Immigrants' Earnings and Workplace Characteristics *

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Abstract

This paper studys the determinants of earnings among foreign workers in Portugal. We use data from a matched employer-employee dataset that covers all wage-earners in the Portuguese economy. Despite the caveats inherent to the use of cross-sectional data, this type of dataset allows us to study the importance of the workplace as a determinant of the economic progress of immigrants. We find evidence of promotions being used to reallocate foreign workers within matches, indicating that occupational upgrading takes place with or without job switching. "Ethnic goods" in the workplace are also important determinants of immigrants' earnings. This result translates to the workplace the importance of ethnic concentration in residential areas previously documented in the literature. Quantile regression shows that the wage disadvantage of immigrants varies enormously along the wage distribution (it is null at the right tail, and maximum at the 3^{rd} decile). At the left-tail of the wage distribution, foreign workers are effectively protected by minimum wage provisions. Returns to schooling and country-of-origin effects also vary along the wage distribution.

KEYWORDS: Immigrants' earnings, quantile regression, matched employer-employee data

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1 Introduction

In the very heart of today's immigration debate lies the question of how well immigrants fare at destination. The answer to this question crucially determines the social and economic consequences of immigration for receiving countries.

The comparison between successive cohorts of immigrants to the United States unequivocally demonstated the importance of skills in the process of shaping the economic performance of immigrants both in the immediate post-migration period and over the long-run (see Borjas, 1999, e.g.). Yet, it is also well-know that human capital accumulated at home, through schooling or labor market experience, instantaneously looses value as individuals cross national borders. The magnitude of this loss is significantly influenced by factors such as the economic and cultural similarity between the source and destination countries (Chiswick, 1979). The larger those differences are the more immigrants lack country-specific skills and information which harms their immediate labor market prospects. Alone, lower returns to foreign human capital were found to fully explain the earnings disadvantage of immigrants as compared to those earned by similar native workers (Friedberg, 2000). The difficulty of finding jobs in high-skilled occupations leads high-skilled immigrants to accept job offers in low skilled occupations, thereby magnifying the depreciation of the human capital acquired at home.

Occupational downgrading may be optimal if combined with on-the-job search which, with time, permits them to find better matches and receive higher wages (Weiss et al., 2003). Mobility up the occupational ladder alongside with rising returns to imported and local human capital are the three major sources of wage growth for immigrants. The national origin of an individual's human capital (Friedberg, 2000), language skills (Chiswick and Miller, 2002), training and experience acquired locally (Cohen and Eckstein, 2002) and clustering into ethnic enclaves (Borjas, 2000), all have been found to play a role in the process of economic assimilation of immigrants. Yet, although it narrows over time, the wage gap between immigrants and natives never closes completely (see Borjas, 1999, for

a review).

This paper is concerned with the analysis of the earnings of immigrants. We focus on the case of immigrants into the Portuguese labor market. In the last decades, Portugal which was, as other West European countries, a region of emigration, turned to a net-immigration country. As that happened, the geographic origin of immigrants to the country grew more and more diversified with increasing numbers of people arriving from Eastern Europe or Asia.[1] Yet, alongside with Germany, Portugal is the European country where immigrants fare the best relative to natives (Adsera and Chiswick, 2005).

The data we use come from a matched employer-employee dataset that contains information on all wage-earners working in the private sector, 23,163 (or 1.1 percent of the total) of which are non-national citizens. Comparing with the type of data more commonly used in the study of the economic performance of immigrants, our data has the advantage of permiting us to incorporate the characteristics of the workplace in our study, while still being able to consider most (but no all) other customary variables, the major exception being time since arrival in the country. [2] Among others, we are able to analyse the role of ethnic segregation at the workplace level. The same reasons why we expect that residential segregation may have an impact on wages are also valid for workplace segregation although the latter has not been given the attention it might deserve. Within-match occupational upgrading is also discussed and the probability of promotion of immigrants and natives are studied.

The paper is outlined as follows. Section 2 describes the dataset. In section 3 an estimate of the wage disadvantage of immigrants is obtained and its variation over the entire distribution of wages is analyzed - the importance of minimum wage legislation at the left-tail of the distribution is ilustrated. In section 4 we discuss the determinants of immigrants. Among other, ethnic concentration in the

[1] Portugal's only experience as a region of immigration occured in the mid-1970s following the independence of the country's colonies in Africa (see Carrington and Lima, 1996).

[2] The importance of employer characteristics for earnings was documented before. Because we are using a single cross-section we cannot avoid the "cohort quality" issue and therefore we are not able identify separately age and cohort effects. See for example, Groshen (1990) or Abowd et al.(1999).

workplace is found to play a significant role. Quantile regression is used in section 5 to uncover changes in the effects of the covariates on the earnings of immigrants over the wage distribution. Section 6 concludes.

2 The Data

The data set used in this study comes from *Quadros de Pessoal* (*QP*). *QP* is an annual mandatory employment survey collected by the Portuguese Ministry of Employment, that covers virtually all establishments with wage earners.[3] Each year every establishment with wage earners is legally obliged to fill in a standardized questionnaire. By law, the questionnaire is made available to every worker in a public space of the establishment. This requirement facilitates the work of the services of the Ministry of Employment that monitor compliance of firms with the law (e. g., illegal work). The administrative nature of the data and its public availability implies a high degree of coverage and reliability.

