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Danish Evidence on the Double-Negative Effect on the Wages of Immigrant Women*

by

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Abstract

In this paper, we investigate whether there is a double-negative effect on the wages of immigrant women in Denmark stemming from a negative effect from both gender and foreign country of origin. We estimate separate wage equations for Danes and a number of immigrant groups correcting for sample selection and individual specific effects. Based on a Danish panel of register data, we find that all women are affected by a substantial gender discrimination in wages, but only Pakistani women experience a double-negative effect.

JEL classification: J15, J16, J31, J71.

Keywords: Double-negative effect, wage assimilation, immigrants, and gender wage gap.

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1. Introduction

It is an established fact that in most countries both females and immigrants are less likely to be employed and have lower wages than native males. Therefore, one might expect that immigrant females face even larger difficulties in the labor market. The wages of the immigrant females compared to their otherwise similar native peers and their otherwise similar male peers constitute the topic of this paper.

Previous research on the wages of immigrant women in North America find no unfavorable wage gap due to foreign country of origin. Based on a wage equation with an indicator variable for being foreign-born Long (1980) for the U.S. and Beach and Worswick (1993) for Canada, find that the wages of immigrant women are 12-14% higher than that of native women conditional on their characteristics. Thus, accepting the existence of gender discrimination in wages, they reject the hypothesis of a double-negative effect on the wages of immigrant females. However, Field-Hendrey and Balkan (1991) show that this conclusion is an artifact of the simplified cross-sectional approaches. Using two independent cross-sections, correcting for selectivity, and predicting actual experience, they find a picture similar to that which is traditionally found for immigrant males: an initial wage disadvantage and a gradual closing of the gap, see e.g. Borjas (1987).

A recent study by Shamsuddin (1998) improves the analysis by employing a decomposition approach to study the possible presence of a double-negative effect on the wages of immigrant women. The decomposition approach allows for a more detailed study of the question, since the wage gap stemming from a difference in qualifications across gender and across ethnicity, and the wage gap stemming from discrimination due to gender and due to ethnicity can be identified. Shamsuddin (1998) concludes that the foreign-born women suffer from double-negative discrimination, though gender discrimination dominates discrimination by birthplace. Immigrant males, on the other hand, are shown to be affected by discrimination by birthplace.

Based on a panel of Danish register data, we investigate whether a double-negative effect on the wages of immigrant women exists, stemming from a combined unfavorable effect of gender and foreign country of origin. In the case of Denmark, a gender wage gap of about 20% prevails of which one-fourth is usually estimated to be due to differences in characteristics and three-fourths to be due to different returns, see Rosholm and Smith (1996). Studying immigrant females, a disadvantageous wage gap due to different returns between foreign born and natives may add on to this discriminatory gender wage gap. We analyze the immigrant-native (‘ethnic’) wage gap and the male-female (‘gender’) wage gap, and try to identify the parts of these gaps that are not due to differences in qualifications, but instead can be explained by differences in returns.

When considering female immigrants, who have a lower participation rate than both native males and females, it is essential to measure actual experience rather than just potential experience. Fortunately, the Danish register data allow us to construct a rather accurate measure of actual experience. In addition to solving the problem of the inaccuracy of potential experience, this also makes us able to test the hypothesis that wage assimilation happens faster for immigrants who participate in the labor market than for non-participants. Another problem, which is more prevalent when estimating wage equations for women than for men, is the possible sample selection due to the participation decision. Having solved the two mentioned problems, we estimate separate wage equations for each gender by country of origin, while also allowing for random individual specific effects.

The paper is organized as follows: section 2 describes the data sets that are used. Section 3 introduces the applied estimation method. Section 4 presents the results of estimation, and investigates the determinants of wages for female and male immigrants from different countries of origin, and compares those determinants to the determinants for native Danes. Section 5 studies the presence of a double-negative effect for immigrant females by use of a decomposition analysis. Section 6 concludes the analysis.

2. Data description

The empirical analysis is based on two register-based data sets. One data set consists of 10% of the Danish population (about 500,000 individuals) followed during the period 1984-1995. The other data set contains information on the entire population of immigrants in Denmark (about 250,000 individuals in 1995) during the period 1984-1995. The data sets contain information on a large number of demographic and labor market characteristics of the individuals and their families. The variables used in this study are the hourly wage, age, civil status, occupation, years since migration, actual labor market experience, and level of formal education obtained in Denmark.

In the empirical analysis in the following section, we do not use the total available data sets. Both data sets are restricted to individuals aged 20-59 years in order to avoid selection problems due to retirement and education. Furthermore, the sample of Danes contains only 3% randomly selected individuals from the original 10%-sample.

The immigrant sample is restricted to include only first generation immigrants. A first generation immigrant is defined as an individual who was born outside Denmark, and who has foreign-born parents or parents with foreign citizenship. If information on one of the parents is missing but the other parent fulfills the criteria, the individual is also defined as an immigrant. Finally, if there is no information on any of the parents then the individual is defined as a first generation immigrant if he

or she is born in a foreign country. Individuals who are applying for asylum are not included in the group of immigrants until they obtain a residence permit. A first generation immigrant usually has a foreign citizenship, but immigrants who have lived in Denmark for a sufficient number of years may have obtained Danish citizenship.

The immigrant data set is separated according to the reason for migration (refugee/non-refugee), and we only look at non-refugee immigrants. Furthermore, the sample is separated in groups based on the country of origin, and the grouping is meant to reflect cultural and geographical proximity. Grouping by country of origin and by reason for migration reduces the cohort effect, and thus facilitates identification of the assimilation process.[1] We select five large immigrant groups among the non-refugee immigrants: Nordic (Swedish, Norwegian, Icelandic, and Finnish), Turkish, African, Pakistani and the combined group of Indian & Sri-Lankan immigrants.

In Appendix A, we show the means of the variables that are used in the analysis. The hourly wage rate is measured in DKK and is deflated by the consumer price index (1995-prices). The information on wages is based on annual earnings divided by annual hours employed.[2] Hourly wages are only observed for individuals who have been employed as wage earners during the year. Working hours and hourly wages are not observed for self-employed individuals and assisting spouses.[3] In addition to the Nordic immigrants, the Indian and Sri Lankan immigrants have high average hourly wages.

