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Gender, ethnic, and national earnings gaps in Israel: The role of rising inequality ☆

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Abstract

The Israeli society is ethnically diverse and it is an ideal case for studying the role of rising inequality on the widening earnings gaps between dominant and subordinate groups. Earnings differences between Ashkenazi men—the dominant group in Israeli society—and the other major ethnic/gender groups in the Israeli labor market and society (Mizrahi men, Arab men, Ashkenazi women, and Mizrahi women) have not narrowed since the early 1970s, despite a gradual convergence in the educational attainment and other productivity-related characteristics of the five groups. In an attempt to solve this puzzle we focus on changes in the earnings structure (i.e., changes in returns to earnings determinants) of the Israeli labor market during the period 1975–2001. To this end, we identify and estimate the effects of changes in the earnings structure on the development of earnings gaps between Ashkenazi men and the other four groups over time. We hypothesize that differences in returns to human capital grew faster than the rate at which between-group mean levels of human capital converged. The analyses are based on 1975, 1982, 1992, and 2001 Income Surveys conducted by the Israeli Central Bureau of Statistics. The results suggest that rising returns to productivity-related variables is indeed the main explanation for the widening earnings gaps between the major demographic groups in the Israeli labor market. Discrimination plays only a minor role, mainly in the case of Arab worker.

Keywords: Earnings gaps; Earnings structure; Inequality; Gender gaps; Ethnic gaps; National gaps; Israel

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1. Introduction

Ethnically diverse societies are usually characterized by earnings gaps between the dominant and subordinate groups. Within each group, men are usually located above women on the earnings scale. There are three possible, not mutually exclusive, explanations for these earnings gaps. First, between-group differences in earnings determinants, mainly education, occupational composition and labor market experience are often cited as legitimate sources for between-group earnings differentials because they follow meritocratic principles. Second, at times there is evidence for labor market discrimination against subordinate groups such as ethnic minorities and women. To the extent that employers prefer men of the dominant group over other types of workers, it may be possible to attribute the earnings gaps to discrimination against workers that do not belong to the preferred group (Becker, 1971). Such a process is perceived as economically inefficient and socially unjust. Finally, the level of earnings inequality in a society, which is a result of social and economic policies as well as market forces, has an impact on between-group earnings differentials (Juhn et al., 1991). Societies characterized by high levels of inequality produce larger earnings differentials between groups. The relative position of weaker groups in the earnings distribution of high-inequality labor markets is inferior compared to the relative position of similar groups in more equal markets (Blau and Kahn, 2000).

Over time, subordinate groups often narrow the differences on productivity-related attributes between them and the dominant groups. At the same time, the level of labor market discrimination against subordinate groups may decline. These processes are due to several factors, some of them generated by public policies that are designed to elevate the social and economic position of the weaker groups, such as affirmative action, equal opportunity legislation, and educational and financial programs for students in need. Other factors are the result of better integration of the weaker groups in society such as the acquisition of skills necessary for success in the labor market, networking, and political representation of subordinate groups.

However, despite narrowing the gaps in human capital and other earnings determinants between them and the dominant group, subordinate groups may find themselves in a worse position in the earnings distribution relative to the dominant group. For example, since the early 1980s the gaps in earnings determinants between black and white women has decreased, yet the average earnings ratio of black-to-white women in the late 1990s had not improved relative to the ratio in the early 1980s (Altonji and Blank, 1999; Blau and Beller, 1992). The explanation for this apparent puzzle is rooted in changes in the earning structure in the US during the 1980s and 1990s. Specifically, earnings inequality increased, and consequently the slight improvement in the relative characteristics of black women was not sufficient to offset the effects of the changing earnings structure (Blau and Kahn, 2000).

After ruling out the possible role of differences in earnings determinants (as is the case in the US with respect to black women), we are left with two processes that might be responsible for maintaining, and even raising the earnings gaps between the dominant and subordinate groups—more intense labor market discrimination, and rising earnings inequality. While the first process has been studied extensively, the latter has often been overlooked. The present paper is designed to fill this gap by examining

the Israeli case. Israel is an ideal case for better understanding the role of rising inequality in the widening earnings gaps between dominant and subordinate groups. First, Israeli society is ethnically diverse. The dominant groups earn more than the subordinate groups, and within each ethnic group women earn less than men. Second, there is evidence for persisting and even growing earnings differentials between dominant and subordinate groups in Israel despite diminishing differences in productivity-related variables between the groups. This ensures that rising inequality or rising discrimination (or both) are indeed responsible for the deterioration in the relative position of minority groups in the Israeli labor market. Finally, income and earnings inequality increased in Israel more than in most other countries (Dahan, 2001; Gottschalk and Smeeding, 1997). Such a sharp rise (similar to a powerful "treatment" in an experiment) allows us to detect its possible impact on the dependent variable—changes in between-group earnings gaps. Furthermore, it appears that similar processes affecting inequality in other countries are also responsible for the rise in inequality in Israel. Such similarities will enable us to generalize the findings of the Israeli case to other countries as well.

2. The Israeli case: background

Israeli society is characterized by a cleavage between Jews and Arabs, and within the Jewish society between Jews whose parents immigrated to Israel from Europe and America (henceforth, Ashkenazim) and those from Asian and African origin (henceforth, Mizrahim). Israeli Arabs compose, approximately, 20% of the Israeli population. The establishment of the Jewish state in 1948 and the Arab–Jewish war that followed left the Arab minority subordinate to the victorious Jewish majority and in an inferior position within the Israeli economy and labor market. Not only were Arabs part of a traditional society, living in small communities, but they were also discriminated against in almost all aspects of life (Lustic, 1980). The cleavage within the Jewish population was created by immigration. Between 1948 and 1980, nearly two million Jewish immigrants, both Ashkenazim and Mizrahim, arrived in Israel. The social, economic, and cultural assimilation of most Ashkenazi immigrants in Israeli society was fast and complete. By contrast, Mizrahi immigrants failed to achieve parity with the native population. While the experience of first generation Mizrahi immigrants was bad enough, it could be explained by the relatively low level of economic development of the source countries from which they came (Semyonov and Lerhental, 1991). But the persistence of socioeconomic gaps among the Israeli-born children of these immigrants (i.e., second generation) is more difficult to explain.

