

LABOR INCOME MOBILITY AND EMPLOYMENT MOBILITY IN ISRAEL, 1993–96

DMITRI ROMANOV\* AND NOAM ZUSSMAN\*

The paper presents a primary large-scale study of income and job mobility in Israel as derived from the micro-level Income Tax Administration data. The results provide solid evidence that though primary income inequality in Israel in the first half of the 1990s was one of the highest compared with other developed economies, the country's labor market was exceptionally dynamic, due, *inter alia*, to the successful occupational absorption of new immigrants from the former USSR. The extent of job mobility in Israel closely resembles that of the USA in the late 1980s. Impressive income mobility contributes to high rates of escape from low pay.

1. INTRODUCTION

Labor income mobility plays a broad and important role in the explanation of the path of income throughout individuals' life cycle and of the changes over time in income distribution.

Income mobility is closely related to basic economic and demographic phenomena such as business cycles, employment mobility, geographic mobility, changes in household's composition and so on. Income mobility is also related to various aspects of an individual's personal characteristics—education, occupation, sex, age, experience and seniority in the labor market, etc.

Income mobility facilitates equality of opportunity, so that economic and social stratification is changeable, providing individuals with an incentive to improve their economic standing. Income mobility is a means of reducing inequality in the distribution of individuals' wealth within their lifetime. The claim is generally accepted that societies with high income mobility are more egalitarian, in the long run, than those with the same degree of inequality at any given point in time but with lower income mobility. It thus transpires that inequality measured at a point in time is higher than that measured over a longer term, and the gap between them widens as income mobility rises.

Income mobility, however, can be viewed as an intrinsically negative factor that increases the uncertainty of income and the risk of a decline in economic status. Polarization of income distribution resulting from downward income mobility (of many) and upward mobility (of a few) is apt to provoke economic instability and social coercion accompanied by calls for restrictions on competitive wage setting (like minimum wage and the earnings ceiling), and by pressures to expand income redistribution.

Employment mobility, associated with labor-market flexibility and efficiency, ensures a rapid response to changes in market conditions, technology, etc., and improves the match between employees and employers.

In Israel the discussion of income and employment mobility has been marginalized in both public awareness and economic research as a result of the lack of longitudinal data needed for

\* Research Department, Bank of Israel.

examining these issues. This paper uses micro-level data from individual income tax returns for 1993–96 to analyze labor income and job mobility of individuals in Israel in this period. The link between income mobility and inequality in income distribution is also examined. As to the best of the authors' knowledge this is the first study of these topics in Israel, and the study focuses on a detailed comparison of the level of mobility in Israel with that in selected industrialized countries. Another accent of the work, motivated by current public debate on raising the minimum wage as a means of reducing poverty and bridging income gaps, is investigation of the extent of income mobility at the lowest end of income distribution and around the poverty line.

The paper is organized as follows: Section 2 reviews the main indices of income mobility and the connection between them and indices of inequality of the distribution of income. Section 3 describes the data. Section 4 presents the findings regarding labor income mobility in Israel and compares them with the findings in other countries. Section 5 analyzes employment mobility. Section 6 discusses the implications of earnings mobility for the chances of escaping from a low wage, and Section 7 concludes.

## 2. INDICES OF INCOME MOBILITY

The correlation coefficient of income ranking is:

$$S_i(t-1, t) = \frac{\sum (R_{it} - \bar{R}_t)(R_{i,t-1} - \bar{R}_{t-1})}{\sqrt{\sum (R_{it} - \bar{R}_t)^2 \sum (R_{i,t-1} - \bar{R}_{t-1})^2}},$$

where  $R_{it}$  is the income rank of individual  $i$  in year  $t$ , for example the Spearman rank correlation. The higher the correlation coefficient, the lower is income mobility.

A mobility matrix, such as the matrix of quintiles shown below, is an open-form representation of income mobility. The  $P_{ij}$  element of this matrix is the probability of crossing from quintile  $i$  in period  $t-1$  to quintile  $j$  in period  $t$ , so that the sum of each row and each column in the matrix is 1.

Income distribution in year  $t$

Income distribution in year  $t-1$

$P_{11}$	$P_{12}$	$P_{13}$	$P_{14}$	$P_{15}$
$P_{21}$	$P_{22}$	$P_{23}$	$P_{24}$	$P_{25}$
$P_{31}$	$P_{32}$	$P_{33}$	$P_{34}$	$P_{35}$
$P_{41}$	$P_{42}$	$P_{43}$	$P_{44}$	$P_{45}$
$P_{51}$	$P_{52}$	$P_{53}$	$P_{54}$	$P_{55}$

The immobility ratio is defined on the basis of the mobility matrix as the share of those who remained in the same percentile for two periods, i.e., the sum of the elements on the main diagonal *divided by* five (for the matrix of quintiles). The immobility ratio must be compared to the situation of complete mobility, in which the probability associated with any element, in the case of quintiles, is 0.2.

As the immobility ratio is not sensitive to the extent of mobility off the main diagonal, use is also made of an index of average absolute jump defined (for the matrix of quintiles) as follows:

$$\sum_{i=1}^{i=5} \sum_{j=1}^{j=5} (P_{ij} |j - i|) / 5 .$$

The dynamic relationship between income mobility and income inequality is not straightforward. It is true, however, that as by any measure income mobility over the longer spans of time is higher than in the shorter periods, so the longer the period of time, the smaller will be inequality in the distribution of income. The extent to which inequality is reduced as a result of a switch to longer-term measurement depends on the frequency of change in individuals' relative position in the income distribution within each year and on the extent of change from one year to another. Shorrocks (1978) showed that inequality in long-term income distribution of a constant population is lower than the weighted average<sup>1</sup> of inequality in each of the years. He proposed an index of income mobility called  $R(I)$  based on the change in the index of inequality in income distribution  $I$  over  $m$  periods:

$$R(I) = \frac{I(Y_{1,m})}{\sum_{k=1}^{k=m} w_k I(Y_k)} ,$$

where:

$I(Y_{1,m})$  is the index of the inequality of income distribution over  $m$  periods;

$I(Y_k)$  is the index of the inequality of income distribution in period  $k$  ( $k=1, \dots, m$ );

$w_k$  is the share of discounted income in period  $k$  in total income over the whole period.

The value of  $R(I)$  is bounded by 1 (no income mobility) and zero (perfect mobility). As the period lengthens, the value of the index declines (at a given level of periodic mobility). As to the sensitivity of the index, its value is close to one for a three-year period (the UK, see Creedy, 1979),<sup>2</sup> declining to 0.87 for a period of twenty-five years (France, 1950-1975, ABM).

### 3. THE DATA

In this paper use is made of the Income Tax Authority database covering the entire population of 300,000 Israeli self-employed individuals and employers' reports on 2 million salaried employees for the years 1993–96. The shortcomings of our data are typical for information usually delivered to and by tax authorities. The unit examined is the individual taxpayer, not the household. There is no information on transfer payments or payments in kind received. Individuals who did not report their labor or capital income or whose income is not taxable are excluded, however those below the tax threshold are included. Only sparse socio-demographic information (necessary for tax purposes) is found in the database, and it covers sex, age, marital status, number of children, residence, economic branch and, indirectly, information on whether the taxpayer is a new immigrant. The number of months in which

<sup>1</sup> Weighted by the share of that year's income in total income over the whole period (both at discounted values).

<sup>2</sup> In Atkinson, Bourguignon and Morrisson (1992) (henceforth ABM), Table 8.

**Table 1**  
**The Taxpayer Population**

	Number ('000)	Percent	Annual labor income (NIS '000) <sup>a</sup>
Total aged 21–64 <sup>b</sup>	2,167	100	43.3
<i>Of which:</i> 21–24 and 55–64	683	32	33.4
Total aged 25–54 <sup>b</sup>	1,485	68	47.8
<i>Of which:</i> non-constant population	396	18	27.1
Total constant population aged 25–54	1,089	50	55.4
<i>Of which:</i> employees	918	42	51.3

<sup>a</sup> At constant (1993) prices.

