Ethnic Disparities in the Graduate Labour Market: A Longitudinal Study

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Abstract

This paper examines ethnic wage differentials for the entire population of students enrolled in 1996 using unique administrative panel data for the period 1996 to 2005 from the Dutch tertiary education system. The study decomposes wage differentials into two components: a component which can be explained by the observed characteristics and unexplained component. The analysis provides novel evidence for the magnitude and the origin of ethnic wage differentials by gender. In general, ethnic wage gap is larger for migrant women than migrant men and larger for Western and Caribbean migrants than Mediterranean migrants. Ethnic minority students appear to have large wage surplus which is almost entirely explained from their favourable observed characteristics. Most notably, Mediterranean female graduates have significant positive wage discrimination while Western female graduates seem to face a small wage penalty.

1   Introduction

Ethnic disparities in the upper segments of skill distribution have received little attention from scholars, in contrast to the concentration of ethnic minorities in the lower segments of the labour market (Adsera and Chiswick, 2007; Heath et al., 2008). However, participation of the largest ethnic minority groups in higher education has increased sharply in the last decade. Between 1995 and 2006, the percentage of Mediterranean (Turkish and Moroccan) students in the Dutch higher education system doubled, from about 16 percent to 37 percent, while the rise in the participation rate of Dutch students has been relatively limited, i.e. from 45 to 55 percent. The participation rate of Surinamese students increased from 28 to 49 percent (Herweijer, 2009).

In contrast with immigrants' position in the lower segments of the labour market, there is little evidence on the performance of ethnic minorities in the high skilled labour market. Attending higher education implies that ethnic-minority students have acquired many main stream norms and values transmitted through all levels of education, generally called host-country-specific capital, which acts as an invisible device for the adjustment of migrants in the host-country labour markets (Chiswick and Miller, 2008, 2009; Friedberg, 2000). Still, a lower proportion of ethnic minority students complete their study compared to Dutch students (Severiens and Wolff, 2008; Meeuwisse et al, 2010; Zorlu, 2011). This paper is the first to address ethnic disparities in the upper segment of the Dutch labour market conditional on the enrolment in the tertiary education.

Theoretically, a disadvantaged ethnic background does not necessarily generate a new ethnic disadvantage. The earlier study by Belman and Heywood (1991) and recent studies by Ferrer and Riddell (2008) and Arcidiacono and colleagues (2008) provide empirical evidence from the United States and Canada that, compared with the majority, ethnic minorities have greater earnings gains associated with completing educational programmes. This relatively large gain has been explained by imperfect signalling model in which minorities receive greater returns to signals for high productivity than natives do. These greater returns would stem from the higher cost of achieving an inaccurately high signal for minorities compared with natives because minorities possess relatively fewer resources (Golbe, 1985; Belman and Heywood, 1991, 1997).

There is another reason to believe that ethnic wage penalties for disadvantaged groups need not be present. Since only a small percentage of ethnic minority youth enrol in higher education, it is likely that most able individuals will be first to enrol. Kristen et al. (2008) report a significant positive selectivity of Turkish students into tertiary education in Germany. Such a positive selectivity can lead to an underestimation of ethnic disparities or an overestimation of relative wages of ethnic minority students when estimation will not adequately control for ability.

This paper contributes to the literature on the performance of ethnic minorities from disadvantaged immigrant groups by examining ethnic disparities in the graduate labour market conditional to enrolment. The study uses unique administrative panel data of the entire 1996 intake cohort in the Dutch tertiary education system, composed of higher vocational education (HBO) and academic education (WO). We follow individuals during ten years after the enrolment in registers to assess the labour market performance of graduates and drop-outs. The paper applies regression analysis to decompose the ethnic wage gap into two components: the first component refers to the explained wage differential which arises from differences in observed characteristics. The second part of ethnic wage differentials is the unexplained

component. This component is often interpreted as a measure of discrimination, as we do in this paper.

The rest of the paper is organized as follows. In Section 2, we briefly describe the Dutch higher-education system and ethnic-minority groups. In Section 3, we discuss the theoretical framework and derive hypothesises. In Section 4, we introduce the data and provide descriptive results. In Section 5, we examine ethnic wage differentials using a decomposition analysis. Section 6 contains our conclusions.

2   The Dutch context

2.1   The Dutch education system

The Dutch higher-education system is organized as a binary system: higher-vocational education (HBO) and academic education (WO). The fundamental difference between these two tracks is the curriculum offered by these institutions: the HBO institutions provide higher professional education in applied subjects, while the WO institutions (universities) conduct research and provide academic education. The HBO institutions are practice oriented, not research oriented. In line with the orientation, the entry-requirement conditions for access are different for HBO and WO. In the Netherlands, access to higher education is conditional on the completion of pre-determined secondary education, no entrance examination is needed. Financial constraints play hardly a direct role in enrolment decisions.