Over the years, a clear hierarchy in the stratification system (i.e., group-based hierarchy regarding labor market outcomes) has been institutionalized in Israeli society in general, and in the labor market in particular, where Ashkenazim are at the top of the socioeconomic ladder, Mizrahim are in the middle, and the Arab citizens of Israel occupy the bottom echelons of the socioeconomic hierarchy (Lewin-Epstein and Semyonov, 1986, 1992; Semyonov and Tyree, 1981; Yaish, 2001). Not surprisingly, within each group, men are above women, at least with respect to their earnings.

Since the 1960s many studies have provided macro sociological explanations for the persistence of the socioeconomic gaps among Israelis of various ethnic and national origin (e.g., Lewin-Epstein and Semyonov, 1993; Yaar, 2002). The empirical literature on gaps in

occupational and earnings differences is even more extensive.[1] Despite the many differences among such studies—in data sets, in methodologies, in the specific groups that were studied, and in specific socioeconomic measures—they all confirmed that the basic hierarchy in the Israeli labor market has not been changed over the past 50 years. As late as 2000, Ashkenazim are still at the top, followed by Mizrahim and Arabs.

Interestingly, the educational gaps between Israeli-born Ashkenazi men and Mizrahi and Arab men and women have somewhat narrowed between the 1970s and 1990s (Cohen and Haberfeld, 1998; Haberfeld and Cohen, 1998a) and the educational gaps between Ashkenazi men and women completely disappeared by the late 1990s (Haberfeld and Cohen, 1998b; Kraus, 2002). These trends, together with declining differences in other productivity-related characteristics, should have resulted in a gradual narrowing of the economic gaps between Ashkenazi men and the other groups. Yet recent research shows that the earnings gaps between Ashkenazi men—the most advantaged group in the Israeli labor market and society—and the other groups not only failed to converge, but for some groups the gaps actually widened between 1975 and 1995 (Cohen and Haberfeld, 1998; Haberfeld and Cohen, 1998a,b). In fact, a recent study found that the unadjusted earnings gaps between Ashkenazi and Mizrahi men in Israel are greater than the gaps between White and African-American men in the US (Rubinstein and Brenner, 2003).

One process that could explain the puzzling persistence of between-groups earnings gaps in light of diminishing between-group differences in productivity-related characteristics is rising inequality, caused primarily by changes in the earnings structure. The earnings structure is defined as the array of returns to productivity-related variables such as education and experience as well as to job characteristics such as the sector of the economy and occupation. The relations between the earnings structure and individual earnings inequality (i.e., within-group variance in earnings) are structural. When, for example, returns to human capital rise (decline), earnings inequality among persons of different levels of human capital must increase (decline). By contrast, the relations between individual earnings inequality and group-based gaps in mean earnings are not necessarily direct. It is possible that earnings inequality within each group increases, and between-group mean gaps remain constant.

Previous research on earnings gaps in the Israeli labor market analyzed two or three groups only. In most studies, Mizrahi men were compared to Ashkenazi men (e.g., Cohen and Haberfeld, 1998; Semyonov and Kraus, 1983; Spilerman and Habib, 1976); Arab men were compared to all Jewish men (e.g., Haberfeld and Cohen, 1998a; Lewin-Epstein and Semyonov, 1993); and all Jewish women were compared to all Jewish men (e.g., Kraus, 2002; Semyonov and Kraus, 1983; Yaish and Kraus, 2003). Comparing all groups of men and women to one benchmark group located at the top of the earnings distribution, as we do in the following pages, is useful if one is interested in understanding the dynamics of the entire stratification system, and not only in parts of it. The earnings gaps between groups and especially between each group and the benchmark group are important characteristics of the stratification

[1] For ethnic gaps between Mizrahim and Ashkenazim see Cohen and Haberfeld (1998), Semyonov and Kraus (1983), Spilerman and Habib (1976). For gaps between Jews and Arabs, see Haberfeld and Cohen (1998a), Lewin-Epstein and Semyonov (1993, 1994). For gender gaps see Haberfeld and Cohen (1998b), Yaish and Kraus (2003), and Kraus (2002).

system. An analysis of the dynamics of earnings gaps benefits from the use of one, clearly defined, relatively homogenous and stable, benchmark group. Yet no study analyzed the socioeconomic fortunes of all groups relative to one benchmark group, nor has previous research considered the role of changes in the earnings structure on earnings gaps between the groups. Rather, the focus was on educational gaps and the possible role of labor market discrimination (Cohen and Haberfeld, 1998). Consequently, there is no comprehensive evaluation of the dynamics of the Israeli stratification system since the 1970s, when changes in the earnings structure increased inequality.

This paper is aimed at filling this gap by analyzing the economic standing of the major groups of Israeli-born workers (Mizrahi men, Arab men, Ashkenazi women, and Mizrahi women) relative to the dominant group of native-born Ashkenazi men over a 26-year period. Specifically, it provides estimates for the extent to which rising individual earnings inequality is responsible for the persisting (and for some groups, during some periods, growing) mean earnings differentials between Ashkenazi men and the other groups during 1975–2001. The paper is organized as follows: the next section discusses possible processes that could explain persisting earnings gaps between Ashkenazi men and the other groups, with an emphasis on the expected role of rising inequality. Section 3 presents the data, and Section 4 presents the statistical model we use to evaluate the empirical status of the inequality hypothesis. Section 5 presents the results, and the final section discusses the main findings and their implications.

3. Labor market discrimination and earnings inequality

Two main processes, not mutually exclusive, may explain the persisting earnings differentials between Ashkenazi men and other major groups of Israeli-born in the labor market, in light of diminishing differences in productivity-related variables between the groups. The first is an increase in labor market discrimination. To the extent that Israeli employers prefer Ashkenazi men over other type of workers—Arabs, Mizrahim, or women—and this preference has intensified over time, it would be possible to attribute the stability (or increase) in the earnings gaps to more intense discrimination against workers not belonging to the preferred group.

