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Gender, Ethnic, and National
Earnings Gaps in Israel:
The Role of Rising Inequality

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Israeli society is characterized by a national 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). Over the years, a clear hierarchy in the stratification system 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. Not surprisingly, within each group, men are above women, at least with respect to their earnings.

Over that past 40 years many studies provided macro sociological explanations for the persistence of the socioeconomic gaps among Israelis of various ethnic and national origin (see, for example, Peres 1971; Smootha 1978; Ben Rafael 1982; Lustick 1980; Swirski 1999; Eisenstadt 1967; Khazzoom 1998). The empirical literature on these issues is even more extensive. In the 1970s virtually all studies focused solely on the two Jewish groups of immigrant men, while the experience of Arabs and women were neglected (Peres 1971; Spilerman and Habib 1976). In the 1980s the ethnic cleavage within the Jewish groups was still the main subject of inquiry, in light of the persistence of the socioeconomic gaps among Israeli-born children of Mizrahi and Ashkenazi immigrants (henceforth “second generation immigrants”) (e.g., Smootha and Kraus 1985; Nahon 1987). During that period the first empirical studies on the socioeconomic achievements of women relative to men were conducted (e.g., Izraeli and Gaier 1979; Semyonov and Kraus 1983; Cohen, Bechar and Rajjman 1987). By the 1990s Arabs were brought back to the Israeli stratification system, and their socioeconomic achievements were systematically explored relative to their Jewish counterparts (e.g., Lewin Epstein and Semyonov 1994; Haberfeld and Cohen 1998a). At the same time comprehensive studies of the ethnic, national and gender-based gaps in educational

attainment and labor market performance were conducted (e.g., Lewin Epstein and Semyonov 1993; Haberfeld and Cohen 1998b; Cohen and Haberfeld 1998; Mark 1996; Kraus 2001; Friedlander, Okun, Eisenbach, and Elmakias 2002).

Despite the many differences between these studies – in data sets, methodologies and specific socioeconomic measures – they all confirmed that the basic hierarchy in the Israeli labor market and hence stratification system has not been changed over the past fifty years. As late as 2000, Ashkenazim are still at the top, followed by Mizrahim in the middle and Arabs at the bottom. In fact, a recent study found the earnings gaps between Ashkenazi and Mizrahi men in Israel are higher than the gaps between White and African American men in the US. (Rubinstein and Brenner 2003). Since Arab men and all women groups earn less than Mizrahi men, the gaps in Israel appear to be greater than the US.

Conclusions about the persisting economic gaps in Israeli labor market are based on numerous studies that normally focused on two or three groups only. In most studies, Mizrahi men were compared to Ashkenazi men; Arab men were compared to all Jewish men; all Jewish women were compared to all Jewish men; and Arab women were compared to all Jewish women. No study analyzed the socioeconomic fortunes of all groups relative to one benchmark group, nor has this been done overtime. This is unfortunate, because it prevents us from a comprehensive evaluation of the dynamics of the Israeli stratification system overtime. In this paper we wish to contribute to this literature by analyzing the economic standing of all groups of Israeli-born relative to the dominant group of Ashkenazi men.

Interestingly, the educational gaps between Israeli-born Ashkenazi men and the other major native-born groups in Israel's labor market (Mizrahi men, Arab men, Ashkenazi women and Mizrahi women) have somewhat narrowed between the 1970s and 1990s (Cohen and Haberfeld 1998a; Friedlander et al. 2002; Kraus 2002). This trend, together with declining differences in other productivity-related characteristics, led many to expect that the economic gaps between Ashkenazi men – the most advantageous group in the

Israeli labor market and society – and the other groups will become narrower over time. Yet recent research shows that despite narrowing differentials in most productivity-related measures between the groups, the earnings gaps between Ashkenazi men and the other groups not only failed to converge, but for some groups the gaps actually widened between 1975 and 1995 (Mark 1996; Cohen 1998; Cohen and Haberfeld 1998; Haberfeld and Cohen 1998a, 1998b).

This paper is aimed at understanding this apparent puzzle, focusing on the role of earnings inequality on the development of national, gender, and ethnic-based earnings gaps in Israel. Specifically, we will provide estimates for the extent to which rising earnings inequality is responsible for the persisting (and for some groups, during some periods, growing) 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 the persisting earnings gaps between Ashkenazi men and the other groups, with an emphasis on the expected role of rising inequality. Section 2 presents the data, and section 3 presents the statistical model we use to evaluate the empirical status of the inequality hypothesis. Section 4 presents the results, and the final section discusses the main findings and their implications the Israeli stratification system.

1. Possible explanations for the rising ethnic-based wage differentials

Three processes, not mutually exclusive, may explain the persisting earnings differentials between Ashkenazi men and other major groups of Israeli-born in the labor market. The first is a basic demographic process: the interaction between aging and educational gaps between groups. During the 1990s members of the Jewish second generation reached a relatively older average age (about 40) compared to less than 35 in the 1970s. Gaps in educational levels result in larger earnings differentials at age 40 than 35. Thus, aging may be responsible for some of the rise in the national and ethnic-based earning gaps during the past 25 years. The second process that could explain the increase in earnings differentials, in light of diminishing schooling differences, is 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.

