

POLICY PAPER SERIES

**LABOR MARKET TRENDS:
EMPLOYMENT RATE AND WAGE DISPARITIES**

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**מגמות בשוק העבודה :
פערים בשיעורי התעסוקה ובשכר**

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Labor Market Trends: Employment Rate and Wage Disparities

Ayal Kimhi*

Abstract

Israel is characterized by exceptionally low employment rates of men and by high wage gaps amongst the working population. Over the past few decades, the decline in male employment was concentrated amongst the less educated, while the rise in female employment has been attributed almost entirely to the rise in the level of education of the younger generations. These trends are especially pronounced in the Arab sector. The growing importance of education in the Israeli labor market is expressed also in the fact that the wage gap between more and less educated workers has not narrowed in the past decade despite the large growth in the share of educated workers. An examination of the changes in wages by occupational group indicates a relative growth in demand for educated workers in specific occupations, something that has brought about a rise in wage gaps in those particular occupations. The conclusion is that employment gaps and wage gaps in Israel are, to a large degree, correlated with education. The skills that workers with no more than 12 years of schooling have do not allow them to integrate in a satisfactory way into the modern labor market.

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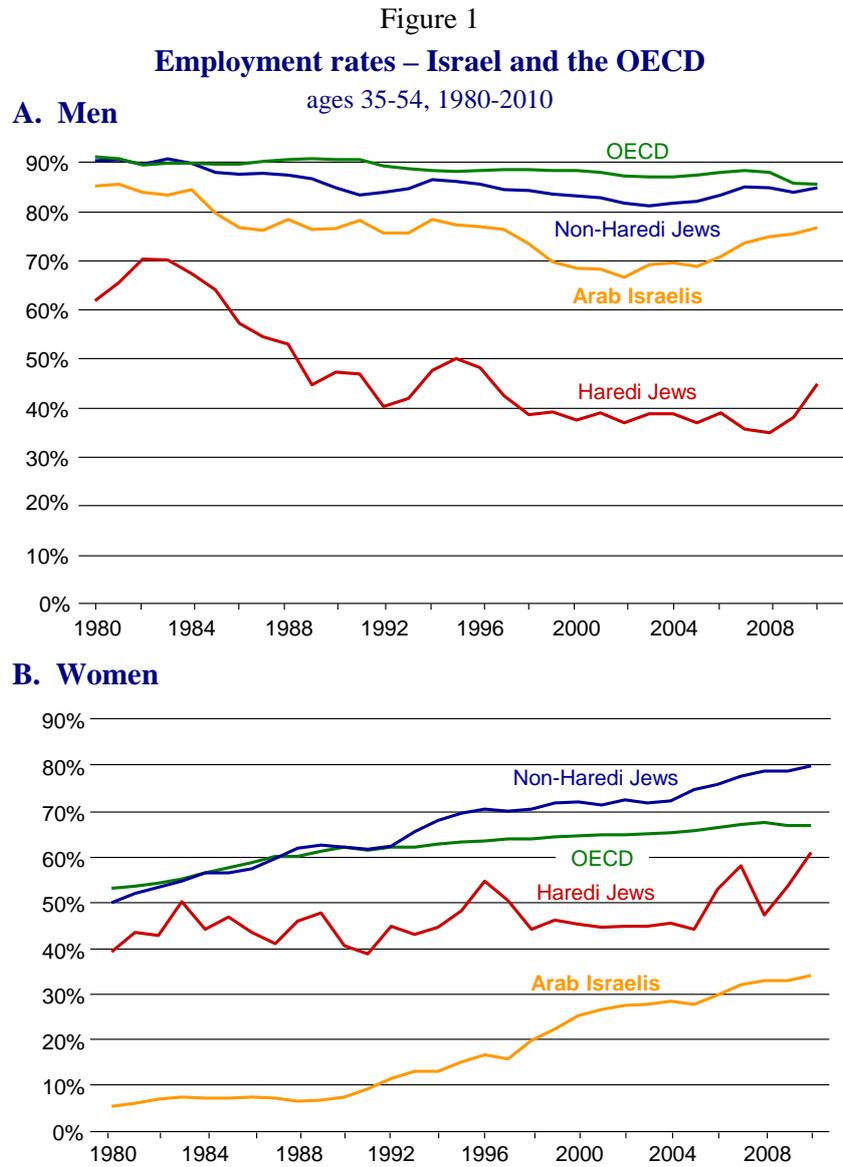
The wave of social protests in the summer of 2011 raised public awareness of the large socioeconomic disparities between different population segments in Israel. In the past it was common to focus on the distress of the weaker segments of society and to propose solutions, such as welfare payments, geared mainly toward addressing the symptoms rather than the disease. However, it is now clear that the feelings of distress characterized much broader segments of the population, including young adults and those belonging to the middle class; hence the need for comprehensive solutions that tackle the root causes of the problems. The Taub Center's recent annual *State of the Nation Reports* have devoted considerable attention to the widening gaps in income, education and healthcare. For example, the 2010 report (Kimhi 2011, pp. 138-140) showed that income disparities stem primarily from employment rate gaps and wage gaps which, in turn, are largely rooted in educational disparities. Recent OECD studies (2011) widely accept the approach that the labor market is the main arena in which the war on inequality should be fought. This chapter will expand on these issues and address them in depth.

1. Trends in Employment Rates

Recent decades have witnessed unprecedented changes in Israeli employment patterns. Among males of prime working age (35-54), the employment rate declined from 91 percent in 1979 to 82 percent in 2010. By contrast, among women from the same age group, employment rates rose during this period from 44 percent to 70 percent. These trends are also prevalent in other countries; however, the rate of change in Israel, for both men and women, has been more rapid than in the OECD countries (Ben-David 2010, pp. 230-240). Similar trends can be identified among broader age groups as well.

The employment rate changes were not uniform across the various population segments. Figure 1A presents employment rate trends since 1980 for men in three different population segments: non-Haredi (non-ultra-Orthodox) Jews, Haredi (ultra-Orthodox) Jews and Arabs.¹ Throughout the period in question there were employment rate differences between these three segments, with the non-Haredi Jewish sector exhibiting the highest employment rate (though one still lower than the average employment rate in OECD countries), while the Haredi sector had the lowest employment rate. Up until a decade ago, employment rates were in decline, primarily among the ultra-Orthodox, while the differences between the three segments continued to widen. At the start of the millennium, with the beginning of an emergence from the deep recession (a recession that hit Arab Israeli businesses especially hard), the employment rate of the Arab sector began to switch direction with a 10 percent increase by 2010. It is reasonable to assume that the deep cuts in welfare benefits had much to do with this change. Two years later, the non-Haredi Jewish employment rate also began to rise, though at a more moderate pace, such that the employment rate gap between the two sectors narrowed slightly. The past two years have also seen a significant rise in the male Haredi employment rate, although this increase has brought the segment's rate to only some 45 percent. It remains to be seen whether these positive trends will continue in the coming years.

¹ The terms Arabs and Arab Israelis are used interchangeably to refer to the same population.



Source: Ayal Kimhi, Taub Center and Hebrew University.

Data: Central Bureau of Statistics, OECD.

Among women, employment rates show the opposite trend – a continuous rise (Figure 1B). In the non-Haredi Jewish sector, the employment rate of women of prime working age rose steadily, from 50 percent in 1980 to over 80 percent in 2010. Although the Arab sector displayed a similar increase of some 30 percent, the relative impact of this change was much greater, as Arab women’s employment rates rose from just 5 percent in 1979 to 34 percent in 2010. After two decades of relative employment rate stability, rates for Haredi women of prime working age began to rise in the middle of the last decade, reaching a rate of 60 percent in 2010. Significant disparities still exist between the various segments in terms of women’s employment rates.

Changes in employment rates over a long period of time can stem from changes in worker employment patterns over the life cycle or from differences in employment patterns of workers from different generations. This must be taken into account when analyzing the factors contributing to employment rate changes, particularly in light of the demographic changes that have taken place over the years in the population of potential workers. The age composition of the potential labor force has changed, with a decline in average worker age. Dividing the population of males and females of prime working age (ages 35-54) into four age groups spanning five years each shows that the relative proportion of the youngest age group grew between 1980 and 2010 (Appendix 1). In order to distinguish changes in employment rates across the life cycle from intergenerational differences in employment patterns, one can analyze the changes that have taken place over time in the employment rates of cohorts defined by year of birth, as an alternative to age group. To keep the cohort population as consistent as possible, the analysis excluded new immigrants.