Reported data cover the establishment itself (location, economic activity and employment), the firm (location, economic activity, employment, sales and legal framework) and each of its workers (gender, age, education, skill, occupation, tenure, earnings and duration of work). The information on earnings is very complete. It includes the base wage (gross pay for normal hours of work), seniority payments, regular benefits, irregular benefits and overtime pay, as well as the mechanism of wage bargaining. Information on normal and overtime hours of work is also available. In fact, one of the main advantages of this data set is to have information at both individual and firm level and to match workers with their employers. Previous empirical research on immigrant wage gaps has been based on individual or household data sets with little information on employers attributes.

Of course, this data set also has some disadvantages. The most important is the impossibility to have information on a panel of individuals. Even though the Ministry of Employment has been conducting this survey since 1982, the 2000 wave is the first one to collect information on worker's nationality. Thus, in our

[3] Public administration and non-market services are excluded.

analysis we will use information solely for the year of 2000.

The *QP* file for 2000 includes 2,688,957 registers. We restricted our sample to non-apatrid workers aged between 16-70 years. Thus, and after excluding those observations with missing values on the explanatory variables and the outliers in wages (1% top and bottom observations), we obtained a sample of 2,195,073 workers.[4] Of this total, 23,163 do not have portuguese nationality and are classified as immigrants. Table 1 presents the sample means for the two groups of workers: immigrants and native-born workers. The sample means for the main groups of immigrants in Portugal accordding to the area of origin are also reported. As can be seen in Table 1, more than 40% of immigrant workers come from former portuguese colonies such as Angola, Mozambique, Cape Verde, Guinea-Bissau, São Tomé & Príncipe and East-Timor. Twenty-two percent are from some of the former Soviet Union (Russia, Ukraine, Moldova and others), 16% from developed countries (Western Europe, USA, Canada and Japan), 11% from Brasil and the remainder 9% are from a wide range of countries [5]

[4] When a worker is present in the *QP* file for more than one time in 2000, the register in the plant in which he had worked a higher number of hours was selected.

[5] See Appendix 1 for the definition of nationalities' groups.

Table 1: Sample means, year 2000

Variables	Natives	All Immigrants	Groups of Immigrants				
			EU+Oth	Eastern Europe	Africa +Tim	Brasil	Others
Age (in years)	36.0	34.0	35.6	33.7	34.7	30.7	33.2
Tenure (in years)	6.8	2.4	5.0	0.2	2.2	1.1	2.4
Education (in years)	7.5	7.6	10.8	6.6	6.5	9.3	7.3
Proportion of Female	0.43	0.44	0.40	0.10	0.53	0.37	0.48
Qualification Levels (%)							
Manager and Highly Professional	0.039	0.038	0.136	0.006	0.011	0.045	0.032
Professional	0.030	0.026	0.089	0.004	0.013	0.025	0.018
Supervisors	0.039	0.019	0.037	0.002	0.015	0.020	0.020
Highly Skilled and Skilled	0.510	0.430	0.508	0.385	0.378	0.458	0.489
Semi-skilled and Unskilled	0.292	0.402	0.139	0.513	0.510	0.320	0.361
Apprentices	0.070	0.061	0.045	0.081	0.056	0.098	0.057
Non-defined	0.020	0.024	0.045	0.009	0.018	0.034	0.024
Industry (%)							
Agriculture & fishing	0.017	0.010	0.015	0.025	0.005	0.006	0.009
Mining & quarrying	0.006	0.003	0.004	0.010	0.001	0.001	0.003
Manufacturing	0.330	0.175	0.323	0.227	0.143	0.156	0.112
Electricity, gas & water	0.007	0.001	0.002	-	0.002	0.001	0.001
Construction	0.112	0.194	0.063	0.489	0.234	0.116	0.100
Wholesale, retail trade & hotels	0.263	0.223	0.242	0.079	0.192	0.319	0.298
Transport, storage & communications	0.063	0.026	0.077	0.007	0.020	0.016	0.015
Banking, insurance & services to firms	0.117	0.289	0.109	0.143	0.350	0.307	0.364
Community, social & personal services	0.084	0.079	0.165	0.021	0.052	0.078	0.099
Plant Size (in logs)	3.54	4.06	3.98	3.45	4.40	3.87	3.82
Hourly Wage (in logs)	6.41	6.36	6.82	6.16	6.27	6.36	6.30
Number of Observations	2,171,910	23,163	3,633	2,403	10,022	2,424	4,681

Notes: (i) Source: *QP* 2000; (ii) the hourly wage is in 2000 PTE (escudo); 1 EURO≡200.482 PTE;

(iii) EU+Oth: Western Europe,North America and Japan;

Eastern Europe: New EU member-states and Former Soviet Union;

Africa+Tim: Angola, Cape Verde, Guinea-Bissau, Mozambique, São Tomé & Príncipe, and East-Timor.

For the definition of each sub-region, see Appendix 1.

In general, immigrant workers are slightly younger, with lower tenure and qualifications, but with approximately the same schooling as natives (7.5 years). Educational attainment is highest for EU immigrants (10.8 years) and lowest for those arriving from the Portuguese-spaking nations in Africa and from East-Timor (Africa+Tim) (6.5 years). Average tenure among natives is 6.8 years, while it is only 2.4 years for immigrants. 46 percent of all immigrants are, on average, employed in low skill occupations, compared to 36 percent of native workers. The main exception are immigrants from Western Europe, U.S.A. and Japan for whom that percentage does not exceed 18.5 percent.