<sup>b</sup> Individuals who worked for at least two years in 1993–96.

individuals were employed in the calendar years 1995–96 with all employers is available, as well as the number of jobs they had in each of these years. The database lacks information regarding education, occupation, experience in the labor market, seniority while with the last employer and individual's working hours.

Labor income is defined in this paper as annual taxable income, and includes wages and salaries from all employers, including pay for overtime, paid leave of absence (annual vacation, sickness pay, pay for reserve army duty, maternity leave payments, etc.), as well as business income of the self-employed.

The research focuses mostly on a constant population, in line with similar studies throughout the world. The constant population includes individuals who received a labor income in each of the four years covered. The age of the constant population was limited to between 25 years in 1993 and 54 years in 1996. In some instances, a non-constant population covering individuals from 21 to 65 years who had labor income during part of the period, but not less than two years, was also examined.<sup>3</sup> These include employees who entered or left the labor market permanently or for a long time, such as demobilized soldiers, students who had just completed their studies, women after their marriage and employees who retired, and those who left the labor force temporarily, e.g. the unemployed, or women on maternity leave.

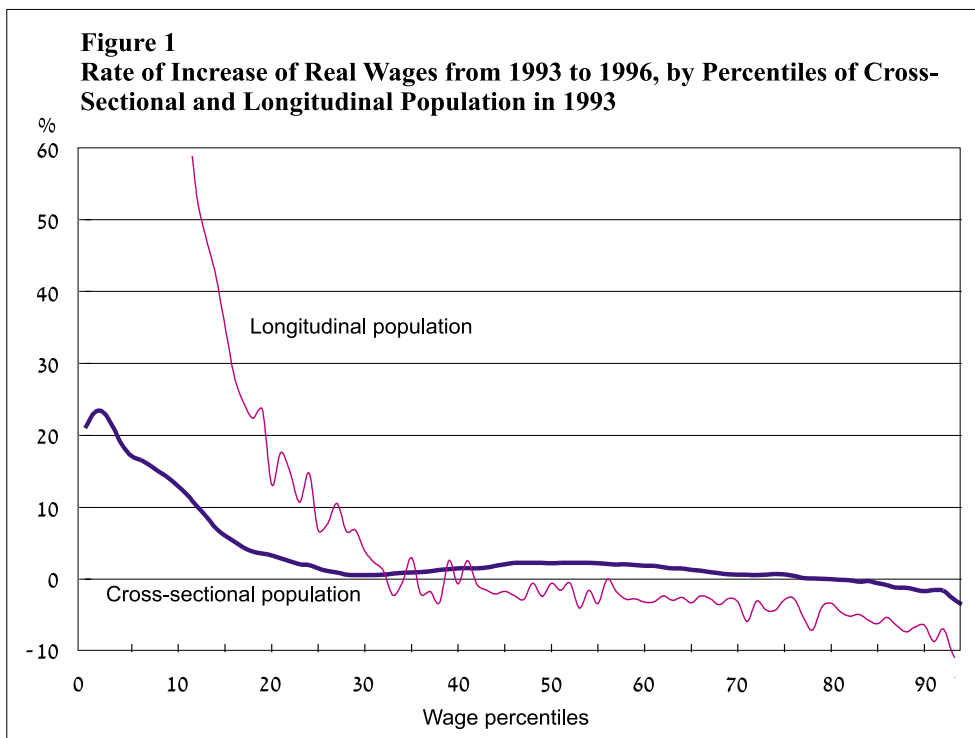
Table 1 shows that, not surprisingly, the labor income of the constant population was higher than that of the non-constant population. Similarly, the labor income of individuals in the main working-age groups was higher than that of individuals of all ages. Only 73 percent of individuals in the 25–54 year age group who had been in the labor market for at least two years had remained in it for four successive years.

#### 4. LABOR INCOME MOBILITY

The decisive effect which income mobility has on income distribution is probably best described by a scissor-movement of wage growth as measured on cross-sectional and longitudinal

<sup>3</sup> As a result of the extension of the age range, the non-constant population includes individuals who could have been included in the constant population if not for the age restriction, for example, those who turned 55 in 1993–95 and continued working.

population (Figure 1). Measurement of changes in income by percentiles of cross-sectional population does not take into account the fact that the population constituting the percentiles is not the same at different points in time. On the other hand, longitudinal measurement of the changes in income looks at individuals found in a given percentile at the beginning of the period and then follows them up throughout the whole period. As can be seen, this measurement shows much higher income mobility than does the cross-sectional one. The ‘mechanics’ of the scissors in Figure 1 is straightforward: in the lower section of the income distribution, the longitudinal population benefited from upward income mobility, while the earnings of the cross-sectional population was relatively stable. In the upper part of the distribution the picture is the opposite, due to downward income mobility of the individuals in the upper percentiles in 1993 whose ranking declined thereafter.



Now we proceed with international comparisons of the extent of income mobility of a constant population. Table 2 shows that based on the correlation coefficient of income ranking, Israel, Germany and the US have similar levels of wage mobility. Note that all three countries experienced relatively high economic activity in the period reviewed.

#### a. Wage mobility by age

*As age rises, there is a gradual decline in wage mobility in Israel.* As Table 2 shows, in the 25–34 age group the correlation coefficient for consecutive years is 0.84, while for the 45–54 group it reaches 0.91. Because our study focuses on the population of wage-earners aged 25–

**Table 2**  
**Correlation Coefficients<sup>a</sup> in Israel, Germany and the US by Length of Period<sup>b</sup>**  
**for a Constant Population in the 25-54 age group**

Population		Length of period (years)				
		1	2	3	4	5
US		0.88	0.82	0.80	0.78	0.74
Germany		0.86	0.81	0.78	0.76	0.72
Israel	Total	0.88	0.82	0.77	–	–
	Age group: 25-34	0.84	0.75	0.68	–	–
	35-44	0.90	0.85	0.80	–	–
	45-54	0.91	0.86	0.83	–	–
	Men	0.90	0.84	0.78	–	–
	Women	0.84	0.76	0.71	–	–
	Veterans	0.89	0.83	0.78	–	–
	Immigrants	0.76	0.63	0.53	–	–
	Business sector	0.89	0.83	0.78	–	–
	Public sector	0.87	0.79	0.74	–	–
	Married	0.90	0.84	0.79	–	–
	Singles	0.82	0.72	0.65	–	–
	Self-employed	0.81	0.72	0.65	–	–

<sup>a</sup> Spearman rank correlation of income from wages.

<sup>b</sup> In Israel, 1993–96; in Germany and the US, 1983–88 (from Burkhauser et al., 1997). The annual correlation coefficient is calculated as the arithmetic average of the coefficients for two consecutive years, with a similar calculation being used for other correlation coefficients.

54, we do not assess the extent of income mobility beyond this age group. Research abroad shows that the relationship between age and income mobility has a U-form with a turning-point in the 50-55 age group. Baudelot (ABM, p. 77) found that up to age 54 the immobility index for men in France in 1970–75 rose, and for women up to age 49. Gittleman and Joyce (1995) found that the mobility in the US in 1990–91 was higher in the lower age groups and 50+ than in the ages between them.

It is quite clear that marked changes in income take place in the early years of participation in the labor market, which are due to changes in the rate of participation and labor productivity, and to a high rate of job mobility, as we will see later. Starting a family creates a deeper commitment to stable employment and income. At pre-retirement ages the opposite process takes place, as some employees opt for part-time work either voluntarily or for medical and other reasons.

### b. Wage mobility by sex

*Wage mobility is lower among men than women.* The difference between the sexes occurs mainly in the lower age groups. In the 25–34 age group the difference in the correlation coefficient of the annual wage was 0.08 in favor of men, declining with age to 0.04 in the 45–54 age group. This result is not surprising, as young women often work in part-time jobs and the extent of their employment is more likely to change. Men, on the other hand, generally

work full-time. Positive proof of this contention is provided by the contraction of the difference in the correlation coefficient in a switch from annual to monthly wages—the difference in the correlation coefficient based on the monthly wage remains constant at 0.02 in favor of men in all age groups. In other words, monthly wage mobility among men is slightly lower than that among women, and the main difference between men's and women's annual wage mobility derives from changes in the extent of women's employment. The fact that the rate of employment of women in the public sector is almost double that of men, and that wage mobility in that sector (in 1993–96 public-sector employees enjoyed a 4.3% real average increase of wages; see below analysis by economy sectors) was higher than in the business sector raises women's wage mobility relative to men's. Women's wage mobility in the business sector is higher than men's, although compared to the above findings the gap has contracted.