The third process that could explain the relative stability (and at time increase) of the wage gap between Ashkenazi men and the other groups in Israel, is the sharp rise in income and earnings inequality since the 1970s. For our purpose, it is important to emphasize that the relations between earnings inequality and gender, national, and ethnic-based earnings gaps are structural. When earnings inequality increase, it implies that earnings of those at the top percentiles increase relative to the wages of those located at the middle and bottom part of the earnings distribution. Because the top portion of the distribution includes a disproportionate number of Ashkenazi men, and the bottom portion includes a disproportionate number of Mizrahim, Arabs, and women, a rise in inequality widens the earnings gap between the groups, when all else is equal.¹

Indeed, rising wage inequality 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 higher gender wage ratios in European countries compared to the US. For example, in 1994 the women to men wage ratio in Italy (.795) was higher than in the US (.729), implying a smaller gender gap in Italy. The entire difference, however, is due to different wage structures in the two countries. Had men's earnings distribution in Italy been the same as that of the US, the wage ratio in Italy would have been only .590. Another word, relative to men, Italian women are doing better than US women, but this is due entirely to the lower earning inequality in Italy than in the US (Blau and Kahn 2000: 94).

In the last three decades, income inequality increased sharply in Israel. Between 1975 and 1982 the Gini coefficient in gross monthly income among households headed by salaried workers increased from .28 to .32 (Israel 1983). In 1992 the coefficient reached .35, and by 2000 it was .38 (Israel 2002, Table 5.31). Data on earnings inequality are

¹ The trends in rising earnings inequality are examined below within the base-line group only, namely, only within Ashkenazi men. In other words, the measure of earnings inequality is inequality within Ashkenazim. This being the case, it is not possible to claim that explaining widening group-based earnings gaps by rising earnings inequality is a tautology.

less readily available than data on income inequality, but available measures, too, imply that earnings inequality increased since the mid 1970s. According to Sussman and Zakai (1996), the Gini coefficient in earnings in the private sector increased from .33 in 1972 to .44 in 1994. Among public sector workers there is less inequality, but the increase in the coefficient was steeper, from .22 to .33 during the same period. According to Dahan (2001), the Gini coefficient for earnings increased from .544 in 1980 to .585 in 1997. Among men working full-time, Dahan calculated that the variance in hourly wage increased by about 32% during approximately the same years.

The rise in income and wage inequality in the last two or three decades is not unique to Israel. With the exception of Germany and Italy, inequality increased in all Western countries (Gottschalk and Smeeding 1997; Morris and Western 1999). The standard explanation for the rising inequality in the advanced economies, is skill-based technological change (technological change that brought about an increased demand for high-skilled workers, but not to low-skilled workers). Less-skilled and blue collar workers suffered from 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 (Gottschalk and Smeeding 1997; Morris and Western 1999). In Israel, no comparable comprehensive studies were conducted. Yet it is reasonable to assume that similar processes affected the Israeli economy and society since the early 1970s. Similar to other developed economies, in Israel too, there have been a sharp increase in the returns to experience, and especially to university degrees since the 1970s (Dahan 2001; Cohen 1998), although it is not known if this increase was driven by skill-based technological changes. Concomitant with the rise in the returns to university education, Israeli labor unions lost half their membership (Cohen, Haberfeld, Mundlak and Saporta, 2003), and collective bargaining agreements were decentralized, thereby increasing wage inequality (Kristal 2002). 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.

In sum, three processes -- aging, an increase in labor market discrimination against non-Ashkenazi men, and rising inequality -- could be responsible for the persisting (and at time widening) national, gender and ethnic-based earnings differentials in Israel. In the following pages we present evidence that it is mainly rising earning inequality that has been responsible for the persisting earnings differentials between Ashkenazi men and the remaining members of the native-born Israeli workforce.

2. 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 households². We use the individual samples based on these surveys, with total sample sizes of about 7,500 individuals in 1975, 14,000 in 1982 and 1992, and about 33,000 in 2001. Because earnings are not available for self-employed, the study will be limited to salaried workers,³ 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

² In 1975, 1982 and 1992, about 6,000-7,000 households were sampled in urban communities with a population of at least 2,000 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 2,000 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 2,000-10,000) is the same as the average earnings in larger communities.

³ In 1975, 74 percent of men and 82 percent of employed women in the labor force were salaried workers. These rates have grown over time, and by 2001 they reached 83 and 92 percent for men and women, respectively (Israel 2002).

Israel's migration laws there are hardly any foreign-born Arabs). Third generation Israeli Jews (Israeli-born to Israeli-born fathers) are 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. In short, excluded from the analyses are older (over 54) and younger (below 25) workers, self-employed, members of kibbutzim, Moshavim and other small communities, third-generation Jews, and immigrants arriving Israel under the law of return as well as labor migrants (from the West Bank, Gaza as well as from overseas – major social groups comprising a significant portion of the Israeli labor force. This is not prohibitive, as our aim is not to provide an overview of the Israeli labor force. Rather, the main purpose of this study is to describe and analyze the effect of rising inequality on the development of the earnings gaps among the largest groups of native-born salaried workers in Israel: The one which is at the top of the socioeconomic ladder (Ashkenazi men) and the others hoping to catch up with it (Mizrahim, Arabs, and women).