Direct labor market discrimination in earnings against women and Arabs (i.e., paying them less relative to Ashkenazi men of similar relevant characteristics) is well documented by previous research (Haberfeld and Cohen, 1998a,b; Kraus, 2002; Lewin-Epstein and Semyonov, 1993). However, it is likely that legal, social, and political developments in Israel in the past three decades resulted in less rather than more labor market discrimination against women and ethnic minorities (Ben Israel, 1998). In the case of Mizrahim, low education, rather than direct labor market discrimination, was found to be the main reason for their poor economic achievements (Cohen and Haberfeld, 1998). Yet experimental studies found rampant discrimination against Mizrahim among college students in Israel (Fershtman and Gneezy, 2001), and regression analyses could not rule out direct labor market discrimination against Mizrahim (Cohen and Haberfeld, 1998). While the existence of labor market discrimination against Mizrahim is still an open question, it is unlikely that its level increased over time. Since the 1970s Mizrahim closed the gaps with Ashkenazim in many spheres of life—from political representation thru residential segregation to marriage patterns and fertility rates (Yaar, 2002). Therefore, as in the case of

women and Arabs, it is likely that during this period, when many Mizrahim joined the ranks of the Israeli middle class by virtue of work or intermarriage, the level of labor market discrimination against Mizrahim decreased rather than increased.

The second process that could explain the persistence or increase in earnings differentials between groups, in light of diminishing between-group differences in determinants of earnings, is related to changes in the earnings structure leading to rising earnings inequality. In the last three decades, income and earnings inequality among workers increased sharply in most developed countries (Gottschalk and Smeeding, 1997). The standard explanation for rising inequality in the advanced economies is skill-biased technological change that brought about an increased demand for high-skilled workers, and hence a rise in returns to higher education. Less-skilled and blue-collar workers, as well as marginal workers (e.g., part-time, contract workers), suffered from the weakening of labor unions, from immigration of unskilled workers to Western countries, and from processes of globalization and privatization that resulted in plant relocations overseas (Morris and Western, 1999).

Income and earnings inequality increased in Israel more than in most other countries (Dahan, 2001; Gottschalk and Smeeding, 1997), and it appears that similar processes affecting inequality in other countries are also responsible for the rise in inequality in Israel. The returns to experience, and especially to university degrees have increased sharply since the 1970s (Dahan, 2001), although it is not known if this increase was driven by technological changes. During the same period Israeli labor unions lost half their membership (Cohen et al., 2003) and collective bargaining agreements were decentralized, thereby increasing wage inequality. Finally, the mass migration from the former Soviet Union and the influx of labor migrants during the 1990s kept wages of less-skilled workers at their low levels (Dahan, 2001).

Our main interest here is to analyze some of the consequences of rising earnings inequality, and, in particular, their effects on the economic gaps between ethnic, national and gender groups in Israel. For this purpose it is important to note that when one group has higher levels of human capital than other groups, rising returns to human capital (or to other earnings determinants) leads necessarily to rising between-group earnings gaps, when all else is equal. However, all else is not equal in Israel. As we discussed above, between-groups differences in mean levels of human capital have somewhat narrowed over the years and yet between-group earnings gaps increased or have not changed much. This could be because returns to human capital in Israel grew faster than the rate at which between-group mean levels of human capital converged. In other words, the improvements in human capital made by Mizrahim, Arabs, and women (relative to Ashkenazi men), can be viewed as swimming upstream the inequality river. Alas, it is possible that in the past 26 years the inequality river has been faster than the swimmers.

Indeed, rising wage inequality (resulting from rising returns to skills) was found to be responsible for much of the slowdown in closing the gender-based wage gap in the US, as well as for the smaller gender wage gaps in European countries compared to the US (Blau and Kahn, 2000). Since earnings inequality has increased in Israel nearly as much as in the US, it is reasonable to expect that rising inequality is the main factor responsible for blocking the narrowing of earnings differentials between the groups of Israeli-born. In sum, two processes—an increase in labor market discrimination against non-Ashkenazi men, and changes in the earnings structure leading to greater individual inequality—could be

responsible for the persisting (and at times widening) national, gender and ethnic-based earnings differentials in Israel. For the reasons specified above, we do not expect that the level of labor market discrimination against Mizrahim, Arabs, and women have increased. Rather, our main hypothesis is that during the 26-year period discrimination has decreased, and between-group gaps in human capital (and in other earnings determinants such as sector and occupation) have somewhat narrowed. However, changes in the earnings structure (which led to rising inequality), more than offset these developments, and are responsible for the persisting (or the increase in) earnings gaps between Ashkenazi men and the other groups of Israeli-born.

4. Data and variables

The data for the study are taken from Income Surveys for the years 1975, 1982, 1992, and 2001. Using four cross-section data sets of the same structure allows us to follow trends in earnings gaps during the entire period of 1975–2001. Income Surveys are conducted annually by the Israeli Central Bureau of Statistics (CBS) as a supplement to Labor Force Surveys, and contain basic demographic information as well as earnings data for a representative sample of households. We use the individual samples based on these surveys, with total sample sizes of about 7500 individuals in 1975 (first year for which there are usable data), 14,000 in 1982 and 1992, and about 33,000 individuals in 2001.[2] Because earnings are not available for self-employed, the study will be limited to Israeli-born salaried workers, 25–54 years old. The upper age limit enables us to focus on persons in the prime working age. It also reflects the relative young ages of second generation Israeli Jews (especially Mizrahim) in the 1970s and 1980s.

Mizrahim are defined as Israeli-born to fathers born in Asia or Africa. Similarly, Ashkenazim are Israeli-born to fathers born in Europe, America, or Australia. Arab men are all those defined as such. The vast majority of them were born in Israel (because of Israel's migration laws there are hardly any foreign-born Arabs). The small group of third generation Israeli Jews (Israeli-born to Israeli-born fathers) is not included in the study, since they are still young and their ethnic origin is not known. Similarly, Arab women are excluded from the analysis because there are less than 50 salaried Arab women in the surveys of 1975 and 1982. Immigrants (i.e., foreign-born) are also excluded because we do not wish to confound our results regarding the native-born with processes affecting immigrants' earnings assimilation.