Immigrants from the EU+Oth group have the highest hourly wages (6.82) - even higher than those of portuguese natives (6.41) - while immigrants from other regions have wages that are considerably lower than their native counterparts. Concerning promotions, in 2000 immigrant workers were promoted at a higher rate than their native counterparts (19.8 percent against 15.5 percent, on average).

More than one half of all immigrants from the EU+Oth group are employed in the manufacturing and wholesale, retail trade & hotels sectors, whereas 62 percent of the Brazilian immigrants are employed in the wholesale, retail trade & hotels sector and in the sub-sector of services supplied to firms.[6] Immigrants from Africa+Tim are also largely employed in the sub-sector of services supplied to firms (more than 30 percent) and in construction (23.4 percent). About one half of all immigrants from Eastern Europe are employed in the construction sector (48.9 percent).

3 The earnings disadvantage of immigrants

The standard approach to the study of the earnings of immigrants is based on the estimation of a human capital earnings function (Mincer, 1974) augmented to include immigrants experience in the host labor market (Chiswick, 1978) and whenever available some measure of the destination language fluency, minority

[6] In the one-digit sector of banking, insurance & services supplied to firms, 82 percent of the immigrant workers are employed in firms of temporary work and firms of cleaning services.

language concentration in residential areas and indicators of the country of origin of the immigrant (e.g., Chiswick and Miller, 2002).

As explained before, the dataset we use is not without inconvenients the most notorious being the lack of information about the year of arrival to Portugal for which reason different cohorts are not separable. A few compromises have to be made although we believe that none is too serious to cloud the interpretation of the results we will look at. One such compromise consists in not distinguishing total experience from experience acquired in the Portuguese labor market - we simply use an age variable (and its square) as a proxy for total labor market experience, independently of where that experience was accumulated.

The basic wage equation is defined as:

$$\ln W_i = \beta_0 + \beta_1 X_i + \beta_2 Z_{ij} + \varepsilon_i \qquad (1),$$

where $\ln W_i$ is the natural log of the average hourly wage for individual i, defined as the ratio between the base wage and the total number of hours usually worked. X_i is a vector of individual characteristics such as gender, immigrant status, age (and its square), education levels, tenure (and its square) and qualification level. Z_{ij} includes a set of firms' characteristics such as size and industry. β_0 is a constant term and ε_i is a disturbance term with zero mean and constant variance.

The variable *male* takes the value one for males and zero for females. The variable *immigrant* is a dummy variable for immigrant status (1 if immigrant; 0 otherwise). The variable *age* of the individual (and its square: *age squared*) is measured in years. The variable *tenure* (and its square: *tenure squared*) is defined as the number of years with the current employer. A set of dummies are used for the education and qualification levels. Six categories are considered for the education levels: less than preparatory (the omitted category), preparatory, lower secondary, upper secondary, college and non-defined (a residual category). Seven categories are defined for the qualification levels: manager and highly professional, professional, supervisors, highly skilled and skilled, semi-skilled and unskilled, apprentices (the omitted category) and non-defined (a residual category). Plant size

is defined as the natural log of total employment at the plant level. A set of industry dummies (one-digit) are also included.[7]

The empirical analysis begins with the estimation of the earnings equation for the sample of immigrants and natives pooled together (first column in Table 2). For the moment, our interest is on the coefficient of the immigrant status variable. The corresponding estimate is -0.026. This simply says that immigrant workers earn hourly wages which are inferior by approximately 2.6 percent than those earned by similar native workers. This estimate is not directly comparable with those available for other immigrants in other countries because we are not conditioning on the duration of stay in the host country. However, considering the fact that immigration to Portugal is recent, this result suggests that immigrants do fare better in the Portuguese labor market than in other (European) countries which is consistent with the results obtained by Adsera and Chiswick (2005) for Portugal.[8]

[7] At one-digit level there are nine sectors according to the Portuguese Classification of Economic Activities (CAE). The omitted category is manufacturing.

[8] Using data from the European Community Household Panel, Adsera and Chiswick (2005) put the difference between immigrants' earnings at arrival and natives in Portugal at -14.4 percent, the lowest they obtain for the 15 European Union countries they consider.

Table 2: OLS regression results

Dependent variable: log hourly wage

Explanatory variables	All sample	Natives	Immigrants
	(1)	(2)	(3)
Age	0.024	0.024	0.014
	(201.1)	(201.7)	(11.2)
Age squared	-0.0002	-0.0002	-0.0001
	(-151.7)	(-152.3)	(-8.9)
Tenure	0.015	0.015	0.027
	(203.0)	(200.7)	(25.2)
Tenure squared	-0.0002	-0.0002	-0.0005
	(-97.7)	(-96.4)	(-12.0)
Male	0.153	0.153	0.078
	(345.6)	(345.4)	(16.9)
Immigrant	-0.026		
	(-13.1)		
Education Levels			
Preparatory	0.088	0.089	0.012*
	(153.2)	(153.6)	(2.0)
Lower secondary	0.204	0.205	0.083
	(317.3)	(316.9)	(13.2)
Upper secondary	0.309	0.310	0.170
	(452.9)	(451.3)	(27.1)
College	0.644	0.644	0.569
	(594.7)	(590.5)	(59.7)
Non-defined	0.176	0.176	0.114
	(106.0)	(104.4)	(11.7)

continued

Table 2: (continued)