Earnings is 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.⁴ Two measures of schooling are used: years of education and whether the respondent has at least a B.A. degree⁵. Age is the best proxy available in the data for labor market experience; thus we include in all equations

⁴ In 1975 the income and hours data are for "last month". In 1992 and 2001 the income and hours data are the "usual". Since the correlation between the two measures of income in 2001 is .96, and the mean difference is less than 1%, this does not pose a problem. More problematic is the fact that the 1982 survey includes only annual income. Monthly earnings in 1982 were derived by dividing annual earnings by 9.25, which is the within-workers ratio of monthly and annual earnings in 1975. The figures for 1982 are thus somewhat less reliable than those of 1975, 1992 and 2001. In addition, in 1982 inflation was high, which may have affected the accuracy of earnings reports.

⁵ In 1975 there is no information on last degree attained by respondents. We considered all those with 16 years of schooling and over as having a B.A. degree.

age and its squared term⁶. In addition, three dummy variables, known to affect earnings, are included to indicate whether respondents are married, whether they hold a professional, technical or managerial (PTM) occupation and whether they reside in a large metropolitan area.⁷

3. Methods and Analyses

Our analyses are based on a method offered by Juhn, Murphy, and Pierce (1991), and was employed in a series of studies by Blau and Kahn (1995, 1996, 1997, 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 enables us to decompose changes in earnings gaps between two groups at two time points into (a) a portion due to changes in group-specific (e.g., gender-based or ethnic-based groups) factors; and (b) a portion due to changes in the overall earnings inequality. The first portion – due to groups’ specific factors, can be further broken down into two types of group-specific factors: (a.1) the relative change in the groups’ measured attributes, and (a.2) the relative change in the market treatment of the two groups (and/or groups’ unmeasured attributes). The main advantage of this method of decomposing earnings gaps over the conventional methods of decomposition (e.g., Oaxaca, 1973) is identification of the independent role of earnings structure (i.e., changes over time in earnings inequality) on earnings gaps. This role of changing inequality ((b) above) is combined in the traditional method with changes in the market treatment factor ((a.2) above) and both create the “unexplained” fraction of the gap. The proposed method allows us to reduce the residual earnings gap by entangling this black box of “unexplained” portion into a residual portion (which we equate with changes in market treatment and/or unmeasured explanatory variables), and a portion due to changes in earnings structure (i.e., inequality).

⁶ Age is a better proxy for men’s labor market experience than for women’s because women spend, on average, more time outside the labor market than do men. As a result, we might inflate women’s actual market experience.

⁷ In 1975 data for metropolitan area indicate employment in one of the largest three cities. In the other years it indicates residence in one of the largest three cities.

First, we calculate earnings differences (D) between two groups (e.g., Ashkenazi and Mizrahi men) at each time point:

$$(1) \quad D_t = Y_{at} - Y_{mt}$$

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

In each year, each Mizrahi's earnings (y_{imt}) is placed in the Ashkenazim's earnings percentile distribution of that year, and each Mizrahi is assigned the percentile that his earnings placed him on. We then calculate the following for each of the years:

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

This percentile ranking is determined by the group-specific factors, namely differences in average earnings determinants between the two groups, and differences in market treatment (i.e., discrimination and/or differences in averages of unobserved characteristics) towards members of both groups.

In order to isolate the impact of differences in earnings determinants from the impact of differences in market treatment, we calculate an earnings equation for Ashkenazim for each year, as follows:

$$(3) \quad y_{iat} = X'_{iat} B_{at}$$

where X is a vector of earnings determinants of Ashkenazim in year t, and B is a vector of their coefficients.

We apply this estimated equation to the Mizrahi averages in order to derive an estimation of the predicted mean Mizrahi's earnings, adjusted for differences in observed characteristics between the two groups.

In addition, we derive an Ashkenazim residual earnings percentile distribution by calculating a residual score for each Ashkenazi each year (e_{iat}):

$$(4) \quad e_{iat} = y_{iat} - X'_{iat}B_{at}$$

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

$$(5) \quad e_{imt} = y_{imt} - X'_{imt}B_{at}$$

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

$$(6) \quad MR_t = \text{Mean residual percentile ranking of Mizrahim} \\ \text{in Ashkenazim's residual earnings percentile} \\ \text{distribution in each year.}$$

This figure (MR_t) indicates the relative earnings of Mizrahim 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 Mizrahim indicates the group-based difference in unobserved attributes or the differential market treatment towards the two groups. The major advantage of this measure, compared to the traditional “unexplained” difference, is that changes in the mean residual are not contaminated by changes in the earnings structure.

Finally, and most important to our research question, we derive the impact of changes in the earnings structure (i.e., overall 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 (e.g., 2001) in the Ashkenazim's earnings distribution at t_1 (e.g., 1975). 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 the inequality within the Ashkenazim earnings distribution). (See appendix A for the method in which over-time changes in between-groups earnings differences are decomposed into group-specific and market structure factors).

This method will be used for each group relative to the benchmark of Ashkenazi men. In other words, 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.

4. Results

4.1 Descriptive statistics

Table 1 presents descriptive statistics of the variables used in the study for each group for the four 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 show 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 45 percent of its average earnings in 2001. Similarly, Mizrahi men, Arab men, Ashkenazi women, and Mizrahi women earned in 1975, 50, 66, 52, and 53 percent respectively, of their average 2001 earnings⁸. Evidently, Ashkenazi men experienced the largest earnings growth, and Arabs 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 1980's, while women experienced the fastest growth during the 1990's.

⁸ Ratios are based on geometric means.