In contrast to the situation in Israel, Aaberge et al. (1996) in a study of Scandinavian countries in the 1980s found income mobility of men to be higher, and Joyce and Gittleman (1995, 1996) obtained the same result regarding the US in 1967–92. The latter contend that the explanation lies in the fact that in the US relatively fewer women than men work in blue-collar jobs. Job mobility of blue-collar workers is higher than that of white-collar workers. This assumption was substantiated by a study carried in the UK, where it was found that income mobility of women was lower than that of men, and mobility of white-collar workers was lower than that of blue-collar workers (Department of Employment, in ABM, pp. 68–69). Similar results were obtained regarding mobility in France in 1970–75 (excluding the 20–24 age group) (Baudelot, in ABM, pp. 76–77).

### **c. Wage mobility of the immigrants who arrived in the 1990s**

The mass immigration of Jews from the former Soviet Union to Israel started towards the end of 1989, and amounted to a total of more than 600 thousand immigrants till the end of 1996. Immigrants who arrived in Israel in the 1990s constitute 12.6 percent of employees aged 25–54 in the constant population, according to the data used in this study.

Wage mobility of immigrants is considerably higher than that of the veteran population, and apparently derives from relatively frequent job changes by immigrants, as part of the process of matching jobs to their human capital and climbing the occupational ladder. The average correlation coefficient of immigrants for two years is 0.76, but this masks a rapid process of declining wage mobility with the rise in their time in Israel. The correlation coefficient for 1993–94 was 0.70, and for 1995–96 it was 0.79. The difference between the correlation coefficient of the *monthly* wage of immigrants and veterans shows hardly any reduction, in other words, most of the immigrants in the constant population worked for most of the year.

Wage mobility of male immigrants is only slightly higher than that of female immigrants (0.75 compared to 0.72 for two years).

### **d. Wage mobility by sector**

The findings of the current study contradict the generally accepted assumption that public-sector wages are more stable than those in the private sector due to lower job mobility in the former. In 1993–96 there was great variation between wage agreements which were signed in

the public sector: some were generous, e.g., wage earners in the constant population employed in education obtained a cumulative rise in their real wage of about 46 percent for those four years, while those employed in community and social services settled for an increment of less than 3 percent.

#### e. Wage mobility by marital status

Wage mobility is closely related to marital status. Married workers are less mobile than single (i.e., unmarried, divorced or widowed) workers, as they are more deeply committed to ensuring income stability for the household. Even taking into account the fact that singles are generally younger, differences in wage mobility do not disappear: the correlation coefficient for consecutive years in the 25–34 age group is 0.85 for the married and 0.79 for singles. It may be assumed that a not insignificant part of the wage mobility derives from changes in marital status because they are often accompanied by job changes and changes in the extent of employment.

Table 3 compares wage mobility, measured by the correlation coefficient and the real cumulative rate of change in wages, between 1993, the year prior to a change in marital status (1994), and 1995, the year after the change. The year following the change was chosen because by then all the effects of the change in marital status on wage mobility would have been fully expressed. Two types of change in status were examined: from single<sup>4</sup> (unmarried, divorced or widowed) to married, and vice versa. The control groups consisted of instances where no change in marital status had taken place.

**Table 3**  
**Wage Mobility by Change in Marital Status in 1994**

Marital status in 1993		Single	Single	Married	Married
Marital status in 1994		Single	Married	Married	Single
		Annual wage			
Correlation coefficient <sup>a</sup> 1993–95	Men	0.70	0.60	0.86	0.72
	Women	0.77	0.61	0.76	0.67
Rate of change in wage <sup>b</sup> 1993–95 (percent)	Men	31.9	51.5	16.4	27.7
	Women	21.2	26.2	22.6	25.1
		Monthly wage			
Correlation coefficient <sup>a</sup> 1993–95	Men	0.72	0.60	0.85	0.67
	Women	0.79	0.68	0.81	0.67
Rate of change in wage <sup>b</sup> 1993–95 (percent)	Men	20.5	37.3	10.3	13.9
	Women	17.3	21.5	15.6	12.0

<sup>a</sup> Spearman rank correlation.

<sup>b</sup> Real cumulative rate of change in wage.

The table shows that a change in marital status is followed by increased wage mobility for men and women, in the annual wage as well as in the monthly wage. Marriage has the following effect on wage and job mobility: the rise in the monthly wage of men is greater than that of

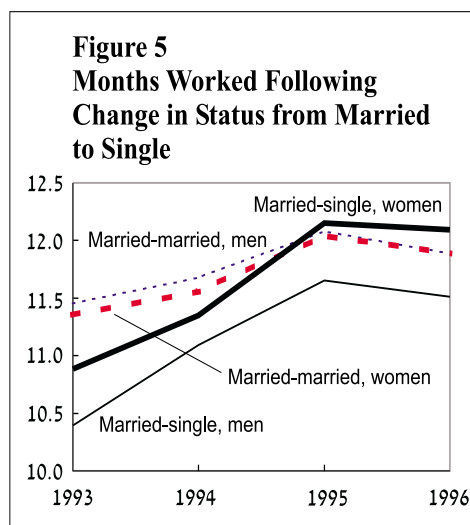
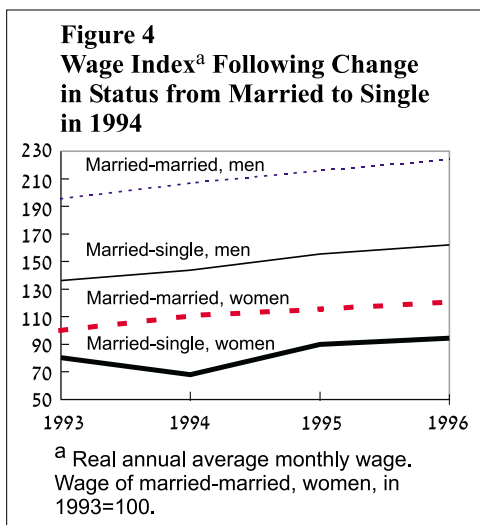
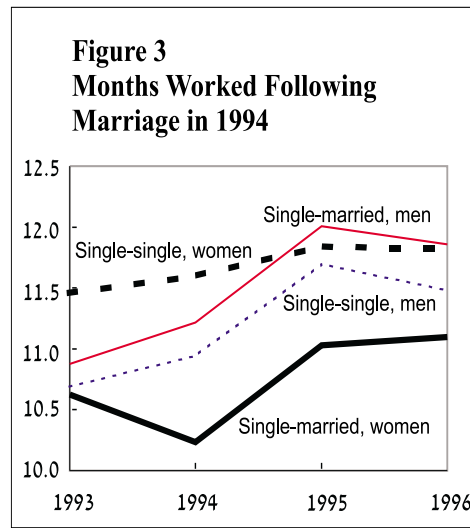
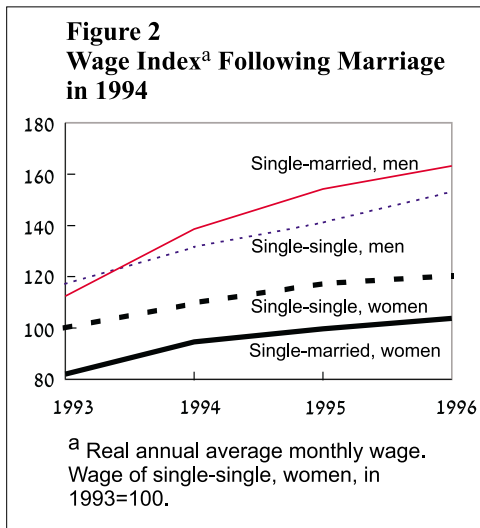
<sup>4</sup> This includes cohabiting individuals, and separated married couples.