The sample contains information on the type of education acquired in Denmark. Since immigrants, who already have a foreign education, may quickly acquire formal qualifications corresponding to many years of schooling for Danish born individuals, we use indicator variables for the highest level of education attained rather than length of schooling. For immigrants the reference category in the estimations is 'no Danish education', while for the group of Danish born it is 'primary education'.

It seems that immigrants coming from Turkey and Pakistan have acquired less education than those coming from India and Sri Lanka. The experience variable measures actual experience obtained by

[1] See Lalonde and Topel (1997).

[2] Thus, overtime payments and wages in a second job are included in the average wage measure. If overtime work and the frequency of a second job vary systematically between immigrants and native-born, we may over- or underestimate the differences between the wage levels of immigrants and native-born individuals.

[3] Self-employment is a very important economic state for many immigrants, since 16% of the employed immigrants are self-employed whereas only 8% of the employed native born are self-employed. However, since we are not able to get information on wages and working hours for the self-employed based on register information, they are grouped with the non-participants who have no observed wage either.

being employed as a wage earner in Denmark.[4] However, periods in self-employment and periods as assisting spouse do not add to the accumulated experience. Since many immigrants are self-employed, we expect to be underestimating the actual work experience of immigrants.

On average, the individuals from Turkey, Pakistan and India and Sri Lanka have been in Denmark for the longest time, and the individuals from Turkey, Pakistan, and Africa have the lowest level of experience relative to the years since migration.

A major problem for the analysis is that the registers contain no information on fluency in Danish and the type or length of education and experience obtained before immigration to Denmark, all of which are expected to be important for the wage potential. In the econometric analysis, this problem is handled by using a panel data model where the unobserved pre-immigration characteristics are treated as random individual specific effects that do not vary over time.[5] The random effect estimator is expected to capture time invariant unobserved heterogeneity, but we are not able to control directly for unobserved proficiency in speaking the Danish language which probably varies over time for the individual immigrant. Indirectly, some of this may be captured by the coefficient on the variables measuring years since migration.

Since the 1970s, Denmark has experienced extremely high unemployment rates, and even higher unemployment rates for immigrants than for Danes. In 1994, the unemployment rate for immigrants from outside EFTA and EU peeked and exceeded 40%. Entering the country in such a year naturally complicates getting a job. Generally speaking, if the labor market is tight at the year of entry, it is probably considerably easier to get a job, and this may have long-term effects on the labor market career. Therefore, we include a variable indicating the overall Danish unemployment rate in the year of immigration. For Danish born individuals the analogue variable is the overall unemployment in the year the individual leaves the educational system. The average value of this variable differs among immigrant groups.

To study the wage gaps across ethnicity (natives versus immigrants) and across gender, it is instructive to look at the raw wage gap between native males and immigrant males, and the raw wage gap between immigrant males and immigrant females. These wage gaps are presented in

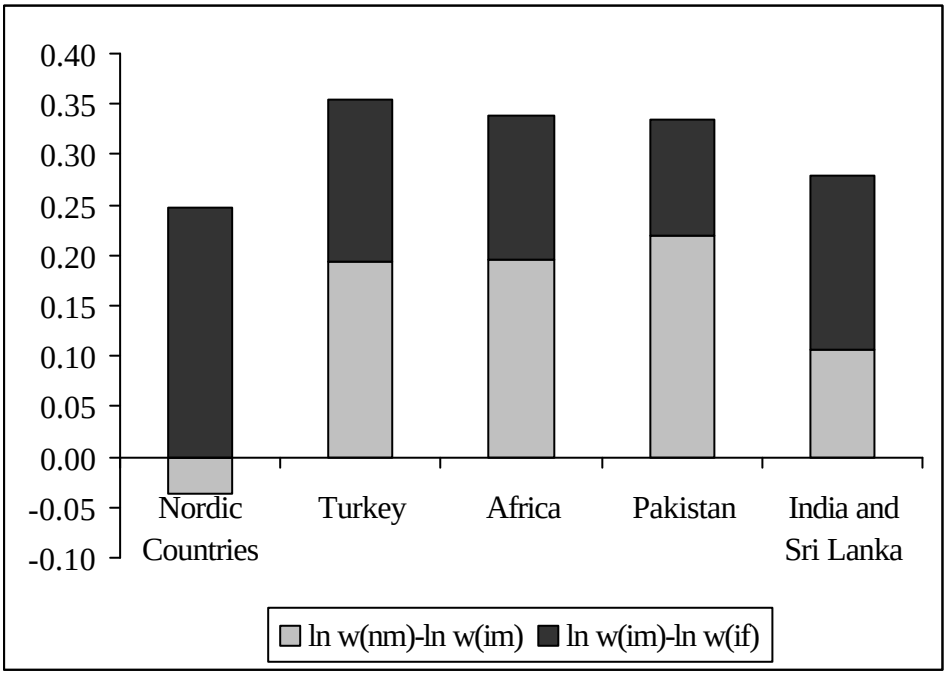
[4] See details about the experience variable in Husted et al. (2000).

[5] If the unobserved level of education acquired in country of origin is correlated with the included explanatory variables, this may result in inconsistent estimated coefficients in the random effects model. An alternative is to use a fixed effects model, which does not suffer from this problem. We prefer the random effect estimator for efficiency reasons and because it gives direct estimates on time constant variables like the country of origin. Furthermore, random effects are intuitively appealing when the cluster units are individuals.

Figure 1. A first glance at the figure reveals the fact that the gender wage gaps are substantial for all countries of origin, whereas there is a large variance in the ethnic wage gaps.[6]

Figure 1 shows that Nordic immigrant males earn more than the Danish males, hence the ethnic wage gap is negative.[7] All other immigrant groups are characterized by a positive ethnic wage gap. The largest ethnic gaps (above 15 percentage points) are found for Turkey, Africa, and Pakistan. The gender wage gap, however, is positive for all countries. The largest gender wage gap (around 20 percentage points) is found for individuals from the Nordic countries, and the smallest one is found for Pakistan.

Figure 1. Raw log-wage gap between native and immigrant males, and between immigrant males and females by country of origin.



