Educational Assortative Mating, women's labor force participation and Inequality in Israel

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Introduction

The purpose of the current study is to investigate the impact of changes in family patterns on the rise in income inequality. We focus on educational assortative mating and participation in the labor force within households, and examine how changes in these domains relate to the rise in income inequality.

The rise in inequality in most industrial countries has been drawing attention to the social and economic processes underlying changes in income distribution (Bryan & Martinez, 2008; Fortin & Lemieux, 1997; Frank, 2009; Gottschalk & Danziger, 2005; Hyslop, 2001; Kimhi & Shafir-Tidhar, 2012; Morris & Western, 1999; Neckerman & Torche, 2007). While industrial and economic transformations experienced by most western labor markets are among the major forces that account for the rise in inequality, there are also important demographic changes that took place in many countries which contribute to inequality patterns (Breen & Salazar, 2011; Esping-Andersen, 2007; McCall & Percheski, 2010; McLanahan & Percheski, 2008).

The concept of the "Second DemographicTransition"[1]consists of primary transitions in demographic behaviors, such as delays in fertility and marriage, increases in cohabitation, divorce, non-marital childbearing, and rising maternal employment, all of which took place in the second half of the twentieth century in most industrialized countries (Lesthaeghe & Neidert, 2006; McLanahan, 2004; Van de Kaa, 2002).The current research investigates the relationships between these

[1]The theory refers to the fertility decline that occurred at the end of the 19th century and the beginning of the 20th century as the first demographic transition. The current research does not discuss that change and instead concentrates on changes that occurred in the last decades.

demographic changes and increasing inequality in the Israeli society, with a focus on within-household participation in the labor market and educational assortative mating.

Israel is characterized by high levels of inequality and poverty compared to other OECD countries (but similar to that of the United States). For example, in 2010Israel's Gini coefficient for household disposable income was 0.376, with only four other OECD countries having higher rates (Mexico, Turkey, Portugal, and the United States) (OECD, 2012). Additionally, inequality in Israel is on the rise, as seen, for example, in a 17% increase in the Gini coefficient from 1979 to 1997 (Ben-David, 2003). A recent study reported that the rise in income inequality did not stop in 1997, and that from 1998 to 2009 the Gini coefficient increased by more than 10% (Kimhi, 2012). Furthermore, inequality in hourly wage grew by about 40% from 1970 to 2001 (Kristal & Cohen, 2007).

Family patterns have changed over the last decades and at the same time income inequality has grown. Few studies only have looked at the contribution of changing family patterns to income inequality; furthermore, they did so mostly by looking at each change in family pattern independently. Needless to say, most research has not considered the Israeli society. The current study asks how changes in family patterns that occurred in Israel over the last decades and represent the second demographic transition have affected the rise in income inequality across households. Specifically, the research will focus on changes in women's labor force participation, and changes in educational homogamy. Thus, the study aims to investigate the role of changes in family patterns in determining rising inequality, using Israel as a unique case study due to its high growth rates in levels of inequality.

Demographic changes and inequality

Rising income inequality has been characterized not only by rapid income growth among top earners and changes in the institutional and organizational factors, but also by new patterns across families and households (Breen & Salazar, 2011; Esping-Andersen, 2007; Hyslop, 2001; Kolleneyer, 2012; McCall &Percheski, 2010; Nielsen & Alderson, 1997; Torche, 2010; Western et al., 2008). Specifically, McCall and Percheski (2010) suggested that in addition to economic factors, sociological aspects and especially family patterns must be taken into account when discussing inequality.

Esping-Andersen (2007) argues that three main demographic changes affect income inequality in western countries. First, women participation in the labor force has increased. This tendency has been coupled with a rise in women's educational attainment and with consequent changes in their occupational status (McCall & Perchesky, 2010). As participation has not grown equally in different income levels, this change has led to an increase in inequality across households. Second, assortative mating has increased, so that many households now include two partners with the same level of education. Highly-educated households generate higher earnings relative to less educated households (Breen & Salazar, 2011), thus contributing to inequality. Third, a significant increase in single-parent households is noted in many countries. Since a high percent of those single-parent households are headed by women whose income is lower, this change can significantly affect inequality across households.

Kolleneyer (2012) examined patterns of income inequality in sixteen countries, with a focus on women participation in the labor market, educational assortative mating, and on the increase in single-parent households. The impact of

these three changes on income inequality was measured by the Gini coefficient for disposable income after controlling for macro characteristics of the countries under study. Kolleneyer reported that the rise in single-parent households exacerbated income inequality in all countries, educational assortative mating contributed to inequality differences across countries, whereas the rising share of women in the labor force reduced inequality. These results suggest that these demographic changes must be considered together.

Educational assortative mating

Educational assortative mating generates a set of household types defined by the couple's education. For example, one type of household is a household in which both spouses have high education; another type is a household in which one spouse has high education (e.g., over 15 years of schooling) while the other spouse has a lower level of education (e.g., 12 years of schooling). These different types are expected to result in different levels of household income, because education is an important determinant of labor force participation (especially for women) as well as of income. In other words, differences in household income across household types may arise because educational assortative mating brings together individuals whose education creates different capacities to generate earnings (Breen & Salazar, 2011).