Figure 2A presents the employment rates of males in different cohorts as a function of age. A rise in male employment rates for all of the relevant cohorts up until age 40 is evident, from which point the rates decline. However, the age at which employment rates begin to decline has also been trending upward. For those born between 1940-1949, the

maximum employment rate is reached at age 38, while for those born during 1950-1959 the maximum employment rate is at age 40, and the age for those born between 1960-1969 is 42. On the other hand, the later the cohort (in terms of birth year), the lower the employment rate. For the 34-36 age group, the employment rate of those born during 1940-1949 approaches 90 percent, while the rate for those born during 1950-1959 is slightly more than 80 percent for the same age group, reaching a maximum of 84 percent at age 40. This trend continues for those born in the 1960-1969 cohort as well; the employment rate at ages 34-36 for this group is 78 percent, reaching a maximum of 80 percent at age 42.

This translates into a decline in employment rates among later cohorts at earlier ages. At the same time, there were changes in the employment patterns of older age groups. Figure 2A shows that the employment rates of those in the 1920-1929 birth cohort are 5 percent lower on average between the ages of 65-75 than those of the 1910-1919 birth cohort at the same age. The employment rates of the 1930-1939 birth cohort are also lower by 5 percent or more than those of the previous cohort (1920-1929) at ages 55-60, although this gap declines with age and disappears completely by age 72. This phenomenon repeats itself in the case of the 1940-1949 birth cohort which reaches the employment rates of its predecessor (the 1930-1939 cohort) by age 62, and in the case of the 1950-1959 cohort, whose employment rates reach those of the preceding cohort (1940-1949) by age 54.

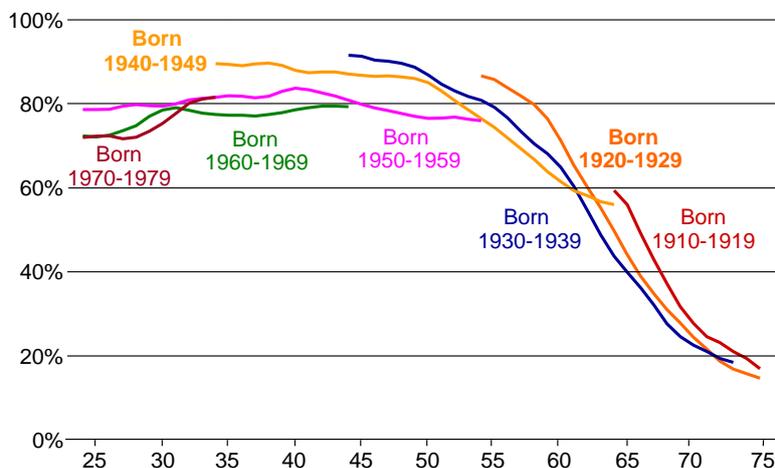
The conclusion is that the trend for men is one of a “flattening” of the employment profile as a function of age, with later cohorts both exhibiting lower employment rates during the prime working years and reaching higher employment rates at later ages. Continued employment at later ages could be the result of improved health status and a rise in life expectancy. Figure 2A shows that the decline in employment rates among males of prime working age is stronger than the rate seen in the later age groups, such that, the male employment rate has been trending downward over the long term. (This is also seen in the aggregate employment rates presented in Figure 1A.)

Figure 2

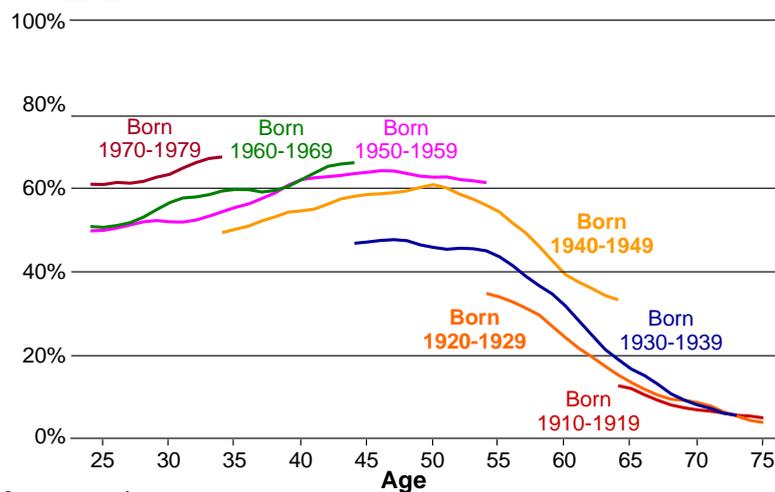
Employment rates of men and women*

A. Men

by age and birth decile



B. Women



* 3-year moving average.

Source: Ayal Kimhi, Taub Center and Hebrew University.

Data: Central Bureau of Statistics.

Israeli women's employment rates have developed in an entirely different way. Figure 2B shows that the later the cohort, the higher the employment rates are for women. For example, at age 44 the employment rate of those born during 1930-1939 is 47 percent; for the 1940-1949 cohort, the rate is 58 percent; for the 1950-1959 cohort, the rate is 64 percent; and for those born during 1960-1969, the rate is 66 percent. The latest cohort in the graph, those born from 1970-1979, reaches an employment rate of 68 percent by age 33, and it may be assumed that the employment rate of these young women will continue to rise over the coming decade, and perhaps beyond.

On the other hand, for the three "oldest" female cohorts a tendency for employment rates to decline more rapidly at the more advanced ages is found. In numerical terms, this phenomenon is still negligible compared with the rise in employment rates among those of prime working age from later cohorts; this explains why the aggregate data point to a rise in women's employment rates over the years (Figure 1B). Moreover, the employment rates of those born during 1950-1959 decline more slowly between the ages 50-54 than for those born during 1940-1949, while the employment rates of those in the 1940-1949 cohort decline at a slower rate at ages 60-64 than do those of women born in 1930-1939. This phenomenon may indicate a "flattening" of the female employment profile, similar to the trend that is seen more clearly among men. If these changes in women's employment patterns persist, it is likely that the aggregate employment rates for women will continue to rise over the years, and to approach the aggregate employment rates for men.

Figure 3 illustrates the changes that have occurred in the employment rates of the various cohorts; it presents the employment rates of 44-year-old women and men from several cohorts, by population segment (non-Haredi Jews, Arabs and Haredi Jews).² There is a narrowing in the employment rate gender gap; the rate for men declines while the rate for women rises (although not uniformly for Haredi women) in all population

² The choice of age 44 is to a great extent arbitrary and does not significantly influence the results. Around this age employment rates are the highest.

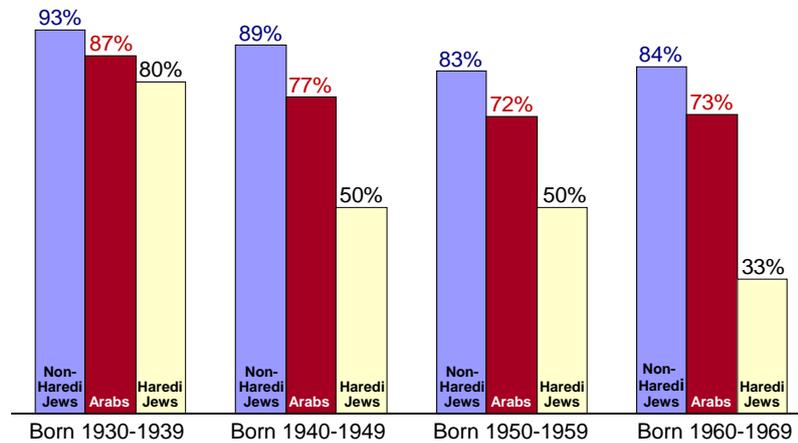
groups the later the birth cohort. Among men, the non-Haredi Jewish employment rate is the highest while that of Haredi Jews is the lowest. The gap between the employment rates of non-Haredi Jews and Arabs grew from 6 percentage points among those born during 1930-1939 to twice that among the 1940-1949 birth cohort (during the first half of the 1980s), and it has remained stable since then. The gap in employment rates between non-Haredi and Haredi Jewish men was 13 percentage points for those born during 1930-1939. Due to a very sharp decline in the employment rate of Haredi men born during the 1940s, the employment rate gap has tripled to 39 percent. The steep decline in employment among Haredi males reappeared within the 1950-1959 cohort and the 1960-1969 cohort (during the first half of the previous decade), and the employment rate disparity between non-Haredi and Haredi Jewish males grew to 51 percentage points.