An analysis of the development of the ethnic and gender wage gaps over the observation period reveals that the gaps are relatively constant over the period. In a couple of cases the gaps increase or decrease a little during the period, and in all cases this development is followed closely by changes in the human capital variables. Hence, we are not going into more detail about the changes in the gaps over time.

[6] Alternatively, we could have chosen to illustrate the raw wage gap between native males and females, and the gap between native females and immigrant females. In that case, the picture is nearly identical.

[7] See Pedersen (1996) and Schröder (1996).

The purpose of the econometric analysis that follows is to analyze the presented wage gaps in more detail. To study the double-negative effect, we need to eliminate the parts of the gender and the ethnic wage gaps that are a result of different characteristics, and separate out the parts of the two gaps that are due to different returns to characteristics. However, first the applied econometric methods are presented.

3. Methodology

The availability of a panel data set instead of a single cross section allows us to distinguish the age and experience effects from the assimilation process.[8] To exhaust the panel property of the data set, we estimate jointly a wage equation and a selection equation with bivariate random effects. For individual *i* in time period *t*, the model is the following:

$$
\begin{aligned}
y_{it}^{*} &= x_{it}\beta + \alpha_i + \varepsilon_{it} \\
d_{it}^{*} &= z_{it}\gamma + \eta_i + \nu_{it} \\
d_{it} &= \begin{cases} 1 \text{ if } d_{it}^{*} > 0, \\ 0 \text{ otherwise} \end{cases} \\
y_{it} &= y_{it}^{*} \cdot d_{it}
\end{aligned} \tag{1}
$$

where d_{it} is an indicator for having an observed wage, y_{it} denotes log wage, x_{it} and z_{it} are vectors of explanatory variables, α_i and η_i are individual specific random effects. About the error terms ε_{it} and ν_{it} are assumed that $(\varepsilon_{it},\ \nu_{it}) \sim N(0,0,\Sigma)$, where

$$
\Sigma = \begin{bmatrix} \sigma_{\varepsilon} & \rho\sigma_{\varepsilon} \\ \rho\sigma_{\varepsilon} & 1 \end{bmatrix} \tag{2}
$$

Assuming that the bivariate random effects follow a discrete distribution with 2×2 points of support, and that $\varepsilon_{it}, \nu_{it} \perp \alpha_i, \eta_i$, we can maximize the likelihood function. Let $\alpha = \{\alpha_1, \alpha_2\}$, $\eta = \{\eta_1, \eta_2\}$ and, $p = \{p_{11}, p_{12}, p_{21}, p_{22}\}$, where $p_{kj} = \Pr(\eta_k, \alpha_j)$, and let $\theta = [\beta, \gamma, \sigma_{\varepsilon}, \rho, p, \alpha, \eta]$ denote the parameter vector. The following likelihood function is maximized:

$$
L_i(\theta) = \sum_{j=1}^{2}\sum_{k=1}^{2} p_{kj} \prod_{t=1}^{T_i} f(\varepsilon_{it}, \nu_{it} | \eta_k, \alpha_j) \tag{3}
$$

[8] See Borjas (1987) versus Chiswick (1978).

where

$$(4)\qquad f(e_{it},n_{it}\mid a_i,h_i)=((1-F_{n|e}(-z_{it}g-h_i\mid y_{it}-x_{it}b-a_i))\cdot f_e(y_{it}-x_{it}b-a_i))^{d_{it}} \times F_n(-z_{it}g-h_i)^{1-d_{it}}$$

Consult Vella (1998), Nijman and Verbeek (1992), Jensen, Rosholm and Verner (2000) and Husted et al. (2000) for more details about the estimation technique. The expected log wage for those who participate for at least one year is the following:[9]

$$(5)\qquad \overline{E(y_{it}\mid d_{it}=1)}=\frac{\sum_{i=1}^{I}\sum_{t=1}^{T_i}d_{it}\left[x_{it}b+E(a_i\mid d_{i1},\ldots,d_{iT_i})+E(e_{it}\mid d_{it}=1)\right]}{\sum_{i=1}^{I}\sum_{t=1}^{T_i}d_{it}}$$

where

$$E(a_i\mid d_{i1},\ldots,d_{iT_i})=\sum_{j=1}^{2}a_j q_{ji}^{a}$$

$$E(e_{it}\mid d_{it}=1)=rs_e\sum_{k=1}^{2}q_{kit}^{e}\frac{f(z_ig+h_k)}{\Phi(z_{it}g+h_k)}$$

The term q_{ji}^{a} denotes the individual probability distribution of a_i. It is given by:

$$(6)\qquad q_{ji}^{a}=\frac{\sum_{k=1}^{2}p_{kj}\prod_{t=1}^{T_i}\left[\Phi(z_{it}g+h_k)\right]^{d_{it}}\left[1-\Phi(z_{it}g+h_k)\right]^{1-d_{it}}}{\sum_{l=1}^{2}\left[(p_{l1}+p_{l2})\prod_{t=1}^{T_i}\left[\Phi(z_{it}g+h_l)\right]^{d_{it}}\left[1-\Phi(z_{it}g+h_l)\right]^{1-d_{it}}\right]}$$

and q_{kit}^{e} denotes the individual-period probability distribution of e_{it}:

$$(7)\qquad q_{kit}^{e}=\frac{\sum_{j=1}^{2}p_{kj}\Phi(z_{it}g+h_k)}{\sum_{j=1}^{2}\left[p_{1j}\Phi(z_{it}g+h_1)+p_{2j}\Phi(z_{it}g+h_2)\right]}$$

[9] The expression for $\overline{E(y_{it}\mid d_{it}=1)}$ is derived in detail in Husted et al. (2000).

The model is estimated for Danish males (*dm*), native females (*df*), and five groups of immigrants of each gender (*im*, *if*). Using the formulas, the expected log wage may be calculated for participants from each of these twelve samples.

