0.000	0.000	0.000	0.462

Table 2 continued: Returns to Human Capital, by Region of Origin

	B. FEMALES						
	Natives	All Immigrants	OECD	Turkey	East Europe/ fSU	Ex- Yugoslavia	Others
Education abroad	–	0.069*** (0.012)	0.100*** (0.018)	0.097*** (0.012)	0.075*** (0.014)	0.014 (0.021)	-0.038 (0.036)
Education in Germany	0.067*** (0.005)	0.072*** (0.013)	0.100*** (0.019)	0.110*** (0.014)	0.087*** (0.016)	0.012 (0.020)	-0.008 (0.031)
Experience abroad	–	0.004** (0.002)	0.009** (0.004)	0.001 (0.004)	0.006 (0.004)	-0.006 (0.005)	0.003 (0.011)
Experience in Germany	0.006*** (0.001)	0.014*** (0.002)	0.014*** (0.003)	0.024*** (0.004)	0.014*** (0.004)	0.006 (0.005)	0.014 (0.009)
Constant	1.040*** (0.086)	0.880*** (0.176)	0.702** (0.294)	0.606*** (0.197)	0.692*** (0.195)	1.489*** (0.280)	0.863 (0.540)
R-squared	0.361	0.318	0.432	0.587	0.337	0.332	0.750
Observations	12,812	4,373	1,697	735	796	1046	99
Tests (p-value):							
$\gamma_{FYOS} = \gamma_{GYOS}$	–	0.615	0.992	0.120	0.210	0.865	0.054
$\gamma_{FLX} = \gamma_{GLX}$	–	0.000	0.227	0.001	0.054	0.020	0.165

Notes: * (**, ***) Significant at 10% (5%, 1%). The OECD category excludes Turkey and other non-high income member nations while East Europe excludes countries from former Yugoslavia. See further notes in Table 1.

Table 3: Returns to Human Capital, by Immigration Cohort

A. MALES				
	All	Pre-1974	1974-1988	1989-2006
	Immigrants			
Education abroad	0.0439*** (0.0054)	0.0422*** (0.0086)	0.0499*** (0.0061)	0.0532*** (0.0095)
Education in Germany	0.0524*** (0.0060)	0.0509*** (0.0086)	0.0621*** (0.0097)	0.0439** (0.0214)
Experience abroad	0.0023 (0.0015)	-0.0011 (0.0026)	0.0008 (0.0021)	-0.0002 (0.0024)
Experience in Germany	0.0115*** (0.0017)	0.0109** (0.0044)	0.0208*** (0.0050)	0.0383*** (0.0062)
Constant	1.2820*** (0.1341)	1.4679*** (0.2004)	0.9029*** (0.1585)	1.2861*** (0.3152)
R-squared	0.311	0.353	0.445	0.324
Observations	12,491	7,816	2,816	1,859
Tests (p-value):				
$\gamma_{FYOS} = \gamma_{GYOS}$	0.028	0.169	0.104	0.615
$\gamma_{FLX} = \gamma_{GLX}$	0.000	0.026	0.001	0.000
B. FEMALES				
	All	Pre-1974	1974-1988	1989-2006
	Immigrants			
Education abroad	0.0759*** (0.0125)	0.0805*** (0.0179)	0.0695*** (0.0114)	0.0393*** (0.0152)
Education in Germany	0.0797*** (0.0130)	0.0859*** (0.0212)	0.0601*** (0.0147)	0.0167 (0.0240)
Experience abroad	0.0057** (0.0023)	0.0065 (0.0042)	-0.0016 (0.0033)	0.0011 (0.0040)
Experience in Germany	0.0130*** (0.0022)	0.0038 (0.0064)	0.0247*** (0.0067)	0.0242** (0.0100)
Constant	0.7330*** (0.1951)	0.8678*** (0.3192)	0.1343 (0.2540)	1.1444*** (0.3001)
R-squared	0.328	0.380	0.487	0.231
Observations	4,373	2,724	1,130	519
Tests (p-value):				
$\gamma_{FYOS} = \gamma_{GYOS}$	0.547	0.606	0.332	0.227
$\gamma_{FLX} = \gamma_{GLX}$	0.007	0.761	0.000	0.041

Notes: * (**, ***) Significant at 10% (5%, 1%). See further notes in Table 1.