Employment rates for women were also the highest for Jewish non-Haredi women aged 44, while the employment rates of Arab women were the lowest. Non-Haredi Jewish women had the greatest rise in employment rates between the 1930-1939 cohort and the 1960-1969 cohort (29 percentage points). Nonetheless, the increase in the employment rate of Arab women is also quite impressive (from 4 percent among those born from 1930-1939 to 25 percent among those born in 1960-1969). The major portion of this rise took place between the 1940-1949 and the 1950-1959 cohorts (during the first half of the 1990s). Haredi women's employment rate rose between the 1930-1939 and the 1940-1949 cohorts (during the first half of the 1980s), and has remained at the same level among those born during 1960-1969.

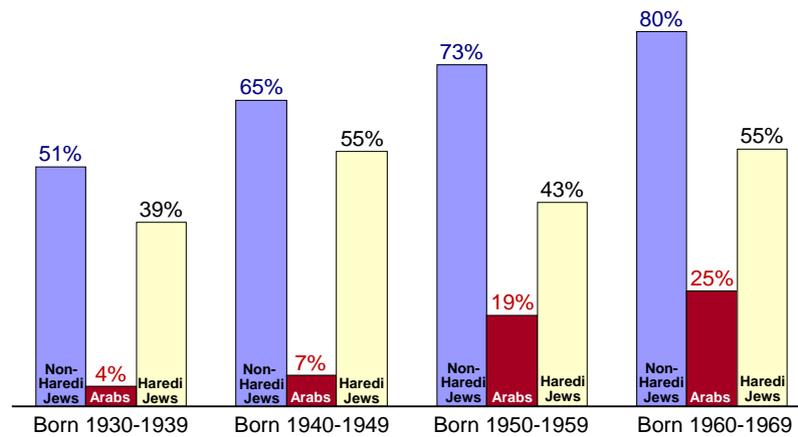
Figure 3

Employment rates for men and women age 44 by population segment and birth decile

A. Men



B. Women



Source: Ayal Kimhi, Taub Center and Hebrew University.

Data: Central Bureau of Statistics.

2. The Importance of Education to Employment Rate Trends

One of the most impressive changes to have taken place in Israel over the last few decades is the increased accessibility to higher education (Shavit and Bronstein 2011, pp. 287-296; see also Appendix 2 to this chapter). As worker education is considered to be a primary factor in labor productivity, one might expect it to also have a significant impact on employment. Ben-David (2010, pp. 253-258) has shown that the decline in male employment rates between 1970 and 2008 was more moderate among those with more education. Similarly, the rise in women's employment rates was positively correlated with their number of years of schooling. It is thus worth considering to what degree the changes in employment patterns noted are linked to changes in education.

Figure 4 compares the employment patterns of men with more than 12 years of schooling with those of men with less than 12 years of schooling. It is evident that the differences in employment rate between the various cohorts are greater among the less-educated. Also, the decline in employment rate with age is steeper among the less-educated, and this difference increases with later cohorts. For example, employment rates among those born in 1930-1939 are similar across the two education groups at age 45 (92 percent), while at age 60 the employment rate of those with more education is 80 percent and that of the less-educated is 61 percent.

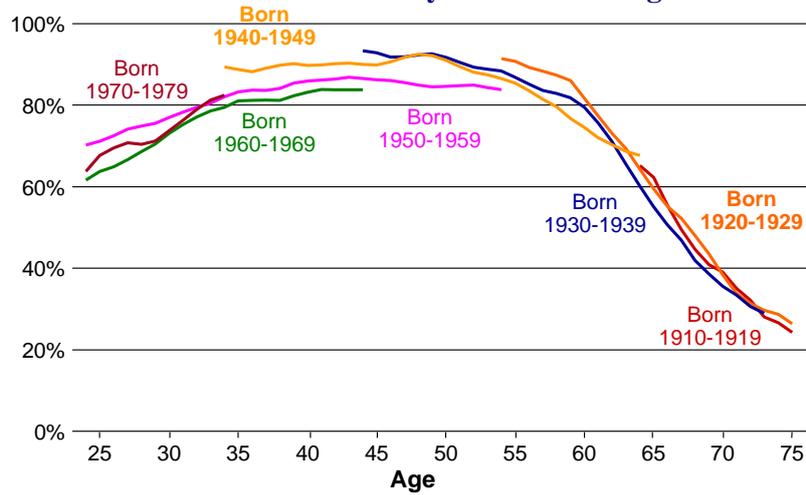
Among those born from 1940-1949 employment rates are similar at age 39 for both groups (90 percent), but they decline more steeply afterward among the less-educated; at age 60 the employment rate of the more-educated is 73 percent, while that of the less-educated is 52 percent. Among those born from 1950-1959, employment rates are similar for both groups at age 34 (81 percent); however, the employment rate of the more-educated continues to rise to 87 percent and remains at 83 percent to age 54, while the employment rate of the less-educated declines to 68 percent at age 54.

The conclusion is that employment rate disparities between the more-educated and the less-educated widen with age. Less-educated men find it hard to remain employed as they get older, and this problem intensifies with age. This may be related to the fact that less-educated men tend to be employed in physical labor, and their decline in physical fitness over time affects their ability to work. Another possible reason is that the demand for less-educated workers has been declining over the years, making it difficult for such workers to keep jobs or to find different jobs when necessary.

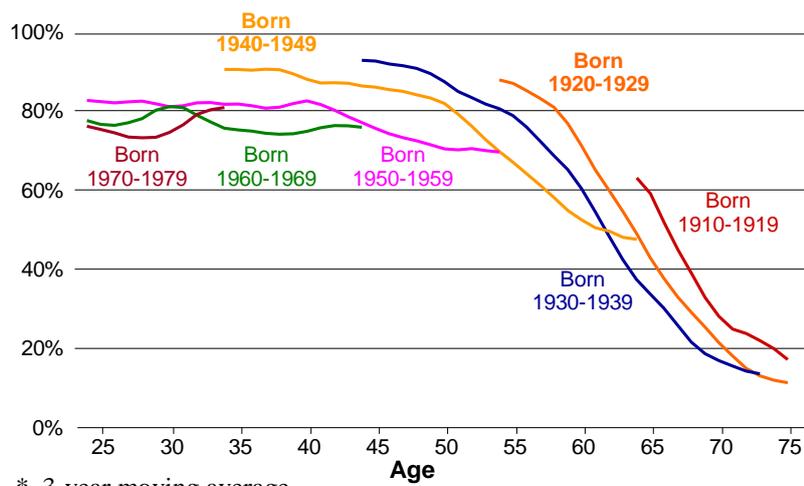
Figure 4

Employment rate for men*
by education, age and birth decile

A. Workers with more than 12 years of schooling



B. Workers with 12 years of schooling or less



* 3-year moving average.

Source: Ayal Kimhi, Taub Center and Hebrew University.

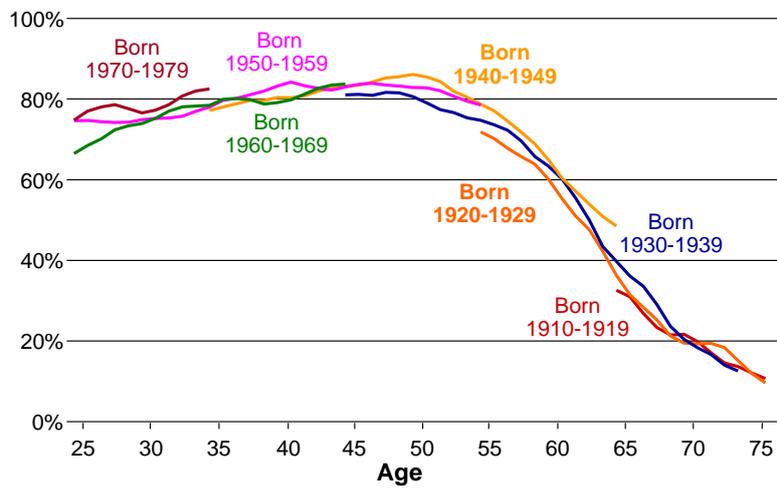
Data: Central Bureau of Statistics (*Labor Force Surveys*).

For women the picture is completely different (Figure 5); the differences in employment rate between the more- and less-educated are evident from the earliest ages of employment. The employment rate of women with more education is over 80 percent between the ages of 35-50 for all birth cohorts, while the employment rate of less-educated women ranges from 40 percent to 50 percent within the same age range. The increase in the employment rate among the later cohorts is virtually not seen for women when they are divided into groups by education level.