Insert Table 1 here

These between-group differences in earnings growth appear to be uncorrelated with changes in group's observed characteristics. 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 measure on which Ashkenazi men showed an impressive increase (together with Ashkenazi women) relative to the other workers, is age. The average age of Ashkenazi men and women increased by about 6 years between 1975 and 2001, compared to an increase of about 3 years among Mizrahi men and women, and a decrease of almost 2 years by Arab men. These figures are inconsistent with the possibility that changes in age structure explain the failure of Ashkenazi women to narrow the earnings gaps between them and Ashkenazi men. However changes in age structure among salaried workers could explain part of the failure of Mizrahi men and women, and especially of Arab men to catch up with Ashkenazi men. Finally, there are no appreciable between-group differences in the changes in working hours, or in the portion of group members holding PTM occupations. In short, most productivity-related characteristics 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 during the 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.

4.2 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 20 earnings equations – one for each group in each year. The dependent

variable in each equation is (y_{igt}) , where y_i denotes (ln) real earnings of the i th person; g represents the group to which the person belongs ($g =$ Ashkenazi men, Mizrahi men, Arab men, Ashkenazi women, and Mizrahi women); and t stands for the year ($t = 1975, 1982, 1992, 2001$). The list of earnings determinants (X) includes years of schooling, academic degree, age and its squared term, (ln) hours of work, and indicators for being married, PTM occupation, and living in a big city.

Insert Table 2 here

Table 2 presents the results of these earnings equations that we use for decomposing over-time changes in group-to-Ashkenazi men earnings gaps. Table 3 provides detailed results of these decompositions. The over-time changes in earnings gaps are decomposed into two main components. The first (column 4) is the portion 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 earnings inequality 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 (see Appendix 1 for the decomposition method).

Insert Table 3 here

The main finding of Table 3 is that rising inequality 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. For example, during 1975-2001 Mizrahi men have improved their mean unobserved attributes (the residual distribution, column 3) and especially their observed attributes (column 2) relative to Ashkenazi men. These two improvements cut the earnings gap between the groups by .145 log points

(column 4). However, changes in the earnings structure (inequality) during this period (.245, column 7), more than offset the relative improvement in the mean attributes of Mizrahi men. Since this figure (.245) is larger than the figure that is due to improvements in relative characteristics of Mizrahim (.145), the observed earnings gap between the groups increased by .100 log points (column 1) between 1975 and 2001. Evidently, changes in earnings structure led to an overall increase in the earnings gap between the two groups. Had inequality in 2001 remained at the same level of 1975, the gap between Ashkenazi and Mizrahi men would have declined by .145 log points rather than the increase, as it actually had, by .100 log points.

Rising inequality, mostly due to higher return to B.A. degree, age, and PTM occupations, is also the sole reason for the wider earnings gaps between Ashkenazi men and other three groups in 2001 compared to 1975. The earnings gaps widened despite narrowing differences in mean observed and unobserved characteristics between Ashkenazi men and the other groups during this period. The only exception to this result is the group of Arab men. The observed (especially age, but not schooling) and unobserved characteristics of Arabs declined over time relative to that of Ashkenazi men. However, even in the case of Arab men changes in market structure (inequality) are responsible for over $\frac{3}{4}$ of the entire rise in the earnings gap between them and Ashkenazim between 1975 and 2001. The two groups whose mean characteristics improved the most (relative to Ashkenazim) are the two Mizrahi groups. However, despite their improved characteristics, the earnings gaps between them and Ashkenazi men increased by .100 (men) and .162 (women). Had inequality in 2001 remained at 1975 level, both Mizrahi men and women would have narrowed the earnings gap between them and Ashkenazi men by .145 (men) and .143 (women) log points.

The largest impact of rising inequality on the earnings gap occurred, for most groups, between 1975 and 1982, followed by the 1982-1992 period, while changes in the earnings structure between 1992-2001, the period where inequality hardly increased, had the smallest effect on the growing gaps.

Finally, Table 4 presents the effect of rising inequality on the widening earnings from a somewhat different angle. Specifically, it presents group-to-Ashkenazi men earnings ratios had the 1975 Ashkenazi men earnings distribution remained the same. For example, in 2001 Mizrahi-to-Ashkenazi men observed earnings ratio was .714 (column 2). If inequality among Ashkenazi men in 2001 had remained at its 1975 level, the earnings ratio between these groups would have increased to .852 (column 3). Comparing column 3 to column 2 suggests that for all groups the earnings ratios would have been much larger if earnings inequality had remained constant. Under such conditions, the earnings ratio in 2001 of Arab men, Ashkenazi women and Mizrahi women to Ashkenazi men would have been around .68-.76, compared to the observed ratios of .44-.55.

Insert Table 4 here

5. Discussion and Conclusions

Table 3 and 4 tell an unequivocal story: Since 1975, and especially until 1982, the changes in the earnings structure, namely, rising earnings inequality, is the sole reason behind the rising earning gap between Ashkenazi men and Mizrahim, both men and women. Thus, the rise in the earnings gap between Ashkenazim and Mizrahim during the 26-year period must not be attributed to rising gaps in productivity-related traits, nor to rising labor market discrimination against Mizrahi men and women. In fact, Mizrahi men and women made impressive relative gains in productivity-related characteristics (and their treatment by the market) in all time periods (the exception being the market treatment of Mizrahi women during 1992-2001). However, the rising inequality, especially during 1975-92 (but for men also during 1992-2001), more than offset these gains of Mizrahim, and blocked their relative economic progress.