It appears that the association between educational assortative mating and inequality depends on the country under study (Breen & Andersen, 2012; Breen & Salazar, 2010; 2011). For example, Breen and Salazar (2011) found no association between the increase in educational homogamy and the rise in inequality in the United States. In contrast, Breen and Andersen (2012) showed that in Denmark the rise in educational assortative mating was associated with an increase in inequality. The

authors argued that labor market regulation and high levels of female participation in the labor force determine the effect (or lack thereof) of educational assortative mating on income inequality. They speculated that a more regulated labor market (e.g., in Denmark) ensures that an individual's education is more closely related to his or her income, and thus educational assortative mating has more influence on inequality in regulated markets.

Changes in educational assortative mating will thus be included in the current research as one of the demographic changes that might contribute to the increase in income inequality in Israel.

Participation of women in the labor force

The effect of women's employment on inequality is not straight forward and depends mostly on patterns of selection into the labor market. Previous research in the US found that wives' employment reduced inequality across families because women's wages complemented the household income and drove family income toward the center of the income distribution. It is clear that in order for income inequality to decline, women participation in the labor force should be relatively high (Cancian & Reed, 1999; Nielsen & Alderson, 1997). Albrecht and Albrecht (2007) also reported that increased female employment results in lower levels of inequality, and Western et al. (2008) found that among families with children, women participation has an equalizing effect on income. Furthermore, Kolleneyer (2012) found that women participation in the labor market had a moderating effect on income inequality.

However, other studies suggest that women participation in the labor market contributes more to the household income in households that belong to the higher quintiles of the income distribution, and therefore women participation does not

decrease income inequality but rather increases it (Esping-Andersen, 2009). Hyslop (2001) found that positive assortative mating in earnings that reflects earning power (i.e., the fact that spouses' wages and earnings are similar) accounts for about 25% of the increase in permanent inequality. Also, husbands' income plays a relatively minor role in determining income inequality, whereas the income of the wives is more important in predicting increases in inequality in family earnings (Hyslop, 2001) Furthermore, Stier and Lewin (2002) found that women's employment in Israel contributed to the generally high poverty level, since women are positively selected for paid employment. In other words, women with potentially higher wages are more likely to enter the labor force than are women with lower wages. Once women with higher wages enter the labor force, the income distribution changes, the median income rises, and a greater number of lower income households fall below the poverty line. Stier and Lewin (2002) analyzed levels of employment (part-time, full-time, and non-employed) and found that part-time participation of non-employed women from couple-headed households could reduce poverty. Similarly, part-time participation of women from single-parent households could reduce levels of poverty significantly. However, the reduction of poverty levels would be more moderate if non-employed women entered the labor market on a full-time basis. Furthermore, the gaps between single-parent households and couple-headed households would have widened had all non-employed women entered the labor market and had they all worked full-time.

The inconsistent findings suggest that the effect of changes in women's labor force participation on inequality should be further examined.

The Israeli case

High level of inequality in Israel are attributed largely to changes in the labor market, especially the transition to knowledge-based technologies and the disappearance of labor intensive industries that provided jobs for a large part of the Israeli labor force (Ben-David & Bleikh, 2013; Kimhi; 2012). In addition, the tight regulation of the labor market has eased considerably in the last decades along with processes of privatization, and the labor unions have weakened (Kristal & Cohen, 2007). Also, the influx of immigrants and foreign workers that came to Israel since the 1990s affected job opportunities available to the weakest segments of the Israeli workforce (Stier, 2006).

From the 1970s and up to 2008 women participation in the labor force increased from 29% to 58% in women aged 15 and older, and up to 83% in women aged 25 to 55 (Israel Central Bureau of Statistics, ICBS, 2011). The change in women's economic behavior is related to the rise in education. Israel's higher education system has expanded substantially over the last decades. Although changes began in the late 1970s, the process was accelerated at the beginning of the 1990s with the establishment of regional and private colleges. In 1983, 34.4% of Jewish men aged 25-34, and 35.4% of Jewish women of the same age group had at least some post-secondary education (ICBS, 1985: Table 22.2). By 1995 these numbers rose to 47.6% for men and 49.6% for women (ICBS, 1997: Table 22.2), reaching 55.3% and 58.5%in 2008, respectively (ICBS, 2008: Table 8.3). Additionally, in the mid 1980s about 50,000 undergraduate students were enrolled in the education system and by 2008 the number of students had tripled and reached 168,010 (Shavit & Bronstein, 2011). Educational homogamy is prevalent in Israel and has increased during the

1980s and 1990s (Stier & Shavit, 2003), most likely due to the rise in education levels that took place at that time, as well as due to the postponement in the age at marriage.

Another important change is associated with the welfare system in Israel and its transition from a supportive, universalistic system to a more targeted system (Doron, 2003). This change has mainly affected vulnerable groups who had previously relied on income maintenance and other sources of support, leading to an increase in poverty in Israel in general, and among low wage workers in particular. Thus, unskilled workers who have been forced to take jobs were drawn to low-paying jobs, mostly as contract employees. Thus, it is possible that the rise in education and the new market opportunities that opened for the highly educated on the one hand, and the vulnerable position of the less educated and less skilled on the other hand have both contributed the income inequality in Israel (Ben-David and Bleikh, 2013; Kimhi; 2012; Stier & Herzberg; 2013).