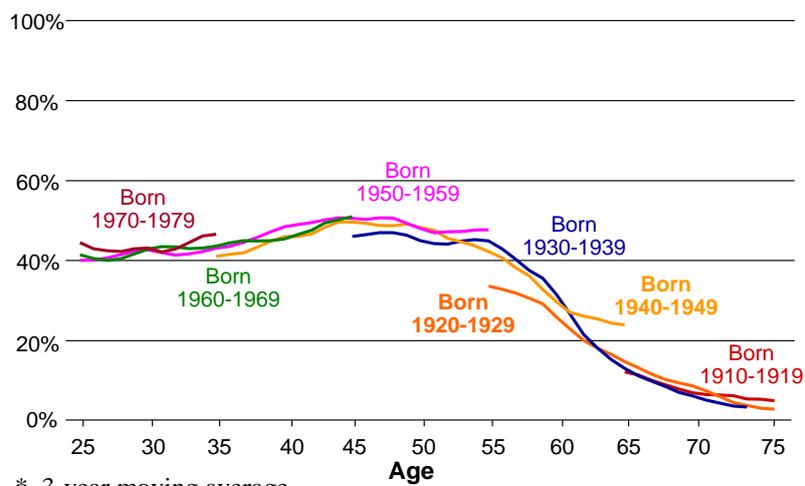
The conclusion is, therefore, that the rise in employment rate among women in the later cohorts is due primarily to the fact that these women are also better educated (Appendix 2). This conclusion may support an approach that would place a major emphasis on education in any policy package aimed at encouraging employment, particularly women's employment. Interestingly, when comparing Figure 4 and Figure 5 one finds that the differences in employment rates between men and women are not large for those with more than 12 years of schooling, meaning that the major portion of the disparity between men and women can be found among those with less than 12 years of schooling.

Figure 5
Employment rate for women*
 by education, age and birth decile

A. Workers with more than 12 years of schooling



B. Workers with 12 years of schooling or less



* 3-year moving average.

Source: Ayal Kimhi, Taub Center and Hebrew University.

Data: Central Bureau of Statistics.

Figure 6 illustrates the distinct effects of education and age on employment rates for men and women focusing on one representative cohort – those born in 1950-1959. The data show that the employment rates of non-Haredi Jewish males and Arab males at all educational levels are quite similar at around age 30 (82-84 percent). Beginning at this age, though, differences begin in employment rates between the more- and less-educated – a disparity that widens with age.

Among the more-educated men, up until age 36 the Arab employment rate rises faster than the Jewish employment rate; however, from this age onwards it drops, while the employment rate of non-Haredi Jews continues to rise until about age 40. Starting at age 44, when the employment rate for men in both educated population segments is 90 percent, the employment rate of more-educated Arab males starts to decline rapidly, while that of non-Haredi educated Jewish males drops only slightly, by a few percentage points, meaning that the gap between the employment rates of more-educated Jewish males and more-educated Arab males widens with age.³

Among the less-educated, the employment rates of non-Haredi Jewish men and Arab men are quite similar until age 36 (80-82 percent). From this age onwards the employment rate of less-educated Arab men starts to decline, a trend that intensifies after age 40, such that the employment rate gap between less-educated Jewish and Arab men widens greatly with age (to a greater degree than the gap between educated males in the two population groups). It should also be noted that the employment rate of Haredi men is significantly lower than all other population groups. Despite fluctuations (stemming in part from the relatively low

³ Achdut and Gera (2008) found that the decrease in employment rate with rising age is in part caused by declining health. It is interesting to find out if this is a more significant issue in the Arab sector. No significant differences were found between the occupational distributions of educated Arabs and non-Haredi educated Jews.

representation of this population group in the sample), it stabilizes at around 40-47 percent from the late 30s to age 54.⁴

As in Figure 5, the employment rate disparities between more- and less-educated women are much greater than those between men. This difference is particularly evident in the case of Arab women, among whom only 10 percent of the less-educated are employed, compared with 70-80 percent of the more-educated.⁵ The more-educated, non-Haredi Jewish women's employment rate rises with age to 87 percent at age 39 then declines to 80 percent at age 54. At its peak, the employment rate for these women is only slightly lower than that of more-educated, non-Haredi Jewish men. More-educated Arab women also exhibit an employment rate that is only 10 percent lower than that of their male counterparts.

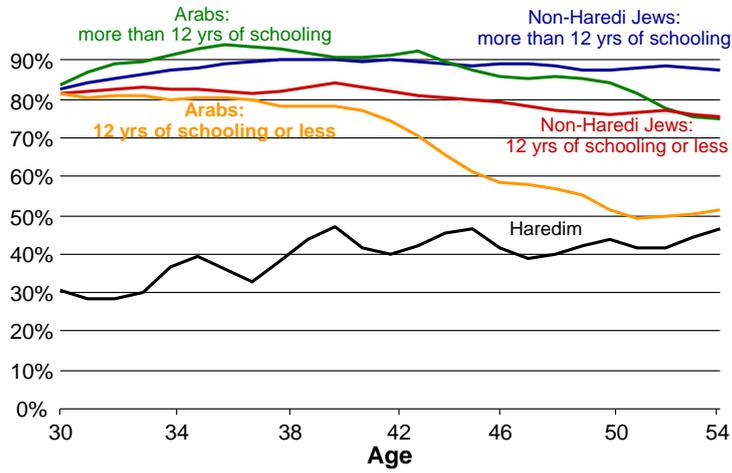
The employment rate of Haredi women is slightly lower than that of less-educated non-Haredi Jewish women at age 30; however, while the employment rate of less-educated non-Haredi Jewish women rises until age 44, that of Haredi women declines until age 38, due, perhaps, to the larger number of children that they bear. The employment rate of Haredi women rises between the ages of 38 and 42 or so, and remains stable between the ages of 42 and 48, when it again rises until achieving near parity with the employment rate of less-educated non-Haredi Jewish women. The relatively low employment rate of Haredi women appears to be largely related to their family structure; only when they pass their childbearing years, and/or as their children get older, do their employment rates increase.

⁴ Haredim were not broken down by level of education due to their relatively low numbers. Almost all Haredi males born between 1950-1959 had more than 12 years of schooling, while amongst women the rates are lower although still greater than 50 percent.

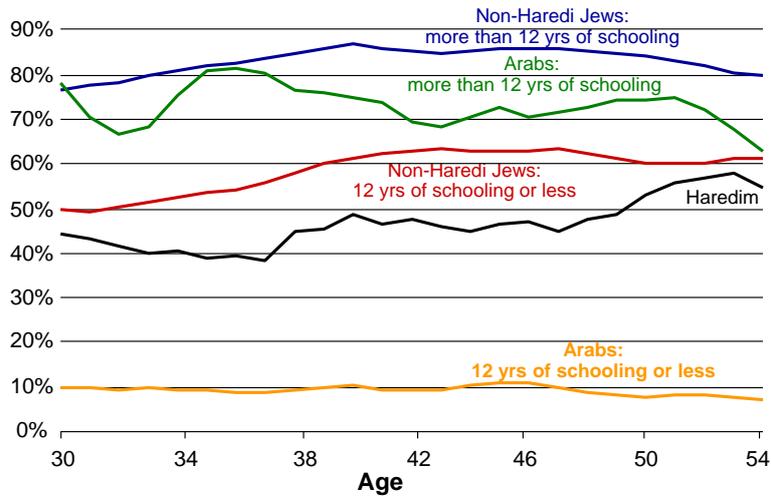
⁵ The small number of educated Arab women in each age group led to their greater employment rate fluctuation.

Figure 6
Employment rates for those born 1950-1959
 by gender, population segment, education, and age

A. Men



B. Women



Source: Ayal Kimhi, Taub Center and Hebrew University.

Data: Central Bureau of Statistics, OECD.

To conclude, it could be said that the employment rate gaps between non-Haredi Jews and Arabs are concentrated largely among the less-educated. Employment rate disparities are wider among women, and one may attribute nearly all of the impressive rise in women's employment rates over the years to the greater prevalence of higher education among women. Among men, employment disparities by education level widen with age, primarily among Arabs.

