

# Wage mobility in Israel: the effect of sectoral concentration

**Ana Rute Cardoso**

IZA, Bonn and University of Minho, Portugal

**Shoshana Neuman\* #**

Bar-Ilan University, Israel

**Adrian Ziderman #**

Bar-Ilan University, Israel

## **Abstract**

Using a unique eight-year data set, merging population census and national insurance data, the paper examines and compares patterns of wage mobility in Israel. First, the public and the private sectors are compared. Second, within each of these sectors, a distinction is made between sub-sector groupings that exhibit a high level of concentration and those that are more diffuse and unregulated. Based on alternative measures of wage mobility, the central finding of the paper is that the extent of wage mobility in a given economic sector is negatively related to the degree of concentration in that sector.

**Keywords:** wage mobility, concentration, economic sectors, Israel

**JEL codes:** J3, J6, L5

Corresponding author: Shoshana Neuman, Email: [neumans@mail.biu.ac.il](mailto:neumans@mail.biu.ac.il)

\* Also associated with the CEPR, London

# Also associated with IZA, Bonn

## **1 Introduction**

The central hypothesis of this paper is that the extent of wage mobility in a given economic sector is related to the degree of concentration and regulation in that sector: the greater the extent of concentration the lower will be the expected level of wage mobility. The relationship between the degree of concentration and labor market regulation on the one hand, and wage mobility on the other, has been examined in earlier studies (a recent example is provided in Cardoso, 2006) but these studies have taken the form of international comparisons of differing types of economies as a whole rather than being located at the sectoral level within a given country. This macro-level analysis may be regarded as problematic because it is influenced by numerous macro-economic variables (such as economic growth, unemployment level and inflation) which may affect mobility patterns. As far as is known, the research reported here is the first of its kind, in analyzing the relationship between wages mobility and the degree of concentration and regulation at the sectoral level.

Using a unique eight-year combined data set (matching Israeli Census data with detailed wages information from the National Insurance Institute), the paper examines patterns of wage mobility in Israel in two differing types of sectors: those that exhibit a high level of concentration and significant regulation and those that are more diffuse and unregulated. Also, this association should be evident in sub-sectors, within both the public and the private sectors: more concentrated and regulated sectors are expected to be associated with lower wages mobility.

## **2 Background**

It has been argued in the literature that more centralized labor markets with stricter regulations should exhibit lower wage mobility (e.g., Gottschalk 1997). This lower wage mobility would be explained partly by more continuous work histories and a lower tendency to change working places. Empirical evidence is scarce. The findings of international comparisons of labour markets, between countries, have not supported this view. Burkhauser et al. (1997) find similar mobility levels in the U.S. and

Germany. Aaberge et. Al. (2002) report lower mobility in the U.S. compared with the Scandinavian countries. The OECD (1997) found similar mobility levels in the U.S. and the U.K. and Cardoso (2006) concludes that the contrasting labour markets in the U.K. and in Portugal are not significantly different in terms of wage mobility.

A potential methodological and statistical problem that underlies these comparative studies is that the countries that have been examined and compared are very different in many macro economic aspects (business cycles, unemployment, growth, inflation and more). These factors, which might well affect wage mobility, have not been considered or controlled for. Unless we control for these differences, it cannot be concluded that stricter regulation does not lead to lower wage mobility.

The present study overcomes this potential problem which might bias the results, by examining different sectors within the same economy over a given time interval. Since all macro effects are held constant, sector-specific institutional effects are responsible for differences in the degree of wage mobility between economic sectors.

While the wide international empirical literature on wage mobility has focused on measuring wage mobility for whole economies and comparisons between countries, the pioneering study of wages mobility in Israel by Romanov and Zussman (2003) did include a sectoral dimension, though this was not its main focus. Using income-tax administrative data for 1993-1996, they examined the differing patterns of wage mobility in a number of directions over this three-year period, including a comparison of wage mobility in the public and private sectors. However, the research did not examine the effect of concentration and regulation on sectoral wage mobility.

Unusually, Romanov and Zussman reported greater wage mobility in the public sector than in the private sector; this contrasts with the generally accepted assumption of greater wage stability in the public sector (for example, this is confirmed for Austrian data in Raferzeder and Winter-Ebmer, 2006). However, there may be a compositional issue here. This is because both the private and the public sector are internally diverse, with each containing contrasting sub-sectors in terms of concentration and regulation. Thus wage mobility will be influenced not only by the public-private sector divide but also by the degree of sub-sectoral

concentration within both the private and the public sectors. In this paper we confirm, with Israeli data, that wage mobility is greater in the private than in the public sector. But when these two sectors are broken down into concentrated and non-concentrated groupings, we observe that for both the public and private sectors, wage mobility in the low concentrated sub-sector grouping substantially exceeds wage mobility in the highly concentrated sub-sector grouping. The level of concentration is a more potent force explaining mobility than is the public – private divide.

### **3 Research objectives**

The aim of the research reported in this paper is to measure and compare patterns of wage mobility for four different sectoral groupings, based on the extent of concentration. The common finding that private sector wage mobility exceeds wage mobility in the public sector is tempered by our working assumption that workers employed in sectors with greater concentration (whether private or public) will experience less wage mobility than those in low concentrated sectors. The private sector low-concentrated sectors include such sub-sectors as computer services and hi-tech; the public low concentrated sector includes public administration. Sectors of high concentration are typified by commercial banking (private) and public monopolies such as water and electricity.