The gaps between Ashkenazi men and women also increased during the period, and here too, rising inequality is the entire explanations for the rise in the earnings gaps between men and women of Ashkenazi origin. Relative to the benchmark group, Ashkenazi women also improved their productivity-related characteristics (and their treatment by the

market), but not as much as the two Mizrahi groups, mostly because the human capital of Ashkenazi women was already relatively high in 1975. Thus, had inequality remained constant during the 26-year period, the gap between the two Ashkenazi groups would have declined by .039 log points, rather than increase, as it actually did, by .151 points. About two-thirds of the effect of inequality on the rising earnings gap between Ashkenazi men and women occurred in the 1970s, and the remaining effect is due to rising inequality during 1982-2001.

The case of Arab men is somewhat different. While inequality harmed their relative earnings no less than it harmed the Jewish groups, their characteristics (and their treatment by the labor market) did not improve during the period. Rising inequality is thus responsible for “only” about $\frac{3}{4}$ of the rising earnings gap between Ashkenazi and Arab men during the entire period. The remaining portion of the rising earnings gap between Ashkenazi and Arab men is due to the relative deterioration in Arabs’ observed characteristics, mostly age and occupation (during 1975-92), and their treatment by the Israeli labor market during 1975-82 and 1992-2001.

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 observed characteristics. However, the Israeli labor market treated these characteristics less favorable than similar characteristics of Ashkenazi men. 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 inequality remained at its 1992 level, and Arabs would have received similar returns to their characteristics as Ashkenazi men, the earnings gap between them and Ashkenazi men would have declined by .054 log point between 1992 and 2001. As we can see in Table 3, the gap actually increased during this decade by .140 log points. Changes in inequality and market treatment are equally responsible for this increase.

Taken together, the results suggest that rising 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 Mizrahim or women has not grown during the period. Rather, to the extent that Mizrahi men and Mizrahi and Ashkenazi women 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, since the results are consistent with the hypothesis that labor market discrimination against Arab workers has grown between 1975 and 2001, and that most of the growth occurred since 1992. To be sure, studies based on regression analysis, and ours is no exception, are unable to reject the alternative hypothesis: that the relative decline in Arabs' earnings are due to unobserved characteristics such as quality of schooling, and not due to rising discrimination by Israeli employers. Notwithstanding this possibility, the fact that Arab men are the only group for which we found possible evidence for rising discrimination, together with the political situation in Israel in 2001 (the worst year in Jewish-Arab relations in recent memory), suggests that growing discrimination is one plausible explanation for the results.

On a broader level, the results imply that a policy aimed at reducing income and wage inequality is necessary for improving the relative standing of weaker groups in the Israeli labor market, whose efforts for economic and social progress can be viewed, in Blau and Kahn's (1997) words as "swimming upstream" the raging river of the Israeli labor market. It is likely that income 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: educated Ashkenazi men.

Appendix A.

Decomposing over-time changes in between-groups earnings differences

For decomposing over-time changes in between-groups earnings differences, we follow Blau and Kahn (1995):

$$\begin{aligned} D_{(A-M)t2} - D_{(A-M)t1} = & \\ & [(X_{At2} - X_{Mt2}) - (X_{At1} - X_{Mt1})] * B_{At1} + \\ & (X_{At2} - X_{Mt2}) * (B_{At2} - B_{At1}) + \\ & [(e_{At2} - e_{Mt2}) - (e_{At1} - e_{Mt1})] * \sigma_{(At1)} + \\ & (e_{At2} - e_{Mt2}) * [\sigma_{(At2)} - \sigma_{(At1)}] \end{aligned}$$

Where $D_{(A-M)}$ is the difference in mean earnings between the two groups (e.g., Ashkenazim and Mizrahim) in t_j (e.g., 2001); X is a vector of means; B is a Vector of coefficients; e is the mean standardized residual (i.e., from a normal distribution with mean zero and s.d. 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 x 's) to the over-time (between t_1 and t_2) change in earnings differences between Ashkenazim and Mizrahim. The second term measures the contribution of over-time changes in returns (to the measured variables) to the over-time change in earnings differences (i.e., $D_{(A-M)t2} - D_{(A-M)t1}$). The third term reflects the effect of over-time differences in the relative position of Ashkenazim and Mizrahim net of observed qualifications. Put differently, it provides the over-time difference in the earnings gap that would result if the level of the residual Ashkenazi earnings inequality was the same in t_1 and t_2 , and the only difference between these two years is the mean percentile ranking of Mizrahim in the Ashkenazi residual distribution. 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 . 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 qualifications and unmeasured qualifications (or market discrimination) - affecting changes in between-group earnings differences. The second and the fourth terms constitute the effects of market structure, namely changes in market returns to those measured and unmeasured qualifications, on these changes⁹.

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_{Mt2} is estimated by MR_{t2} (i.e., the mean residual percentile ranking of Mizrahim in the Ashkenazim's residual earnings percentile distribution in t_2). Since $e_{At2} = 0$, then $(e_{At2} - e_{Mt2})$ 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_{t2} 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 $(e_{At2} - e_{Mt2}) * \sigma_{(At1)}$. Similarly, we derive estimators for the other expressions in the third and fourth terms (see Blau and Kahn, 1995; 1996).