Since the effect of assortative mating on income inequality varies across countries, and since it has been argued that it depends on the market's level of regulation (Breen & Andersen, 2012; Breen & Salazar, 2010; 2011), it is expected that changes toward more homogeneous educational assortative mating will be associated with an increase in income inequality in Israel since changes occurred in Israel in the last decades have led to its labor market to be less regulated than it was.

Stier and Herzberg (2013) found lower participation for non-educated women and higher participation for more educated women. In the current study we look not only at total percentage of participation but also at the variation in levels of employment (e.g., full-time vs. part-time). We also examine participation by education with an attempt to document patterns of self-selection into the labor market

in Israel. First, we expect that the increase in women participation will contribute to an increase in inequality, possibly due to positive selection into the labor market. Second, we assume that differences in women participation that depend on levels of education will accelerate inequality as well.

Method and data

The study is based on Israeli census data, collected by the Israeli Central Bureau of Statistics in 1983 and 2008. For the purpose of the current study only couple-headed households were selected, thus making it possible to examine the effects of within-household changes on between-households differences as well as to examine educational assortative mating. The sample is further restricted to include household heads in the age range of 25 to 64. The sample in 1983 includes 54,237 households and 143,200 households in 2008

Variables

Income was defined as the household gross income from salaried work. The choice of this variable limits the analysis to income returns on family employment without any government transfer pay[2].

Educational assortative mating was defined according to the highest diploma received by each of the two spouses. The education of each spouse was first categorized into one of five levels (less than secondary, secondary without matriculation, matriculation, post-secondary non-academic, and academic education). Then 25 combinations of household educational categories were created. Detecting the joint effect of educational homogamy and level of participation, households were

[2]Data constrains at the moment prevent us from using the total household income variable.

categorized by nine levels of education based on three levels of education to each spouse.

Participation in the labor market and the level of employment – this variable was examined first by analyzing the number of providers in the household. Each household was defined according to the participation of both spouses in the labor force (both spouses participate; only one spouse participates). Households were further categorized by level of employment to account for the fact that full-time and part-time participation might differ in important ways and were divided into eight groups: both spouses employed full-time, both spouses employed part-time, men employed full-time and women employed part-time, women employed full-time and men employed part-time, men do not work and women employed full-time, men do not work and women employed part-time, women do not work and men employed full-time, and women do not work and men employed part-time.

Measuring inequality

An extensive discussion has been devoted to the question of how to measure inequality, and various measures have been proposed by different researchers. The current study is based on the method suggested by Breen and colleagues who used the Theil index (Breen & Andersen, 2012; Breen & Salazar, 2010; 2011).

The Theil index serves as a measure of inequality for two primary reasons. First, it is a decomposable index (unlike the Gini coefficient, for example), and this fact makes it possible to detect changes in inequality between and within specific groups. Second, it measures overall inequality, unlike, for example, the 90:10 ratio, which compares the earnings of households at the 90^{th} percentile of the distribution

with those at the 10th percentile. This feature is important for addressing the associations between inequality and the suggested family patterns.

The analyses examine the relation of the Theil index to demographic changes (e.g., educational assortative mating and participation of women in the labor market). This approach differs from reliance on comparison of inequality across pre-determined groups only. The Theil index allows us to take into account inequality both between and within groups, as well as to calculate the level of inequality (Bourguignon, 1979; Breen & Salazar, 2011). The Theil index is presented in the following equation:

(1) $T=\frac{1}{n}\sum_{i=1}^{n}\frac{x_i}{\bar{x}}\ln\left[\frac{x_i}{\bar{x}}\right]$

In equation 1 x_i denotes the i_{th} household income and $\bar{x}$ denotes the mean income. This calculation is the average of the ratio between the household income and the mean income, multiplied by the log of the same ratio.

The Theil value for inequality within the j_{th} group (T_j) is defined as follows:

(2) $T_j=\frac{1}{n_j}\sum_{i=1}^{n_j}\frac{x_{ij}}{\bar{x_j}}\ln[\frac{x_{ij}}{\bar{x_j}}]$

In equation 2x_{ij} denotes the i_{th} household income in group j, n_j denotes the number of cases in group j, and $\bar{x_j}$ denotes the mean income of group j.

Equation 3 shows the decomposition of the Theil index into a between-group and a within-group component:

(3) $T = \sum_j P_j \frac{\bar{x_j}}{\bar{x}}\ln\left[\frac{\bar{x_j}}{\bar{x}}\right] + \sum_j P_j \frac{\bar{x_j}}{\bar{x}} T_j$

Groups were defined for the categories of each demographic variable and are indexed as j, so that $\bar{x}_j$ is the mean income in group j, P_j is the proportion of each group of the suggested family patterns, and $\bar{x}$ is the overall mean income of the sample. The term T_j is the Theil value for inequality within the j_{th} group as was defined in equation 2.

Using the between-group and within-group inequality components of the Theil index will make it possible to detect to what extent family patterns contribute to income inequality.