Candidates for WO are required to have a leaving certificate from pre-university education (VWO) or to have completed the first year of an HBO programme, while the minimum requirement for access to HBO programmes is either a leaving certificate from general secondary education (HAVO) or a level-4 diploma from the secondary vocational-education programme (MBO). The Dutch education system was different from the Anglo-Saxon Bachelor-Master type until the 2002/2003 academic year. The higher education system in the Netherlands was then organized in a Bachelor-Master degree structure in the framework of the harmonization of educational systems in the European Union, regulated by the Bologna agreement (1999). The new system has been applied to new entrants since September 2002. Before the introduction of this new structure, both study types lasted formally for four years. A WO graduate received a Master's degree, while HBO students received a degree equivalent to a Bachelor's degree. Since our data only relate to the 1996 entrants, for this study the old higher education system applies.

2.2   Ethnic minorities

This study decomposes ethnic-minority students in Dutch higher education into four major groups taking into account the parental immigration history and these students' socioeconomic position and their own educational attainment. The first group includes students of Turkish and Moroccan origin (*Mediterranean*). The second group comprises students from Suriname and the Dutch Antilles, (*Caribbean*). The third group covers students originating from western countries (*Western*). The first Turkish and Moroccan immigrants came to the Netherlands as guest workers in the 1960s while immigration flows from Suriname and the Netherlands Antilles have been derived from colonial relations. Immigration from Western countries has been related to economic conditions.

This historical background reflects the socioeconomic position of these groups and their cultural distance from the host society. Caribbean migrants often speak Dutch and adopt cultural norms similar to those of the Dutch through their colonial relations. Their labour-market position is somewhat less favourable than that of the native Dutch. In contrast, the predominantly Muslim Mediterranean migrants are frequently less well-educated, hardly ever spoke Dutch prior to immigration, and have a greater cultural distance from the Dutch. There is some empirical evidence that these migrants face significant difficulties in the Dutch education system, labour, and housing markets (Heath et al., 2008; Zorlu, 2011). These students have a high dropout rate, they are frequently unemployed, and they are concentrated at the bottom of the occupational distribution.

It should be noted that a large portion of ethnic-minority students were born in the Netherlands or immigrated at young ages and followed primary and secondary education there. Consequently, these students, in contrast with their parents, have been exposed to mainstream norms and values in Dutch society. Possibly only a small share of the ethnic-minority students came to the Netherlands to study. These students also have to satisfy the standard entry-requirements of higher education, including language. These non-discriminatory entry conditions ensure that students will not face basic language problems and they will not lack basic relevant information. However, ethnic minority students may still lack cultural and linguistic capital which the Dutch middle and higher class have in common (see next section). Thus, any differences in wages of the groups will reflect ethnic disparities. These can stem from many sources, including motivation, ability, preferences and quality of the match between individual and employer.

3 Theoretical Framework and Hypotheses

In Europe and in the Netherlands in particular, most of ethnic minorities from developing countries are concentrated in the lower end of the skill distribution. An increasing number of youth has enrolled in the higher education and entered the labour market with higher qualifications than their parents. The question remains whether ethnic minority graduates from disadvantaged communities obtain similar return to their qualifications as native Dutch do. Traditionally, human capital theory links education to labour market performance by regarding education as investment which enhances productivity (Becker, 1964). Since all students take similar courses, human capital theory is of little importance in explaining ethnic disparities (Wiers-Jenssen and Try, 2005). Instead, we make an appeal to signalling theory and the sociological theory of social and cultural capital to explain these findings.

Signalling theories emphasise signalling effects of education. If employers can not observe the true productivity of a worker, this employer will use easy-to-observe indicators, such as education, that are thought to be correlated with productivity. In traditional signalling models (Spence 1973; Weiss 1995), schooling acts as a screening device for the productivity of workers. This suggests that schooling has a signalling function beyond its contribution to productivity, as argued by human capital theory. An imperfect signalling model predict that ethnic minorities are expected to receive greater returns to signals of high productivity than the majority does because ethnic minorities may have a relatively high cost of achieving an inaccurately high signal, owing to their relatively limited resources to devote to higher education (Belman and Heywood 1991; Golbe 1985).

The literature on statistical discrimination argues that employers' decisions on hiring and earnings are based on a conditional expectation of productivity, given the signal of productivity. In other words, employers will hire workers who signal expected high productivity through 'common' indicators of high productivity such as education. Employers may also use other easy-to-observe indicators for productivity such as ethnicity and race if productivity is thought to be related to these indicators. In such a context, ethnic minority communities with a less favourable image may face more likely discrimination in the labour market. Signalling theory provides tools to understand possible ethnic disparities in the post-graduation period if individual productivity is determined properly. However, it is unlikely that a degree can capture entire productivity. There must be other determinants of productivity such as quality of courses taken and an IQ score that are not included in our data. We deal with the problem of unobserved determinants of productivity by applying an estimation strategy with correction for unobserved individual heterogeneities.