<sup>5</sup> In the 25–54 age group in the general population, some four-fifths of marriages which end do so by divorce, and one-fifth are due to the death of a partner.



women, mainly in the year the marriage took place (Figure 2). Whereas the change in the number of months worked in the year by men who married was similar to that of men who remained single, women who married significantly reduced the number of months in which they worked in the year of their marriage, and in the next year the number of work months rose markedly (Figure 3). Hence, following marriage, men's annual wage rose faster than women's, beyond the rise in the wage of singles in the same period. This is also due to men's higher age at marriage than women's, when they have already started moving up the wage scale quickly, which may itself be a factor in the decision to marry. The correlation coefficients (Table 3) also indicate higher wage mobility among those who marry than among singles.

The breakup of a marriage or death of a spouse has the effect of increasing the monthly and yearly wage mobility of men and women (Table 3). In the year of divorce or partner's death<sup>5</sup>



**Table 4**  
**Mobility and Changes in Income Inequality in the US<sup>a</sup> and Israel<sup>b</sup>**

	Age group	Average absolute jump <sup>c</sup>		Gini index of inequality		<i>R(Gini)</i>
		annual average <sup>d</sup>	during period	annual average <sup>d</sup>	whole period	
Israel: Unrestricted	Total	0.80	1.27	0.432	0.412	0.95
Restricted		0.64	1.09	0.375	0.363	0.97
US		0.81	1.32	0.356	0.339	0.95
Israel: Unrestricted	25-34	1.02	1.59	0.397	0.370	0.93
Restricted		0.83	1.40	0.328	0.312	0.95
US		0.90	1.56	0.314	0.294	0.94
Israel: Unrestricted	35-44	0.71	1.15	0.426	0.409	0.96
Restricted		0.59	0.99	0.365	0.355	0.97
US		0.80	1.20	0.340	0.322	0.95
Israel: Unrestricted	45-54	0.62	1.03	0.452	0.437	0.97
Restricted		0.51	0.88	0.398	0.389	0.98
US		0.73	1.01	0.432	0.420	0.97

<sup>a</sup> 1985–89; male heads of households in the 25–54 age group who had positive labor income and not less than 1,000 annual hours of work each year during the period (including hours of unemployment).

<sup>b</sup> Employed, in the constant population in 1993–96. Unrestricted—men and women, with no restriction on the extent of employment; restricted—men who worked for at least six months each year during the period.

<sup>c</sup> In transition matrix of deciles of labor income.

<sup>d</sup> Arithmetic mean.

SOURCE: Arkes (1998).

women's monthly wage falls (Figure 4), and in the following year it rises again, and there is a marked rise in the number of months worked (Figure 5). Men's monthly wage is barely affected by the breakup of marriage or their wife's death, but the number of months in which they work in the year rises. It should be borne in mind that most divorces take place at a relatively young age after only a few years of marriage, and at that age wage mobility is relatively high in any event. If the age at which the marriages end is taken into account, the differences between wage mobility among divorcees and that among those in the same age group who stay married are smaller.

#### **f. Income mobility of the self-employed**

Not surprisingly, labor income mobility of the self-employed is far higher than that of employees (Table 2); the former are more exposed to market forces and the business cycle.

#### **g. International comparison**

As Table 2 shows based on the correlation coefficient of salaried income ranking of the constant population, mobility in the US, Germany and Israel is remarkably similar.

Henceforth we concentrate on income mobility in Israel compared with that in the U.S. (Table 4) and Scandinavian countries (Table 5). Note however that the data of these countries

**Table 5**  
**Index of Labor Income<sup>a</sup> Mobility<sup>b</sup> in Israel, the US and Scandinavian Countries**

	Total Population		Men		Gini index of inequality (Total Population)	
	11 years <sup>c</sup>	5 years <sup>c</sup>	11 years <sup>c</sup>	5 years <sup>c</sup>	11 years <sup>c</sup>	5 years <sup>c</sup>
Israel: Total	–	0.050	–	0.043	–	0.387
Veterans	–	0.046	–	0.041	–	0.383
US: Total	0.109	0.051	0.080	0.055	0.384	0.376
White	0.112	0.059	0.080	0.056	–	–
Denmark	0.080	0.057	0.097	0.063	0.239	0.246
Norway	0.069	0.053	0.090	0.066	0.276	0.294
Sweden	0.073	0.045	0.078	0.045	0.252	0.262

<sup>a</sup> Labor income defined as follows: in Israel—wages and salaries of those in the 25–58 age group in 1993; in the US—wages and salaries and imputed income for self-employed for head of household and spouse; in Denmark—wages and salaries and unemployment benefit; in Norway—wages and salaries, and unemployment and sickness benefits; in Sweden—wages and salaries, unemployment and sickness benefits, maternity grants and pensions from part-time employment.

<sup>b</sup>  $1-R(G)$ , where  $G$  is the Gini index of inequality in income distribution.

<sup>c</sup> 11 years: from 1980 to 1990. 5 years: from 1986 to 1990 for the US and Scandinavia. 4 years: from 1993 to 1996 for Israel. Gini index: annual arithmetic average.

SOURCE: Aaberge et al. (1996).

relate to the second half of the 1980s, so that care must be exercised in drawing conclusions regarding comparability of current income mobility in those countries.

A comparison of annual wage mobility in Israel ('Israel: Unrestricted,' in Table 4) and in the US using the index of the average absolute jump and the immobility index  $R(\text{Gini})$  shows that mobility among men in the 25–54 age group who were employed for most of the year was lower in Israel. The differential rises with age. Inequality of the wage distribution of men in the 25–54 age group is higher in Israel than in the US (see also Dahan, 2002), while in the 45–54 age group inequality is lower in Israel. The authors' view is that inequality is higher in Israel in the 25–44 age groups due to the entry into the labor market of large numbers of new immigrants and young Israelis.<sup>6</sup> In the US entry into the labor market takes place at an earlier age than in Israel, so that those in the 25–34-year cohort are not just starting out in the labor market; this in itself would result in higher inequality in that age group in the US than in Israel, as inequality rises with age and work experience. The 45–54 group contains hardly any new immigrants who were employed in each of the years from 1993 to 1996, and the number of new participants in the labor force from among the veteran population is minimal. These factors help explain the fact that inequality in Israel among the 45–54 group in 1993–96 was lower than that in the US in 1985–89.

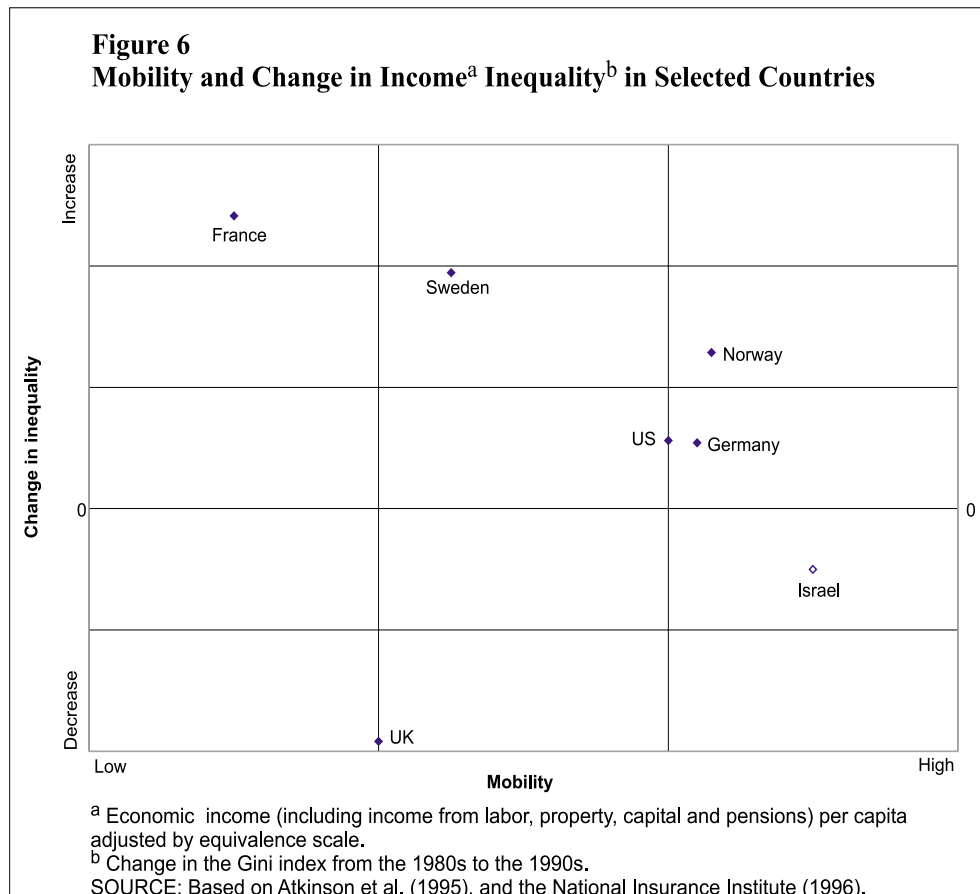
A comparison of mobility and inequality among the entire constant population (men and women employed for any period each year) with those of men employed for most of each year ('Israel: Unrestricted' and 'Israel: Restricted', respectively) shows unsurprisingly that income mobility was higher in the former, i.e., in the population having higher job mobility. The Gini index of wage inequality of the unrestricted constant population was higher in all age groups