Shamsuddin (1998) suggests analyzing the double-negative effect by analyzing the wage gap between native males and immigrant females, and decomposing that gap into an ethnicity gap (Δ_G) and a gender gap (Δ_E). The gender wage gap may be estimated as the wage difference between native males and native females or the wage difference between immigrant males and immigrant females. The ethnicity wage gap may be defined as either the difference between the wages of native males and immigrant males or the gap between native females and immigrant females. In the empirical analysis we do both combinations, but here we present only one possibility:

$$\begin{aligned}(8)\qquad & \hat{y}^{dmdm} - \hat{y}^{ifif} \\ & = \underbrace{\hat{y}^{dmdm} - \hat{y}^{imim}}_{\Delta_E} + \underbrace{\hat{y}^{imim} - \hat{y}^{ifif}}_{\Delta_G}\end{aligned}$$

where each term are the expected log wage for individuals of ethnicity *e* and gender *g*, when the estimated coefficients for ethnicity *e'* and gender *g'* are used to calculate the expected value:

$$(9)\qquad \hat{y}^{e\,g\,\grave{e}\,g'} = \sum_{i=1}^{I^{eg}} \sum_{t=1}^{T_i^{eg}} \frac{d_{it} E(y_{it}^{eg} \mid d_{i1},...,d_{T_i}; x_{it}^{eg}, z_{it}^{eg}, y^{\,e'\,g'})}{N_p^{eg}}, \text{ where } e, e' = d, i \text{ and } g, g' = m, f.$$

The gross ethnic log wage gap, Δ_E, and the gross gender log wage gap, Δ_G, may be decomposed further in the spirit of Oaxaca (1973):[10]

$$(10)\qquad \hat{y}^{dmdm} - \hat{y}^{ifif} = \underbrace{\hat{y}^{dmdm} - \hat{y}^{imdm}}_{Q_E} + \underbrace{\hat{y}^{imdm} - \hat{y}^{imim}}_{D_E} + \underbrace{\hat{y}^{imim} - \hat{y}^{ifim}}_{Q_G} + \underbrace{\hat{y}^{ifim} - \hat{y}^{ifif}}_{D_G}$$

The Q-terms denote the log wage difference due to different qualifications (or endowments) across ethnicity and gender, respectively, whereas the D-terms denote the log wage difference due to different coefficients (so-called discrimination)[11] across ethnicity and gender, respectively.[12] The

[10] We do not go into any detail with the decomposition of gender and ethnic differences in $E(a_i \mid d_{i1},..., d_{iT_i})$ and $E(e_{it} \mid d_{it} = 1)$. As illustrated by Neuman and Oaxaca (1999), it is debatable whether decomposition of the selectivity terms should be interpreted as discrimination or qualification.

[11] Traditionally (Oaxaca, 1973), the term 'discrimination' is used for *D*, although it *need not* have anything to do with the notion of gender or racial discrimination in the usual sense.

term that Shamsuddin denotes the double-negative effect is the sum of the so-called discrimination component of the ethnic wage gap and the gender wage gap, D_E and D_G.

In a non-linear model like the present one, the expected log wage, $\overline{E(y_{it} \mid d_{it} = 1)}$, is a complex expression and it might not equal the average log wage, $\overline{y}_{it}$, in the relevant sample. However, in practice, the equality holds approximately. Therefore, the log wage differential may still be decomposed. In the empirical section we look further into this potential deviation.

4. Results

The most important variables in the context of wages of immigrants are the variables catching the assimilation process. An essential hypothesis to be tested in this paper is that the assimilation process goes faster for immigrants who are employed than for non-employed immigrants, and to test that hypothesis we investigate the effect of years in Denmark and actual labor market experience. Earlier studies have shown that the experience profile is best modelled as linear splines because the often used quadratic form turns out not to be sufficiently flexible (Husted et al., 2000). The same approach is used for years since migration.[13]

Other explanatory variables determining the wages are indicators for the highest level of education obtained in Denmark, indicators for being single, indicators for occupational categories, and a continuous variable for the total unemployment rate in Denmark when the individual entered the labor market.

When estimating the joint model of wages and participation in wage employment, household variables describing the number of children and the age of the youngest child are used to identify the selection process. For endogeneity considerations the variables describing occupation and experience are only included in the wage equation and not in the selection equation.

The results from estimation of the econometric model are presented in Appendix B. The model is estimated separately for each (group of) country(ies) of origin, and for males and females. Table B1 shows the results from estimation of the selection equation, whereas Table B2 shows the results from estimation of the wage equation.

---

[12] Altogether, there are four different ways to decompose the total log wage gap between Danish males and immigrant females, depending on how we measure the gender and ethnicity difference, and which set of coefficients are used to distinguish the endowment and discrimination component.

[13] For years since migration (YSM), we include YSM, (YSM-5)*(YSM>5), (YSM-10)*(YSM>10) etc., and similar for experience.

A brief look at the selection equations shows that the probability that we observe a wage for males is higher for individuals with Danish vocational education, and even higher for individuals with Danish theoretical education than for those with no Danish education. The probability is lower for singles than for couples, and higher for parents than for non-parents, though a large number of children decrease the probability. Having entered the labor market when it was tight decreases the probability of having an observed wage. For females the picture is less clear cut since the signs of the family and child indicators vary. Females from Pakistan and Turkey stand out, since singles have a higher probability of having a wage than females living in a couple. Also women from the Nordic countries stand out because having young children increases the probability of observing a wage.[14] Regarding years since migration, an increasing number of years since migration increases the probability of having an observed wage for females (at a decreasing rate). The more time immigrant males from Turkey and Pakistan have spent in Denmark, the lower are the employment probabilities, which is a bit odd.

Turning to the wage equation, it is seen that the return to education is positive for Danes but that the return to Danish education for immigrants is generally not estimated to be positive.[15] For all the samples the managers and higher level salaried workers are estimated to earn the most, but for some samples it is predicted that skilled workers earn less than unskilled workers which is puzzling. However, Grossman (1984), who studied the differences in the occupational attainment between foreign and Swedish women around 1980, found that difference in choice of occupation is due to parameter differences rather than different qualifications. He suggested that their characteristics are evaluated differently, they are treated differently in the labor market, or they have different preferences for occupations.

Looking at the coefficients to the experience splines, we find that - for all groups - experience gives a positive return compared to non-experience. The return to experience compared to non-experience is highest during the first 5 years of experience and for more than 10 years. Hence the wage

[14] This is the opposite to MacPherson and Stewart (1989), who find that immigrant females from less-developed countries of origin who have young children are more likely to participate than comparable women from more developed countries. We do not test the hypothesis that married women subsidize the human capital investment of their husbands, meaning that they increase their participation if their husbands are undertaking education, although this hypothesis is supported by Long (1980), Duleep and Sanders (1993), and MacPherson and Stewart (1989).