3. Trends in Wages

Between 1998 and 2010, the monthly income of full-time salaried workers (employed at least 35 hours per week) rose by 7.5 percent more than the rise in the consumer price index (Table 1). A similar wage increase is found when one calculates the average hourly wage for these workers. By contrast, the average hourly wage of part-time workers declined by over 9 percent. It is interesting to note that while in 1998 the average hourly wage of a part-time worker was nearly 11 percent higher than that of a full-time worker, in 2010, it was nearly 7 percent lower. The average hourly wage of all salaried workers rose by 3.1 percent during the same period. By comparison, the cumulative per capita GDP growth rate between 1998 and 2010 was slightly more than 20 percent in real terms, meaning that, regardless of the method used to calculate the wage increase, the situation of salaried workers in the Israeli economy worsened during this period relative to those with other forms of income (e.g., the self-employed and the independently wealthy).

When examining wages for men and women separately, one finds that the monthly income and average hourly wage of salaried women employed full-time grew at a much higher rate than the same wages for men. The average hourly wage of salaried women employed part-time decreased between 1998 and 2010, although at a lower rate than that of the decline in the average wage of males employed part-time. As a result, the wage gap between men and women employed full-time decreased by

4.5 percentage points, versus a nearly 13.5 percent decline in the wage gap between salaried men and women employed part-time. Ultimately, since only about a tenth of salaried men work part-time while over a third of women work part-time, the average hourly wage of all salaried women increased less than that of men, meaning that the wage gap between men and women widened by slightly more than 1 percent.

The male-female wage gaps indicated by Table 1 are dwarfed by the wage gaps that exist between workers of different education levels (Figure 7). If the gap in hourly wage between men and women is around 17 percent (Table 1), the wage gap between workers with over 12 years of schooling and workers with less than that is 67 percent.⁶ The disparity is wider among men than among women (75 percent versus 64 percent) and it is of particular interest to note that the wage gap between men and women of the same education level rises as education level rises (from 18 percent among those with less than 12 years of schooling to 26 percent among those with more than 12 years of schooling). It appears that, compared with their male counterparts, a greater number of more-educated women are not reaching their full earning potential – whether by choice (e.g., due to the difficulty of balancing their role in the labor market with their role in the home), or due to problems in climbing the wage ladder. Since the rate of higher education among working women is greater than that of working men (the share of the more-educated in the total number of men’s work-hours rose from 42 percent in 1998 to 52 percent in 2010, while the share of the more-educated in the total number of women’s work-hours rose from 52 percent in 1998 to 62 percent in 2010), education level is insufficient to explain the male-female wage gap.

⁶ This refers to the average disparity in 1998 and in 2010.

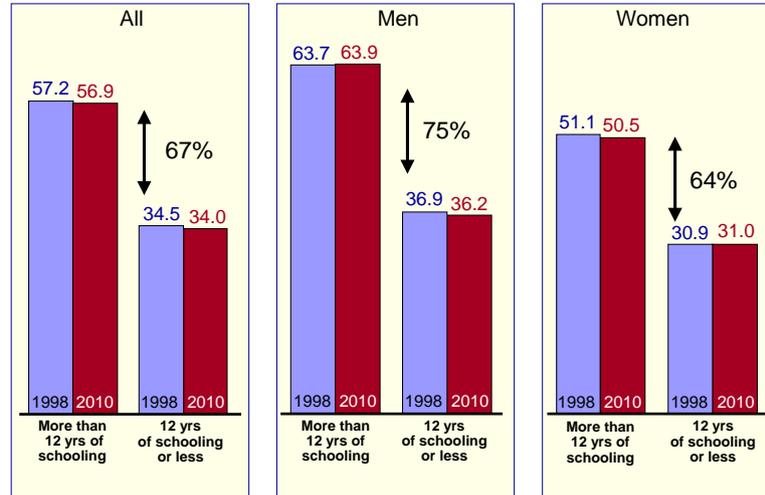
Table 1. **Changes in wages**
NIS, 2010 prices

	1998	2010	Percent change
All salaried workers			
Gross monthly income of a full-time salaried worker	8,691	9,345	7.50
Gross hourly wage of a full-time salaried worker	44.38	47.73	7.60
Gross hourly wage of a part-time salaried worker	49.21	44.69	-9.20
Gross hourly wage	45.59	47.00	3.10
Men			
Gross monthly income of a full-time salaried worker	9,750	10,444	7.11
Gross hourly wage of a full-time salaried worker	47.66	51.07	7.15
Gross hourly wage of a part-time salaried worker	57.69	48.03	-16.70
Gross hourly wage	48.77	50.69	3.90
Women			
Gross monthly income of a full-time salaried worker	6,812	7,752	13.80
Gross hourly wage of a full-time salaried worker	38.55	42.89	11.30
Gross hourly wage of a part-time salaried worker	46.58	43.47	-6.70
Gross hourly wage	41.88	43.10	2.90
Gaps			
Hourly wage gap between men and women – full-time salaried workers	23.60%	19.10%	
Hourly wage gap between men and women – part-time salaried workers	23.90%	10.50%	
Hourly wage gap between men and women – all salaried workers	16.40%	17.60%	

Source: Ayal Kimhi, Taub Center and Hebrew University.

Data: Central Bureau of Statistics (*Income Surveys*).

Figure 7
Gross wage per work-hour for salaried employees
 by gender and education, NIS per hour, 2010 prices



Source: Ayal Kimhi, Taub Center and Hebrew University.

Data: Central Bureau of Statistics (*Income Surveys*).

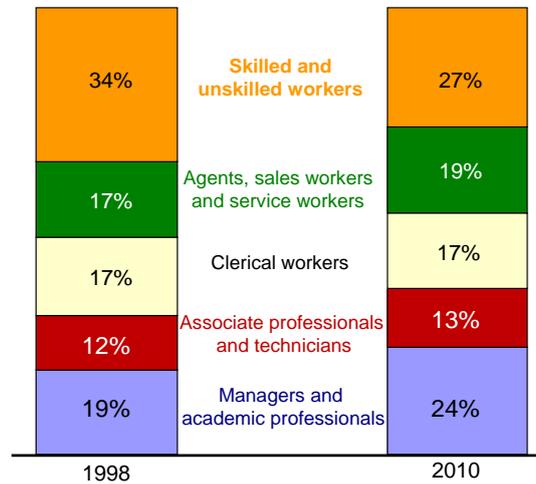
It is interesting to note that within the education-level and the gender/education-level groups, the wage changes between 1998 and 2010 are quite small. This indicates that the rise in average wage that took place during that period (Table 1) was due solely to a rise in the proportion of workers with more education. If the labor market is thought of as composed of two sub-markets divided by worker education level, this means that the changes in demand for all types of workers and in worker supply cancelled each other out in terms of their impact on wages. In other words, because, relatively speaking, the number of more-educated workers rose, then if the demand for educated workers had grown at a lower rate (compared with the demand for less-educated workers), the wage gap between the more- and less-educated would have

been lower over time. And vice versa: if the demand for more-educated workers had grown at a faster rate, then the wage gap between the more-educated and the less-educated would have grown over time. Since the wage gaps remained nearly unchanged, it may be concluded that the rise in demand for more-educated workers compared with less-educated workers was identical to the relative increase in the supply of educated workers.

In an earlier study (Kimhi 2011), the wage gap increase by education level was attributed to relative growth in human-capital-intensive industries and in occupations associated with these industries. The present discussion will provide a more in-depth analysis of changes in the structure of demand for workers and the relationship between these changes and changes in wages. Figure 8 presents the distribution of work-hours within the economy, and the changes that have occurred to this distribution by occupation. The figure shows that, during the period 1998-2010, work-hours increased more in the occupation group of managers and academic professionals than in other groups; their share in the economy's total number of work-hours grew from 19 percent in 1998 to 24 percent in 2010. By contrast, the share of skilled and unskilled workers, who accounted for over a third of the economy's total work-hours in 1998, declined to 27 percent in 2010.⁷

⁷ The total number of work-hours in the economy grew by more than 30 percent in each occupation group; the occupation groups are distinguished, though, by the amount of the increase.

Figure 8
Distribution of work-hours in the economy
 by occupational group, 1998 and 2010



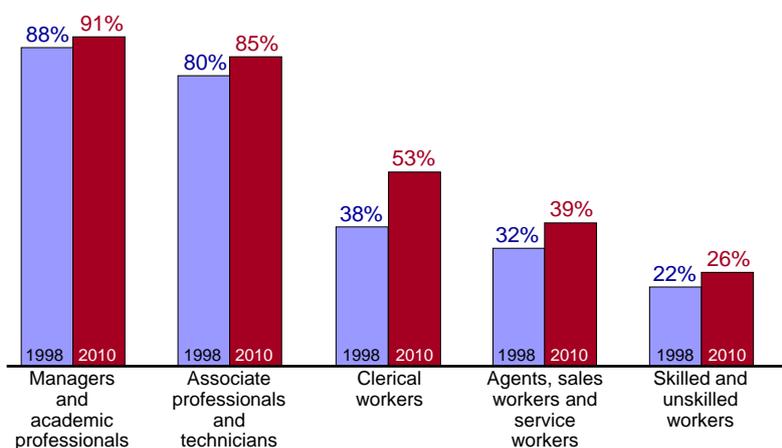
Source: Ayal Kimhi, Taub Center and Hebrew University.