Counterfactual analysis

Further analyses will examine total inequality, between-group inequality, and within-group inequality when two of the three components that appear in the Theil index are held constant at their earlier values (1983) and one of them is set at its later value (2008). This procedure will be repeated for each component separately. Thus, a counterfactual level of inequality will be generated for 2008 and this level will be compared with the observed inequality of an earlier time (1983) as well as with the observed inequality of the later time (2008). This approach offers an accurate measure of change over time. To better explain the analytical approach, we demonstrate the three counterfactual analyses using the first model, in which households were classified into three groups on the basis of participation in the labor market: both spouses participate, men participate and women do not participate, women participate and men do not participate.

Equation 4 represents the first counterfactual analysis, when only T_j (Theil within group based on the level of employment) takes its later value (2008). This is denoted as subscript 2. Subscript 1 indicates the earlier period (1983), and in this counterfactual analysis the proportion of each group defined by participation in the

labor market in 1983,p_j, as well as the mean income of each group based on participation in the labor market in 1983, $\bar{x}_j$, are kept at their 1983 levels. Equation 4 calculates the level of inequality in 2008 if nothing has changed except the level of inequality within groups based on the level of employment.

$$(4)\ T = \sum_j p_{1j} \frac{\bar{x}_{1j}}{\sum_j x_{1j} p_{1j}} \ln[\frac{\bar{x}_{1j}}{\sum_j x_{1j} p_{1j}}] + \sum_j p_{1j} \frac{\bar{x}_{1j}}{\sum_j x_{1j} p_{1j}} \mathrm{T_{2j}}$$

Equation 5represents the second counterfactual analysis, when only $\bar{x}_j$ takes its later value (2008). This is written as subscript 2. Subscript 1 indicates the earlier period (1983). Equation 5 calculates a level of inequality in 2008 if nothing has changed except the average groups' income based on the level of employment.

$$(5)\ T = \sum_j p_{1j} \frac{\bar{x}_{2j}}{\sum_j x_{2j} p_{1j}} \ln[\frac{\bar{x}_{2j}}{\sum_j x_{2j} p_{1j}}] + \sum_j p_{1j} \frac{\bar{x}_{2j}}{\sum_j x_{2j} p_{1j}} \mathrm{T_{1j}}$$

Equation 6 represents the third counterfactual analysis, when only p_j takes its later value (2008). This is written as subscript 2. Subscript 1 indicates the earlier period (1983). Equation 6 calculates the level of inequality in 2008 if nothing has changed except the proportion of groups based on the level of employment.

$$(6)\ T = \sum_j p_{2j} \frac{\bar{x}_{1j}}{\sum_j x_{1j} p_{2j}} \ln[\frac{\bar{x}_{1j}}{\sum_j x_{1j} p_{2j}}] + \sum_j p_{2j} \frac{\bar{x}_{1j}}{\sum_j x_{1j} p_{2j}} \mathrm{T_{1j}}$$

Equation 6 addresses the main question of the study[3]. Because p_j represents the proportion of all households in the j_{th} type, changing the $p_j$values reflects the changing distribution of households across types which are based on household participation in the labor market.

[3]Although equation 6 addresses the main question of the study, examining equation 4 and 5 will make it possible to determine whether other factors have also contributed to the change in inequality.

Results

Table 1 presents changes in educational assortative mating, changes in the proportion of dual-earner households, and changes in the proportion of dual-earners full-time households at two time points: 1983 and 2008. As can be seen in the table, the proportion of educationally homogamous couples in Israel declined from 52.53% of all couple-headed households in 1983 to 48.89% in 2008. At the same time, the proportion of dual-earner households increased from 58.74% of all couple-headed households in 1983 to 71.34% in 2008. Furthermore, the proportion of dual-earner households who both work full-time has increased from 27.26% in 1983 to 37.79% in 2008. Thus, household participation in the labor force has changed along with the Theil level of participation, whereas no global increase in educational homogamy was seen between 1983 and 2008.

Table 1 here

Educational assortative mating

Table 2 presents the results of the counterfactual analysis, with the aim of showing what would have happened to the total, between-household, and within-household inequality if two out of three components of the Theil index were held constant at their 1983 values, and the third component was set at its 2008 value. This analysis generates the expected level of inequality for 2008 while looking at specific components and at the same time comparing it to the 1983 inequality level. As shown in the top row in Table 2, 20% of the total inequality can be attributed to between-group differences[4], or, in other words, to educational homogamy. A comparison of the top row (1983) and the bottom row (2008) in Table 2 shows that income inequality

[4] $\frac{between\ group\ Theil}{Theil} = \frac{0.0559}{0.2730} = 0.20$

increased over these 25 years, and the effect of educational assortative mating was higher in 2008, accounting for 26% of the total level of inequality. That is, although the level of educational homogamy decreased during this period, its contribution to the total inequality increased.

Changing the within-group Theil index (for the different types of households) to its 2008 value, while holding the mean income and proportion of the population of each group at their 1983 values demonstrated that the Theil index increased as a function of the change in within-group inequality from 0.2730 in 1983 to 0.2999 in 2008. Thus, some of the rise in inequality between these two time points was accounted for by changes in within-group inequality.