[15] This finding lends no support to the hypothesis that immigrants have a higher return to education than natives because the value of the human capital from their country of origin increases when they acquire human capital in the destination country, see Duleep and Regets (1999). They use an example of a Cambodian carpenter, whose knowledge of carpentry from Cambodia gains value after a further education in the U.S.

capacity increases more slowly for females who are non-employed[16] than for those who are employed. Looking at the coefficients to the years since migration splines, it is seen that in most cases the effect on wages becomes positive after the first 5 years, this indicates that some assimilation happens also in case of accumulation of non-employment. However, to get an exact picture of wage assimilation, age-experience-assimilation profiles are needed, see Husted et al. (2000) for a detailed analysis of the assimilation profiles for males. Now we turn to the decomposition analysis.

5. Analysis of a possible double-negative effect

As mentioned in section 3, a drawback from using a panel data sample selection model is that the mean expected log wages may deviate from the average log wage in the sample. Before we go to the decomposition analysis, it is instructive to check how well we predict the expected log wages. If the deviation is large, a decomposition analysis would not be worthwhile.

Table 1 shows that the largest deviation between the expected and average log wage is almost six percentage points in the case of Danish males, otherwise it is a couple of percentage points. Underestimation of the expected log wage for Danish males means that we underestimate the total log wage gap, meaning that the estimates are conservative.

Table 1. Comparison of the expected log wages and the average log wage in the samples.

	$\overline{E(y_{it} \mid d_{it}=1)}$ [1]		$\overline{y}_{it}$	
	Males	Females	Males	Females
Denmark	4.938	4.739	4.996	4.763
Nordic countries	5.017	4.771	5.033	4.785
Turkey	4.775	4.616	4.803	4.642
Africa	4.761	4.616	4.801	4.658
Pakistan	4.731	4.612	4.776	4.661
India & Sri Lanka	4.856	4.695	4.890	4.717

1. The expression for the expected log wage is shown in equation (5).

Using the decomposition of the expected log wage in equation (10), the presence of a potential double-negative effect may be analysed. Table 2 shows the decomposition of the log wage

[16] As mentioned in the data section, accumulation of 'non-experience' also covers self-employment. This may influence the results.

difference between Danish males and immigrant females into an ethnic and gender wage gap, each of which are divided according to differences in endowments (qualifications) and in coefficients (discrimination). What is denoted discrimination is the residual wage difference when the effect of different endowments or qualifications is eliminated. In addition to discrimination in the traditional sense, it might also include differences due to different preferences, cultural and language differences (including the speed of learning the new language).

Table 2. Decomposition of expected log wage gaps for five groups of immigrants.

	Δ_E	Q_E	D_E	Δ_G	Q_G	D_G	Δ_{Total}
(1)	$\hat{y}_{dmdm} - \hat{y}_{imim}$	$\hat{y}_{dmdm} - \hat{y}_{imdm}$	$\hat{y}_{imdm} - \hat{y}_{imim}$	$\hat{y}_{imim} - \hat{y}_{ifif}$	$\hat{y}_{imim} - \hat{y}_{ifim}$	$\hat{y}_{ifim} - \hat{y}_{ifif}$	$\hat{y}_{dmdm} - \hat{y}_{ifif}$
	- percentage points -						
Nordic	**-7.9**	22.6	-30.6	**24.7**	2.7	22.0	**16.8**
Turkey	**16.3**	22.7	-6.5	**16.0**	0.5	15.4	**32.2**
Africa	**17.7**	19.7	-2.0	**14.5**	0.8	13.7	**32.2**
Pakistan	**20.7**	-0.6	21.3	**11.9**	-3.9	15.8	**32.6**
India & Sri Lanka	**8.2**	9.9	-1.6	**16.1**	1.8	14.3	**24.3**
(2)	Δ_E	Q_E	D_E	Δ_G	Q_G	D_G	Δ_{Total}
	$\hat{y}_{dfdf} - \hat{y}_{ifif}$	$\hat{y}_{dfdf} - \hat{y}_{ifdf}$	$\hat{y}_{ifdf} - \hat{y}_{ifif}$	$\hat{y}_{dmdm} - \hat{y}_{dfdf}$	$\hat{y}_{dmdm} - \hat{y}_{dfdm}$	$\hat{y}_{dfdm} - \hat{y}_{dfdf}$	$\hat{y}_{dmdm} - \hat{y}_{ifif}$
	- percentage points -						
Nordic	**-3.1**	2.1	-5.2	**19.9**	8.0	11.9	**16.8**
Turkey	**12.3**	4.8	7.6	**19.9**	8.0	11.9	**32.2**
Africa	**12.3**	2.7	9.6	**19.9**	8.0	11.9	**32.2**
Pakistan	**12.7**	3.5	9.2	**19.9**	8.0	11.9	**32.6**
India & Sri Lanka	**4.4**	5.0	-0.5	**19.9**	8.0	11.9	**24.3**

Note: The formula for the decomposition (1) is shown in equation (10).

When evaluating the possible presence of a double-negative effect, we find that it is clearly present for Pakistanis, although the relative magnitudes are ambiguous. And it is clearly not present for Nordic and Indian and Sri-Lankan immigrants. Evaluating discrimination by a comparison of immigrant females with Danish females (the lower part of Table 2), this also indicates a double-discriminatory effect for the Turkish and African females. However, all women are affected by the gender discrimination.

Altogether, the evidence in favor of the double-negative effect is mixed, since most immigrant females are affected mainly by gender discrimination in wages. However the country of origin of the female immigrant is an overall important factor.

6. Concluding remarks

Estimation of wage equations for immigrants shows no general positive return to Danish education for immigrants. As usually observed, a wage-assimilation process is going on for most immigrant groups, and this is the case whether individuals are employed or non-employed.