<sup>6</sup> Whereas the annual average Gini index for men in the 25–54 age group was 0.375, that of veterans only was 0.370. See also Table 2.

than the comparable index among men employed for most of the year. The table also shows that wage inequality rises with age (at least up to age 55 year). Klinov (1999) found that in 1993–96 the wage differentials between the young and the older in Israel increased as return on labor market experience rose. Dahan (2002) reached the opposite conclusion.

Table 5 shows that wage mobility in the total constant population in Israel is similar to that in the US, lower than in Denmark and Norway and higher than in Sweden. Among men, wage mobility may be slightly lower in Israel, taking into account the fact that mobility in Israel was measured over a four-year period, and in Scandinavia and the US over a five-year period. Inequality in Israel in 1993–96 was much higher than that in Scandinavia, and slightly higher than that in the US. This is consistent with the indices of income inequality as calculated by the National Insurance Institute (1996) based on the Luxembourg Income Study. However, the period reviewed in the Scandinavian countries and the US was the second half of the 1980s, and since then inequality has risen sharply in those countries (Atkinson, 2002), so that the differences between the indices for Israel and the other countries relating to the 1990s are likely to be smaller.

Figure 6 is a rough graphic presentation of the relative positions of indices of mobility and changes in income inequality in selected industrialized countries derived from this section



and from other sources. It can be seen clearly that in general the higher the mobility, the more likely a decrease in inequality. Although inequality of income distribution in Israel is among the highest in industrialized countries, impressively high income mobility in the 1990s has contributed to a reduction in inequality from its level in the 1980s.

## 5. EMPLOYMENT MOBILITY

Wages usually change with job turnover. This section analyzes employment mobility in Israel and compares it to that in the US. The database does not enable job changes to be identified with certainty as it does not relate employees to specific employers, but a change in industry (based on the four-digit classification) will in the first instance serve as an indirect indication of a job change.

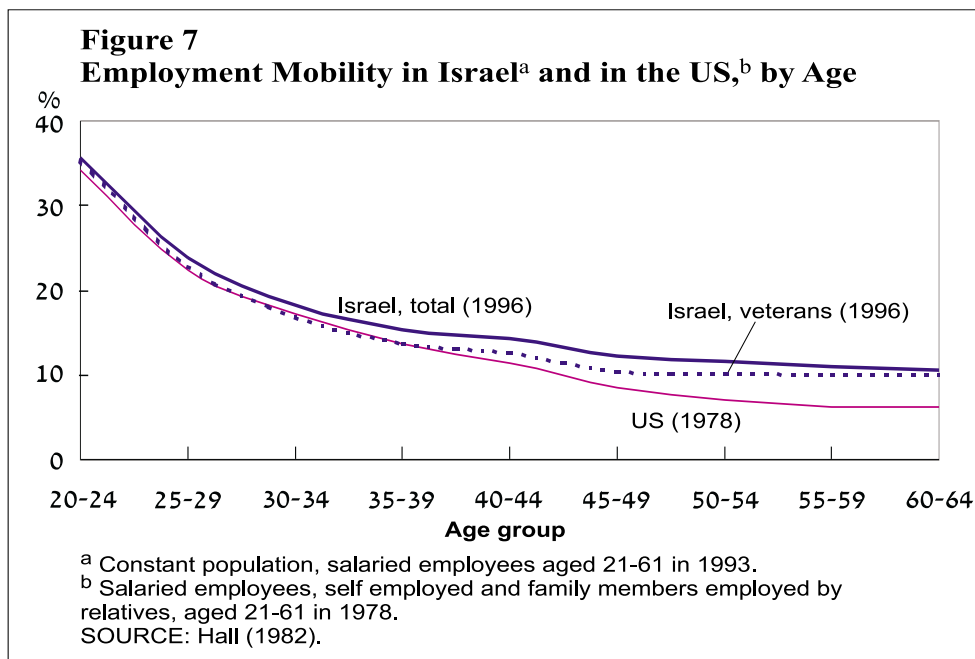
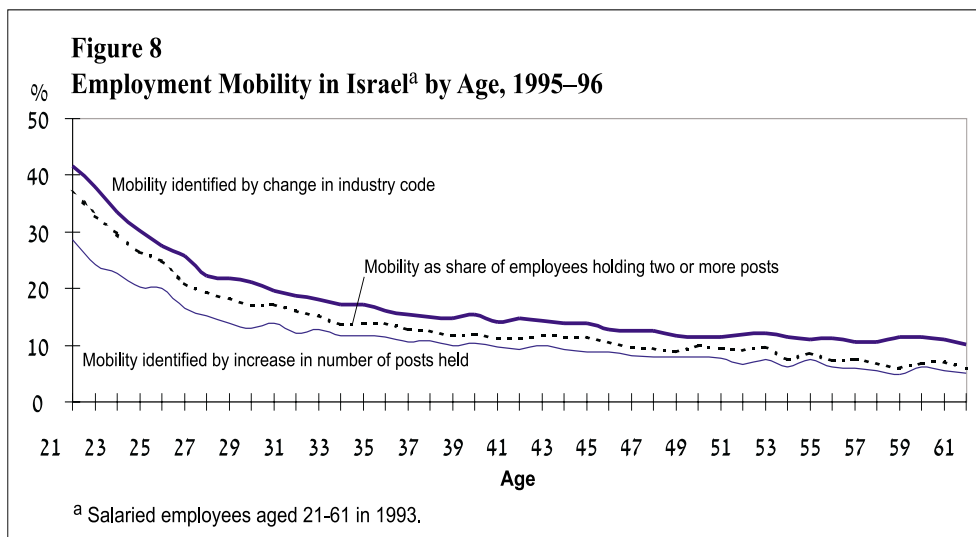


Figure 7 shows that employment mobility falls sharply in the first ten years in the labor market, and declines more slowly thereafter. In the US it was found that some two-thirds of job changes and of the increase in salary in the lifetime of American high-school graduates occur in the first ten years of work, with job changes accounting for about third of the increase in salary in that period (Topel and Ward, 1992). In the 1970s about half of the men and a quarter of the women aged 30 and upwards had kept the same job for more than twenty years (Hall, 1982). Figure 7 also shows that employment mobility is apparently higher in Israel than in the US, and the gap between them rises with age. This finding is surprising bearing in mind that the US labor market is far less regulated than Israel's, the labor unions are weaker, and the concept of lifelong employment guarantee is relatively unknown. Two possible explanations may be considered regarding the difference between employment mobility in the US and that

in Israel. As Figure 7 shows, the employment mobility of new immigrants is higher than that of veterans, but this factor does not close the gap between employment mobility in Israel and the US in the 40+ age group. The remaining difference may be attributed, at least partially, to the fact that employees in certain segments of the labor market in Israel, such as teachers or those in the security services, can take advantage of early-retirement options which enable them to cultivate a second career in their forties; the share of these segments is higher in Israel than in the US.