⁹ The third and fourth term constitute the traditional "unexplained" portion of the gap.

6. References

Ben Rafael, Eli. 1982 *The Emergence of Ethnicity: Cultural Groups and Social Conflict in Israel*. Westport, CT: Greenwood Press.

Blau Francine, and Lawrence Kahn. 1995. "The Gender Earnings Gap: Some International Evidence." In R.B. Freeman and L.F. Katz (eds.) *Differences and Changes in Wage Structures*. Chicago, Ill: The University of Chicago Press, Pp. 105-143.

-----.. 1996. "Wage Structure and Earnings Differentials: an International Comparison." *Economica* 63:(Supp.): S29-S62.

-----.. 1997. "Swimming Upstream: Trends in Gender Wage differentials in the 1980s." *Journal of Labor Economics* 15(1): 1 1-42.

-----.. 2000. "Gender Differences in Pay." *Journal of Economic Perspectives* 14: 75-99.

Cohen Yinon. 1998. "Socioeconomic Gaps among Jews, 1975-1995." *Israeli Sociology* 1: 115-134. (Hebrew).

Cohen, Yinon, and Yitchak Haberfeld. 1998. "Second Generation Jewish Immigrants in Israel: Have the Ethnic Gaps in Schooling and Earnings Declined?" *Ethnic and Racial Studies* 21: 507-528.

Cohen, Yinon, Yitchak Haberfeld, Guy Mundlak, and Ishak Saporta. Forthcoming (2003). "Unpacking Union Density: Membership and Coverage in the Transformation of the Israeli Industrial Relations System." *Industrial Relations*.

Dahan, Momi. 2001. "The rise in economic inequality." In Ben Bassat, A. (ed.) *The Israeli Economy, 1985-1998: From Government Intervention to Market Economics*. Tel-Aviv: Am Oved Publishers, pp. 610-656 (Hebrew).

Eisenstadt, S.N. 1967. *The Israeli Society*, London: Weidenfeld and Nicolson.

Friedlander, Dov, Barbara Okun, Zvi Eisenbach, and Lilach Elmakias. 2002. "Immigration, social change, and assimilation: educational attainment among birth cohorts of Jewish ethnic groups in Israel, 1925-29 to 1965-69." *Population Studies* 56: 135-150.

Gottschalk, Peter, and Timothy Smeeding. 1997. "Cross National Comparisons of Earnings and Income Inequality." *Journal of Economic Literature* 35: 633-687.

Haberfeld, Yitchak. 1992 "Immigration and ethnic origin: the effect of demographic attributes on earnings of Israeli men and women" *International Migration Review*, vol. 27(2): 286-305.

- Haberfeld Yitchak, and Yinon Cohen. 1998a. "Earnings of Native Born Arab and Jewish Men in Israel 1987-1993". *Research in Social Stratification and Mobility* 16: 69-88.
- Haberfeld, Yitchak, and Yinon Cohen. 1998b. "Earnings Gaps Between Israel's Native-born Men and Women, 1982-1993." *Sex Roles* 39: 855-872.
- Israel. 1983. Supplement to Monthly Bulletin of Statistics. 34: 7.
- Israel. 2002. *Statistical Abstract of Israel*. Jerusalem: Central Bureau of Statistics.
- Izraeli, Daphna, and Kalman Gaier. 1979 "Sex and interoccupational wage differences in Israel." *Industrial Relations*. 8: 227-232.
- Juhn, Chinhui, Kevin Murphy, and Brooks Pierce. 1991. "Accounting for the slowdown in Black-White wage convergence." in Marvin Kosters (ed.) *Workers and their wages*. Washington, DC: AEI Press. Pp. 107-143.
- Khzzoom, Aziza. 1998. *The origin of ethnic inequality among Jews in Israel*. Ph.D. Dissertation, Dept. of Sociology, UC Berkeley.
- Kraus 2002. *Secondary Breadwinners : Israeli Women in the Labor Force*. Westport, Conn: Praeger.
- Kristal, Tali. 2002. "Decentralization of collective bargaining agreements and the rise in Inequality in Israel. *Labor, Society and Law* 9: 17-42) (Hebrew).
- Lewin Epstein, Noah, and Moshe Semyonov. 1993. *The Arab Minority in Israel's Economy*. Boulder, CO: Westview Press
- Lewin Epstein, Noah, and Moshe Semyonov. 1994 "sheltered labor markets, public sector employment and socioeconomic return to education of Arab in Israel." *American Journal of Sociology* 100 (3): 622-651.
- Lustick Ian. 1980. *Arabs in the Jewish State: Israel's control of a national minority*. Austin: University of Texas press.
- Mark, Nili. 1996. 'The contribution of education to earnings differentials among ethnic groups in Israel', *Israel Social Science Research*, vol. 11, no. 1, pp. 47-86
- Nahon, Yaakov. 1987 *Education Levels and Employment Opportunities: The Ethnic Dimension*, Jerusalem: Jerusalem Institute for the Study of Israel (Hebrew).
- National Insurance Institute. (1996). Mean Earnings and Income by Economic Variables, 1992-93. Survey No. 135. Jerusalem: National Insurance Institute.