Earnings are measured by gross income from salaried work per month, expressed in 2001 NIS. The main variable is thus the (natural logarithm of) monthly earnings. Labor supply is measured by (ln) monthly hours of work. Two measures of schooling are used: years of education and whether the respondent has at least a B.A. degree. Age is the best proxy available in the data for labor market experience; thus we include in all equations age and its squared term. In addition, three dummy variables, known to affect earnings,

[2] In 1975, 1982, and 1992, about 6000–7000 households were sampled in urban communities with a population of at least 2000 in the Jewish sector, and 10,000 in the Arab sector. In 2001, about 14,000 households were sampled in both Jewish and Arab communities of over 2000 persons. Apparently, the exclusion of Arab communities of less than 10,000 persons from the samples in 1975–1992 is not a problem. Evidence from Israel's National Insurance Institute (1996) suggests that the average earnings of Arabs residing in small urban communities (population 2000–10,000) are the same as the average earnings in larger communities.

are included to indicate whether respondents are married, whether they hold a professional, technical or managerial (PTM) occupation (defined by 1-digit occupational classification) and whether they are employed in the public sector (defined by 1-digit industrial classification). While all these variables are measured at the individual levels, they will be used in order to derive between-groups earnings gaps and residual gaps that are the focus of our analysis. Individual earnings inequality, as specified in Section 5, will be measured only within the baseline group (Ashkenazi men), hence earnings inequality and between-group earnings gaps are two separate variables.

5. Methods

Our analyses builds on a method proposed by Juhn et al. (1991), and was employed in a series of studies by Blau and Kahn (1995, 1996, 2000) for explaining the impact of inequality on the development of racial and gender gaps in the US labor market, as well as for comparing the US to European labor markets. This method, using successive cross-sectional data sets, enables us to decompose changes in earnings gaps between two groups at two time points into (a) a portion due to changes in *returns* to (a.1) observed and (a.2) unobserved characteristics leading to changes in individual earnings inequality; and (b) a portion due to changes in *mean* group-specific (e.g., gender-based or ethnic-based groups) factors. The second portion—due to groups' specific factors, can be also further broken down into two types of group-specific factors: (b.1) the relative change in the groups' measured characteristics, and (b.2) the relative change in the market treatment (i.e., discrimination) of the two groups, and/or groups' unmeasured characteristics. The main advantage of this method of decomposing earnings gaps over the conventional methods of decomposition (e.g., Duncan, 1969; Jones and Kelly, 1984; Kraus, 1986; Oaxaca, 1973) is the identification of the independent role of the earnings structure on between-groups earnings gaps. In the traditional method, the role of the changing earnings structure ((a) above), is combined with changes in labor market discrimination and unobserved characteristics ((b.2) above) and both create the "unexplained" fraction of the gap. The method that we use allows us to reduce the residual earnings gap by decomposing this black box of "unexplained" portion into a residual portion (which we equate with changes in discrimination and/or unmeasured explanatory variables), and a portion due to changes in earnings structure (i.e., changes in inequality).

Below we specify the main stages of this method. First, we calculate earnings differences (D) between two groups (e.g., Ashkenazi and Mizrahi men) at each time point:

$$D_t = Y_{at} - Y_{mt}, \tag{1}$$

where Y denotes average group (ln) earnings, "a" and "m" are subscripts for Ashkenazim and Mizrahim, respectively, and "t" indicates time ($t = 1975$, 1982, 1992, and 2001).

In each year, each Mizrahi's earnings (y_{imt}) are placed in the Ashkenazim's earnings percentile distribution of that year, and each Mizrahi is assigned the percentile that his earnings placed him on. The cumulative distribution of Ashkenazi men serves as the base line distribution in all the following analyses. We then calculate the following for each of the years:

$$\mathrm{MP}_t = \text{Mean percentile ranking of Mizrahim in the earnings percentile distribution of Ashkenazim.} \quad (2)$$

Clearly, this percentile ranking is determined by group-specific factors, namely differences in average earning determinants between the two groups, and differences in discrimination and/or differences in averages of unobserved characteristics.

To isolate the impact of differences in earnings determinants from the impact of differences in discrimination, we calculate an earnings equation for Ashkenazim for each year, as follows:

$$\hat{y}_{\mathrm{ia}t} = \boldsymbol{X}'_{\mathrm{ia}t}\boldsymbol{B}_{\mathrm{a}t}, \quad (3)$$

where $\boldsymbol{X}$ is a vector of earnings determinants of Ashkenazim in year t, and $\boldsymbol{B}$ is a vector of their coefficients.

There is only one earnings regression that is estimated: the regression of Ashkenazi men, which is the reference group. Then, this regression is used to predict the earnings of all groups, as well as to break down the earnings differences between the reference group and the other weaker groups into ''explained'' and ''unexplained'' portions. For that purpose, we first apply this estimated equation to the Mizrahi averages in order to derive the predicted mean Mizrahi earnings, adjusted for differences in observed characteristics between the two groups. Second, we derive an Ashkenazi residual earnings percentile distribution by calculating a residual score for each Ashkenazi each year ($e_{\mathrm{ia}t}$):

$$e_{\mathrm{ia}t} = y_{\mathrm{ia}t} - \boldsymbol{X}'_{\mathrm{ia}t}\boldsymbol{B}_{\mathrm{a}t}. \quad (4)$$

Next, we calculate, for each year, a residual score for each Mizrahi. We do it by using the Ashkenazi earnings equation:

$$e_{\mathrm{im}t} = y_{\mathrm{im}t} - \boldsymbol{X}'_{\mathrm{im}t}\boldsymbol{B}_{\mathrm{a}t}. \quad (5)$$

We then place each Mizrahi's residual score in the Ashkenazi residual earnings percentile distribution and calculate the mean residual for Mizrahim:

$$\mathrm{MR}_t = \text{Mean residual percentile ranking of Mizrahim in the Ashkenazi residual earnings percentile distribution.} \quad (6)$$

This figure (MR_t) indicates the ranking of Mizrahim (relative to Ashkenazim) each year, after controlling for ethnic-based differences in observed earnings determinants. Put differently, the difference between the mean residual earnings percentiles of Ashkenazim and Mizrhim indicates the differential market treatment towards the two groups. The advantage of this measure over conventional ''unexplained'' difference, is that changes in the mean residual are not contaminated by changes in the earnings structure (namely, changes in returns to unmeasured earnings-related attributes).