These explanations notwithstanding, it may be that the gap in employment mobility between Israel and the US is due to measurement errors produced by identification of employment mobility by changes in the 4-digit industry codes. Mobility was therefore measured for 1995–96 by two other methods based on the information about the number of jobs held by salaried employees. Unless an individual changes jobs on January 1 (the beginning of a tax year), any switch from one job to another or change in the number of jobs held concurrently can be traced through a change in the number of reports filed by employers of that same individual to income tax authority. In one method, employment mobility is measured by the increase in number of posts held by an employee from one post in 1995 to two or more posts (either consecutively or concurrently) in 1996. In the other method, employment mobility is measured by the share of employees who held two or more jobs in 1996 provided that the number of months worked in total did not exceed twelve (this restriction reduces the possibility of overlapping jobs). According to both these methods employment mobility declines at a slower rate with the rise in experience in the labor market (Figure 8).

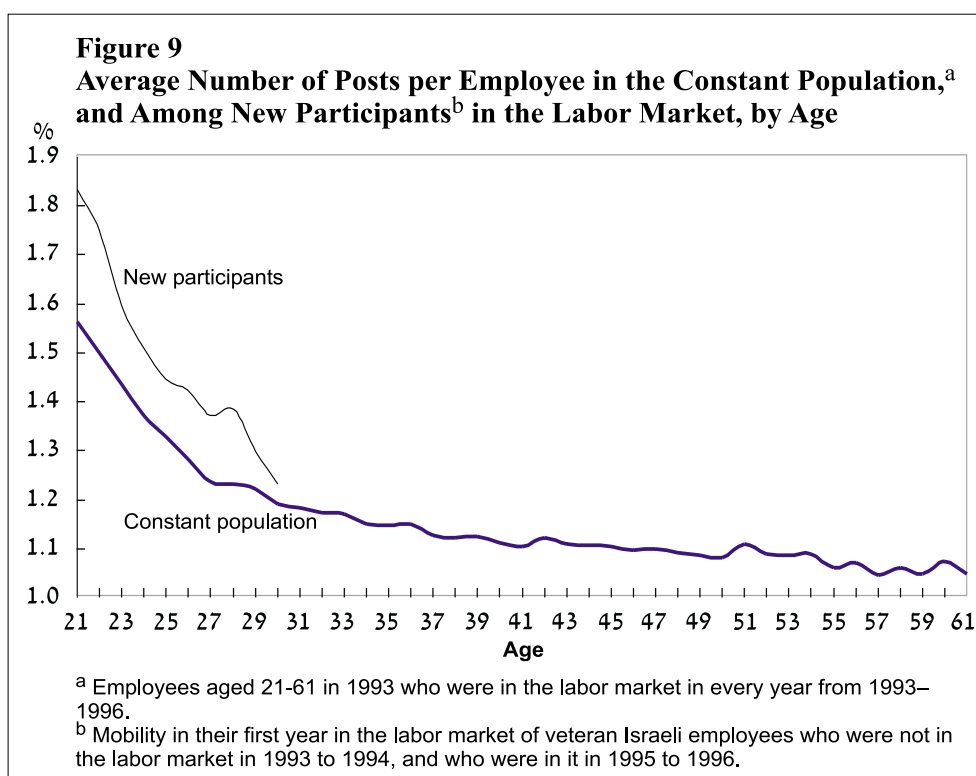


The method of measuring mobility by the change in industry code allows at most one change of job to be identified in a given year. Furthermore, the number of those changing jobs will not include those whose old and new employers are in the same four-digit industry classification. In mobility measured by employees who increased the number of posts from 1995 to 1996, those who changed jobs in 1995 and also in 1996 would not be included. In this method and also in the measurement by the share of those who held two or more posts in

1996, the number of job changers includes those who held two jobs concurrently in 1996, although this deviation is smaller in the latter method due to the restriction to a maximum of twelve months of work in a year. None of the three methods covers employees who changed jobs within the same company, which is quite a widespread occurrence in large companies. Thus it transpires that the measurement by the share of employees who held two or more posts in 1996 estimates employment mobility best, although it almost certainly suffers from a downward bias deriving from the fact that it does not include intra-firm mobility. As the measurement of mobility in the US (Figure 7) also excludes this factor, employment mobility in Israel is assessed at a similar level in both countries in all age groups.

Figure 9 shows the annual changes in the number of posts per employee, which is in fact the mirror image of the rate of employment mobility. Frequent job changes are characteristic of the young who entered the labor market en masse in the first half of the 1990s and who are generally employed in casual nonprofessional jobs, or who are actively seeking employment better suited to their qualifications. The number of marriages among people in their twenties and their productivity is high, and this also contributes to the incidence of employees in this age group working in more than one job in a year.

As expected, new participants in the labor market change jobs more frequently than those with longer work experience. Figure 9 shows that there is an increase in the number of posts occupied by new participants in the labor force in the 27–29 age group. This is not surprising, as this age corresponds to the age at which Israeli students normally graduate from the higher



education institutions.<sup>7</sup> About half of those who received a first degree were in the 25–29 age group, and the median age of first degree recipients was 26.8 years.<sup>8</sup> As almost 17 percent of this cohort obtain first degrees, their mass entry into the labor market in search of a steady job has a notable effect on employment mobility.

## 6. ESCAPING FROM THE LOWEST WAGE GROUP

The chances of escaping from the lowest wage group (the ‘hazard rate’) are inextricably bound up with labor income mobility. In this study low wage earners are defined as those whose wage is in the lowest quintile in the distribution of taxpayers by annual wage. Clearly the choice of a quintile rather than any other percentile group is arbitrary, but the upper bound of the lowest quintile of wage distribution seems to be close to the minimum wage<sup>9</sup> (NIS 1,314 and NIS 1,361 respectively in 1993).

Our study has nothing to say about the chances and dynamics of escape from poverty—an issue that draws significant public interest—because there is very little overlap between the population consisting of the poor, as defined by the National Insurance Institute,<sup>10</sup> and that consisting of low wage earners, and the conclusions attained regarding low wage earners

**Table 6**  
**Share of Employees<sup>a</sup> who Stayed in the Lowest Annual Wage Quintile in Israel, the US and Germany<sup>b</sup>, by Length of Time**

	Population	1 year	2 years	3 years	4 years	5 years
US		75.0	66.4	61.0	58.2	55.4
Germany		78.8	70.2	64.6	59.2	52.6
Israel	Total	66.5	58.9	55.1	–	–
	Age group <sup>c</sup> : 25-34	59.5	51.9	48.5	–	–
	35-44	70.5	64.2	59.1	–	–
	45-54	74.1	68.0	62.9	–	–
	Men	67.2	60.3	56.9	–	–
	Women	64.8	57.4	52.0	–	–
	Veterans	70.0	62.7	58.2	–	–
	Immigrants	48.7	43.5	39.6	–	–

<sup>a</sup> Aged 25–55 years.

<sup>b</sup> In Israel, 1993–96; in the US, 1982–88; in Germany, 1983–88.

SOURCE: Burkhauser et al. (1997).

<sup>7</sup> The delay in purchasing higher education in Israel in comparison to other countries is caused by the mandatory military service (three years for men and two years for women).

<sup>8</sup> *The Higher Education System in Israel: Trends and Developments, 1997 Statistical Report*, The Council for Higher Education, The Planning and Budget Committee (Hebrew).

<sup>9</sup> 45 percent of the median average monthly wage.