Qualification levels			
Manager and highly professional	0.590	0.588	0.776
	(405.4)	(402.0)	(53.9)
Professional	0.576	0.574	0.696
	(381.4)	(378.6)	(43.9)
Supervisors	0.408	0.407	0.545
	(304.7)	(303.0)	(32.1)
Highly skilled and skilled	0.162	0.162	0.188
	(188.6)	(187.2)	(21.4)
Semi-skilled and unskilled	-0.003	-0.003	0.006*
	(-3.6)	(-3.6)	(0.7)
Non-defined	0.314	0.311	0.114
	(188.5)	(185.6)	(11.7)
Plant Size	0.041	0.041	0.029
	(324.7)	(325.1)	(23.1)
Industry dummies	yes	yes	yes
Constant	5.302	5.200	5.607
	(2254.4)	(2248.5)	(227.7)
$\overline{R}^2$	0.59	0.59	0.59
N	2,195,073	2,171,910	23,163

Notes: (i) t-statistics are shown within parentheses;

(ii) all estimates are significant at 1%, except those with an *.

However, the estimate of the effect of Immigrant status on the conditional mean of the (log) hourly wage distribution is not necessarily indicative of the size of that effect at the lower and upper tails of that same distribution. A more complete picture can be obtained by estimating a family of conditional quantile functions (Koencker, 2005). The estimates of the same coefficients for each decile of the wage distribution are plotted in Figure 1. The extent of earnings disadvantage of immigrants varies considerably along the entire distribution of wages from a maximum of -0.036 at the 3^{rd} decile to virtually zero at the top-end of the distribution (the estimate at the 9^{th} decile is -0.003 and it is not significantly different from zero at the level of 10 percent).

Although the estimate of the wage penalty associated with being immigrant decreases monotonically from the 3^{rd} to the 9^{th} deciles, at the bottom of the

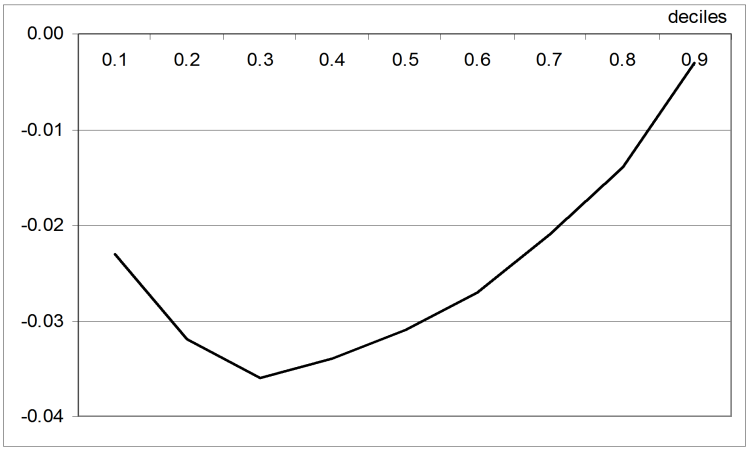

Figure 1: Estimated immigrants' wage penalty - Quantile regressions

distribution immigrants fare relatively better than other immigrants at the mid of that same distribution - as we move from the left to the right of the distribution, the estimated penalty for the 1^{st} decile is not obtained before the 7^{th} decile is reached.

The relative better performance of immigrants at the lower-end of the wage distribution is forcefully linked to the protection granted by the existence of a legal minimum wage. Legal minimum wages exist in Portugal since 1974 and all the existing studies of their effects indicate that they are actually binding both in terms of wages and employment opportunities (Portugal and Cardoso, 2002, Pereira, 2003).

Mandatory minimum wages eliminate the possibility of workers and employers to contract over wages if they are willing to trade wages for non-wage benefits. In fact, this is the reason why minimum wage earners receive less or no training from the employers (Card and Krueger, 1995). The same argument is sufficient to explain why the wage penalty immigrants receive at the bottom of the distribution is lower than at upper deciles.

At the other extreme of the wage distribution, the absence of any penalty may be explained with recruitment in international markets for top-level executives, especially in the case of multinational firms, which result in higher (by Portuguese

standards) wages being paid to foreign workers hired into high wage positions. The choice between managerial expatriates and natives is one of the most researched topics in the literature on the staffing practices of multinational companies. In that context the design of compensation policies has the primary objective of promoting international mobility among top cadres while guaranteeing equity within the company (Bonache and Férnandez, 1997), both resulting in higher wages being paid to expatriates (immigrants) than to native workers in similar positions. In the aggregate, this is consistent with a smaller penalty associated with being an immigrant at the top of the wage distribution, which is exactly what we found.

4 The determinants of earnings of immigrants and natives

4.1 Schooling and experience

To get a more clear picture of how each regressor in Equation 1 contributes to the wages earned by immigrants and natives, Equation 1 was estimated using two sub-samples corresponding to each worker group - natives and immigrants. Results are displayed in the last two columns in Table 2. Conditionning on the same set of regressors, we find that returns to age (experience) and schooling are much lower among immigrants than they are among natives. Schooling, especially at low and intermediate levels, is less valuable for immigrants even if we cannot control for the duration of stay in the Portuguese labor market. Low returns to schooling and experience, even considering the caveats involved, necessarily means that immigrants into Portugal suffer huge losses in returns to human capital accumulated in the country of origin. Differently put, human capital is imperfectly transferable across nations, a result also noted by several authors (e.g., Friedberg, 2000, Eckstein and Weiss, 2003).