Data: Central Bureau of Statistics.

In terms of distribution by education (Figure 9), it is evident that more-educated workers are concentrated in two occupational groups. Some 90 percent of the work-hours of managers and academic professionals were supplied by those with more than 12 years of schooling during the period 1998-2010, as well as over 80 percent of the work-hours of those in the associate professionals and technicians group. In the remaining occupational groups, the share of workers with post-secondary educational backgrounds is less than half; most prominent among these are skilled and unskilled workers, only a quarter of whose work-hours were supplied by those with a post-secondary education. Regarding changes in work-hour distribution by education level, it appears that in all occupational groupings there has been a rise in the

proportion of work-hours of more-educated workers. In other words, all occupations have become more education-intensive. However, it may be noted that levels of education-intensiveness increased more in those occupations that had been previously less education-intensive in 1998 (particularly clerical workers), meaning that the mix of more-educated and less-educated workers became slightly more equal across the various occupations during the years 1998-2010.

Figure 9
**Fraction of work-hours for employees
with more than 12 years of schooling**
as percent of total work-hours within
the occupational group, 1998 and 2010



Source: Ayal Kimhi, Taub Center and Hebrew University.

Data: Central Bureau of Statistics (*Labor Force Surveys*).

The narrowing of the education-intensiveness gap between the various occupations can be accounted for by a fairly straightforward technical explanation, namely, that the proportion of highly-educated workers among the managers, associate professionals and technicians, and academic professionals was quite high to begin with and could not increase significantly. The rise in percentage of the highly-educated within the labor force related primarily to those occupations that had not previously been education-intensive. However, this explanation is inconsistent with the fact that in those occupations that are least education-intensive (skilled and unskilled workers), the rise in education-intensiveness was quite low (4 percentage points).

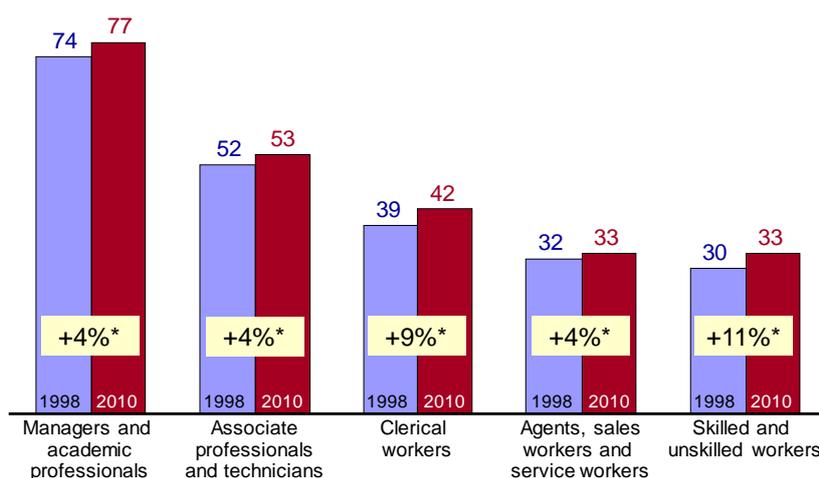
Other factors exist that have distinct effects on the demand for educated workers in the various occupational groups. For example, the office-computerization revolution, which enabled clerical workers to get more done in less time, increased the demand for more-educated clerical workers capable of handling more complex and sophisticated tasks. In order to grasp the relative changes in demand for workers in the various occupational groups, one must also look at changes in wages by occupation. This kind of approach will shed light on the issue of whether the rise in education-intensiveness in a given occupation indicates a true increase in worker productivity, or whether these more-educated workers are performing tasks that less-educated personnel could be carrying out with the same degree of efficiency.

A wage comparison for the various occupations (Figure 10) suggests that wages are largely commensurate with education level. Nevertheless, the wages of managers and academic professionals are significantly higher than those of associate professionals and technicians, despite the fact that the percentage of those with higher education in both groups is quite similar. It would seem that the two occupational groups differ in other ways that are not reflected by education level, like entrepreneurship, leadership and the like. By contrast, no wage difference was found between the agents, sales and service worker group and that of the skilled and unskilled worker group, despite the fact that

the percentage of educated workers in the latter group is significantly lower. It may be that skilled and unskilled workers earn wages that are relatively high for their educational background due to their willingness to engage in physical labor; moreover, higher education may not provide a high rate of return in the agent, sales and service fields. Between 1998 and 2010, the greatest wage increase (a rise of 11 percent) was found among skilled and unskilled workers – those located at the bottom of the wage scale. Clerical worker wages also exhibited a relatively large increase during this period, one that may be explained by the sharp rise in the proportion of the more-educated among those employed in this occupation group (Figure 9).

Figure 10

Gross wage per work-hour of salaried employees
by occupational group, NIS per hour, 2010 prices, 1998 and 2010



* Increase in wage from 1998 to 2010.

Source: Ayal Kimhi, Taub Center and Hebrew University.

Data: Central Bureau of Statistics (*Income Surveys*).

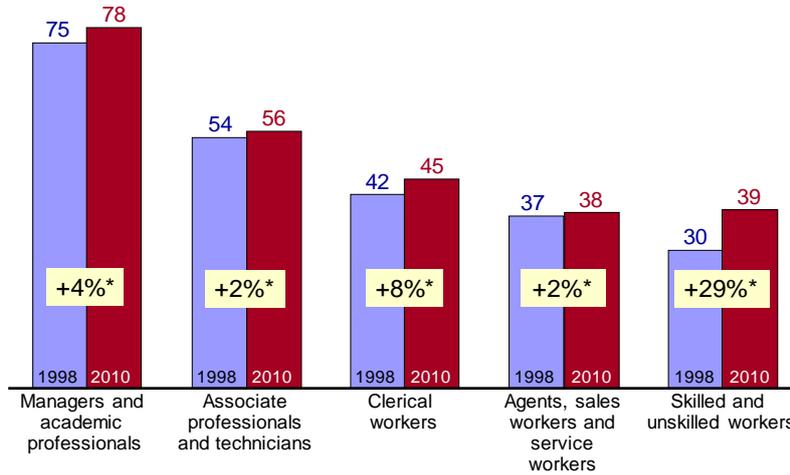
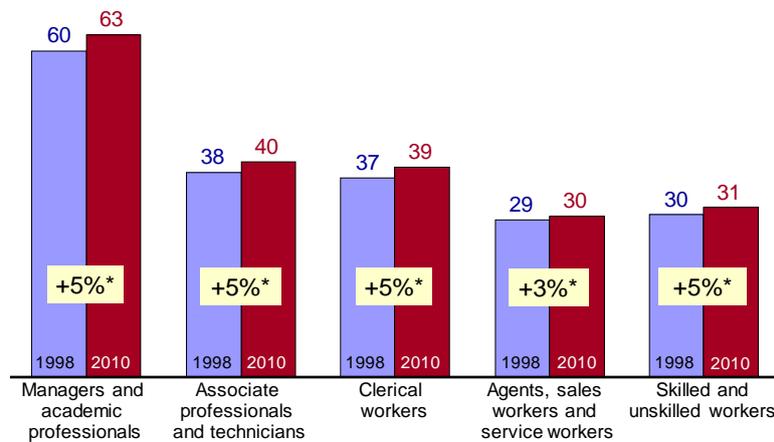
In order to understand the relationship between the rise in wages and the rise in the percentage of more-educated workers in the various occupations, Figure 11 compares changes in worker wages by education level and by occupation. Several major insights emerge from this comparison. Firstly, the wages of less-educated workers rose at similar rates across all occupation groups. By contrast, wage increases for the more-educated differed by occupation. While the percent wage increase of highly-educated workers in the managerial and academic professions, in the associate professional and technician group of occupations, and in the agent, sales and service occupations was similar and perhaps even slightly lower than the percent wage increases of less-educated workers in the same fields, the wages of educated workers in the skilled and unskilled worker occupations jumped by 29 percent during the period 1998-2010. In addition, the wages of educated workers in the clerical occupations increased by 8 percent during the same period. This degree of wage increase may be an outcome of technological advancement and the resultant relative rise in the value of education in these fields – a phenomenon that has been documented in other developed countries as well (Van Reenen 2011). Beyond this, changes in the public-sector wage-agreement structure may have been particularly favorable for the more-educated employees in these occupations. It may also be that privatization and a weakening of regulation facilitated wage increases for more-educated workers in jobs whose salaries had been exceptionally low prior to privatization. Until proven otherwise, the conclusion is that there has been a relative rise in demand for more-educated workers in both of these occupational groups. Given that the percentage of educated workers among the clerical-worker population has grown at a much higher rate than in the other occupations (Figure 9), the most likely scenario is that the supply of more-educated clerical workers adjusted itself to the change in demand. Thus, the percent increase in the wages of these workers was relatively modest, while the supply of more-educated workers within the skilled and unskilled occupations was insufficiently elastic, resulting in a sharp wage increase for them. It is also interesting