Table 2 here

Changing the mean income of each household type to its 2008 value and holding the within-group inequality and proportion of households at their 1983 values revealed an increase from 0.2730 in 1983 to 0.3264 in 2008 (see Table 2, third row). , accounting for more than the entire rise in inequality between these two points of time.

Changing the proportion of the different types of households to their 2008 values, while holding the within-group inequality and the mean income of each group at their 1983 values, revealed a slight decline in inequality from 0.2730 in 1983 to 0.2611 in 2008.

Thus, the counterfactual analyses demonstrated that the increase in inequality was associated with a change in within-group inequality and in mean income. In contrast, the increase in inequality was not associated with a change in the proportion

of households of different educational mating patterns. In fact, inequality slightly decreased as a function of the change in educational mating patterns. The slight decline in education homogamy contributed to a slight decline in income inequality.

The findings so far suggest that mechanisms other than the change in educational assortative mating account for the rising level of income inequality in Israel, contrary to our preliminary expectations.

Participation in the labor market

Next we turned to the investigation of the association between changes in patterns of participation in the labor market among couple-headed households and income inequality. First, participation was categorized according to household earner composition to reflect whether the household income is based one or two providers. This analysis found that change in earner composition, or the increase in proportion of two-earner households, had no contribution to the increase in income inequality (see appendix).

Second, level of participation in the labor market was categorized according to household employment, determining whether either spouse had a full-time or a part-time job or was not employed (see Figure 1).These classifications were then used in another counterfactual analysis (summarized in Table 3). As can be seen in the top row of Table 3, 14% of the total inequality in 1983 can be attributed to between-group differences, (e.g., to differences in level of employment within households). The level of income inequality increased from 0.2715 in 1983 to 0.2975 in 2008. In fact, the composition of level of employment accounted for a smaller share of the variance in total inequality in 2008 (11% in 2008 vs. 14% in 1983).Theil index was 0.3133, so that within-group differences accounted for a greater share of the rise in inequality

between these two time points than did the analysis that did not consider these differences.

Table 3 here

Analyzing the change in mean income revealed a decrease from 0.2715 in 1983 to 0.2638 in 2008.When looking at the proportion of different types of households based on level of employment with the 2008 value, an increase in inequality was noted from 0.2715 in 1983 to 0.2882 in 2008.

To sum up the results of these analyses, it appears that inequality increased primarily due to the change in within-group inequality as well as due to the change in the proportion of household level of participation in the labor market. In contrast, the change in mean income of households led to a decrease rather than an increase in inequality.

As can be seen from these analyses, the main predictor of the rise in inequality is the increase in within-group Theil that reflects within-group inequality. Changes in the distribution of the level of employment of households have also contribute to the increase in income inequality. Next, we turn to the relative contribution of changes in couple level of education and employment to the prediction of increase in income inequality. As can be seen in Table 4, 27% of the total inequality can be attributed to between-group differences, or, in other words, to the differences in level of employment and education across couples. The level of income inequality increased from 0.2714 in 1983 to 0.2975 in 2008. In fact, the combined effect of education and level of employment was greater in 2008, accounting for 30.5% of the total level of inequality relative to 26.69% in 1983.

The Theil index was very similar on both time points with respect to change in within-group inequality, 0.2714 in 1983 relative to 0.2774 in 2008. The change in mean income resulted in a Theil index increase from 0.2714 in 1983 to 0.2908 in 2008, accounting for almost the entire rise in inequality between these two time points.

Table 4 here

Finally, changing the proportion of the different types of households to their 2008 values, and holding the within-group inequality and the mean income of each group at their 1983 values, revealed an increase in inequality from 0.2714 in 1983 to 0.2898 in 2008.

To sum up the results of all counterfactual analyses, inequality increased mainly as a function of the change in mean income and as a function of the joint changes in education and in level of employment. In contrast, changes in the inequality within types of households did not contribute to the increase in income inequality. In addition, inequality within the different types of households was found to contribute to the increase in inequality between the two time periods (see appendix).

Changes in patterns of education and employment

Changes in level of employment as well as their covariation with changes in household level of education were found to contribute to the increase in income inequality. But what has changed? Figure 1 reveals the changes in patterns of employment of couple-headed households between the two time periods. The percentage of full-time couple-headed households increased from 0.27 in 1983 to 0.38

in 2008, and full-time dual-earner employment became the most common type of household. The percentage of households in which women worked part-time and men worked full-time decreased from 0.26 in 1983 to 0.19 in 2008, and the percentage of couple-headed households in which men were sole-providers decreased from 0.35 in 1983 to 0.21in 2008. Another change is the increase in the percentage of households in which men do not work and women work, either full-time (0.02 in 1983; 0.09 in 2008) or part-time (0.02 in 1983; 0.07 in 2008). Thus, the greater share of full-time dual-earner households, as well as the greater share of households in which women are the sole earners, appears to contribute to the increase in income inequality.

Changes in the covariation between household employment and education also contributed to the increase in income inequality. We thus categorized educational assortative mating according to patterns of employment and. As reported above, percentages of full-time dual earner households and of women-sole provider households changed between 1983 and 2008 and thus the analyses described here focus on these households alone[5]. Figure 2 shows that in 1983 most of the full-time-dual earner households had low education, whereas in 2008 most of these households had homogamous high education. Figure 3 shows the education patterns of couple-headed households in which women were the sole provider. Education levels increased for all types of these households, but it is important to note that in 2008 most households with women as the sole provider have relatively low education.