4.2 Tenure

On the contrary, returns to tenure are for immigrants almost twice as greater as for natives - for the first year they spend with one employer, immigrants wages rise by 2.65 percent (1.48 percent for natives). The fact that returns to tenure are

higher for immigrants than for natives with the same characteristics indicates that part of the adverse consequences of forming less than adequate matches - occupational downgrading - are reversed within a short period and without further job switching. This could be another consequence of the imperfect transferability of human capital - the information content of schooling diplomas being reduced, employers hire immigrant workers into low-level positions and as information about the true quality of the match becomes available they are promoted into higher level positions (alternatively, their contracts are terminated). Occupational downgrading is followed by occupational upgrading even within on-going employment relationships and even if the motivation for immigrants to accept low-skilled jobs is justified on the grounds of continuing (on-the-) job search efforts as suggested by Weiss et al. (2003).

Another indication that immigrants move up the occupational ladder faster than natives may be obtained from the analysis of employers' promotion policies. To do that we used the information contained in the dataset on the year of admission and the year of last promotion of each worker still employed in 2000 (the only year for which information on the nationality of the worker is available). To avoid more serious selectivity problems that would result from sampling very long employment relationships, we restricted our analysis to workers admited in 1999 and still employed in the same establishment in 2000.[9] The final sample contains 140,441 workers (observations), 1,323 of which are immigrants. A probit model for the probability of being promoted in the year 2000 was estimated on this sample. Results are on Table 3.

[9] Although this sampling plan may under-represent very short employment spells, the consequences for our analysis are minor considering that we are only interested in the comparison of the probability of promotion for the two groups of workers and the same restriction is imposed on the two datasets.

Table 3: Probit results

Dependent variable: prom=1 if promoted in 2000

Explanatory variables	(1)
Age	-0.028
	(142.4)
Age squared	0.0002
	(65.2)
Male	-0.082
	(103.4)
Immigrant	0.127
	(11.6)
Education Levels	
Preparatory	0.033
	(7.86)
Lower secondary	0.132
	(109.0)
Upper secondary	0.167
	(167.9)
College	0.125
	(45.1)
Non-defined	0.031*
	(0.9)

Table 3: continued

Qualification levels	
Manager and highly professional	-0.057
	(5.0)
Professional	-0.095
	(12.2)
Supervisors	-0.109
	(14.8)
Highly skilled and skilled	-0.142
	(137.2)
Semi-skilled and unskilled	-0.159
	(156.1)
Non-defined	0.459
	(409.6)
Plant Size	0.038
	(301.7)
Industry dummies	yes
Constant	0.213
	(26.3)
Log-L	-75090.8
N	140,441

The probability of being promoted within one year from admission is decreasing with age and increasing with schooling (except for college education), skill-levels and the size of the plant. Conditional on the observables, women are also more likely to be promoted than men, which is in contradition with the 'glass-ceiling hypothesis' but not with the results obtained by Booth et al. (2003). More importantly, immigrants face a higher probability of being promoted than native workers with similar characteristics. The estimated marginal effect of being an immigrant on the probability of promotion for a worker with the same characteristics of the average immigrant hired in 1999 and still employed in 2000 is +4.0 percentage points. Hence, promotions within the context of continuing employment relationships contribute to the economic assimilation of immigrants because they make the internal reallocation of immigrants possible. The fact that this reallocation process is faster for immigrants than for natives may be indicative of the severity

of the informational disadvantage employers' face when they choose to hire foreign rather than native workers.

4.3 Job and workplace characteristics

Returns to location in the establishment's hierarchy of skills are greater for immigrants than for natives irrespective of the skill-level. This is the result of lower wages at the baseline category (apprentices) which reflects the fact that, at entry-levels, immigrants earn considerably less than natives, and also of the fact that promotions to higher-level positions imply a wage premium with two components - returns to specific training and to information that immigrants may be able to signal during the early stages of their stay with the employer.

The positive premium associated with working in large size employers (Brown and Medoff, 1989) is less important for immigrants than it is for natives. Although there is no obvious reason why this should be the case, this result could indicate that immigrants hired into large units are to some extent confined to peripheral and perhaps temporary positions which is something we cannot control for. In fact, estimation of the probit model separately for natives and immigrants shows that the marginal effect of the size variable evaluated for a worker with the average characteristics of immigrants hired in 1999, is half as large for immigrants than for natives.

4.4 Region of origin

Schooling and labor market experience determine earnings both through their levels and their national origin. The country where human capital was accumulated matters and is a crucial determinant of its value in the host labor market (Friedberg, 2000). Differences in school quality across countries as well as in the degree of compatibility between national schooling systems and labor market requirements at destination are the two most frequently cited reasons why that should be the case. The national origin may also be related to any possible form of discrimination especially if discriminatory behavior varies with schooling (or other observed

attributes) and its distribution across nationalities is also different.

To analyze the effects of the country of origin on wages of the foreign born, eight dummy variables to nationality groups were entered into the regression equation (1).[10] The omitted group is that of the Portuguese-speaking countries. Another variable *Same Group Pct* was also added to the regression equation. Results are in Table 4 (first column).