The second line of arguments emphasizes the role of structural and cultural constraints implicit in society that generate disparities for disadvantaged minorities. Students from racial and ethnic minority groups are more likely to come from disadvantaged families and are thought to lack the relevant social and cultural capital necessary for finding a job. Social capital refers to productive relationships or networks that provide access to opportunity or lead to favourable outcomes (Coleman, 1988). Cultural capital refers to high-status linguistic and cultural competences like value, preferences and tastes that are inherited from parents, peers and other institutional agents. The acquisition of cultural capital depends heavily on early and imperceptible learning, performed within the family from the earliest days of life (Bourdieu, 1986). Deficiency in the proficiency of majority language within a minority group is likely to be an important source of a low level of cultural capital. Students from developing countries, especially Mediterranean students, potentially comprise such a minority group possessing less social and cultural capital owing to their less-advantaged position within Dutch society. A low level of social and cultural capital is associated with a greater cultural distance from the host society, which will potentially hamper establishing relevant social networks which serves as effective channels of relevant information to get highly valued scarce jobs (Granovetter, 1985). Furthermore, high skilled jobs are increasingly non-monotonic and require a high degree of interpersonal interactions, language skills, cultural capital and social relations. All these requirements in mind, employers may not prefer graduates from disadvantaged immigrant groups that are perceived not to 'fit' to the profile of a 'standard' employee or they pay relatively low wages to ethnic minorities.

Relying on predictions of imperfect signalling model and considering deficiency in social and cultural capital and relevant social networks to get good jobs, we formulate the following hypotheses:

(H1). Mediterranean graduates who are predominantly from Muslim origin, whose linguistic and cultural distance from the Dutch is great, will have relatively higher wages if predictions of imperfect signalling model is dominant (H1a), and the least returns if deficiency in social and cultural capital and social networks will be dominant (H1b).

(H2). Caribbean graduates, who have a colonial history with the Netherlands and many of whom speak Dutch, and who are quite close to the Dutch society concerning religious and cultural characteristics will experience less difficulties compared to the Mediterranean. However, they

will still face some disadvantages because of the weakness of relevant social networks that may stem from their less favourable socioeconomic position as a group, compared to the Dutch.

(H3). Western graduates who are quite comparable with Dutch regarding their social cultural and religious background will experience little or negligible disadvantages in the Dutch labour-market.

4   Data

The analysis uses two main longitudinal data sources: the Central Register of Higher Education (CRIHO) and the Social Statistical Database (SSD). The CRIHO includes information about the subject of study, type of education (vocational - HBO, or academic -WO), institution of study, and month and year of graduation. The SSD includes variables measuring the relevant labour-market characteristics of individuals and their parents, in addition to basic personal characteristics such as age, gender, and ethnicity. Both datasets were derived from individual register data ensuring a high quality of measurement. We selected the entire cohort of students in the CRIHO who started in the Dutch higher education system for the first time in 1996, and followed them through until 2006 (see the structure of the data below). Individuals who left the country or died were excluded from the analysis. Only individuals who were in the Netherlands in the period of 1996 to 2005 take part of the analysis. Excluding emigrants can potentially bias our estimations if emigrants are selective on certain characteristics that affect the performance of individuals in higher education and in the labour market. However, there is little reason to believe that such selectivity has occurred. Most students enrolling in the Dutch higher education tend to look for a first job in the Netherlands. It is likely that a small number of students might have left the country to participate in PhD programs abroad. This restriction excludes foreign exchange students and generates a common career path for all students to identify interethnic differences.

We chose the cohort of starters in 1996, because the earliest formal graduation would take place in 1999, 3 to 4 years after enrolment, and 1996 is the starting year of the SSD. The SSD panel includes information about changes in demographic characteristics and labour-market position for the years 1999 to 2006. The merging of these two databases provided us with unique longitudinal data to examine the duration of study and performance of students in the labour market.

The structure of data: the intake cohort from 1996 in higher education is tracked as follows:

1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Educational attainment (CRIHO)									
			Labour market (SSD)						
			1999	2000	2001	2002	2003	2004	2005

The combined database includes individual students' main demographic characteristics such as gender, age, country of birth and origin, household structure, kind of pre-university education, type of study and year of graduation. For the analysis of wage differentials, we used daily earnings calculated from the annual earnings reported in the tax registers. The annual earnings were divided by the number of days worked; these came from social-security registers. Unfortunately, there was no information on the number of working hours. This lack implies that

there might be still some measurement errors for daily earnings if individuals did not work a full day in the years 1999 and 2000. From 2001 onwards, however, extra information is available about whether jobs are full-time, part-time or flexible, which helps to standardize daily earnings more precisely. We construct daily wages for the years 1999 - 2005 using this available information about annual earnings, total number of days worked in a year and extra information about the full-time and part-time status of job to use in the analysis.

It should be noted that both databases (CRIHO and SSD) comprise administrative registers, and include the entire population of students who started in the Dutch higher education for the first time in 1996 and were in the Netherlands during the whole analyse period. These students are followed from 1996 to 2005. Our panel data (SSD completed with CRIHO data) covers the period 1999 to 2005 in which each individual appears seven times. So, we could deal with a balanced panel of an entrance cohort.