Finally, and most important to our research question, we derive the impact of changes in the earnings structure (i.e., changes in individual inequality) on changes in the ethnic-based gaps by first estimating the effect of changes in the ethnic-specific factors on changes in the ethnic-based gaps. For that purpose, we place the mean percentile ranking (Eq. 2) of Mizrahim at t_2 in the Ashkenazim's earnings distribution at t_1. The earnings associated with Ashkenazim's percentile at t_1 would have been the mean earnings for Mizrahim at

t_2 had the earnings structure remained constant between t_1 and t_2. Thus, the difference between this expected earnings figure and the actual Mizrahim's earnings in t_2 is the result of changes in the overall earnings structure (as measured by changes in individual inequality within the Ashkenazim earnings distribution).

This method is used for each group relative to the benchmark of Ashkenazi men. Thus, in all analyses, the Ashkenazi men are the benchmark group to which the other groups—Mizrahi men, Arab men, Ashkenazi women and Mizrahi women—are compared.

6. Results

6.1. Descriptive statistics

Table 1 presents descriptive statistics of all variables for each group for the 4 years. As expected, rising inequality in the Israeli labor market during the period is manifested in the sharp increase in the variance in monthly earnings within all groups between 1975 and 2001. With regard to the level of earnings, Table 1 shows that all five groups have experienced positive growth in real earnings during the 26-year period. The average earnings of the benchmark group in 1975—Israeli-born Ashkenazi men—constitute 40% of its average earnings in 2001. Similarly, Mizrahi men, Arab men, Ashkenazi women, and Mizrahi women earned in 1975, 45, 57, 45, and 49%, respectively, of their average 2001 earnings. Evidently, Ashkenazi men experienced the largest earnings growth while Arabs achieved the smallest earnings growth. Furthermore, the earnings growth of all groups was steady and positive in all time lags that were examined. Interestingly, men experienced the fastest growth during the 1980s, while women experienced the fastest growth during the 1990s.

These between-group differences in earnings growth appear to be uncorrelated with changes in the observed characteristics of the groups. As shown in Table 1, Ashkenazi men experienced the smallest increase in educational attainment, while Arab men experienced the largest increase on the educational measures between 1975 and 2001. Mizrahi women are second to Arabs in improving their educational levels. Yet, Arabs and Mizrahi women have experienced the smallest earnings growth, while Ashkenazi men led the labor force in earnings growth during the same period. The only productivity-related measure, on which Ashkenazi men showed an impressive increase (together with Ashkenazi women) relative to other workers, is age, which is a proxy for labor market experience. The average age of Ashkenazi men and women increased by about 6 years between 1975 and 2001, compared to an increase of about 2 years among Mizrahi men and 5 years among Mizrahi women, and a decrease of almost 2 years among Arab men. This being the case, changes in the average age cannot explain the failure of Ashkenazi women to narrow the earnings gaps between them and Ashkenazi men, but they may explain part of the failure of Mizrahi men and especially of Arab men to catch up with Ashkenazi men. Finally, there are some differences between the groups in changes in working hours, in the portion of group members holding PTM occupations, and in the portion working in the public sector. However, for none of these three variables the growth of the benchmark group was the greatest. Working hours grew the most among Ashkenazi women. The share of those holding PTM occupations grew the most among Mizrahi men and women; while that of those working in the public sector increased the most

Table 1
Means and S.D. of labor market characteristics: Israeli-born salaried workers 25–54 years old by gender and ethnic origin, 1975–2001[a]

	1975	1982	1992	2001
Ashkenazi men				
Earnings (NIS)	5256 (2450)	7187 (4102)	10029 (6653)	13299 (10006)
(ln) earnings	8.467 (.458)	8.736 (.545)	9.000 (.689)	9.261 (.708)
Years sch.	13.7 (3.3)	13.8 (2.9)	14.6 (3.0)	14.7 (2.8)
B.A.+	.35	.34	.43	.42
Age	33.7 (7.4)	35.4 (7.3)	39.3 (7.4)	39.8 (8.7)
Married	.89	.89	.87	.80
Hours	195 (46)	200 (35)	204 (56)	207 (55)
PTM	.50	.56	.56	.56
Public	.37	.39	.34	.38
No. of cases	320	302	448	803
Mizrahi men				
Earnings (NIS)	4096 (1689)	4655 (2168)	6492 (4166)	9117 (6526)
(ln) earnings	8.243 (.387)	8.350 (.438)	8.611 (.579)	8.922 (.624)
Years sch.	10.3 (3.0)	10.7 (2.6)	11.9 (2.6)	12.8 (2.6)
B.A.+	.09	.09	.11	.19
Age	34.6 (9.2)	31.7 (6.7)	33.8 (6.2)	36.9 (7.6)
Married	.84	.81	.80	.78
Hours	199 (38)	194 (28)	199 (49)	204 (48)
PTM	.18	.16	.23	.27
Public	.30	.31	.32	.40
No. of cases	127	274	565	1324
Arab men				
Earnings (NIS)	3418 (1010)	4258 (2479)	5052 (2760)	6002 (4597)
(ln) earnings	8.092 (.306)	8.228 (.505)	8.404 (.492)	8.535 (.539)
Years sch.	7.5 (3.6)	8.5 (3.7)	9.6 (3.5)	11.5 (3.5)
B.A.+	.02	.06	.08	.17
Age	38.3 (8.2)	37.9 (8.4)	36.8 (7.7)	36.2 (8.0)
Married	.89	.90	.87	.81
Hours	181 (34)	188 (30)	184 (45)	190 (53)
PTM	.13	.19	.12	.21
Public	.37	.24	.24	.33
No. of cases	89	86	154	756
Ashkenazi women				
Earnings (NIS)	3228 (1304)	4106 (2215)	5142 (3111)	7178 (5839)
(ln) earnings	8.018 (.411)	8.184 (.529)	8.382 (.580)	8.666 (.642)
Years sch.	13.5 (2.9)	13.8 (2.6)	14.5 (2.4)	14.9 (2.7)
B.A.+	.25	.29	.38	.47
Age	33.8 (7.2)	35.7 (7.1)	38.5 (7.6)	39.9 (8.9)
Married	.81	.79	.79	.78
Hours	135 (47)	144 (47)	144 (48)	151 (52)
PTM	.54	.52	.55	.52
Public	.68	.65	.62	.58
No. of cases	275	280	473	815
Mizrahi women				
Earnings (NIS)	2652 (1283)	3454 (1967)	4057 (2499)	5411 (3376)
(ln) earnings	7.786 (.438)	8.011 (.521)	8.164 (.530)	8.425 (.589)
Years sch.	10.9 (2.7)	11.9 (2.5)	12.6 (2.3)	13.3 (2.5)
B.A.+	.05	.08	.12	.23