[10] For the list of countries included in each group, refer to Appendix 1

Table 4: OLS regression results

Dependent variable: log hourly wage

Explanatory variables	All Immigrants	Portuguese -speaking	non Portuguese -speaking
Age	0.015	0.013	0.024
	(12.42)	(8.67)	(201.55)
Age squared	-0.0002	-0.0001	-0,0002
	(-10.35)	(-7.58)	(-152.10)
Tenure	0.027	0.029	0.015
	(25.90)	(20.39)	(201.73)
Tenure squared	-0.0006	0.0007	-0.0002
	(-14.12)	(-11.18)	(-97.07)
Male	0.081	0.071	0.153
	(17.60)	(12.20)	(345.44)
Same group pct	-0.043	-0.022	-0.027
	(-5.55)	(-1.77)	(-3.18)
Education Levels			
Preparatory	0.007*	0.025	0.089
	(1.15)	(3.42)	(152.96)
Lower secondary	0.066	0.058	0.205
	(10.69)	(7.77)	(316.63)
Upper secondary	0.143	0.134	0.309
	(22.57)	(17.06)	(451.26)
College	0.516	0.537	0.643
	(54.02)	(38.54)	(591.91)
Ignored	0.102	0.087	0.176
	(10.48)	(5.44)	(105.31)
Qualification levels			
Manager and highly professional	0.726	0.744	0.589
	(51.12)	(33.08)	(403.83)
Professional	0.647	0.610	0.575
	(41.44)	(26.97)	(379.98)
Supervisors	0.514	0.450	0.407
	(30.94)	(20.90)	(303.78)
Highly skilled and skilled	0.180	0.164	0.162
	(20.79)	(15.64)	(187.79)
Semi-skilled and unskilled	0.005*	-0.005	-0.003
	(0.56)	(-0.51)	(-3.47)
Non-defined	0.499	0.457	0.313
	(32.53)	(23.04)	(187.06)

Table 4 (continued)

Explanatory variables	All Immigrants	Portuguese -speaking	non Portuguese -speaking
Plant size	0.026	0.009	0.041
	(19.05)	(5.20)	(325.34)
W. Europe, U.S., Japan	0.175		0.162
	(26.28)		(28.12)
New EU members	-0.027		-0.048
	(-1.72)		(-3.09)
Former Soviet Union	-0.022		-0.067
	(-3.95)		(-10.96)
Brazil	-0.010*		
	(-1.43)		
Other Portuguese speaking		0.018	
		(2.77)	
China	-0.122		-0.098
	(-6.86)		(-5.41)
Africa	-0.039		
	(-2.95)		
Asia	-0.041		-0.092
	(-2.79)		(-6.37)
Latin America	0.014*		-0.003*
	(0.89)		(-0.17)
Industry Dummies	yes	yes	yes
Constant	5.602	5.757	5.202
	(226.01)	(191.58)	(2252.99)
$\overline{R}^2$	0,61	0.52	0.59
N	23,163	12,445	10,718

Notes: (i) t-statistics are shown within parentheses;

(ii) all estimates are significant at 1%, except those with an *.

The estimates obtained indicate that, conditional on the other characteristics, immigrants arriving from Western Europe, USA and Japan earn the highest wages. All the remaining groups receive a wage penalty if compared to the immigrants from the Portuguese-speaking nations in Africa. The difference between wages received by these workers and immigrants from Brazil other Latin American nations is not statistically different from zero. The highest penalty is observed for Chinese citizens.

Exception made for the group of immigrants originating in the most developped

countries, the fact that immigrants faring the best are those from Portuguese-speaking countries indicates that language-skills do matter. However, there is no evidence that immigrants who use the Portuguese as their native language may receive higher returns to schooling or experience. In fact it is the opposite that we observe (Table 4, two last columns). Although we cannot separate experience acquired before and after migration, the estimate obtained for the age variable is consistent with the fact that language proficiency and post-migration experience are substitutes (Chiswick and Miller, 1993). As to language fluency, it is admitedly measured with error as it rests only on the identification of the country of birth. However, the result we obtained could indicate that schooling quality related issues may be outweighting any possible benefits of language fluency that may exist, especially because the highest wage immigrants are in the non-Portuguese-speaking group. The only benefit of language fluency as determined by country of birth emerges as higher returns to tenure, consistent with the fact that local accumulation of (specific) human capital is complementary to language fluency.

4.5 Ethnic concentration

Residential areas with higher concentration of immigrants of the same origin offer "ethnic goods" at a lower cost than they are available in low-concentration areas. Hence, high wage offers will be needed to induce one member of the group to leave the area. As a result, wages will be inversely related to group-concentration. Immigrants are expected to make wage concessions so as they can live in more home-like neighborhoods. Although we are not aware that the issue has been investigated before, the same reasoning applies to workplaces. Workers may be willing to pay to work in units where they may share with their co-workers the same geographic origin (or, indeed, the immigrant status). It is this effect that the *Same Group Pct* variable is meant to capture. This variable measures for each worker the proportion of his co-workers at the same establishment that have the same nationality as defined in Appendix 1. The results in Table 4 indicate that immigrants actually value ethnic goods. For the whole sample of immigrants, wages are reduced by

approximately 4.3 percent for each 1 percentage point increase in the workplace ethnic concentration. The corresponding estimates for the Portuguese-speaking and non-Portuguese-speaking groups are -1.8 and -2.7 percent, respectively. These results show that the value of ethnic concentration is all the greater, the more culturally distant (in terms of language, at least) the country of birth is from the country of residence.

5 Quantile regression and the determinants of earnings of immigrants

Most studies of immigrants earnings employ least squares regression methods. However, these methods produce estimates of the various covariates effects on the conditional mean of the dependent variable, possibly concealing differences in responses at the two extremes of wage distribution. Quantile regression helps to uncover any such differences.