Table 4: Returns to Human Capital:
Foreign versus Domestically-acquired Skills, Permanent and Temporary Immigrants

	Males	Females
Education abroad	0.0364*** (0.0106)	0.0948*** (0.0187)
Education in Germany	0.0292** (0.0149)	0.0904*** (0.0211)
Experience abroad	-0.0037 (0.0034)	0.0117** (0.0046)
Experience in Germany	0.0075*** (0.0027)	0.0138*** (0.0048)
Temporary	-0.4354* (0.2453)	0.1204 (0.3509)
Education abroad \times Temporary	0.0297* (0.0175)	-0.0165 (0.0206)
Education Germany \times Temporary	0.0351 (0.0232)	-0.0028 (0.0283)
Experience abroad \times Temporary	0.0127** (0.0056)	-0.0010 (0.0073)
Experience Germany \times Temporary \times 100	0.2834 (0.4499)	0.1648 (0.6859)
Constant	1.7980*** (0.1916)	1.0850*** (0.4176)
R-squared	0.348	0.311
Observations	2,953	911

Notes: * (**, ***) Significant at 10% (5%, 1%). Temporary migrants are defined as immigrants who do not wish to stay permanently in Germany in the *last three years* from the survey year.

Table 5: Complementarity of Foreign and Domestic Human Capital by Region of Origin

	A. MALES					
	All	East Europe	Ex-	Yugoslavia	Others	
	Immigrants	OECD	Turkey	fSU		
Education abroad	0.0340*** (0.0082)	0.0384*** (0.0108)	0.0033 (0.0125)	0.0434*** (0.0132)	0.0063 (0.0217)	0.0205 (0.0216)
Education in Germany	0.0497*** (0.0066)	0.0499*** (0.0097)	0.0253*** (0.0104)	0.0481** (0.0213)	0.0263* (0.0142)	0.0212 (0.0165)
Experience abroad	0.0053* (0.0029)	0.0095* (0.0056)	0.0046 (0.0061)	0.0015 (0.0042)	-0.0034 (0.0067)	0.0450*** (0.0131)
Experience in Germany	0.0100** (0.0045)	0.0023 (0.0057)	0.0097** (0.0049)	0.0132 (0.0104)	0.0057 (0.0085)	0.0361*** (0.0102)
Education abroad × Education Germany	0.0007 (0.0012)	0.0024 (0.0028)	0.0009 (0.0019)	-0.0028 (0.0030)	0.0008 (0.0024)	0.0047*** (0.0016)
Education abroad × Experience Germany	0.0004 (0.0004)	0.0003 (0.0005)	0.0010* (0.0006)	0.0005 (0.0009)	0.0010 (0.0008)	-0.0009 (0.0008)
Experience abroad × Experience Germany	-0.0002 (0.0002)	-0.0001 (0.0003)	-0.0006** (0.0003)	-0.0000 (0.0004)	-0.0003 (0.0003)	-0.0032*** (0.0009)
Constant	1.4354*** (0.1198)	1.5039*** (0.2287)	1.4145*** (0.1684)	1.3556*** (0.1996)	1.8837*** (0.2503)	1.4717*** (0.2842)
R-squared	0.306	0.441	0.324	0.309	0.354	0.615
Observations	12,491	4,507	3,756	1,910	2,077	241

Table 5 continued: Complementarity of Foreign and Domestic Human Capital by Region of Origin