Regarding the double-negative effect, the general picture in this study confirms the finding by Shamsuddin (1998) for Canada. He found that immigrant females are mainly affected by gender discrimination in wages that also affect their native peers. The fact that we have access to the total population of immigrants means that, in contrast to Shamsuddin (1998), we are able to distinguish between different immigrant groups according to countries of origin. And, not surprisingly, the results show that this distinction is essential. Females from Pakistan clearly experience a double-negative effect on wages, and females from the Nordic countries and India and Sri Lanka experience no double-negative effect at all. For Turkish and African females the conclusion is ambiguous, even though they are discriminated against if the ethnic wage gap is defined as the difference between native an immigrant females. In addition to discrimination in the traditional sense, the so-called discriminatory ethnic wage gap also include differences due to different preferences, cultural and language differences, including the speed of learning Danish.

Only males from Pakistan are affected by an unfavorable ethnic wage gap. The other ethnic groups, and the Nordic immigrants in particular, tend to experience a favorable ethnic wage gap remunerating their skills better than natives.

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Appendix A. Details about the samples.

Table A1. Sample means, males.

	Denmark	Nordic countries	Turkey	Africa	Pakistan	India and Sri Lanka
Wage (DKK)	157.10	175.46	128.82	132.20	127.62	146.74
Ln wage (if Wage>0)	4.99	5.03	4.80	4.80	4.78	4.89
Wage>0	0.73	0.49	0.45	0.42	0.38	0.50
Primary education	0.33	0.09	0.31	0.15	0.29	0.17
Secondary education	0.03	0.03	0.01	0.02	0.03	0.03
Vocational education	0.47	0.06	0.02	0.05	0.04	0.04
Theoretical education	0.17	0.15	0.01	0.05	0.01	0.07
Experience DK	13.27	4.70	4.82	3.72	4.44	5.42
Non-experience DK	-	4.21	5.70	4.76	6.18	5.10
Years since migration	-	8.52	10.37	8.33	10.43	10.28
Age	38.96	38.40	29.11	33.22	32.56	36.75
Single	0.31	0.44	0.23	0.38	0.38	0.31
Youngest child 0-2 yrs	0.10	0.12	0.31	0.20	0.25	0.18
Youngest child 3-6 yrs	0.08	0.08	0.18	0.10	0.13	0.13
Youngest child 7-17 yrs	0.22	0.13	0.18	0.12	0.16	0.20
Number of children	0.68	0.57	1.45	0.83	1.35	0.93
High level salaried	0.23	0.19	0.02	0.07	0.02	0.13
Low level salaried	0.13	0.06	0.03	0.08	0.05	0.08
Skilled	0.19	0.05	0.03	0.05	0.03	0.05
Missing occupation	0.18	0.53	0.51	0.57	0.53	0.43
Unemployment (%)	4.99	7.46	6.80	7.56	6.50	6.55
Sample size	47,259	63,805	94,139	40,552	34,265	7,333

Table A2. Sample means, females.

	Denmark	Nordic countries	Turkey	Africa	Pakistan	India and Sri Lanka
Wage (DKK)	122.63	128.87	108.63	112.40	112.25	117.59
Ln wage (if Wage>0)	4.76	4.78	4.64	4.66	4.66	4.72
Wage>0	0.68	0.52	0.23	0.28	0.19	0.43
Primary education	0.44	0.13	0.17	0.15	0.14	0.13
Secondary education	0.03	0.04	0.01	0.02	0.02	0.03
Vocational education	0.34	0.06	0.01	0.03	0.02	0.05
Theoretical education	0.19	0.13	0.00	0.03	0.00	0.04
Experience DK	9.49	4.57	2.36	2.22	2.19	4.28
Non-experience DK	-	5.08	7.39	6.51	8.56	6.84
Years since migration	-	9.47	9.62	8.64	10.64	11.02
Age	38.91	36.90	30.50	32.35	32.67	35.60
Single	0.26	0.35	0.13	0.26	0.16	0.20
Youngest child 0-2 yrs	0.11	0.15	0.32	0.29	0.30	0.19
Youngest child 3-6 yrs	0.10	0.13	0.21	0.17	0.20	0.17
Youngest child 7-17 yrs	0.26	0.22	0.24	0.20	0.27	0.31
Number of children	0.78	0.85	1.73	1.55	2.07	1.24
High level salaried	0.17	0.17	0.01	0.04	0.02	0.06
Low level salaried	0.30	0.17	0.02	0.06	0.04	0.11
Skilled	0.01	0.01	0.01	0.01	0.00	0.02
Missing occupation	0.28	0.49	0.75	0.72	0.77	0.54
Unemployment (%)	5.07	6.98	7.13	7.49	6.39	6.34
Sample size	45,308	83,480	91,903	27,758	33,425	7,801

Appendix B. Estimation results.

Table B1. Results from estimation of selection equation.