Table 1 (*continued*)

	1975	1982	1992	2001
Age	31.9 (7.0)	30.7 (6.0)	33.4 (6.3)	36.9 (7.5)
Married	.58	.73	.78	.78
Hours	148 (47)	153 (43)	148 (44)	150 (49)
PTM	.21	.28	.28	.31
Public	.51	.52	.49	.55
No. of cases	73	154	515	1372

[a] Earnings are in 2001 NIS. Included in the analysis are salaried workers with monthly earnings of over 1000 NIS (in 2001 prices) with no missing values.

among Mizrahi men, and since 1982, among Arab men.[3] In short, most of the productivity-related characteristics (as well as other earnings determinants) of the four groups improved at a faster rate than the characteristics of the benchmark group, yet the earnings gap between them and the benchmark group did not narrow, but somewhat increased, during that period.

We now turn to the multivariate analyses aimed at identifying the factors responsible for the widening earnings gaps between native-born Ashkenazi men and the other groups of native-born workers.

6.2. Decompositions

The main purpose of this study is to identify the sources of the over-time widening earnings differences between Ashkenazi men and the other four groups. To this end, we first estimated 4 Ashkenazi earnings equations—one for each year. The dependent variable in each equation is (ln) real earnings. The list of earnings determinants includes years of schooling, academic degree, age and its squared term, (ln) hours of work, and indicators for being married, PTM occupation, and working in the public sector.[4]

Next, the results of the earnings equations for Ashkenazi men (not shown) were used for decomposing over-time changes in group-to-Ashkenazi men earnings gaps.Table 2 provides detailed results of these decompositions. The over-time changes in earnings gaps (column 1) are decomposed into two main components. The first (column 4) is the portion

[3] Being employed by the public sector was found to be beneficial for Arabs (Lewin-Epstein and Semyonov, 1993). The 1975 estimate for the proportion of Arabs in the public sector, however, is most likely an overestimate (due, in part, to the small sample size of Arabs in 1975).

[4] Some scholars call for a correction of possible sample selection bias when estimating women's wage models by referring to women's wage offers rather than actual wages. The most widely used correction is that developed by Heckman (1980). However, "although the Probit selection model is ingenious, its value in practice is controversial" (Little and Schenker, 1995, p. 57). The most serious problem with this model is its lack of robustness (e.g., Manski, 1989). A relatively small departure from its assumptions (e.g., normality) or about the way that selection occurs (Winship and Mare, 1992) may lead to large biases in the estimates. Another practical problem associated with this model is that of identification. In order to get stable estimates, it is necessary to have some variables that are used exclusively in the probit equation and not used in the wage (Y) equation. Theoretically, it is very difficult, of course, to find explanatory variables that determine wage offers but not wages. For these reasons, more and more researchers many times intentionally avoid using the two-step probit model (e.g., Blau, 1998, p. 128).

Table 2
Decomposition of changes in the differences in mean (ln) earnings between Israeli-born Ashkenazi men, 25–54 years old, and other ethnic/gender groups in the Israeli labor market, 1975–2001[a]

	Total change in (ln) earnings gaps	Due to change in observed characteristics	Due to change in treatment (discrimination or unobservables)	Due to change in group percentile	Due to change in returns to observed characteristics	Due to change in returns to unobservables	Due to change in market structure (inequality)
	1(4 + 7)	2	3	4 (2 + 3)	5	6	7(5 + 6)
Mizrahi men							
1975-1982	.162	**.109**	**.004**	**.113**	.013	.037	.050
1982-1992	.003	−.004	**−.073**	−.077	**.131**	−.051	.080
1992–2001	−.050	**−.157**	**.062**	**−.094**	.044	−.000	.044
1975–2001	.115	−.004	**−.031**	−.035	**.141**	.009	**.150**
Arab men							
1975–1982	.134	.034	.053	**.087**	−.048	.108	.047
1982–1992	.088	**.108**	**−.161**	−.053	**.190**	−.049	.140
1992–2001	.130	−.058	**.152**	.093	.028	.009	.037
1975–2001	.351	.068	**.019**	.086	**.185**	.080	**.265**
Ashkenazi women							
1975–1982	.103	.005	**−.013**	−.008	.077	.095	**.111**
1982–1992	.066	.001	**.005**	.006	.061	−.001	.060
1992–2001	−.023	−.055	**.031**	−.024	.001	.001	.008
1975–2001	.146	−.022	**.007**	−.015	**.112**	.048	**.161**
Mizrahi women							
1975–1982	.044	.001	**−.025**	−.025	.078	−.009	.069
1982–1992	.112	−.006	**−.057**	−.063	**.183**	−.009	**.174**
1992–2001	.000	**−.154**	**.100**	−.054	.051	.003	.054
1975–2001	.155	**−.096**	.000	**−.096**	**.248**	.003	**.251**

Figures in bold (columns 2–7) are those decomposition components that were found to be significantly different from zero (at .05 level) when applying the bootstrap method.

[a] See note #5 for the formula for deriving these decomposition components.

of the change due to changes in the differences between mean measured (column 2) and unmeasured (column 3) attributes of the two groups between two time points. The second component (column 7) is the portion of the change in earnings gaps due to changes in the earnings structure between two time points. Similar to the first component, this portion too, is constructed of two parts. The first (column 5) is over-time changes in returns to observed characteristics, and the second (column 6) is over-time changes in returns to unobserved characteristics (changes in residual inequality) between two time points.[5]

Finally, we applied the bootstrap method for deriving confidence intervals for each of these decomposed components. In the discussion that follows we refer only to those components that were found to be significantly different from zero.