<sup>10</sup> The National Insurance Institute defines as poor someone whose disposable income (economic income plus transfer payments minus direct taxes) per capita on the equivalence scale is less than half of the median disposable income of the whole population. In about 70 percent of Israeli households below the poverty line there is no wage earner.



cannot be directly applied to the population of poor. Table 6 shows that the survival rate in the lowest wage group are lower in Israel than in the US or Germany. For example, about 45 percent of those who were in the lowest wage quintile in Israel in 1993 were no longer in that quintile three years later. The comparable figures for the US and Germany were 39 percent and 35 percent respectively. In that period economic activity was at a high level in all three countries, so that the differences cannot be attributed to different step on the business cycle. The difference may be due to the fact that at the beginning of the 1990s many immigrants who had arrived in Israel years earlier joined the labor force, and most of them enjoyed rapid upward wage mobility. New immigrants stand a better chance of escaping from the lowest wage group than veterans due to the process of their human capital adjusting to the labor market in Israel, with their occupations and wages rising rapidly as the time since their arrival increases. Other factors which may explain the difference between the chances of moving up out of the lowest wage group include: the fact that the young constitute a higher share of the labor force in Israel than in the US and Germany, and as will be shown, the young escape from the low wage group more easily. The incidence of single-parent families is low in Israel, at least compared to that in the US, and the wage of single breadwinners generally remains low for a long time.

Women stand a better chance of escaping from the lowest wage group than do men. This finding is apparently contrary to indication of higher poverty rates among households with female heads than in the households with male heads, according to the Poverty Report prepared by the National Insurance Institute. This is explained quite simply: women, heads of single-parent families, etc. are poor because of their low participation rate in the labor force. On the other hand, all the women covered by this study are wage earners, and the fact that they enter the labor market is an indication of their relatively higher earning ability. The econometric analysis (Figure 11) shows that after controlling for a range of personal characteristics, women have a lower hazard rate than men. Another finding of Table 6 is that the hazard rate of the low wage group declines with age.

The hazard rate of the lowest wage group declines the longer one remains in that group. We found that after two years or more in the lowest annual wage quintile, only 23 percent leave it in the following year, and after three years or more, only 18 percent. Of this latter group, some 60 percent move up one quintile, and 25 percent rise two quintiles.

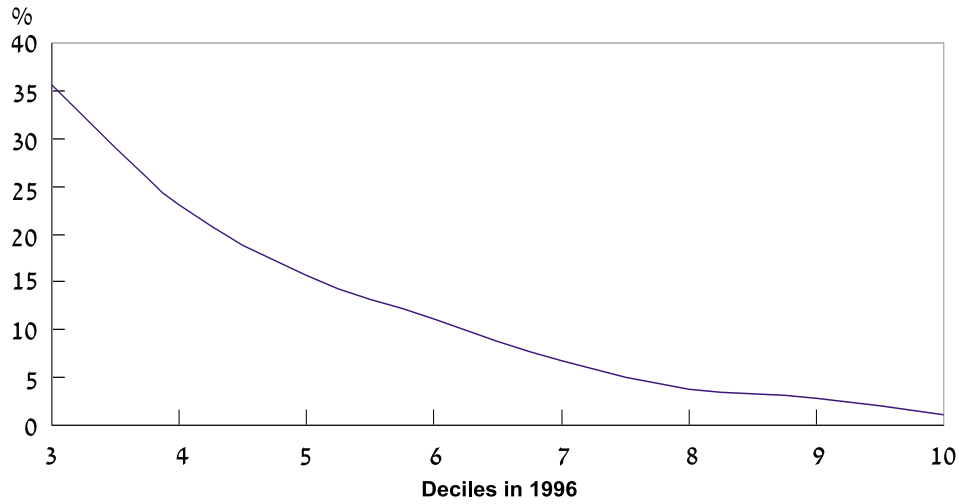
Only 55 percent of those who were in the lowest annual wage quintile in 1993 were still there three years later (Table 7).

**Table 7**  
**Transition Matrix of Employees,<sup>a</sup> by quintiles of Annual Wage, 1993–96**

1993 quintiles	1996 quintiles				
	1	2	3	4	5
1	55.1	26.4	12.0	4.8	1.7
2	26.4	44.7	20.7	6.5	1.7
3	20.9	21.7	45.7	18.7	3.0
4	5.2	5.3	19.0	54.8	5.7
5	2.4	1.9	2.6	15.2	77.9

<sup>a</sup> Aged 25–55 in the non-constant population.

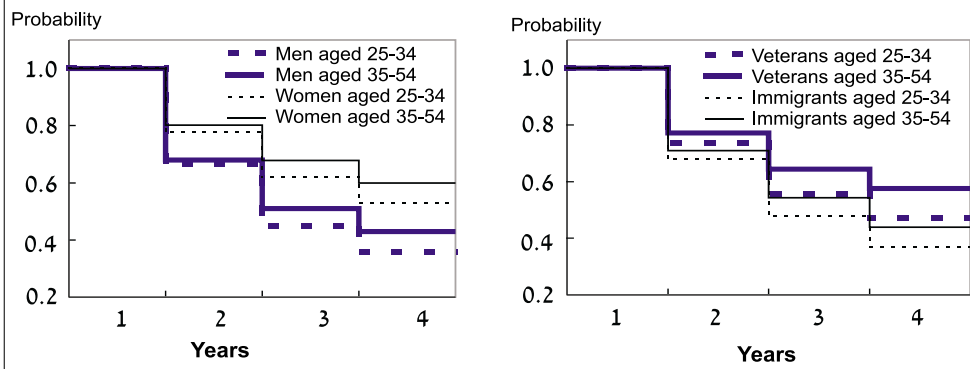
**Figure 10**  
**Distribution of Employees who were in the Lowest Annual Wage Quintile in 1993 and Escaped, by Deciles of Annual Wage in 1996**



Contrary to the commonly held view that an increment of only a few New Israeli Sheqel would rescue many from the bottom of the wage scale,<sup>11</sup> the increases in wages were spread over a wide range, and were not confined to the lower limit of the second quintile (Figure 10).

The chance of escaping from the lowest wage group was also analyzed by means of the estimated survival function in the lowest annual wage quintile by essential personal characteristics. The non-parametric estimates obtained using the Kaplan-Meier method are shown in Figure 11. The figure confirms the findings in Table 6 that older employees, women

**Figure 11**  
**The Survival Function in Lowest Annual Wage Quintile, 1993–96**



<sup>11</sup> In fact, it was a thesis behind the union claim that a minimum wage hike would bring thousands of Israeli households above the poverty line.

and veterans are more likely to remain in the lowest annual wage quintile than younger employees, men and new immigrants. Young women (up to 35 years old) have even lower hazard rates than do men in the 35–54 age group, and immigrants in the older age group have slightly better chances to escape from low wage than the younger group in the veteran population.

The relation between the chances of remaining at a low wage and individuals' personal characteristics was also estimated, as was the length of time spent at the lower end of the income distribution, using parametric regression in two ways. In the first, the function of the time spent in the lowest annual wage quintile in 1996 was estimated (Table 8). As the appropriate distribution function of hazard rates cannot be determined *a priori*, three different functions were studied: the Weibull distribution, a log-normal distribution and a log-logistic distribution. In the Weibull distribution, the hazard rates decline monotonically at a reducing rate the longer

**Table 8**  
**Survival Function and Binary Model of Probability of Remaining in the**  
**Lowest Annual Wage Quintile, from 1995 to 1996<sup>a</sup>**

	Survival function			Binary model (Logit)	
	Weibull	Log-normal	Log-logistic	Model A	Model B
Intercept	0.279 (0.020)	0.179 (0.019)	0.487 (0.021)	1.773 (0.060)	6.126- (0.090)
Monthly income in 1995 <sup>b</sup>	-0.007 (2.4E-4)	-0.027 (1.0E-3)	-0.149 (3.0E-3)	-0.223 (8.9E-3)	0.071 (8.3E-3)
Age	0.013 (4.6E-4)	0.010 (4.3E-4)	0.010 (4.3E-4)	0.036 (0.001)	0.043 (0.002)
Women	0.315 (0.009)	0.245 (0.008)	0.176 (0.008)	0.418 (0.024)	0.262 (0.030)
Immigrants	-0.154 (0.011)	-0.127 (0.010)	-0.143 (0.010)	-0.551 (0.030)	-0.674 (0.039)
Increase in number of posts <sup>c</sup>	0.080 (0.004)	0.064 (0.004)	0.077 (0.004)	0.344 (0.011)	0.464 (0.014)
Increase in number of work months <sup>c</sup>	-0.039 (8.5E-4)	-0.034 (8.6E-4)	-0.037 (8.5E-4)	-0.208 (0.003)	-0.323 (0.004)
Changing industry <sup>c</sup>	0.347 (0.010)	0.325 (0.009)	0.302 (0.009)	0.878 (0.025)	0.842 (0.031)
Married	-0.190 (0.009)	-0.137 (0.009)	-0.120 (0.009)	-0.156 (0.025)	0.140 (0.032)
Number of years in lowest quintile	-	-	-	-	1.912 (0.021)
Scale parameter	0.633 (0.003)	0.729 (0.004)	0.419 (0.002)	-	-
<b>Log likelihood</b>	<b>-38,370</b>	<b>-35,333</b>	<b>-35,136</b>	<b>-22,691</b>	<b>-15,118</b>

<sup>a</sup> Numbers in parentheses are standard errors.