- Oaxaca, Ronald L. 1973. "Male-female wage differential in urban labor markets." *International Economic Review* 14(3): 693-709.
- Peres, Yochanan. 1971 'Ethnic relations in Israel', *American Journal of Sociology*, vol. 76, no. 5, pp. 1021-1047
- Rubinstein, Yona, and Dror Brenner. 2003. "The origin related wage gaps: evidence from the 'Promised Land.'" Unpublished Manuscript. Tel Aviv: Sapir Center for Development.
- Semyonov, Moshe, and Vered Kraus. 1983. "Gender, ethnicity, and earnings inequality: the Israeli experience" *International Journal of Comparative Sociology*, vol. 24, no. 3-4, pp. 258-272
- Smooha, Sami. 1978. *Israel, Pluralism, and Conflict*, Berkeley: University of California Press.
- and Kraus, Vered. 1985. "Ethnicity as a factor in status attainment in Israel". *Research in Social Stratification and Mobility* 4: 151-175
- Spilerman, Symour, and Jack Habib. 1976. "Development towns in Israel: the role of community in creating ethnic disparities in labor force characteristics." *American Journal of Sociology* 81: 781-812.
- Sussman, Zvi, and Dani Zakai. 1996. "The Decentralization of Collective Bargaining and Changes in the Compensation Structure in Israel's Public Sector." Discussion Paper No. 96.04. Jerusalem: Research Department, Bank of Israel.
- Swirski, Shlomo. 1999. *Politics and education in Israel: comparisons with the United States*. New York: Falmer Press.

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

	Ashkenazi Men				Mizrahi Men				Arab Men				Ashkenazi Women				Mizrahi Women			
	1975	1982	1992	2001	1975	1982	1992	2001	1975	1982	1992	2001	1975	1982	1992	2001	1975	1982	1992	2001
Earnings (NIS)	5210 (2382)	7193 (4251)	10035 (6641)	13103 (8909)	4041 (1718)	4572 (2186)	6490 (4163)	9077 (6266)	3559 (1671)	3929 (2331)	5044 (2753)	5884 (4293)	3192 (1339)	3976 (2131)	5146 (3108)	7131 (5252)	2468 (1330)	3334 (1871)	4054 (2496)	5429 (3403)
(ln) earnings	8.462 (.449)	8.725 (.573)	9.000 (.688)	9.258 (.699)	8.225 (.395)	8.323 (.462)	8.611 (.578)	8.921 (.621)	8.111 (.345)	8.146 (.504)	8.403 (.490)	8.521 (.534)	8.020 (.402)	8.152 (.530)	8.383 (.579)	8.665 (.641)	7.793 (.537)	7.976 (.523)	8.163 (.530)	8.427 (.592)
Years sch.	13.7 (3.4)	13.9 (3.2)	14.7 (3.4)	14.8 (3.1)	10.3 (2.9)	10.7 (2.7)	11.9 (2.5)	12.9 (2.7)	7.6 (3.6)	8.1 (3.8)	9.6 (3.5)	11.8 (3.6)	13.5 (2.9)	13.8 (2.6)	14.5 (2.5)	15.0 (3.0)	10.6 (2.9)	11.8 (2.6)	12.6 (2.3)	13.3 (2.6)
B.A.+	.34	.39	.46	.42	.08	.12	.12	.19	.02	.08	.12	.19	.26	.39	.43	.47	.05	.15	.14	.23
Age	33.9 (7.5)	35.4 (7.3)	39.2 (7.4)	39.8 (8.7)	34.4 (9.1)	31.8 (6.8)	33.8 (6.2)	36.9 (7.6)	38.1 (8.2)	38.0 (8.6)	36.8 (7.8)	36.6 (8.1)	33.5 (7.2)	35.6 (7.1)	38.6 (7.6)	40.0 (8.9)	32.5 (7.4)	30.8 (6.2)	33.4 (6.3)	36.9 (7.5)
Married	.90	.90	.87	.79	.83	.81	.80	.78	.88	.90	.87	.82	.81	.79	.79	.78	.59	.73	.78	.78
Hours	209 (49)	215 (38)	217 (59)	220 (53)	213 (40)	208 (30)	213 (48)	217 (48)	196 (42)	202 (33)	203 (41)	208 (51)	142 (53)	154 (50)	153 (47)	162 (51)	150 (54)	164 (43)	159 (43)	163 (46)
PTM	.50	.57	.57	.59	.20	.16	.23	.29	.15	.17	.12	.21	.56	.52	.55	.53	.22	.28	.28	.31
Big city	.75	.26	.25	.21	.72	.24	.19	.15	.28	.15	.12	.05	.78	.36	.27	.22	.79	.19	.18	.16
N of cases	365	389	450	808	150	344	566	1332	92	104	155	883	317	356	474	821	92	192	517	1379

^aEarnings are in 2001 NIS. Data for big city in 1975 indicate district of employment. Included in the analysis are salaried workers with monthly earnings of over 1000 NIS (in 2001 prices).

Table 2. Regression Coefficients of (ln) monthly earnings: Israeli-born salaried workers 25-54 years old by gender and ethnic origin, 1975-2001.