4.1   *Descriptive statistics*

Table 1 shows the covariates used in the analysis and their mean values by ethnic background. We distinguish three major ethnic groups besides native Dutch, relying on similarities in the socioeconomic position of their parents and their own educational attainment. The ethnic groups differ significantly regarding their characteristics and performance. Most of the ethnic-minority students were second generation: they were born in the Netherlands or immigrated before they were six years old. A relatively low percentage of second-generation Caribbean students is possibly related to the fact that the Netherlands attracts students from the origin countries. Indeed, about 18 percent of these students immigrated just before starting their study in September 1996. Interestingly, a majority of the Mediterranean group are male while other groups are mainly composed of female students. The Mediterranean group is also older than other students.

A comparison of student performance by ethnic group ten years after starting in higher education reveals substantial differences. A large share of the students started and graduated in HBO, while a relatively small share graduated in WO. Although this pattern holds for all ethnic groups, there are interethnic differences. Mediterranean and Caribbean students are more likely to enroll in HBO and more likely to switch to WO, while Western students are more likely to start with a WO study. In general, an HBO study takes more time than a WO study. Remarkably, Mediterranean and Caribbean students seem not to benefit from their choice of a study lasting for a relatively short time. They are also less likely than Dutch students to finish their studies. After ten years, about 40 percent of them had not graduated compared with 22 percent of Dutch students: we refer to these as dropouts.

<<< TABLE 1 >>>

4.2   *Study performance*

In order to describe the duration pattern of study and degree performance, we first estimated non-parametric survival models (Kaplan-Meier) for the ethnic groups for the separate HBO- and WO-study types. Note that we use the same scale for the figures of HBO and WO to facilitate easy comparison of both figures. Figure 1 indicates that HBO students graduate more quickly than WO students do. However, after ten years a larger share of WO students had graduated compared

with HBO students. The probability of graduation decreases significantly with time for HBO students, especially after 60 months, while the probability remains relatively high for WO students. In both study types, the performance of Dutch students is the highest. They are followed by Western students and ONW. Caribbean and Mediterranean students are the most likely to drop out and need more time to finish their study.

<<< FIGURE 1 >>>

5   Returns on higher education

In this section we report our analyses of the wage growth of graduates and dropouts and identify ethnic differences in diploma effects and wage-growth rates. The main questions are how large the impact of obtaining a degree is, and how high is the growth rate of wages in the early career of graduates across ethnic groups; that is, whether returns on qualifications differ by ethnic origin. First we present descriptive results for male and female graduates and dropouts. Subsequently, we report our estimates of the wage functions of men and women allowing variations in the impact of regressors across ethnic groups.

Let us first consider developments in the labour-market position of dropouts and graduates over time. We plot median wages and unemployment for ethnic groups by gender. Individuals are regarded as unemployed if they do not have labour income. This definition differs from the traditional definition of unemployment. The choice of median wage instead of mean wages is related to sensitivity of mean wages for 'outliers' in small samples. Mean wages of Mediterranean and in particular Caribbean students fluctuate over time so that wage profiles of dropouts and graduates do not follow a monotonous line. The general pattern of median wage profiles is quite similar to the pattern of mean wage profiles. Our definition of unemployment is different than the standard ILO definition of unemployment. In this study, individuals receiving wages are treated as employed while those who have no wage income are treated as unemployed.

Figure 2 shows a sharp increase in wages for men and women but this increase is at a higher rate for graduates than for dropouts. The initial wage rate of dropouts is higher than for graduates. However, the graduates' wage rate quickly catches up with the dropouts' wage rate in 2001 for women and in 2002 for men and, the gap continues to steadily increase due to a relatively lower growth rate of dropouts' wages for each subgroup. This pattern is similar for men and women, although for the female sample the wage growth of dropouts is significantly slower than for graduates. If we closely look at wage profiles of all subgroups, the gap between median wages of dropouts and graduates is the largest in 2005 for Dutch women owing to a relatively low median wage of dropouts, rather than a higher wages of graduates while the size of gap is the smallest for Caribbean women and Mediterranean men. The sharp wages increase is probably caused by the nature of our sample, which is composed of relatively-young people at the beginning of their careers.

Figure 2 also shows that as expected, the unemployment rate is persistently higher for dropouts than for graduates for all subgroups. However, the difference in unemployment rates of dropouts and graduates is the greatest for Mediterranean men and women. Among Dutch and western students, this difference is larger for women than for men while the opposite holds for Caribbean

students. These results imply that a degree is more beneficial for Mediterranean (men and women) as well as Dutch and western women.