<sup>b</sup> NIS '000.

<sup>c</sup> From 1995 to 1996.

one remains in the lowest wage group; in the other two distributions the probability of escape rises initially, and then declines at an increasing rate. Goodness-of-fit criteria show that the log-logistic distribution provides the best description of the chances of remaining at a low wage.

A Logit model, which relates the probability of the binary outcome—staying in the lowest annual wage quintile in 1996 or leaving it—to an array of personal characteristics and time spent in that quintile, was also estimated.

Estimation shows that the chances to escape from the low wage are lower for older age groups, women, veterans, single individuals and those who change jobs frequently. Obviously, those with a relatively high monthly wage are less likely to remain in the lowest quintile, as are those who increase the number of work months in the year. The effect of switching to a different industry on the chances of staying at a low wage, over and beyond the effect of switching posts, is negative. The results of the estimate of the Logit model excluding the number of years spent in the lowest quintile (model 'A') were similar to those described above. If the low-wage 'tenure' variable is added (model 'B'), the signs of the income variables and marital status are reversed. These changes show that wage earners who remain in the lowest quintile for a relatively long time actually earn a higher wage than those who are in the quintile for a shorter period. The population in question is the extensive one of those earning the minimum wage or slightly above it for many years. They are usually employed full-time and do not change jobs often. Most are married, and hence the change in the sign of the marital status variable.

Our analysis of long-term low wage earners and the chances of escaping from the lowest wage group does not enable us to identify long-term poverty groups such as working-age heads of households with no income, the elderly who have not accumulated sufficient pension rights, and others, nor to identify the causes of such situations. It does however enable us to make several observations. It turns out that low wage earners in Israel remain in that situation for a relatively short time; in other words, their hard core is relatively small. This is apparently due to a dynamic labor market and the successful absorption of many immigrants into the labor market. As wage mobility in general, and that of low wage earners in particular, is high in Israel, the poverty and inequality indicators published annually by the National Insurance Institute seems to overstate the gloominess of the situation.

## 7. SUMMARY AND CONCLUSIONS

This study focuses on describing wage income mobility and employment mobility in Israel in the years 1993–96, and is based on administrative data from the income tax system.

Comparing various wage-mobility indices shows that mobility declines rapidly with age. Women's wage mobility is higher than men's because of higher volatility in the extent of their employment due to marriage, birth, and a partial or complete return to the labor market thereafter. Wage mobility of married workers is lower than that of singles, even when the age effect is taken into account. Wage mobility is higher in the public sector than in the private sector, but it seems that this is due to the generous and differential wage increases granted to employees in the public sector in the first half of the 1990s. Immigrants have high upward

wage mobility deriving from their successful absorption into the labor market with the improvement in their human capital adequacy and their acquiring the necessary local expertise as their stay in Israel lengthens.

Although inequality in the distribution of economic income in Israel is among the highest, if not the highest, in the western world, it has very impressive wage mobility which is no lower than that of such a mobile economy as the US. The significance of this is that society in Israel is not particularly stratified. Due to high wage mobility, marked changes take place in individuals' location along the income distribution, and inequality measured at a point in time suffers from a heavy upward bias compared to dynamic inequality measured over a longer period. A considerable part of the strong wage mobility in Israel may be attributed to the influx of immigrants from the CIS (the former Soviet Union) and their relatively successful absorption in employment.

It is not surprising that employment mobility declines more slowly with age—whereas many new participants in the labor market work on average in two posts in their first working year, only one older employee in ten changes jobs in a year. Around the time of graduation the rate of job changes spurts. Employment mobility of men, married workers and veterans is lower than that of women, single individuals and immigrants, respectively. Employment mobility in Israel in the first half of the 1990s was similar to that in the US at the end of the 1970s.

The analysis of the probability of escaping from the lowest wage group shows that to a large extent earning a low wage is a transient situation: only 55 percent of those who were in the lowest annual wage quintile in 1993 were still there three years later. Those who moved up out of the lowest wage group moved into a wide wage group, and were not merely confined to the narrow wage band close to the upper bound of the lowest quintile. The rate of success in climbing out of the lowest wage group falls as the length of time in the lowest quintile increases: only 18 percent of those who were in the lowest quintile for three or more consecutive years escaped from it in the next year. The hard core of low wage earners includes more older employees, women and veterans. The hazard rate of the lowest labor income group in Israel exceeds that in the US and Germany, and part of this finding is certainly associated with the relatively successful occupational absorption of immigrants and their rapid ascent of the wage scale.

## REFERENCES

- Aaberge, R. et al. (1996). *Income Inequality and Income Mobility in the Scandinavian Countries Compared to the United States*, Statistics Norway, Research Department, Discussion Paper No. 168.
- Arkes, J. (1998). "Trends in Long-Run Versus Cross-Section Earnings Inequality in the 1980s," *Review of Income and Wealth*, Series 44 (2), 199–213.
- Atkinson, A.B. and F. Bourguignon (1992). *Empirical Studies of Earnings Mobility*, Harwood Academic Publishers.
- , F. Bourguignon and C. Morrisson (1988). "Earnings Mobility," *European Economic Review*, Vol. 32 (2/3), 619–632.
- , L. Rainwater, and T.M. Smeeding (1995). *Income Distribution in OECD Countries*, OECD.
- Atkinson, T. (2002). *Income Inequality and the Welfare State in a Global Era*, John F. Kennedy School of Government, Harvard University, (mimeo).
- Burkhauser, R., D. Holtz-Eakin, and S.E. Rhody, (1997). "Labor Earnings Mobility and Inequality in the United States and Germany During the Growth Years of the 1980s," *International Economic Review*, Vol. 38 (4), 775–794.
- Creedy, J. (1979). "The Inequality of Earnings and the Accounting Period," *Scottish Journal of Political Economy*, Vol. 26 (1), 89–96.
- Dahan, M. (2002). "The Rise of Economic Inequality," In Ben-Bassat, A.(ed.), *The Israeli Economy, 1985–1998, from Government Intervention to Market Economics*, MIT Press.
- Gittleman, M. and M. Joyce (1995). "Earnings Mobility in the United States, 1967–91" *Monthly Labor Review*, Vol. 118 (9), 3–13.
- (1996). "Earnings Mobility and Long-Run Inequality: An Analysis Using Matched CPS Data," *Industrial Relations*, Vol. 35 (2), 180–196.
- Hall, R.E. (1982). "The Importance of Lifetime Jobs in the U.S. Economy," *American Economic Review*, Vol. 72 (2), 716–724.
- Klinov, R. (1999). *Changes in the Wage Structure—Inter and Intra Industry Wage Differentials: Israel 1970–1997*, Freidrich Ebert Foundation and The Institute for Economic and Social Research, Discussion Paper No. 4.
- National Insurance Institute, Research and Planning Administration, *Annual Survey 1995/96*, Jerusalem (Hebrew).
- Shorrocks, A. (1978). "Income Inequality and Income Mobility," *Journal of Economic Theory* Vol. 19, 377–393.
- Topel, R.H. and M.P. Word (1992). "Job Mobility and the Careers of Young Men," *Quarterly Journal of Economics*, Vol. 57 (2), 439–479.