	Denmark		Nordic countries		Turkey		Africa		Pakistan		India and Sri Lanka	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Constant 1	-0.269	-2.340	-3.640	-3.369	0.519	0.066	-0.278	-1.905	-0.796	-1.002	-1.342	-1.984
	(0.094)	(0.095)	(0.066)	(0.059)	(0.041)	(0.025)	(0.075)	(0.097)	(0.073)	(0.112)	(0.182)	(0.184)
Constant 2	1.967	-0.269	-1.574	1.475	1.813	1.135	1.229	-0.484	0.501	0.281	0.393	-0.438
	(0.093)	(0.094)	(0.064)	(0.058)	(0.042)	(0.027)	(0.077)	(0.098)	(0.074)	(0.114)	(0.184)	(0.185)
Primary education			-0.074	-0.101	0.016	0.135	-0.124	0.165	0.028	-0.003	-0.175	0.040
			(0.019)	(0.014)	(0.012)	(0.016)	(0.021)	(0.029)	(0.019)	(0.034)	(0.046)	(0.051)
Secondary education	-0.199	-0.071	-0.041	0.036	-0.004	0.331	-0.078	0.413	0.084	0.293	-0.052	0.408
	(0.043)	(0.034)	(0.030)	(0.023)	(0.036)	(0.041)	(0.042)	(0.046)	(0.037)	(0.059)	(0.086)	(0.092)
Vocational education	0.170	0.245	0.174	0.287	-0.064	0.439	0.028	0.586	0.194	0.022	0.208	0.455
	(0.016)	(0.015)	(0.021)	(0.020)	(0.026)	(0.039)	(0.029)	(0.040)	(0.036)	(0.053)	(0.077)	(0.085)
Theoretical education	0.355	0.505	0.256	0.386	0.703	0.874	0.464	0.792	0.652	1.316	0.467	0.615
	(0.023)	(0.020)	(0.015)	(0.013)	(0.032)	(0.054)	(0.028)	(0.051)	(0.060)	(0.128)	(0.057)	(0.080)
Years since migration			2.727	4.254	-6.074	0.776	0.144	6.603	-8.719	1.402	-1.511	0.983
			(0.584)	(0.501)	(0.382)	(0.401)	(0.601)	(0.891)	(0.812)	(0.940)	(1.753)	(1.896)
Yrs since migr (5+yrs)			-2.302	-4.492	2.952	-2.221	-0.103	-6.144	4.596	-0.090	-5.027	4.309
			(0.883)	(0.734)	(0.535)	(0.677)	(0.916)	(1.326)	(1.151)	(1.142)	(2.636)	(2.613)
Yrs since migr (10+yrs)			-3.161	-0.525	-3.340	-2.538	-0.232	-4.995	-2.496	-2.108	3.120	-7.266
			(0.580)	(0.462)	(0.338)	(0.429)	(0.647)	(0.831)	(0.635)	(0.707)	(1.492)	(1.461)
Yrs since migr (20+yrs)			3.613	-1.400	1.708		-0.153	-1.312	3.393	-0.583	3.308	-12.113
			(1.464)	(1.087)	(0.359)		(1.423)	(1.828)	(1.131)	(1.485)	(3.165)	(3.069)
Unemployment	-3.809	-4.082	-5.159	-4.184	-10.538	-10.140	-2.016	-6.178	-10.550	-5.858	-8.644	-5.068
	(0.253)	(0.232)	(0.265)	(0.211)	(0.204)	(0.244)	(0.297)	(0.435)	(0.323)	(0.386)	(0.745)	(0.707)
Single	-0.294	-0.131	-0.178	-0.101	0.010	0.111	-0.091	-0.006	0.087	0.298	-0.011	-0.144
	(0.017)	(0.015)	(0.013)	(0.010)	(0.011)	(0.014)	(0.015)	(0.020)	(0.017)	(0.024)	(0.041)	(0.042)
Age	1.912	11.940	16.304	15.795	2.786	1.241	-0.055	7.282	8.441	0.295	9.879	10.246
	(0.497)	(0.507)	(0.313)	(0.301)	(0.258)	(0.199)	(0.408)	(0.551)	(0.355)	(0.647)	(0.933)	(1.063)
Age squared	-5.880	-17.550	-21.377	-22.016	-7.002	-6.340	-2.583	-11.969	-12.400	-2.757	-15.241	-16.338
	(0.619)	(0.633)	(0.382)	(0.378)	(0.378)	(0.300)	(0.563)	(0.738)	(0.471)	(0.907)	(1.207)	(1.495)
Youngest child 0-2 yrs	0.305	-0.377	0.249	-0.143	0.091	-0.011	0.129	-0.047	0.192	0.010	0.109	-0.151
	(0.037)	(0.032)	(0.027)	(0.019)	(0.012)	(0.011)	(0.021)	(0.024)	(0.020)	(0.025)	(0.059)	(0.063)
Youngest child 3-6 yrs	0.324	-0.197	0.247	-0.024	0.055	-0.035	0.097	0.003	0.124	0.024	0.126	-0.150
	(0.042)	(0.035)	(0.030)	(0.020)	(0.014)	(0.012)	(0.026)	(0.027)	(0.025)	(0.027)	(0.068)	(0.065)
Youngest child 7-17 yrs	0.273	-0.027	0.175	0.072	0.023	-0.019	0.129	0.063	0.021	0.051	0.221	-0.015
	(0.027)	(0.025)	(0.023)	(0.016)	(0.013)	(0.011)	(0.021)	(0.023)	(0.019)	(0.022)	(0.051)	(0.055)
Number of children	-0.161	-0.117	-0.063	-0.121	-0.053	-0.052	-0.046	-0.103	-0.064	-0.034	-0.058	-0.087
	(0.013)	(0.013)	(0.011)	(0.007)	(0.004)	(0.003)	(0.007)	(0.007)	(0.006)	(0.006)	(0.020)	(0.022)

Table B2. Results from estimation of wage equation.