Understanding the changes that occurred in the proportion of each type of households makes it possible to identify the mechanisms underlying the relationship between changes in educational assortative mating and changes in patterns of

[5]Appendix 3 presents proportion of all types of households according to the covariation between employment and education.

employment. Our analyses suggest that the rise in income inequality reflects widening of the gap between the strongest and the weakest earners. On one end we found the doubly-blessed households with two full-time highly educated earners. On the other end we found the doubly-cursed couple-headed households in which women are the sole providers and education level is lowest.

Conclusions

Inequality has increased in Israel in the last decades, alongside an increase in the percentage of households in which both spouses work and both work full-time, as well as a decrease in assortative mating. The current study mapped the effects of changes in the composition of households on income inequality. Although assortative mating had little effect on the increase in inequality when examined on its own, its covariation with level of employment was crucial to understanding the rise in inequality.

During the period under study women participation in the labor force had also increased dramatically, whereas rates of participation for men declined (Kimhi, 2012). While most couple-headed households in Israel are composed of two earners, there is still substantial variation among them in terms of level of employment. Some households consist of two full-time earners, others consist of one spouse (or both) who works on a part-time basis, and still others consist of only one provider. The effect of women's employment on inequality is thus of great importance, especially since their pattern of work is more varied than that of men. Characterization of households by level of education as well by as their level of participation advances our understanding of trends of change in income inequality. The main conclusion of this work is that only if we look at education level together with levels of employment

can we fully appreciate income divides across households. When both spouses work full-time and have high education their joint income is much greater than the income of households in which the woman works (either full-time or part-time) and the man does not.

Our results contrast with the results of previous studies that investigated the contribution of educational homogamy to income inequality (Breen & Andersen, 2012; Breen & Salazar, 2010; 2011). Breen and associates suggested that in a more regulated labor market educational assortative mating contributes more to income inequality than in less regulated markets. Our findings emphasize that it is not only educational assortative mating that propels income inequality, but also the household level of employment. It may be that patterns of employment are different among households with different levels of education, and this might be more characteristic of the less regulated labor market. However, before we can draw such general conclusions, similar analyses should be conducted across various market types.

We should note that the current analyses involved only couple-headed households in which spouses (at least one) have incomes from salaried work. The use of gross household income would have made it possible to look at a larger population, including self-employed couples and couples with no paid jobs. Such analyses might offer better generalization to the entire population. Future research will also consider changes in fertility and their possible contribution to the increase in inequality, as well as the joint effects of education, participation in the labor market, and fertility. Further research should also include the single-parent households, with an attempt to characterize the changes that occurred in those households and their relation to the overall level of inequality.

Table 1: Changes in educational assortative mating, dual earner households, and inequality, by year

	1983	2008
Proportion of educationally homogamic households	0.5253	0.4889
Proportion of dual-earners households	0.5874	0.7134
Proportion of dual-earner full-time households	0.2726	0.3779
Inequality (Theil index)	0.2731	0.3055
N (households)	54,237	143,200

Table 2: Sources of change in the Theil index, educational assortative mating

	Theil	Between	Within
1. 1983 Observed	0.2730	0.0559	0.2172
2. Change in within-group Theil	0.2999	0.0559	0.2440
3. Change in mean income	0.3264	0.1078	0.2186
4. Change in proportion of household groups	0.2611	0.0370	0.2241
5. 2008 Observed	0.3167	0.0836	0.2330

Table 3:Sources of change in the Theil index, level of employment in the household

	Theil	Between	Within
1. 1983 Observed	0.2715	0.0371	0.2344
2. Change in within-group Theil	0.3133	0.0371	0.2762
3. Change in mean income	0.2638	0.0304	0.2334
4. Change in proportion of household groups	0.2882	0.0592	0.2290
5. 2008 Observed	0.2975	0.0338	0.2637

Table 4:Sources of change in the Theil index, within-household level of employment and education

	Theil	Between	Within
1. 1983 Observed	0.2714	0.0724	0.1990
2. Change in within-group Theil	0.2774	0.0724	0.2049
3. Change in mean income	0.2908	0.0944	0.1965
4. Change in proportion of household groups	0.2898	0.0887	0.2012
5. 2008 Observed	0.2975	0.0908	0.2067

Figure1: Precentage of household combinations of spouses' level of employment out of all households, by years