to note that in 1998 there was no wage gap between more-educated and less-educated employees within the skilled and unskilled worker occupation groups, while in other groups the gap ranged from 15 percent among clerical workers to 44 percent among associate professionals and technicians. From this one may conclude that the sharp wage increase for the more-educated employees within the skilled and unskilled worker groups led to a situation in which the wage gap between the more-educated and less-educated workers in these groups reached 24 percent in 2010, a larger gap than that in the clerical worker group (17 percent).

Figure 11

Gross wage per work-hour of salaried employees

by education and occupational group, NIS per hour, 2010 prices, 1998 and 2010

A. Workers with more than 12 years of schooling**B. Workers with 12 years of schooling or less**

* Increase in wage from 1998 to 2010.

Source: Ayal Kimhi, Taub Center and Hebrew University.**Data:** Central Bureau of Statistics.

It is interesting to examine whether the more elastic supply of more-educated clerical workers is related to an increase in the labor supply of educated women, as discussed previously. Figure 12 presents the percentage of women in each of the occupational groups. It turns out that a large majority of clerical workers (over 70 percent) are women, while an even larger proportion (over 80 percent) of skilled and unskilled workers are men. Based on this, the following scenario may be drawn: during the period in question there was a relative increase in demand for more-educated workers in both of these occupational groups (which experienced the steepest wage increases for educated workers), that of skilled and unskilled workers and that of clerical workers. Since most skilled and unskilled workers are men, whose employment rate declined during the period in question, the rise in demand was reflected more in a wage increase for these workers than in a rise in their number of work-hours. By contrast, since most clerical workers are women, whose employment rate increased during the period 1998-2010, there was no difficulty in increasing the number of educated women employed as clerical workers, meaning that their wages did not increase at the same rate.

Figure 13, which presents changes in work-hour distribution by gender and education level for all of the occupations, supports this picture. Amongst clerical workers, a turnover of more-educated for less-educated workers did indeed take place primarily among women, while, by contrast, within the skilled and unskilled worker population the turnover took place solely among men. Moreover, the turnover in clerical workers was more intensive (took place at a higher rate) than in the skilled and unskilled worker population.

It is also interesting to see that, among managers and academic professionals, more-educated women replaced more-educated and less-educated men, while among agents, salespeople and service workers, more-educated men and women replaced less-educated men.

Figure 12
Fraction of work-hours of women
 by occupation group, 1998 and 2010

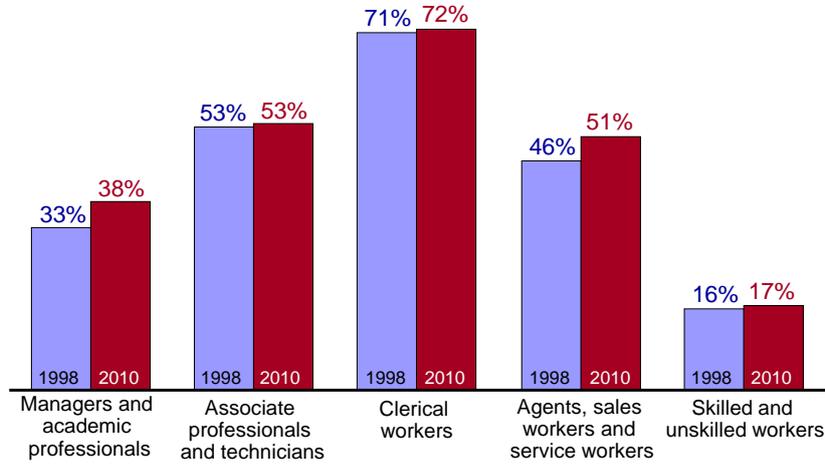
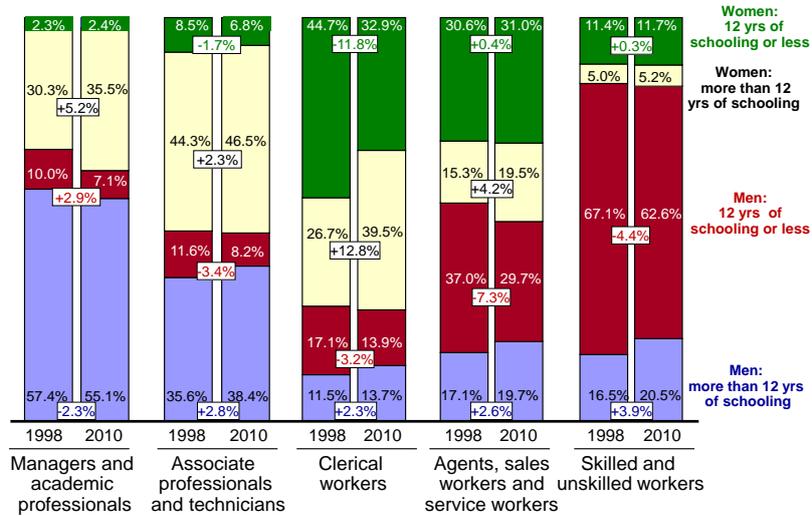


Figure 13
Distribution of work-hours in occupational groups
 by gender and education, 1998 and 2010



Source for both figures: Ayal Kimhi, Taub Center and Hebrew University.
 Data for both figures: Central Bureau of Statistics (*Labor Force Surveys*).

4. Conclusions and Policy Implications

The education level of the labor force is the primary factor that explains employment and wage gaps among workers. There has been a global trend toward rapidly increasing demand for educated workers, at a time when the supply of such workers, though growing, has been doing so at a more limited pace.⁸ The Israeli data indicate that the employment rate of each new generation of men has been lower than that of the preceding generation, while each new generation of women tends to work more than its predecessor. These trends are observable in all population segments.

Among women, the change in work patterns stems primarily from the fact that women from the later birth cohorts tend to be better educated; this is particularly evident among Arab women. Among men, employment rates in the younger age range are not influenced by education level; however, as men age, the tendency is for the less-educated to drop out of the labor market. This phenomenon particularly stands out in the Arab sector. Generally speaking, gender and sector employment rate gaps for workers with more than 12 years of education are quite low. Nevertheless, there has been a relative decline in the employment rate of educated Arab men who have passed their mid-forties.

The wage gaps between more-educated and less-educated workers did not widen significantly between 1998 and 2010, but neither did they narrow. It appears that the increase in the number of educated workers moderated the wage increases that might have been expected to result from a relative rise in demand for more-educated workers. The breakdown by occupation shows that the most significant increase in real wages (29 percent) was enjoyed by skilled and unskilled workers with more than 12 years of schooling; educated clerical workers also

⁸ Lutz et al. (2008) claim that raising education levels is possible for the most part amongst the young; the rise in the average level of education of workers as a response to demand for more-educated workers is, indeed, gradual.

experienced a relatively impressive wage increase (8 percent). These two occupational groups can be distinguished by several major attributes. Firstly, most skilled and unskilled workers are men, while most clerical workers are women. Secondly, the number of jobs for skilled and unskilled workers suffered a relative decline during 1998-2010, while the number of jobs for clerical workers grew at precisely the same rate as that of job creation in the economy as a whole. Moreover, the share of educated workers in the clerical occupation group grew significantly, while the share of educated workers in the occupation group of skilled and unskilled workers grew much more moderately. Given that the rise in education level of the labor force was much more pronounced among women than among men during the period in question, and given that the overall employment rate for women rose while the rate for men declined, these data point to the following possible scenarios:

- Demand for educated workers in the two occupational groups in question, clerical workers and skilled and unskilled workers, grew relative to other occupations.
- Since clerical workers are for the most part female, and given the growing supply of more-educated women in the labor force, the rise in demand was reflected in a rise in the influx of educated women into clerical positions. This increased supply of educated clerical workers balanced, to some degree, the increased demand for such workers; as a result, the wages of educated clerical workers rose only moderately.
- Since skilled and unskilled workers are mostly male, and given that the rise in supply of more-educated men was lower than the corresponding rise in supply of more-educated women, the increased demand for educated workers in this sphere did not lead to a significant increase in the employment of such workers. Since the rise in demand was not accompanied by a corresponding increase in supply, the wages of more-educated workers in this occupational group increased sharply.