<<< FIGURE 2 >>>

5.1 Method

Enrolment in higher education is a selective process. First, an aspirant student has to satisfy the main admission requirements in the form of a certain level of preparatory schooling. Candidates are then free to choose a subject and whether to enrol. This procedure suggests student selectivity. All students enrolled for the first time in 1996 remain in the data for the following ten years. Since some students had not (yet) graduated in the period of the analysis, returns on higher education were assessed using the population of graduates and non-graduates. Those returns may be an overestimation of the true returns owing to the initial selectivity. The perceived returns on the completion of a degree can be seen as the cost of dropping out for a student in our data.

We examine ethnic wage disparities by adopting the conventional earnings function and the Oaxaca linear decomposition technique (Oaxaca, 1973). This technique is widely used to decompose wage differentials between various ethnic groups or between men and women into two components: differentials attributed to differences in endowments or observed characteristics, and an unexplained component, which may be supposed to capture labour market discrimination (Oaxaca,1973; Cotton, 1988; Neumark, 1988, Oaxaca and Ransom, 1994; Neuman and Oaxaca, 2004).

The basic specification is

$$\ln W_{it} = \beta_1 Age_{it} + \beta_2 YoE_{it}^m + \beta_3 YEdS_{it}^m + \beta_4 YEdI_i + \beta_5 GRAD_{it}^m + \beta_6 YsG_{it}^m + \beta_7 YsDO_{it}^m + \beta_8 Coh_{it} + \varepsilon_{it}$$

(1)

where the subscript i indicates individual i, t indicates time and the superscript m indicates whether the higher education type is HBO or WO.

$\ln W$ is logarithm of the daily wage of interest, YoE is years of education in HBO or WO, $YEdS$ is years of experience during study, $YEdI$ is years of experience during interruption, $GRAD$ is a dummy variable indicating a degree in HBO or WO, YsG is years since graduation in HBO or WO, $YsDO$ is years since dropout in HBO or WO, Coh is a dummy variable indicating married of cohabiting and the ε_{it} are the idiosyncratic errors. Years of experience refers to the number of years for which an individual has observed wages.

In order to capture relevant activities of students, graduates and drop outs, the model includes variables indicating these groups and measures potential experience for these groups. In addition, the model includes age and age-squared and specify labour market variables in detail during and after the completion of the study. To account for ethnic differences in track changes between HBO and WO institutions, we include dummy control variables indicating that the student started with a WO-study, dummy variables indicating the shift from HBO- to WO-study with or without

a degree, and a series of dummy variables indicating the subject of study. The ε_{it} are normally distributed errors[1].

We estimate this wage regression for the male and female subpopulations of Dutch, Mediterranean, Caribbean and Western by Ordinary Least Square (OLS) estimator using the pooled data for the years 1999 -2005. That means each individual occurs maximum seven times in this pooled data depending on the presence of wage. During this period, the individual may be either a student or a graduate or a drop out. Thus we use information from all individuals irrespective of their status to assess ethnic wage differentials. However, we refine our results by focussing on separate populations of students, graduates or drop outs in section 5.3. It is important to note that we treat no-wage as *missing* rather than *zero* wages. Observations with missing wages were excluded from the analysis. This approach can lead to biased estimates if individuals select themselves into employment.

The estimates of the OLS models in tables 2 and 3 show that there are significant differences in the estimated parameters across ethnic groups. Significant differences in the age distribution, study performance, academic tracks and socioeconomic characteristics of natives and immigrant groups explain some part of ethnic wage differentials, but much of the differentials remain unexplained by the factors observed. In order to uncover the explained and unexplained parts of wage differences between natives and separate ethnic groups, we adopted the Oaxaca linear decomposition technique (Oaxaca, 1973) using the separate regression models for each group. This technique decomposes, in fact, the mean differences in wages of natives and immigrants into explained and unexplained components. The idea is that some part of wage differentials between natives and ethnic groups can be explained by the differences in the observed characteristics of natives and ethnic groups that are included in the models estimated. This part is denoted as the explained component of ethnic wage differentials, while the remaining part of the differentials refers to the unexplained component.

According to the Oaxaca technique, the observed mean differential of wages, $\overline{W}_n - \overline{W}_m$, is decomposed into two components by the following equation:

$$\overline{W}_n - \overline{W}_m = \hat{\beta}_n \left(\overline{X}_n - \overline{X}_m \right) + \overline{X}_m \left(\hat{\beta}_n - \hat{\beta}_m \right) \qquad (2)$$

where the subscripts *n* and *m* denote natives and migrants, clustered into three groups as Mediterranean, Caribbean and Western in view of the similarities between the groups. $\overline{X}_n$ and $\overline{X}_m$ are the mean values for the observed characteristics; $\hat{\beta}_n$ and $\hat{\beta}_m$ are the associated coefficients. The first term on the right hand side, $\hat{\beta}_n \left(\overline{X}_n - \overline{X}_m \right)$, is a differential owing to the characteristics (referring to the measured productivity differential) and the second term $\overline{X}_m \left(\beta^* - \hat{\beta}_m \right)$ gives unexplained differentials. This unexplained part may be attributed to three main groups of factors. First, employers can pay relatively low wages to various ethnic minority