	Ashkenazi Men				Mizrahi Men				Arab Men				Ashkenazi Women				Mizrahi Women			
	1975	1982	1992	2001	1975	1982	1992	2001	1975	1982	1992	2001	1975	1982	1992	2001	1975	1982	1992	2001
Yrs schl.	.008	-.003	.002	.007	.020	.023	.066**	.057***	.019	.042*	.026	.036**	.035**	.040*	.030*	.041**	.104**	.054**	.055**	.048**
B.A.+	.027	.109	.204**	.403**	.012	.058	.125	.165**	.055	.154	-.129	.096	-.025	.008	.116*	.108*	-.353	.055	.108	.164**
Age	.088**	.102*	.179**	.050*	-.003	-.070	.069*	.043*	.042	.049	.076	.039	.063*	.037	.064*	.086**	-.022	.114*	.044	.028
Age sq	-.001*	-.001*	-.002*	-.0001	.0002	.001*	-.0007	-.0004	-.001	-.001	-.001	-.0004	-.001*	-.0005	-.001	-.001*	.001	-.001*	-.0004	-.0002
Married	.254**	.326**	.297**	.240**	.163	.245**	.252**	.237**	.145	.490**	.032	.119*	.0003	.039	.031	.044	-.157	.018	.104*	.079**
(ln) hrs	.419**	.427**	.635**	.848**	.418*	.640**	.566**	.952**	-.076	.774*	.717**	.466**	.550**	.707**	.986**	.800**	.417**	.954**	.799**	.880**
PTM	.172**	.259**	.304**	.293**	.301**	.085	.123*	.293**	-.034	.379*	.190	.374**	.251**	.100	.153**	.247**	-.145	.138	.112*	.216**
Big city	-.039	.019	.030	.042	.106	-.132*	-.020	-.023	-.252*	.003	-.101	-.067	.033	.052	.005	-.057	-.263*	-.084	.004	.034
Constant	4.015	3.943	1.185	2.764	5.434	5.495	3.042	1.694	7.4800	2.345	2.709	4.562	3.552	3.292	1.378	1.906	5.127	.391	2.306	2.421
R ² (ajsd)	.292	.228	.407	.458	.257	.190	.331	.443	.134	.293	.162	.312	.372	.282	.452	.439	.302	.371	.344	.437
F	.17.4	11.9	39.1	81.5	6.4	9.0	35.4	124.0	2.7	5.4	4.6	50.1	21.3	14.8	49.5	80.5	4.9	12.4	34.4	132.3
Cases	319	297	446	763	126	273	557	1237	89	87	152	867	275	281	471	812	74	155	510	1356

^aEarnings are in 2001 NIS. Data for big city in 1975 indicate district of employment. Included in the analysis are salaried workers with monthly earnings of over 1000 NIS (in 2001 prices).

* P < .05

** p < .01

Table 3. Decomposition of Changes in (ln) earnings differences between Israeli-born Ashkenazi men, 25-54 years old, and other ethnic/gender groups in the Israeli labor market, 1975-2001.

	Total change in (ln) earnings gaps	Due to change in observed attributes	Due to change in treatment (discrim. or unobservables)	Due to change in Mizrahi percentile	Due to change in returns to observed attributes	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	.166	.026	.00	.026	.030	.110	.140
1982-1992	-.014	-.033	-.05	-.083	.144	-.075	.069
1992-2001	-.052	-.155	.06	-.095	.063	-.020	.043
1975-2001	.100	-.105	-.04	-.145	.158	.087	.245
Arab Men							
1975-1982	.228	.021	.06	.081	.006	.141	.147
1982-1992	.018	.066	-.11	-.044	.121	-.059	.062
1992-2001	.140	-.054	.09	.036	.064	.040	.104
1975-2001	.386	.045	.04	.085	.184	.117	.301
Ashkenazi Women							
1975-1982	.131	-.007	.01	.003	.012	.116	.128
1982-1992	.043	-.001	-.01	-.011	.089	-.035	.054
1992-2001	-.024	-.047	-.02	-.067	.054	-.011	.043
1975-2001	.151	-.029	-.01	-.039	.131	.059	.190
Mizrahi Women							
1975-1982	.080	-.006	-.04	-.046	.031	.095	.126
1982-1992	.088	-.012	-.04	-.052	.212	-.072	.140
1992-2001	-.006	-.131	.04	-.091	.121	-.036	.085
1975-2001	.162	-.103	-.04	-.143	.274	.031	.305

Table 4. Unadjusted group-to-Ashkenazi men earnings ratio at 1975
Ashkenazi-men earnings distribution.

	Mean Percentile in Ashkenazi distribution	Observed Group/Ashke- nazi earnings ratio	Group/Ashkenazi earnings ratio at 1975 Ashkenazi distribution
	1	2	3
Mizrahi Men			
1975	32.70	.789	.827
1982	28.08	.668	.787
1992	31.41	.678	.823
2001	34.61	.714	.852
Arab Men			
1975	23.89	.704	.745
1982	21.39	.578	.730
1992	22.64	.550	.745
2001	18.94	.479	.701
Ashkenazi Women			
1975	22.17	.643	.737
1982	23.26	.584	.741
1992	23.61	.540	.745
2001	25.48	.553	.760
Mizrahi Women			
1975	13.37	.512	.631
1982	17.20	.510	.674
1992	16.31	.433	.657
2001	17.67	.436	.677

^aFor deriving the figures in column 3 we assigned for each group in each year the (ln) earnings associated with its percentile on the 1975 Ashkenazi-men distribution. Next we calculated the ratio of this figure to the (ln) earnings associated with the 50th percentile of Ashkenazi men in 1975. The 1975 observed ratios are not equal to the respective figures in column 3 because the correlations between percentiles and earnings are less than 1.

Source: Table 1.