	B. FEMALES					
	All	East Europe/ fSU	Yugoslavia	Ex-	Others	
	Immigrants	OECD	Turkey	fSU	Yugoslavia	
Education abroad	0.0786*** (0.0129)	0.0837*** (0.0159)	0.0878*** (0.0196)	0.0994*** (0.0253)	-0.0400 (0.0426)	-0.0412 (0.0542)
Education in Germany	0.0734*** (0.0118)	0.0812*** (0.0150)	0.1082*** (0.0147)	0.0961*** (0.0168)	-0.0260 (0.0304)	-0.0365 (0.0453)
Experience abroad	0.0037 (0.0043)	0.0204*** (0.0076)	0.0014 (0.0073)	-0.0038 (0.0065)	-0.0039 (0.0088)	-0.0382 (0.0462)
Experience in Germany	0.0176*** (0.0052)	0.0170** (0.0071)	0.0200*** (0.0076)	0.0228*** (0.0083)	-0.0139 (0.0180)	0.0013 (0.0136)
Education abroad × Education Germany	0.0005 (0.0026)	0.0078** (0.0038)	-0.0032 (0.0029)	-0.0031 (0.0020)	0.0051 (0.0033)	0.0591*** (0.0160)
Education abroad × Experience Germany	-0.0005 (0.0006)	-0.0000 (0.0006)	0.0004 (0.0006)	-0.0014 (0.0009)	0.0023 (0.0017)	-0.0018 (0.0014)
Experience abroad × Experience Germany	0.0001 (0.0003)	-0.0007** (0.0003)	-0.0001 (0.0004)	0.0009* (0.0005)	-0.0002 (0.0004)	0.0046 (0.0032)
Constant	0.8045*** (0.1646)	0.7614*** (0.2431)	0.7264*** (0.2342)	0.4505* (0.2699)	1.9625*** (0.4590)	1.2822 (0.8498)
R-squared	0.319	0.448	0.589	0.353	0.340	0.784
Observations	4,373	1,697	735	796	1,046	99

Notes: * (**, ***) Significant at 10% (5%, 1%).

Table 6: Returns to Schooling by Level and Region of Origin

	A. MALES						
	Natives	All Immigrants	OECD	Turkey	East Europe/ ISU	Ex- Yugoslavia	Others
Experience abroad	-	0.001 (0.002)	0.005* (0.003)	-0.009*** (0.003)	0.001 (0.002)	-0.011*** (0.003)	0.006 (0.007)
Experience in Germany	0.010*** (0.001)	0.012*** (0.002)	0.004 (0.003)	0.015*** (0.002)	0.017*** (0.003)	0.013*** (0.002)	0.016*** (0.004)
Primary	-0.032 (0.032)	0.035** (0.014)	0.017 (0.022)	-0.005 (0.021)	0.178*** (0.051)	0.012 (0.024)	-0.241** (0.095)
Secondary	0.107*** (0.010)	0.023 (0.020)	0.060 (0.040)	0.040 (0.024)	-0.066 (0.042)	0.024 (0.035)	0.078 (0.108)
University	0.051*** (0.006)	0.098*** (0.014)	0.082** (0.038)	0.061* (0.035)	0.107** (0.042)	0.137*** (0.032)	0.045 (0.041)
Primary abroad	-	-0.007 (0.006)	0.004 (0.011)	-0.003 (0.006)	-0.016 (0.013)	-0.004 (0.010)	-0.045 (0.030)
Secondary abroad	-	0.007 (0.020)	-0.002 (0.043)	-0.019 (0.027)	0.091** (0.038)	-0.002 (0.036)	0.061 (0.110)
University abroad	-	-0.046* (0.025)	-0.059 (0.051)	0.008 (0.077)	-0.034 (0.048)	-0.069 (0.043)	-0.144** (0.064)
Constant	1.987*** (0.292)	1.540*** (0.157)	1.686*** (0.291)	1.648*** (0.203)	0.332 (0.460)	1.877*** (0.238)	4.112*** (0.834)
R-squared	0.357	0.309	0.444	0.324	0.321	0.358	0.566
Observations	39,330	12,491	4,507	3,756	1,910	2,077	241