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[1] Ordinary Least Square estimation may yield biased coefficients if there is unobserved heterogeneity in the data; that is, wages may be correlated with unobserved effects in the estimating equations. In this case, using the random and fixed effects panel data estimators can be a way of dealing with the problem of unobserved heterogeneities. We estimated wage functions also by these panel data estimators (not reported here but available on request). The estimations indicate, in general, comparable results presented here.

groups, irrespective of their observed productive capacity. Second, there may be significant differences in unobserved productivity across ethnic minority groups, such as motivation and other unobserved abilities. Third, ethnic minority groups may have preferences for some study subjects that are associated with lower or higher earnings. These three components of unexplained differentials are hard to distinguish in the administrative data without additional information about attitudes and abilities. Nevertheless, the entire unexplained component is conventionally interpreted as the discriminatory differential. However, this is an indirect measure of discrimination and not necessarily an ideal measure. One problem with this interpretation is that migrant and Dutch workers may have different mean characteristics as a result of discriminatory practices. For instance, the distribution of migrant workers across sectors, occupations, employers and geographical locations may be due to discrimination. A second problem is that the observed explanatory variables in data explain only a part of wages. The omission of some important variables such as motivation, future career expectations and other unobserved ability measures can bias the results.

In the original form of the decomposition, Oaxaca (1973) proposes either a male or female wage structure as the non-discriminatory wage structure. Later studies suggest a non-discriminatory wage structure β^* be estimated, so that (6) becomes

$$\overline{W}_n - \overline{W}_m = \hat{\beta}_n\left(\overline{X}_n - \overline{X}_m\right) + \left[\overline{X}_n\left(\hat{\beta}_n - \beta^*\right) + \overline{X}_m\left(\beta^* - \hat{\beta}_m\right)\right] \tag{3}$$

where the estimated non-discriminatory structure is given as

$$\beta^* = \Omega\hat{\beta}_n + \left(I - \Omega\right)\hat{\beta}_m \tag{4}$$

Catton (1988) suggests a weighting matrix (Ω) reflecting the share of the majority group in the sample (I_n), $\Omega = I_n I$. Neumark (1988) proposes a least-squares criterion to estimate a weighting matrix from the pooled sample of all the groups distinguished, $\beta^* = \left(X'X\right)^{-1}\left(X'P\right) = \hat{\beta}$, where X is the observation matrix, P is the observation vector of the response variable and $\hat{\beta}$ is the OLS estimate obtained from the pooled sample.

Neumark (1988) and Oaxaca and Ransom (1994) show that the extent of the unexplained part is sensitive to the choice of a non-discriminatory wage structure. There is, however no unambiguous criterion to define a non-discriminatory wage structure. We therefore calculated decompositions using a weighting matrix which is proposed by Neumark (1988). This weighting matrix represents a common non-discriminatory wage structure derived from the pooled sample of natives and immigrants. This implies that natives and ethnic minorities contribute to a non-discriminatory wage structure according to their weighted share in the population.

5.2   Results

In this study, we clustered the immigrants into three groups: Mediterranean, Caribbean and western and applied the Oaxaca decomposition technique to assess the native-immigrant wage differentials. Considering differences in wage structures, we estimated equation (1) for separate ethnic groups by gender. The parameter estimates of OLS models are presented in tables 2 and 3. The results indicate significant variations in the estimated coefficients for some relevant variables across ethnic groups. Most interestingly, the return to each additional year of experience for Mediterranean HBO and WO graduates seems to be relatively low. However, the estimated

coefficients across the separate models for ethnic subpopulations are not directly comparable although they give an indication of the direction of wage differentials. Therefore, we will not discuss OLS estimates in detail. Instead, we focus on the results of the Oaxaca decomposition which base on the underlying OLS estimates. This technique has the advantage of revealing both positive and negative contributions of separate covariates to the total wage differential, so that ethnic differences in effects of all variables will be visible.

Table 4 and 5 reports the logarithmic decomposition of the native-migrant wage differential into the total explained differential and the unexplained differential for men and women. The upper panel of these tables lists the contribution of characteristics to the measured productivity differential while the lower panel lists the contribution of characteristics to the unexplained differential.