To investigate whether these differences matter, the regression equation (1) was re-estimated as a family of conditional quantile functions. The same set of covariates as in Table 4 entered the regression equation. Nine distinct quantile regression estimates, one for each decile, were obtained. Results for the 1^{st}, the median, and the 9^{th} decile are displayed in Table 5.

Table 5: Quantile Regressions - Immigrants

Dependent variable: log hourly wage (N=23,163)

	(1)		(2)		(3)	
	Q=0.1		Q=0.5		Q=0.9	
Explanatory Variables	Coef.	t-ratio	Coef.	t-ratio	Coef.	t-ratio
Age	0.005	(5.98)	0.008	(8.54)	0.014	(6.87)
Age squared	-0.0001	(-5.19)	-0.0001	(-7.36)	-0.0001	(-5.32)
Tenure	0.008	(12.00)	0.023	(29.2)	0.036	(20.09)
Tenure squared	-0.0001	(-2.8)	-0.0004	(-12.99)	-0.0009	(-11.75)
Male	-0.004*	(-1.41)	0.053	(15.59)	0.121	(15.31)
Same Group Pct	0.010	(2.0)	-0.023	(-4.01)	-0.114	(-8.29)
Education levels						
Preparatory	-0.001*	(-0.2)	0.004*	(0.90)	0.024	(2.32)
Lower secondary	0.010	(2.5)	0.035	(4.56)	0.101	(9.39)
Upper secondary	0.023	(5.8)	0.101	(21.65)	0.269	(24.85)
College	0.224	(31.4)	0.579	(81.78)	0.643	(34.20)
Non-defined	-0.004*	(-0.7)	0.029	(4.03)	0.224	(13.36)
Qualification levels						
Manager and highly professional	0.514	(52.01)	0.809	(76.88)	0.857	(32.92)
Professional	0.498	(48.81)	0.754	(65.13)	0.730	(25.32)
Supervisors	0.299	(28.59)	0.521	(42.27)	0.785	(27.94)
Highly skilled and skilled	0.103	(18.49)	0.166	(25.93)	0.237	(16.19)
Semi-skilled and unskilled	0.017	(3.20)	0.023	(3.54)	-0.043	(-2.86)
Non-defined	0.112	(11.44)	0.477	(42.02)	0.893	(33.77)
Plant size	0.027	(32.88)	0.021	(20.60)	0.008	(3.28)
W. Europe, U.S.; Japan	0.036	(7.94)	0.147	(29.74)	0.258	(21.35)
Eastern Europe	-0.038	(-3.86)	-0.029	(-2.42)	-0.065	(-2.36)
Former Soviet Union	-0.018	(-5.26)	-0.015	(-3.53)	-0.009*	(-0.93)
Brazil	-0.011	(-2.62)	-0.011	(-2.13)	0.019*	(1.60)
China	-0.044	(-3.96)	-0.091	(-6.88)	-0.227	(-7.43)
Africa	-0.043	(-5.22)	-0.036	(-3.63)	-0.035*	(-1.56)
Asia	-0.042	(-4.60)	-0.054	(-4.97)	-0.031*	(-1.23)
Latin America	-0.015*	(-1.55)	-0.041	(-3.63)	0.012*	(0.46)
Industry dummies	yes		yes		yes	
Constant	5.712	(372.84)	5.765	(313.79)	5.912	(138.44)
$Pseudo\ R^2$	0.16		0.35		0.52	

Notes: (i) all estimates are significant at 1%, except those with an *.

The first noticeable result is that most covariate effects are very different at the lower and bottom-ends of the wage distribution. Let us consider how those effects

change for a selection of covariates.

Returns to education are very low at the $10th$ percentile for all schooling levels, although returns to college are much higher than to the educational level immediately before. However, at the top of the distribution returns to the very same levels of education are considerably higher except for preparatory school. This tell us that schooling transferability varies enormously with the location in the distribution, although it is always present. [11]

At the top, the wage premium received by male immigrants is twice as large as it is at the median, whereas at the bottom it is not significantly different from zero.

It is of particular interest to compare the estimated coefficient of the *Same Group Pct* variable. From virtually zero at the 1^{st} decile, where again binding minimum wage regulation prohibits any concession workers could agree upon, it decreases steadily to -0.023 at the 5^{th} decile and to -0.1145 at the 9^{th} decile. Immigrants are willing to pay for workplace ethnic goods independently of where they are in the wage distribution. In fact, the higher wage they earn the more they are willing to pay to work with a larger proportion of workers with similar national origins.

The country of origin effect becomes less important as we approach the upper-end of the distribution where most estimates are not statistically different from zero. However, the premium received by Western Europe, USA and Japan national citizens is almost ten times as great in the 9^{th} decile as in the 1^{st}. To a smaller degree, the same happens with Brazilian nationals. On the contrary, the penalty associated with Chinese origin is five times larger at the upper-tail of distribution than at the lower-tail.

6 Conclusions

Using a single cross-section of matched employer-employee data we were able to

[11] A comparison with the corresponding estimates for the sample of native workers reveals that returns to imported schooling are less than to local schooling across the whole wage distribution.

compare the earnings of immigrant and native workers in Portugal. We conclude that immigrants' earnings are 2.6 percent below the earnings of similar native workers. Although we cannot compute the earnings differential at the time of entry, this estimate is consistent with previous findings of migrants faring better in the Portuguese labor market than elsewhere in Europe. Quantile regressions shows that at the left-tail of the wage distribution, immigrants fare better than anywhere else below the 7^{th} decile indicating that such labor market institutions as legal minimum wages are non-neutral also in terms of the economic performance of immigrants.