Table 6 continued: Returns to Schooling by Level and Region of Origin

	B. FEMALES						
	All		East Europe		Ex-		Others
	Natives	Immigrants	OECD	Turkey	fSU	Yugoslavia	
Experience abroad	-	0.003 (0.002)	0.006 (0.004)	-0.001 (0.004)	0.008** (0.004)	-0.007 (0.005)	-0.003 (0.008)
Experience in Germany	0.007*** (0.001)	0.012*** (0.002)	0.011*** (0.003)	0.019*** (0.005)	0.014*** (0.003)	0.005 (0.004)	-0.005 (0.006)
Primary	0.004 (0.058)	0.027 (0.019)	0.048* (0.026)	0.056** (0.027)	0.001 (0.052)	0.015 (0.031)	1.285*** (0.465)
Secondary	0.118*** (0.013)	0.061** (0.024)	0.001 (0.043)	0.059* (0.030)	0.135*** (0.041)	0.046 (0.033)	0.404*** (0.068)
University	0.031*** (0.010)	0.024 (0.047)	0.257*** (0.075)	-0.039 (0.027)	-0.030 (0.032)	-0.074 (0.058)	-0.319*** (0.063)
Primary abroad	-	-0.014* (0.008)	-0.012 (0.010)	-0.026*** (0.010)	-0.034** (0.016)	0.026 (0.020)	0.029** (0.014)
Secondary abroad	-	-0.009 (0.026)	0.050 (0.048)	0.039 (0.037)	-0.031 (0.039)	-0.087** (0.034)	-0.408*** (0.099)
University abroad	-	0.161*** (0.062)	-0.097 (0.106)	0.279*** (0.053)	0.135** (0.062)	0.535*** (0.069)	0.394*** (0.120)
Constant	1.530*** (0.515)	1.431*** (0.183)	1.472*** (0.279)	1.299*** (0.320)	1.623*** (0.501)	1.366*** (0.258)	-10.295** (4.266)
R-squared	0.369	0.345	0.470	0.608	0.372	0.372	0.813
Observations	12,812	4,373	1,697	735	796	1,046	99

Notes: * (**, ***) Significant at 10% (5%, 1%). Education categories: *Primary* (years 1-9), *Secondary* (years 10-13) and *University* or post-secondary (years 14+). See further notes in Table 2.

Appendix

Table A1

DEFINITION OF VARIABLES

Variable	Description
Immigrant	Dummy-variable that takes the value 1 if the respondent is born outside Germany and immigrated after 1948
Log wages	Real hourly labor earnings of the individual (in log), includes wages and salary from all employment
Education	Total number of completed years of schooling
Experience	Total number of years of potential labor market experience, computed as current age - years of schooling - 6
Education abroad	Total number of years of schooling completed outside Germany; assumed 0 for natives
Education in Germany	Total number of years of schooling completed in Germany
Experience abroad	Total number of years of experience outside Germany, assumed 0 for natives
Experience in Germany	Total number of years of experience in Germany
YSM	Number of years since migration to Germany
Temporary	Dummy-variable that takes the value 1 if the respondent is an immigrant and reports that he/she does not wish to stay in Germany permanently over the three years preceding the survey year
<i>Region of Origin</i>	
OECD	Dummy-variable that takes the value 1 if the respondent was born in an OECD member-nation, except from Turkey or other non-high income OECD member-nations (Mexico, Poland, Czech Republic, Slovakia, Hungary)
Turkey	Dummy-variable that takes the value 1 if the respondent was born in Turkey
East Europe/fSU	Dummy-variable that takes the value 1 if the respondent was born in Eastern Europe, except from ex-Yugoslavia
Ex-Yugoslavia	Dummy-variable that takes the value 1 if the respondent was born in an ex-Yugoslavian country
Others	Dummy-variable that takes the value 1 if the respondent was born in a country other than the regions specified above
<i>Education Categories</i>	
Primary	Schooling years 1-9
Secondary	Schooling years 10-13
University or post-secondary	Schooling years 14 and above