The main finding of Table 2 is that changes in the earning structure between 1975 and 2001 is the main factor responsible for the widening earnings gaps between the benchmark group—native-born Ashkenazi men—and the other four groups.[6] More specifically, increasing returns to observed characteristics (column 5) is the main reason for the rising inequality in the Israeli labor market. Rising returns to earnings determinants—mainly college education and labor market experience–is not unique to Israel. Such a trend has been observed in most developed economies (e.g., Card and Lemieux, 1994; Freeman

[5] The method by which over-time changes in between-groups earnings differences are decomposed into group-specific and market structure factors is the following:

$$D_{(\mathrm{a-m})t2} - D_{(\mathrm{a-m})t1} = [(\boldsymbol{X}_{\mathrm{a}t2} - \boldsymbol{X}_{\mathrm{m}t2}) - (\boldsymbol{X}_{\mathrm{a}t1} - \boldsymbol{X}_{\mathrm{m}t1})] \times \boldsymbol{B}_{\mathrm{a}t1} + (\boldsymbol{X}_{\mathrm{a}t2} - \boldsymbol{X}_{\mathrm{m}t2}) \times (\boldsymbol{B}_{\mathrm{a}t2} - \boldsymbol{B}_{\mathrm{a}t1}) + [(e_{\mathrm{a}t2} - e_{\mathrm{m}t2}) - (e_{\mathrm{a}t1} - e_{\mathrm{m}t1})] \times \sigma_{\mathrm{a}t1} + (e_{\mathrm{a}t2} - e_{\mathrm{m}t2}) \times [\sigma_{\mathrm{a}t2} - \sigma_{\mathrm{a}t1}],$$

where $D_{(\mathrm{a-m})}$ is the difference in mean earnings between the two groups (e.g., Ashkenazim and Mizrahim) in t_j (e.g., 2001); $\boldsymbol{X}$ is a vector of means; $\boldsymbol{B}$ is a vector of coefficients; e is the mean standardized residual (i.e., from a normal distribution with mean zero and SD of 1) drawn from the Ashkenazi residual distribution; and σ is the Ashkenazi residual standard deviation of earnings.

The first term provides the contribution of over-time differences in the measured variables (the $\boldsymbol{X}$'s) to the over-time (between t_1 and t_2) change in earnings differences between Ashkenazim and Mizrahim (column 2 in Table 2). The second term (presented in column 5) measures the contribution of over-time changes in returns (to the measured variables) to the over-time change in earnings differences (i.e., $D_{(\mathrm{a-m})t_2} - D_{(\mathrm{a-m})t_1}$). The third term reflects the effect of over-time differences in the relative position of Ashkenazim and Mizrahim on the residual distribution, net of observed characteristics (column 3). The fourth term is the contribution of the over-time difference in residual inequality to the change in the between-group earnings differences from t_1 to t_2 (column 6). As the over-time difference in this residual inequality get larger, so does the between-group earnings difference.

The first and third terms constitute the groups' specific factors—measured and unmeasured characteristics (or market discrimination)—affecting changes in between-group earnings differences (column 4). The second and the fourth terms constitute the effects of market structure, namely changes in market returns to measured and unmeasured characteristics on these changes (column 7). The third and fourth term constitute the traditional ''unexplained'' portion of the gap.

The estimation process of the first and second terms is simple and straightforward. Deriving estimates of the third and fourth terms, however, requires an explanation. $e_{\mathrm{m}t_2}$ is estimated by MR_{t_2}. Since $e_{\mathrm{a}t_2} = 0$, then $(e_{\mathrm{a}t_2} - e_{\mathrm{m}t_2})$ describes the difference in mean (standardized) residual between Mizrahim and Ashkenazim. In order to express this difference in terms of (ln) earnings, we should assign the (ln) earnings value associated with MR_{t_2} in the unstandardized residual distribution of Ashkenazim in t_1 to this expression (and to multiply it by (-1)). The value we get is the estimator of $(e_{\mathrm{a}t_2} - e_{\mathrm{m}t_2}) \times \sigma_{\mathrm{a}t_1}$. Similarly, we derive estimators for the other expressions in the third and fourth terms (see Blau and Kahn, 1995, 1996).

[6] We are mostly interested in the impact of changes in the earnings structure between 1975 and 2001 on the widening earnings gaps between Ashkenazi men and the other groups during that period. However, the role of the earnings structure during the sub-periods analyzed in Table 2 will be presented as well when relevant.

and Katz, 1995; Gottschalk, 1997). During 1975–2001 Mizrahi men improved their mean unobserved attributes (the residual distribution, column 3) and Mizrahi women improved their observed attributes (column 2) relative to Ashkenazi men. These two improvements narrowed the mean earnings gap between these two groups and Ashkenazi men by .031 and .096 log points, respectively. However, changes in the earnings structure during this period (column 7), more than offset the relative improvement in the mean attributes of the weaker groups. This being the case, rising returns to productivity-related characteristics led to an increase in the mean earnings gap between the benchmark group of Ashkenazi men and the two Mizrahi groups. Had returns in 2001 remained at the same level of 1975, the gap between Ashkenazi men and the groups of Mizrahi men and women would have declined by .031 and .096 log points, rather than increase, as it actually had, by .115 and .155 log points, respectively. Similar findings are evident in other countries as well. For example, Blau and Kahn (1995) demonstrate that if male inequality in the US had stayed at its early 1970's level but women's relative qualifications and/or their treatment by the market improved at their actual rate, then the gender-based earnings gap would have narrowed more than it actually did. Ashkenazi men improved their standing relative to Arab men and Ashkenazi women on the residual distribution (column 3). However, the contribution of these improvements to the rising inequality was very small, and changes in the earnings structure were, again, the reason for the widening earnings gaps between Ashkenazi men and Arabs, as well between Ashkenazi men and women. Thus, rising returns to productivity-related characteristics is the sole reason for the wider mean earnings gaps between Ashkenazi men and all the other four groups in 2001 compared to 1975.

The 1975–1982 sub-period contributed the most to the widening earnings gap between Ashkenazi men and the groups of Mizrahi men, Arabs, and Ashkenazi women. During these years, the main factor responsible for this widening gap between Ashkenazi and Mizrahi men was the rising gap between the two groups on the observed characteristics (Column 2), while the the factors responsible for the widening gap between Ashkenazi and Arab men were changes on both observed and unobserved characteristics (column 4).