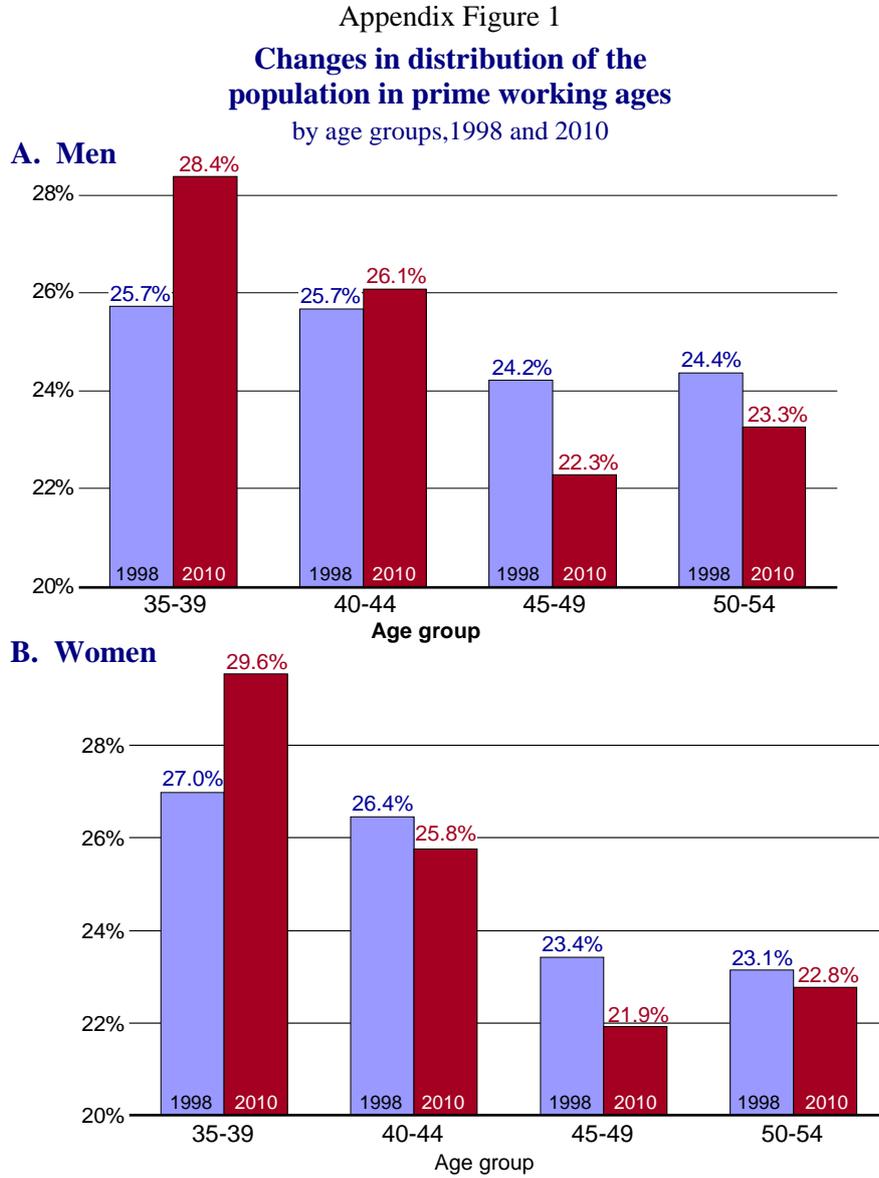
These findings indicate the need for further research in order to determine whether this scenario, which is based on the assumption of a free labor market in which employment and wages are affected by relative changes in the demand for, and supply of, workers of various types, does indeed account for the data observed. Otherwise, alternative explanations, based on other forms of labor relations, like those that exist in Israel's public sector and in other sectors dominated by organized labor, should be sought.

It appears that a policy of encouraging the pursuit of higher education is the key to reducing employment and wage gaps, but one should refrain from such an unequivocal conclusion because this, in and of itself, will not necessarily result in the desired outcomes. Without a sufficient increase in the number of jobs available, a rise in the percentage of the more-educated with their increased tendency to enter the labor market may make it harder for the less-educated to find jobs and remain employed. On the other hand, creating new jobs without increasing the number of educated workers is another situation that does not necessarily help eradicate wage gaps, since the new jobs created may be at the low end of the wage scale. An integrated policy of encouraging higher education and creating jobs may succeed; however, higher education on its own is not sufficient to ensure success in the labor market. Success depends on the education system's ability to teach work skills that are suited to the demands of the modern labor market. Since these demands are changing rapidly, the education system is faced with the task of training workers with highly adaptive skills.

Finally, one should not forget that, in any case, not all workers will be highly-educated and since those lacking higher education will find it increasingly difficult to succeed in the labor market, ways must be found to cultivate the skills taught in high school, so that those with secondary education can support themselves adequately. Beyond this, if the barriers to higher education are socioeconomic background, then it is the state's duty to remove these barriers and to ensure that all pupils enjoy equal opportunity to pursue higher education.

Appendix

These two figures show a rise in the population shares of people aged 35-39 relative to those aged 40-54.



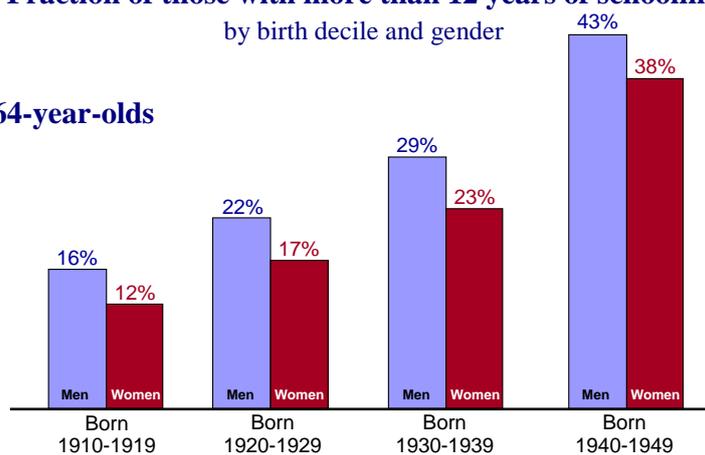
Source: Ayal Kimhi, Taub Center and Hebrew University.
Data: Central Bureau of Statistics.

These two figures show an increase in the population shares of those with more than 12 years of schooling in later age cohorts which is more pronounced in women. For those born before 1960, the share of those with more education amongst men is higher than amongst women, while for those born after 1960, the situation reverses.

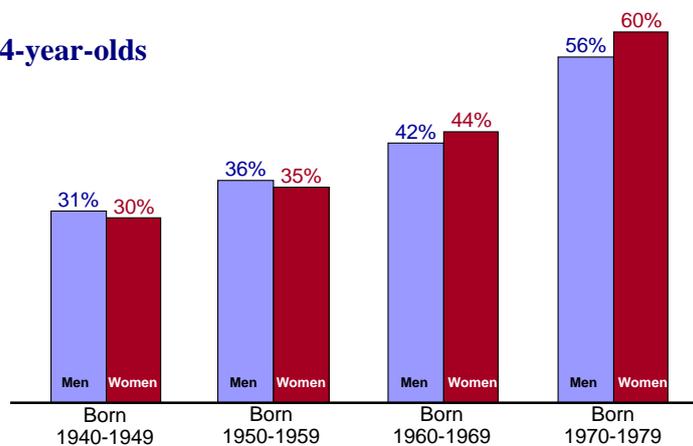
Appendix Figure 2

Fraction of those with more than 12 years of schooling
by birth decile and gender

A. 64-year-olds



B. 34-year-olds



Source: Ayal Kimhi, Taub Center and Hebrew University.

Data: Central Bureau of Statistics.

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