Decomposition Results for Men

First, we look at the decomposition results for men in table 4, and discuss the extent of separate components and relatively big parameter estimates that are statistically significant at conventional levels. The total Dutch-Mediterranean male wage differential is 3.6%, and surprisingly in favour of Mediterranean men. In other words, an average Mediterranean man earns 3.6% higher wages than a Dutch man. An overwhelmingly large part of this advantage (2.7%) comes from the measured productivity differential. In particular, this higher productivity is caused by the older age structure of Mediterranean men, a higher return for Mediterranean male drop-outs, especially HBO-drop-outs, for their experience during HBO-study and their concentration in study fields like Economics and law that generate relatively high wages (negative coefficients for these variables). However, these favourable characteristics mask significant disadvantages for the return to years since graduation from HBO and WO. Mediterranean male HBO and WO graduates have an 8% and 4.1% lower return for years since graduation than their Dutch counterparts. The unexplained part of the Dutch-Mediterranean male wage differential is very small (0.9%) and not statistically significant. This might suggest an absence of a discriminatory wage differential, and rejects the first hypothesis which predicts either an ethnic wage gap due to discrimination (H1a) or an ethnic wage surplus as predicted by imperfect signalling model. However, the parameter estimate for years since graduation-WO in the lower panel of table 2 is positive (2.2%) and significant at almost 5%. This indicates that Mediterranean male WO graduates have a 2.2% lower return to each year since graduation than their Dutch counterparts due to discrimination. This relatively low return may be attributed to wage discrimination for the Mediterranean male, and it is worth noting that the disadvantage seems to decline over time, as indicated by a negative coefficient for the square of years since graduation-WO (-0.012)

The total wage differential between Dutch and Caribbean men is 1.9 % and statistically not significant. This total differential is reduced by a negative unexplained component (-1.4%) although the measured productivity differential is 3.3 % and significant at conventional level. The lower productivity of Caribbean men with respect to Dutch men is largely caused by a significant low return to years since graduation for Caribbean HBO and WO graduates while their older age compensates for a part of the disadvantage. The unexplained component of Dutch-Caribbean wage differential is small (1.4%) and not significant at conventional significance levels. This result indicates that Caribbean men do not face wage discrimination although the second hypothesis (H2) predicted some wage disadvantage for Caribbean migrants.

The total Dutch-western male wage differential is 1.7 % which is composed by a significant productivity differential (2.1%) and an insignificant unexplained differential (0.3 %). The low productivity differential is largely caused by a significant low return to years of experience for western HBO graduates while their older age structure partly compensate this disadvantage. Also for western males, the discriminatory component of the wage differential is small and insignificant. The estimated negligible unexplained component of wage differential for Western migrants confirms their similarities to Dutch men, as suggested by third hypothesis (H3).

Decomposition Results for Women

Table 5 reports the decomposition estimates for women. The total Dutch-Mediterranean wage differential is -2% and, this differential is statistically insignificant. However, if we look at the major components of this differential, both the explained and unexplained parts are statistically significant and these estimates reveal very interesting results. The total explained disadvantage for Mediterranean women is 1.9%. The total unexplained wage differential is -3.9% which indicates a favourable treatment of Mediterranean women with respect to Dutch women. This differential may be interpreted as positive discrimination for Mediterranean women. The opposite effects of explained and unexplained parts obviously lead to a relatively small total wage differential which is insignificant. The wage differential due to the measured characteristics (explained) is mainly increased by disadvantages in years since graduation in HBO and WO, and lowered by favourable age structure and years of experience after dropping out in HBO. The favourable unexplained wage differential is caused by advantages in the variables age and years of WO education, and lowered by years since graduation in HBO and years since drop out in WO. The estimated unexplained advantage for Mediterranean women rejects the second part of the first hypothesis (H1a) which suggests a large disadvantage for Mediterranean migrants who significantly differ from their Dutch counterparts regarding their social and cultural background. This result may be a confirmation of the first part of the first hypothesis (H1a) which suggests a dominance of signalling effects.

The total Dutch-Caribbean wage differential is 3.8% which is composed by a significant 4.5% differential due to the measured characteristics and, an insignificant 0.7% unexplained differential. The magnitude of the explained differential owes to the positive contribution of variables such as years since graduation in HBO and WO, years since drop out in HBO and graduated in HBO, lowered by a favourable age structure and years of experience after drop out in HBO. The small and insignificant unexplained wage differential for Caribbean women, who share cultural norms with Dutch people because of the colonial history, indicates the unimportance of a wage differential due to discrimination.

The total Dutch-Western wage differential is 5.2% which is statistically significant. A 77% of this differential (4%) is explained by the observed characteristics and the rest (1.2%) is unexplained. Both components are statistically significant. The estimated largest wage disadvantage for Western migrants clearly rejects the third Hypothesis (H3) which suggests a negligible wage disadvantage for Western migrants because they are socially and culturally quite similar to Dutch counterparts.

The relatively small explained wage differential for Mediterranean men and women, compared to Caribbean and Western counterparts may indicate a positive selectivity of Mediterranean students: Mediterranean students who have most favourable characteristics enrol first in higher education. The measured characteristics of Mediterranean students are even more favourable than

characteristics of other migrant groups although Mediterranean migrants are in a clearly disadvantaged position in the Dutch society.

5.3 Wage Differentials for Students, Graduates and Drop-outs

The results on ethnic wage differentials discussed above rely on the entire cohort of students irrespective of their position. However, labour market behavior of students, graduates and drop-outs is potentially different owing to the degree of their market orientation. Students are likely to spend less effort on paid employment while graduates fully focus on their labour market career. As mentioned in section 4.2, ethnic minority students are less likely to graduate and they need a longer time to complete their degree. A varying distribution of ethnic minority students across these three statuses can affect ethnic wage differentials. Therefore, we repeat the decomposition exercise for the separate populations of graduates, graduates before graduation (students) and drop outs.