A different picture emerges regarding the two women groups. While the earnings gap between Ashkenazi men and Mizrahi women between 1975 and 1982 did not grow much, Ashkenazi women lagged behind their men counterparts during these years in their earnings growth due to changes on returns to both observed and unobserved characteristics (Column 7). For Mizrahi women, the largest impact on the mean earnings gap between them and Ashkenazi men occurred in the second sub-period, between 1982 and 1992. The main factor responsible for that was changes in returns to observed characteristics. Changes in returns to observed characteristics during this period (1982–1992) played also a major role in the widening earnings gaps among men. In sum, the widening earnings gap among men was mainly the result of changes in group percentile during the 1975–1982 sub-period, and changes in returns to observed attributes during the 1982–1992 sub-period. The widening gap between Ashkenazi men and women was mainly the result of changes in market structure during 1975–1982 (for Ashkenazi women) and during 1982–1992 (for Mizrahi women).

Educational level is the main variable to which the returns increased sharply between 1975 and 2001. Specifically, rises in returns to educational level (measured by years of schooling and B.A. degree) are responsible for 59, 48, and 27% of the growth in the gaps in mean earnings between Ashkenazi men and Mizrahi men, Arab men, and Mizrahi women, respectively (data not shown); rising returns to experience (measured by age and age

squared) and PTM occupation are responsible for additional 20–40%. Not surprisingly, however, rising returns to education are hardly responsible for the growth in the earnings gaps between Ashkenazi men and women. This is because by 2001 Ashkenazi women's educational level surpassed that of men (Table 1). Rather, rising returns to full-time employment (measured by ln hours of work) appears to be the main reason for the failure of Ashkenazi women (and to a lesser extent also for the failure of Mizrahi women) to close the earnings gap with their male counterparts.

The pattern of results regarding Arab men is somewhat different. Some of their characteristics (especially age and occupation) declined during 1975–1992 relative to that of Ashkenazi men. However, even in the case of Arab men, changes in the earnings structure are responsible for over 3/4 of the entire rise in the earnings gap between them and Ashkenazi men between 1975 and 2001. Of particular interest for understanding the development of Arab-Ashkenazi men gap is the last decade, 1992–2001. During these years, Arab men appreciably improved their educational level and occupational standing. However, the Israeli labor market treated these characteristics less favorably than similar characteristics of Ashkenazi men, suggesting that Arabs were discriminated against. In addition, rising inequality also harmed the relative economic progress of Arab men in this period. Taken together, the gap between Arab men and Ashkenazi men increased between 1992 and 2001. Had individual inequality remained at its 1992 level, and had Arabs received similar returns to their characteristics as Ashkenazi men, the earnings gap between them and Ashkenazi men would have declined between 1992 and 2001 (column 2). As shown in column 3, the gap actually increased during this decade, and changes in market treatment are solely responsible for this increase.

Changes in labor market treatment during the 1990's harmed not only Arabs, but all the other groups as well. Mizrahi men and women, as well as Ashkenazi women faced an inferior treatment by the market relative to Ashkenazi men (Column 3). The worsening market situation in those years offset some of the improvements in the observed attributes that the Mizrahi groups experienced during this period, and the gains that the Mizrahi groups and the Arabs made during the previous period (1982–1992) in their treatment by the market.

7. Conclusions

Table 2 tells an unequivocal story: Since 1975, the transformation in the earnings structure which led to rising earnings inequality among Israeli workers is the sole reason behind the rising mean earnings gap between Ashkenazi men and Mizrahim, both men and women. Likewise, the gaps between Ashkenazi men and women also increased during that period, and here too, changes in the earnings structure leading to rising inequality, provide the entire explanation for the rise in the earnings gaps between men and women of Ashkenazi origin. Rising inequality, however, is responsible for "only" about 3/4 of the rising earnings gap between Ashkenazi and Arab men during the entire period. The remaining portion of the rising earrings gap between Ashkenazi and Arab men is due to the relative decline in Arabs' observed characteristics, mostly age and occupation (during 1982–1992), and their treatment by the Israeli labor market during 1992–2001.

Taken together, the results suggest that rising individual inequality is the main factor responsible for the growing earnings gaps between the main groups of salaried workers in the Israeli labor force. Moreover, the results suggest that labor market discrimination

against Mizrahi men has not grown during the period. Rather, to the extent that Mizrahi men are discriminated against in the Israeli labor market, the level of discrimination declined during the 26-year period. Unfortunately, we are unable to reach the same conclusion regarding Arab men and Ashkenazi women, since the results are consistent with the hypothesis that labor market discrimination against these groups has grown between 1975 and 2001, and that most of the growth occurred since 1992. However, studies based on regression analysis, and ours is no exception, are unable to reject the alternative hypothesis, namely that the relative decline in Arabs' and Ashkenazi women's earnings are due to unobserved characteristics such as the quality of schooling, and not due to rising discrimination by Israeli employers.

In our case, we tend to accept this alternative hypothesis, especially for the period 1992–2001, where the findings suggest that all four groups suffered from rising residual earnings gap with Ashkenazi men. We do not believe that discrimination is responsible for the results since 1992 because this period in Israel was characterized by a rising awareness of issues related to equal opportunity that resulted in the introduction of some anti-discrimination laws and policies that most likely lowered rather than increased discrimination (Ben Hador et al., 2005). We therefore believe that the rising residual gaps of the 1990s are the result of unmeasured variables unique to the 1990s. In this decade Israel experienced rapid economic growth that was driven by the hopes for peace in the Middle East, the booming high technology industry, and the influx of hundred of thousands of highly educated workers from the former Soviet Union to Israel. It is quite possible that unmeasured variables such as "ability" (however defined) and social networks enhancing economic opportunities played a major role in creating the residual earnings gaps between Ashkenazi men and the other groups between 1992 and 2001. It is likely that earnings inequality hurts other weak groups in Israeli society—new immigrants, younger and older workers, and high school dropouts—relative to the most advantageous group in the Israeli labor market: Israeli born men of Ashkenazi origin.

On a broader level, this study demonstrates that changes in earnings structure is the key factor in slowing the convergence of (and in some cases even widening) between-group earnings gaps in developed economies. The results imply that a policy aimed at reducing income and wage inequality is necessary for improving the relative standing of the weak subordinate groups in labor markets.

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