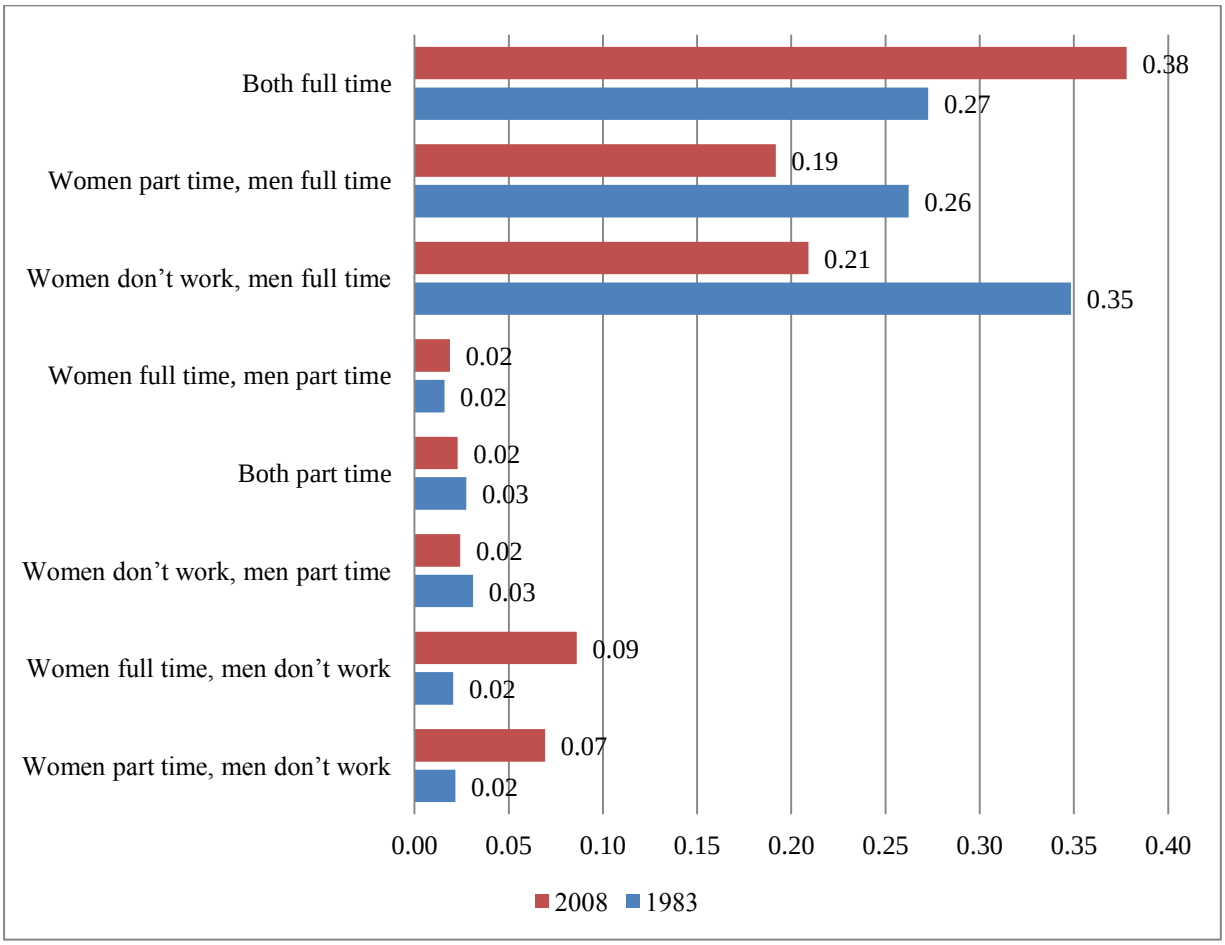


Figure 1: Educational assortative mating among full-time dual-earner households

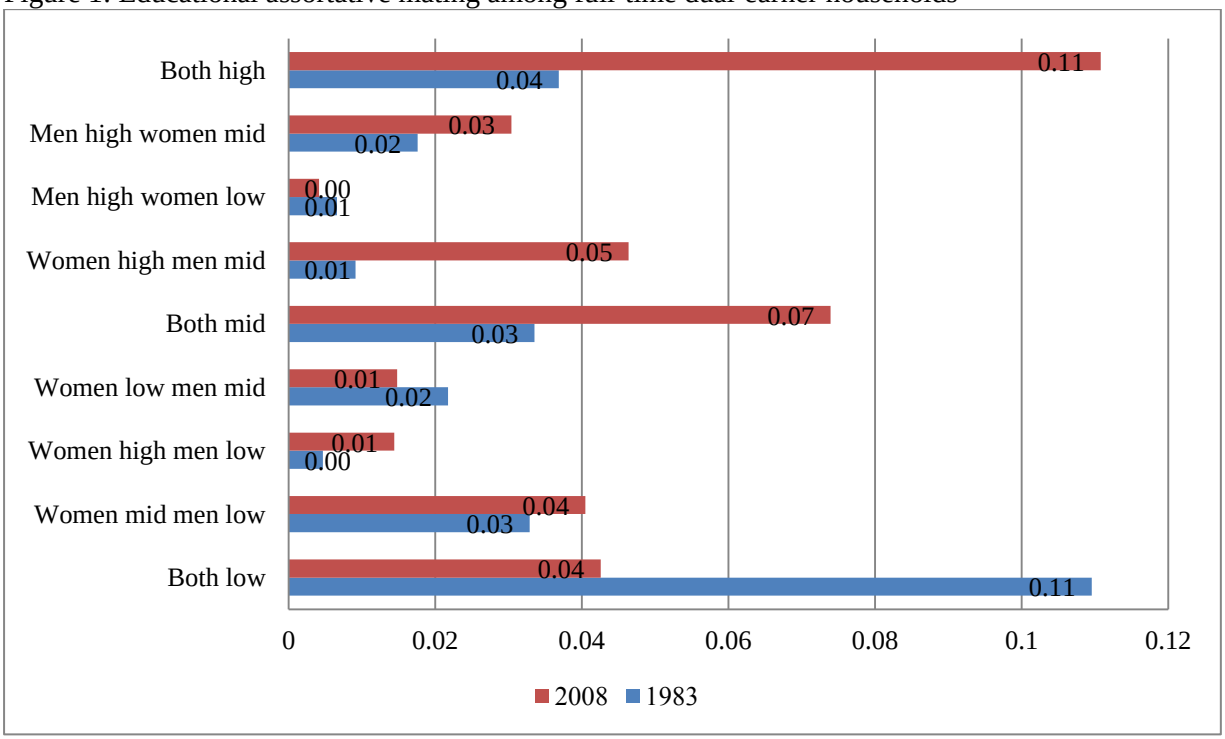
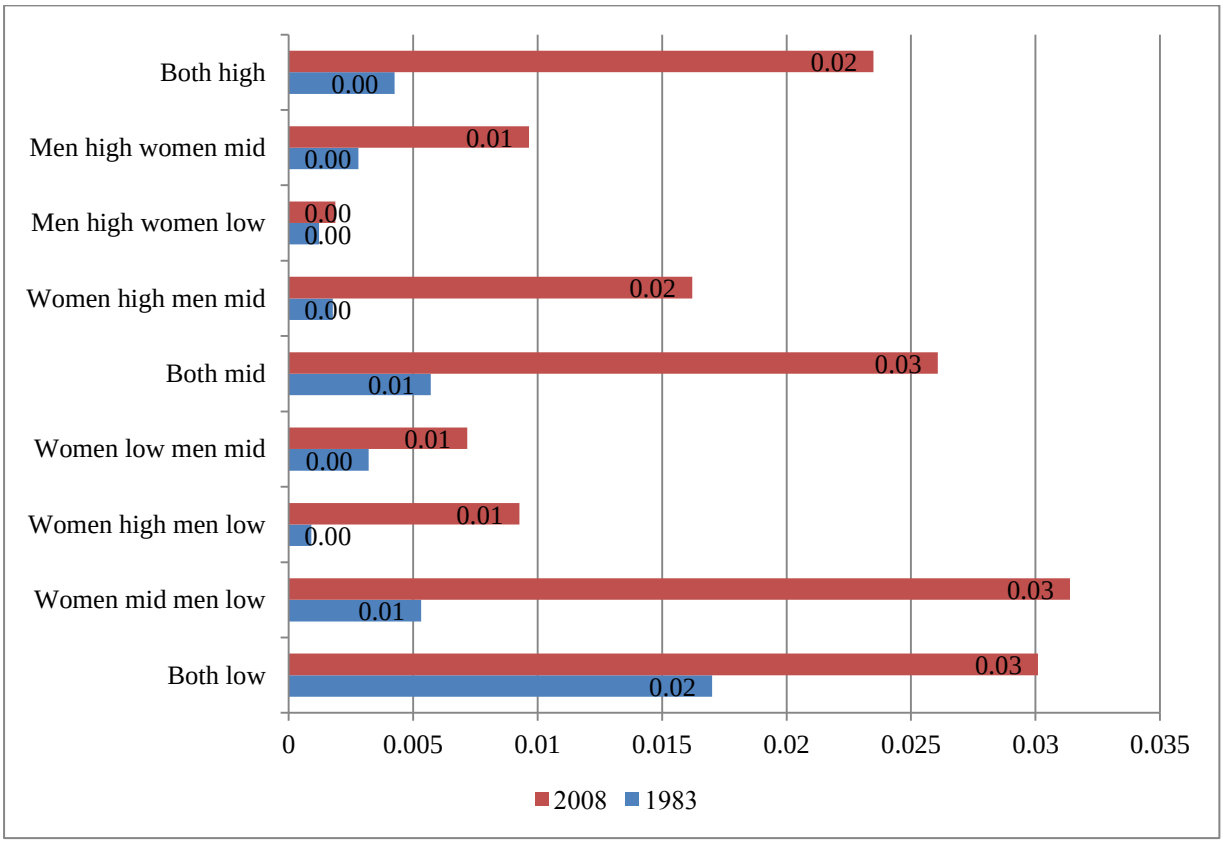


Figure2: Educational assortative mating among households with women as sole-provider



Appendix

Appendix 1: Sources of change in the Theil index, earners composition in household

	Theil	Between	Within
1. 1983 Observed	0.2731	0.0325	0.2406
2. Change in within-group Theil	0.3305	0.0325	0.2979
3. Change in mean income	0.2701	0.0295	0.2405
4. Change in proportion of household groups	0.2726	0.0345	0.2381
5. 2008 Observed	0.3055	0.0263	0.2793

Appendix 2: Sources of change in the Theil index, earners composition in household and three levels of education

	Theil	Between	Within
1. 1983 Observed	0.2730	0.0674	0.2057
2. Change in within-group Theil	0.2917	0.0674	0.2243
3. Change in mean income	0.3008	0.0954	0.2054
4. Change in proportion of household groups	0.2716	0.0612	0.2103
5. 2008 Observed	0.3055	0.0850	0.2206

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