Table A2
DESCRIPTIVE STATISTICS, MALE FULL-TIME WORKERS, 1984-2007

	Natives	All Immigrants	High Income OECD	Turkey	East Europe/fSU	Ex-Yugoslavia	Others
Age	43.47 (0.19)	43.49 (0.40)	45.88 (0.81)	40.12 (0.63)	42.85 (0.72)	46.51 (0.87)	41.99 (1.65)
Married	0.89 (0.00)	0.96 (0.01)	0.95 (0.01)	0.97 (0.01)	0.97 (0.01)	0.96 (0.02)	0.86 (0.06)
Log Hourly wage	2.62 (0.01)	2.49 (0.02)	2.58 (0.04)	2.45 (0.02)	2.47 (0.03)	2.41 (0.03)	2.39 (0.07)
Age at migration	–	22.90 (0.44)	20.96 (0.88)	19.85 (0.58)	28.02 (0.82)	24.92 (0.83)	22.60 (2.30)
YSM	–	20.58 (0.42)	24.92 (0.93)	20.27 (0.42)	14.84 (0.75)	21.59 (0.59)	19.38 (1.65)
1989 to 2006	–	0.50 (0.02)	0.68 (0.05)	0.48 (0.04)	0.18 (0.04)	0.74 (0.04)	0.51 (0.10)
1974 to 1988	–	0.30 (0.02)	0.24 (0.05)	0.44 (0.04)	0.33 (0.05)	0.09 (0.04)	0.25 (0.07)
Pre-1974	–	0.20 (0.01)	0.09 (0.02)	0.08 (0.02)	0.49 (0.04)	0.16 (0.03)	0.24 (0.07)
Education abroad	–	9.37 (0.21)	9.20 (0.53)	8.27 (0.23)	10.78 (0.33)	9.40 (0.28)	9.67 (1.03)
Education in Germany	12.20 (0.06)	1.54 (0.21)	1.95 (0.56)	1.72 (0.20)	0.98 (0.21)	0.78 (0.24)	2.81 (0.91)
Experience abroad	–	7.71 (0.35)	6.01 (0.66)	5.71 (0.48)	11.36 (0.73)	9.66 (0.68)	7.09 (1.72)
Experience in Germany	25.27 (0.19)	18.87 (0.39)	22.72 (0.89)	18.42 (0.39)	13.74 (0.66)	20.68 (0.61)	16.42 (1.27)
Total Primary	8.99 (0.00)	8.81 (0.02)	8.74 (0.04)	8.75 (0.04)	8.98 (0.01)	8.71 (0.06)	8.95 (0.04)
Total Secondary	2.36 (0.02)	1.67 (0.07)	1.67 (0.16)	1.14 (0.09)	2.30 (0.11)	1.36 (0.12)	2.52 (0.23)
Total University	0.85 (0.04)	0.43 (0.08)	0.75 (0.22)	0.10 (0.03)	0.47 (0.11)	0.10 (0.06)	1.01 (0.33)
Primary abroad	–	7.77 (0.13)	7.48 (0.32)	7.49 (0.17)	8.35 (0.16)	8.15 (0.19)	7.21 (0.71)
Secondary abroad	–	1.31 (0.08)	1.28 (0.17)	0.71 (0.09)	2.02 (0.13)	1.15 (0.12)	1.97 (0.29)
University abroad	–	0.29 (0.06)	0.45 (0.15)	0.06 (0.03)	0.41 (0.11)	0.09 (0.06)	0.49 (0.17)
Job Tenure	14.32 (0.22)	11.36 (0.37)	14.41 (0.70)	11.38 (0.57)	7.55 (0.64)	11.69 (0.76)	8.00 (1.36)
Observations	39330	12491	4507	3756	1910	2077	241

NOTE.– Weighted sample using weights provided by the GSOEP.