Table 6 reports a summary of the decomposition results for graduates, graduates before graduation and drop outs by gender. These exercises indicate the validity of the earlier estimated wage differentials for graduates and show interesting results for students. Most notably, the unexplained wage surplus for Mediterranean women and the wage gap for Western women that we reported above reoccur in a very similar percentage (4% and 2.8%) for the graduated Mediterranean and Western women as well. For ethnic minority men, no unexplained ethnic wage gap is found as before. Focusing on wage differentials among graduates before graduation, a significant wage surplus is estimated for students from almost all ethnic groups but this surplus is the highest for Mediterranean men (17.6%) who earn 9.3% higher wages due to favorable characteristics plus 8.3% higher wages due to positive discrimination. The estimated wage surplus is 8.4% and 5.2% for Caribbean and Western men and, these differentials are almost completely explained by the observed characteristics. Also for Caribbean and Western women, the estimated wage surpluses (4.6% and 5.2%) are largely due to favorable characteristics. These wage surpluses confirm the intuition that ethnic minority students spend more time in paid work during their study compared to Dutch students. The rank order of wage surpluses across ethnic groups indicates that students from families with a disadvantaged socioeconomic background have a higher wage surplus: Mediterranean, Caribbean and the lowest for Western students.

Among drop outs, the estimated total wage differential is statistically insignificant. However, Mediterranean men face a 3.1% wage surplus and a 4.4% unexplained wage penalty. Obviously, these opposite effects lead to a very small and insignificant total wage differential. Finally, Western female drop outs have a significant and large wage gap due to less favorable characteristics.

6   Conclusions

This paper used unique individual panel data of the 1996 intake cohort in Dutch higher education to examine performance in Dutch higher education and the labour market. Using panel information covering ten years, the paper provides novel evidence of ethnic wage disparities stemming from different sources. The analysis reveals that ethnic-minority groups from non-western countries have a significantly lower probability of completing a degree than do native Dutch students. In particular, Mediterranean and Caribbean students are less likely to complete their study in the ten-year period. Our results confirm the relatively high performance level of female students in higher education, which also holds for ethnic-minority women. The higher

performance in higher education seems to be weakly correlated with the development of wage profile after graduation across ethnic groups.

The paper applied a decomposition method to assess two components of ethnic wage differentials: a component due to observed characteristics and a residual component which can not be explained from observed characteristics and is often interpreted as a measure of discrimination. The decomposition exercise indicates striking results on ethnic wage differentials. The most important finding is that graduated Mediterranean women earn about 4% higher wages than their Dutch counterparts due to positive discrimination while Western women have a 2% wage penalty due to discrimination. This result is unexpected, given the general drastically-disadvantaged position of Mediterranean women in the Netherlands and, similarities in the socioeconomic position of Western migrants with the Dutch as described by the first and third hypothesis *(H1 and H3)*. The estimated wage surplus for Mediterranean women implies the relevance of the signalling effect of a degree (*H1a*). Such a favourable position for Mediterranean women may also be an outcome of a greater demand for these women, which could stem from shortages of highly-skilled ethnic-minority women in specific jobs, or from recent policies that aim to strengthen the position of women and ethnic minorities.

In contrast to women, Mediterranean men with a degree do not face any wage gap. They have even a 3.6% higher wages than Dutch men. This wage surplus for Mediterranean men stems from their more favourable observed characteristics of students and drop outs among them. Caribbean and Western men have a 2-3% wage gap due to less favourable characteristics. The absence of ethnic wages penalty for Caribbean graduates confirms the hypothesis *H2* which refers to cultural and linguistic similarities with Dutch and their socioeconomic disadvantages.

The analyses also show that ethnic minority students have substantially higher wages than Dutch students during the study (before graduation). Relatively high wages for ethnic minority students confirms the common intuition that ethnic minority students from disadvantaged families would spend more time in paid work than Dutch students during their study since they receive potentially less support from their parents.

The analysis also shows that the relative position of dropouts deteriorates with time while recent graduates experience a substantial improvement in the first years of their labour-market careers, as predicted by the human capital model. This implies a further deteriorating of the position of ethnic minority youth since ethnic minority students are more likely to drop out. Among ethnic minority drop outs, only Mediterranean men face an ethnic wage penalty of 4.4% which can not be explained from their measured characteristic.

The absence of ethnic wage gap for graduates from disadvantaged ethnic minority groups (Mediterranean and Caribbean) implies either a positive selection of these students or the existence of greater demand for graduates from these groups. Deficiency in social and cultural capital obviously plays a negligible role in determining wages of ethnic minority graduates. If students in our data are positively selected, our estimates would give an underestimation of ethnic wage penalties. Our results also suggest that favourable characteristics of ethnic minority students, Mediterranean male students in particular, prevent a large ethnic wage gap due to relatively low return to experience after the completion of a degree.

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