	Denmark		Nordic countries		Turkey		Africa		Pakistan		India and Sri Lanka	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Constant 1	4.174	4.115	3.723	3.880	4.079	4.003	4.275	4.584	4.328	4.448	4.167	4.399
	(0.017)	(0.018)	(0.023)	(0.018)	(0.056)	(0.012)	(0.031)	(0.048)	(0.030)	(0.059)	(0.072)	(0.044)
Constant 2	4.552	4.433	4.297	4.321	4.419	4.423	4.769	5.096	4.776	4.974	4.685	4.771
	(0.017)	(0.018)	(0.023)	(0.019)	(0.005)	(0.011)	(0.031)	(0.049)	(0.029)	(0.059)	(0.073)	(0.045)
Primary education			-0.125	-0.055	-0.037	-0.081	-0.021	-0.123	-0.025	-0.066	0.015	-0.092
			(0.007)	(0.004)	(0.004)	(0.007)	(0.009)	(0.013)	(0.009)	(0.018)	(0.014)	(0.017)
Secondary education	0.165	0.117	0.035	-0.047	0.004	-0.152	-0.054	-0.186	0.005	-0.253	-0.044	-0.022
	(0.005)	(0.007)	(0.011)	(0.007)	(0.011)	(0.017)	(0.020)	(0.020)	(0.016)	(0.026)	(0.029)	(0.028)
Vocational education	0.100	0.050	0.015	-0.037	0.072	-0.154	-0.029	-0.160	0.004	0.042	-0.011	-0.021
	(0.003)	(0.003)	(0.007)	(0.005)	(0.009)	(0.016)	(0.012)	(0.017)	(0.016)	(0.026)	(0.023)	(0.019)
Theoretical education	0.201	0.097	0.075	0.013	-0.064	-0.226	0.014	-0.157	-0.035	-0.369	0.005	0.069
	(0.003)	(0.004)	(0.005)	(0.004)	(0.011)	(0.021)	(0.011)	(0.021)	(0.031)	(0.052)	(0.019)	(0.020)
Experience	4.408	2.261	5.631	3.127	4.490	1.944	2.367	1.224	3.085	0.576	2.484	2.996
	(0.188)	(0.148)	(0.176)	(0.130)	(0.115)	(0.140)	(0.215)	(0.310)	(0.224)	(0.319)	(0.544)	(0.441)
Experience (5+ yrs)	-3.423	-1.925	-6.175	-2.836	-4.635	-2.064	-0.803	-1.762	-2.946	-0.323	-1.082	-3.025
	(0.259)	(0.202)	(0.273)	(0.209)	(0.186)	(0.236)	(0.357)	(0.549)	(0.377)	(0.529)	(0.862)	(0.738)
Experience (10+ yrs)	-0.081	0.688	1.156	0.548	1.001	-0.216	-0.482	1.920	0.259	-0.071	0.198	1.208
	(0.109)	(0.094)	(0.192)	(0.156)	(0.166)	(0.237)	(0.297)	(0.517)	(0.354)	(0.574)	(0.613)	(0.569)
Years since migration			-3.525	-1.360	-1.257	-0.067	-0.342	-1.012	2.321	-0.221	0.115	-0.709
			(0.237)	(0.164)	(0.180)	(0.138)	(0.293)	(0.431)	(0.430)	(0.317)	(0.748)	(0.606)
Yrs since migr (5+yrs)			3.662	1.240	1.439	0.917	-0.076	1.279	-1.303	0.020	-0.685	-0.149
			(0.346)	(0.238)	(0.246)	(0.241)	(0.441)	(0.630)	(0.618)	(0.263)	(1.141)	(0.886)
Yrs since migr (10+yrs)			0.406	0.915	0.814	0.438	0.406	1.628	1.510	0.803	1.765	1.738
			(0.204)	(0.134)	(0.129)	(0.164)	(0.288)	(0.385)	(0.323)	(0.311)	(0.619)	(0.479)
Unemployment	0.428	0.891	1.673	1.986	1.954	3.981	0.763	2.066	4.014	2.293	2.572	1.658
	(0.045)	(0.049)	(0.088)	(0.066)	(0.074)	(0.111)	(0.081)	(0.207)	(0.155)	(0.205)	(0.257)	(0.237)
Single	-0.031	0.008	-0.039	0.015	0.030	-0.044	0.035	-0.007	-0.019	-0.127	-0.025	0.018
	(0.002)	(0.003)	(0.004)	(0.003)	(0.004)	(0.006)	(0.006)	(0.009)	(0.007)	(0.011)	(0.013)	(0.013)
High level salaried	0.133	0.151	0.163	0.124	0.028	0.054	0.108	0.056	0.086	0.110	0.164	0.034
	(0.003)	(0.004)	(0.005)	(0.004)	(0.006)	(0.008)	(0.007)	(0.011)	(0.010)	(0.011)	(0.014)	(0.014)
Low level salaried	-0.020	0.030	0.018	0.035	0.004	-0.013	-0.002	-0.033	-0.061	-0.024	-0.076	-0.030
	(0.004)	(0.003)	(0.006)	(0.004)	(0.004)	(0.005)	(0.007)	(0.008)	(0.008)	(0.009)	(0.016)	(0.011)
Skilled	0.039	0.076	0.038	0.013	-0.071	-0.075	-0.027	-0.025	-0.078	-0.114	-0.056	-0.024
	(0.003)	(0.008)	(0.008)	(0.008)	(0.005)	(0.011)	(0.008)	(0.016)	(0.010)	(0.026)	(0.018)	(0.026)
Missing occupation	-0.077	-0.067	0.078	-0.049	-0.134	-0.100	-0.118	-0.115	-0.161	-0.094	-0.162	-0.126
	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	(0.005)	(0.006)	(0.008)	(0.007)	(0.011)	(0.015)	(0.013)
Age	1.485	1.606	4.251	2.789	2.857	2.474	1.789	0.582	-0.020	2.101	1.472	0.755
	(0.084)	(0.092)	(0.110)	(0.096)	(0.069)	(0.092)	(0.190)	(0.279)	(0.112)	(0.338)	(0.382)	(0.273)
Age squared	-2.027	-1.904	-4.056	-2.815	-3.238	-1.762	-1.358	-0.200	0.640	-1.863	-1.149	-0.386

	(0.101)	(0.113)	(0.133)	(0.125)	(0.110)	(0.145)	(0.258)	(0.389)	(0.167)	(0.460)	(0.502)	(0.378)
s_e	0.066	0.070	0.422	0.358	0.384	0.442	0.461	0.467	0.490	0.494	0.404	0.343
	(0.000)	(0.0)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
r	-0.058	-0.500	-0.720	-0.736	-0.887	-0.956	-0.893	-0.933	-0.934	-0.943	-0.849	-0.849
	(0.014)	(0.007)	(0.004)	(0.003)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.007)	(0.008)
P_{11}	0.231	0.114	0.147	0.100	0.060	0.011	0.061	0.058	0.031	0.013	0.098	0.119
	(0.009)	(0.009)	(0.009)	(0.007)	(0.005)	(0.003)	(0.007)	(0.010)	(0.006)	(0.007)	(0.019)	(0.021)
P_{12}	0.109	0.246	0.373	0.381	0.629	0.736	0.646	0.597	0.641	0.696	0.469	0.499
	(0.008)	(0.010)	(0.010)	(0.008)	(0.007)	(0.007)	(0.009)	(0.014)	(0.011)	(0.013)	(0.024)	(0.026)
P_{21}	0.451	0.487	0.333	0.379	0.223	0.219	0.226	0.309	0.268	0.270	0.330	0.319
	(0.008)	(0.008)	(0.006)	(0.006)	(0.005)	(0.007)	(0.007)	(0.011)	(0.009)	(0.011)	(0.019)	(0.020)
P_{22}	0.208	0.154	0.147	0.140	0.088	0.034	0.067	0.040	0.060	0.022	0.103	0.063
	(0.007)	(0.006)	(0.005)	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)	(0.005)	(0.003)	(0.012)	(0.011)

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