Table A3
DESCRIPTIVE STATISTICS, FEMALE FULL-TIME WORKERS, 1984-2007

	Natives	All Immigrants	High Income OECD	Turkey	East Europe/fSU	Ex-Yugoslavia	Others
Age	39.792 (0.346)	42.585 (0.573)	43.228 (0.999)	39.971 (1.205)	42.292 (1.344)	44.729 (0.699)	42.489 (2.344)
Married	0.740 (0.012)	0.919 (0.015)	0.881 (0.040)	0.999 (0.001)	0.911 (0.023)	0.918 (0.025)	0.895 (0.067)
Log Hourly wage	2.340 (0.016)	2.220 (0.025)	2.205 (0.061)	2.182 (0.068)	2.280 (0.040)	2.192 (0.029)	2.174 (0.081)
Age at migration	–	21.488 (0.564)	20.321 (1.070)	18.513 (1.029)	24.307 (1.119)	22.844 (0.920)	15.973 (3.017)
YSM	–	21.098 (0.611)	22.907 (0.909)	21.457 (0.611)	17.985 (1.406)	21.885 (0.753)	26.516 (4.300)
Temporary migrant	–	0.125 (0.015)	0.216 (0.035)	0.190 (0.046)	0.013 (0.005)	0.134 (0.028)	0.056 (0.036)
1989 to 2006	–	0.534 (0.031)	0.662 (0.052)	0.529 (0.081)	0.268 (0.058)	0.773 (0.057)	0.632 (0.146)
1974 to 1988	–	0.275 (0.028)	0.234 (0.045)	0.451 (0.081)	0.310 (0.050)	0.156 (0.051)	0.083 (0.060)
Pre-1974	–	0.191 (0.022)	0.103 (0.036)	0.019 (0.011)	0.423 (0.054)	0.071 (0.030)	0.285 (0.121)
Education abroad	–	8.753 (0.263)	8.285 (0.512)	7.686 (0.656)	9.933 (0.450)	9.067 (0.160)	6.624 (2.000)
Education in Germany	11.873 (0.078)	1.591 (0.225)	1.572 (0.346)	1.712 (0.507)	1.843 (0.409)	0.315 (0.122)	4.417 (1.880)
Experience abroad	–	6.927 (0.446)	6.274 (1.005)	5.014 (0.654)	8.626 (0.811)	7.795 (0.970)	3.584 (1.515)
Experience in Germany	21.919 (0.368)	19.314 (0.566)	21.097 (0.975)	19.558 (0.785)	15.890 (1.296)	21.552 (0.753)	21.864 (3.365)
Total Primary	8.985 (0.005)	8.640 (0.043)	8.399 (0.087)	8.410 (0.150)	8.966 (0.015)	8.583 (0.086)	8.972 (0.022)
Total Secondary	2.275 (0.042)	1.377 (0.093)	1.036 (0.189)	0.844 (0.268)	2.278 (0.135)	0.763 (0.129)	1.811 (0.316)
Total University	0.613 (0.046)	0.327 (0.076)	0.422 (0.220)	0.144 (0.133)	0.532 (0.116)	0.037 (0.019)	0.258 (0.186)
Primary abroad	–	7.531 (0.177)	7.225 (0.289)	7.019 (0.387)	7.809 (0.292)	8.450 (0.096)	5.916 (1.797)
Secondary abroad	–	1.009 (0.094)	0.781 (0.192)	0.525 (0.267)	1.784 (0.161)	0.603 (0.109)	0.667 (0.248)
University abroad	–	0.213 (0.055)	0.279 (0.140)	0.142 (0.133)	0.340 (0.095)	0.014 (0.014)	0.040 (0.031)
Job Tenure	10.479 (0.297)	9.826 (0.497)	10.791 (0.884)	10.278 (0.955)	7.646 (0.850)	11.422 (0.885)	10.645 (4.674)
Observations	12812	4373	1697	735	796	1046	99

NOTE.– Weighted sample using weights provided by the GSOEP.