We were also able to establish that the economic assimilitation of immigrants takes place in the context of continuing matches as much as with job switching which has been receiving more attention. The demand for "ethnic goods", known to influence the earnings of immigrants, when linked to the choice of the residential area, were found to be important also at the workplace level. Immigrants' wages are reduced by as much as 4.3 percent for each additional percentage point increase in the concentration of same origin immigrants in the workplace.

Quantile regression helped uncover significant differences in the effects of the earnings determinants over the wage distribution - except for very specific cases, the region of origin is less penalized as we approach the right-tail of the wage distribution. The loss of human capital as embodied in schooling is also less important for higher wage levels.

Appendix 1. Nationality Groups

Western Europe, North-America and Japan

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Lichstenstein, Luxembourg, Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom, United States, Canada, Japan.

New EU member-states (and candidates)

Czech Republic, Cyprus, Hungary, Estonia, Latvia, Lithuania Malta, Poland, Romania, Slovakia, Turkey, (former) Yugoslavia.

Former Soviet Union

Moldova, Russia, Ukraine, and others.

Brazil

Other Portuguese-speaking Countries

Angola, Cape Verde, Guinea-Bissau, Mozambique, S. Tomé and Principe, East-Timor

China

Africa

Morocco, Senegal, Guinea-Konakri, other unspecified (excluding the Portuguese-speaking countries in Africa).

Asia

Bangladesh, India, Pakistan, Phillipines, unspecified in Asia (exc. China), unspecified in Oceania (exc. East-Timor).

Latin America

Cuba, Mexico, Venezuela, unspecified (exc. Brazil).

References

Abowd JM, Kramarz F, Margolis DN (1999) High Wage Workers and High Wage Firms. *Econometrica*, 67(2):251-333.

Adsera A, Chiswick BR (2005) Divergent Patterns in Immigrant Earnings across European Destinations. Paper presented at EALE/SOLE conference 2005, San Francisco.

Bonache J, Fernández Z (1997) Expatriate Compensation and Its Link to the Subsidiary Strategic Role: A Theoretical Analysis. *International Journal of Human Resource Management*, 8(4):457-475.

Booth A, Francesconi F, Frank J (2003) A Sticky Floors Model of Promotion, Pay, and Gender. *European Economic Review*, 47(2):295-322.

Borjas GJ (1999) *Heaven's Door: Immigration Policy and the American Economy*, Princeton University Press, Princeton.

Borjas GJ (2000) Ethnic Enclaves and Assimilation. *Swedish Economic Policy Review*, 7(2):89-122.

Brown C, Medoff J (1989) The Employer Size-Wage Effect. *Journal of Political Economy*, 97(5):1027-1059.

Card D, Krueger AB (1995) *Myth and Measurement: The Economics of the New Minimum Wage*. Princeton University Press, Princeton.

Carrington WJ, Lima, PJF (1996) The Impact of 1970s Repatriates from Africa on the Portuguese Labor Market. *Industrial and Labor Relations Review*, 49(2):330-347.

Chiswick BR (1978) The Effect of Americanization on the Earnings of Foreign-born Men *Journal of Political Economy*, 86(5):897-921.

Chiswick BR (1979) The Economic Progress of Immigrants: Some Apparently Universal Patterns. In: Fellner W (ed) *Contemporary Economic Problems*. American Enterprise Institute, Washington D.C., 357-399.

Chiswick BR, Miller, PW (2002) Immigrant Earnings: Language Skills, Linguistic Concentrations and the Business Cycle. *Journal of Population Economics*, 15(1):31-57.

Chiswick BR, Miller, PW (2003) The Complementarity of Language and Other Human Capital: Immigrant Earnings in Canada. *Economics of Education Review*, 22(5):469-480.

Cohen S, Epstein, Z (2002) Labor Mobility of Immigrants: Training, Experience, Language and Opportunities. Mimeo, Tel Aviv University, Tel Aviv.

Eckstein Z, Weiss, Y (2004) On the Wage Growth of Immigrants: Israel, 1990-2000. *Journal of the European Economic Association*, 2(4):665-695.

Friedberg RM (2000) You Can't Take It with You? Immigrant Assimilation and the Portability of Human Capital. *Journal of Labor Economics*, 18(2):221-251.

Groshen E (1990) The Structure of the Female/Male Wage Differential: Is It Who You Are, What You Do, or Where You Work?. *Journal of Human Resources*, 26(3):457-472.

Koencker R (2005) *Quantile Regression*. Cambridge University Press, Cambridge.

Mincer J (1974) *Schooling, Experience and Earnings*. Columbia University Press, New York.

Pereira SC (2003) The Impact of Minimum Wage on Youth Employment in Portugal. *European Economic Review*, 47(2):229-244.

Portugal P, Cardoso AR (2002) Disentangling the Minimum Wage Puzzle: An Analysis of Worker Accessions and Separations from a Longitudinal

Matched Employer-Employed Data Set. Banco de Portugal Working Paper WP 8-02, Lisbon.

Weiss Y, Sauer RM, Gotlibovski M (2003) Immigration, Search and Loss of Skill. *Journal of Labor Economics*, 21(3):221-251.