Thus, wages mobility is expected to display the following pattern:

Private sector > public sector

Private sector, low concentration > private sector, high concentration

Public sector, low concentration > public sector, high concentration

Low concentrated public & private sectors > high concentrated public & private sectors

### **4 Data base**

The study is based on a newly compiled, combined database, which provides information on individual labor market histories over a thirteen-year period. Individual

background information from the 1995 Population Census is matched with data on individual work histories from the National Insurance Institute (NII) administrative records; this forms an extensive database covering some 20% of the Israeli population (Neuman and Ziderman, 2003).<sup>1</sup>

The NII compiles information on individuals' annual wages from all employers and on employment start and finish dates for each period of continuous work. The NII data were linked to data on personal characteristics for a sample of individuals from the 1995 Census. The Census of Population is the most comprehensive source of demographic and socio-economic data on the Israeli population. The extended questionnaire, filled out by 20 percent of the population, provides information, for all individuals aged 15 and over, a series of socio-economic variables, including gender, sector of employment and monthly wage. Data from the 20 percent sample were matched with individual work profiles and wages data from the NII, for a period of thirteen years. This new joint data source constitutes a unique longitudinal data set on wages and work histories of a large representative sample of the Israeli population of working age, during the years 1983-1995.

Our data set may be seen as an improvement on that used by Romanov and Zussman in their study of labor income mobility for Israel in 1993-96: it covers many more years and uses non-truncated earnings data (see below). More important, our study employs finer sectoral breakdowns.

While the data set contains data for the time period of 1983-1995, the analysis of wage mobility is restricted to the years 1988-1995. Income data for 1983-1987 is problematic and not compatible with the 1988-1995 period data, for a number of reasons:

- The change in 1987 of the beginning of the calendar year: it was April up to 1987 and then it changed to January subsequently;
- A national minimum wage was introduced in 1987;
- During the first half of the 1980s, inflation in the Israeli economy rose to unprecedented records, with a peak of over 400% in 1984. The stabilization program, introduced in 1985, brought inflation down dramatically to 19.7% in 1986 and to less than 20% in each of the years of our study.

Hyperinflation has macro economic effects on wage structures that are difficult to control for. The time period used in the analysis (1988-1995) is much more homogenous with relatively reasonable inflation rates.

The analysis uses annual wages information from the NII Administrative Records, rather than wages data from the Census. In general, administrative tax data are more reliable than those reported by individuals in surveys; the use of direct administrative data collection in this study ensures that measurement errors are minor. Administrative income tax records are sometimes censored, both at the bottom (individuals who are below the minimum contribution level and do not pay taxes are not registered) and at the top (due to contribution ceilings or confidentiality measures). Obviously, the use of such truncated samples compromises the validity of empirical studies of inequality and mobility. The data set used in our study contains wages for all employees, including workers at the bottom and at the top of the wage distribution. Problems associated with truncated samples are thus avoided.

The NII records include information on annual wages (which is deflated and expressed in 1995 prices). Information on number of hours of work is not available. To overcome this problem, the empirical wage analysis is restricted to a homogenous sample of full-year, full-time workers (in 1995) who had a continuous attachment to the labor market over the time period under discussion. Work history information (Neuman and Ziderman, 2003) facilitated the identification of respondents with a stable, continuous link to the labor market. To justify the use of annual wage earnings (not controlling for hours) we also make the assumption that workers employed full time in 1995 (when we have detailed personal data) had the same work load also in 1988-1994. This is most probably the case for male workers. Because we are less confident that this assumption holds for women, they are not included in the analysis.

Workers may have switched sectors during the period under scrutiny. Since mobility between economic sectors represents an alternative channel for wage mobility, the analysis includes only those workers who have worked continuously over the eight-year period 1988-1995, without even one short work break. It is rare for a worker to move to another sector without a break in employment, so that the

effect of including only continuously employed workers is to wean out of the data set workers who have been mobile between economic sectors over the period.

The analysis is restricted to Jewish individuals between the ages of 32-65 in 1995. The lower age limit is chosen in order to exclude respondents who were under the age of 25 in 1988 and may have been serving in the armed forces. The upper limit is set to include only individuals who have not reached formal retirement age (65 for men, at that time). Immigrants who arrived after 1983 are excluded from the sample, to ensure that all immigrants included in the study had at least five years to learn the language and to adjust to the Israeli labor market.

The remaining sample of 25,713 individuals was assigned to employment in either the public or private sector, based on the Standard Industrial Classification (SIC). After dropping individuals employed in mixed (private-public) SIC industrial categories, the remaining sample of 22,298 males was distributed as follows: 6,341 in the public sector and 15,957 in the private sector.

SIC industries were assigned to one of four sectoral groupings (Private sector, low concentration; Private sector, high concentration; Public sector, low concentration; and Public sector, high concentration), based on the extent of concentration in that sector in 1995. The concentration ratio (CR3) refers to the share in total sectoral sales of the three largest concerns in the sector. Sectors with concentration ratios of less than 25% were defined as of low concentration, while those sectors with concentration ratios in excess of 50% were designated as highly concentrated sectors.<sup>2</sup> Sectors with concentration ratios in the 25-50% range, and those sectors that could not be specified, were excluded from the analysis (11,184 workers).

The final sample, on which the analysis is based, totaled 11,114. These are distributed amongst the four sectoral groupings, as follows:

Private sector, low concentration	4,836
Private sector, high concentration	2,038
Public sector, low concentration	2,963
Public sector, high concentration	1,277

Further details on the sample distribution by SIC classification are provided in Appendix Table1.

## 5 Wage mobility measures

Two measures are employed to measure relative wage mobility, in terms of changes in the position of the workers in the wage distribution over the defined period:

### Mobility matrix (wage quintiles)

The first measure provides a broad indication of such wages movement, reporting the percentage of workers that switched their rank in the wage distribution between the initial and final periods. Partitioning the worker sample into wage quintiles in the two years 1988 and 1995, the wage mobility matrix shows movement of workers between wage quintile categories over the seven year period. The more workers that change rank in the wage distribution (i.e. move to a different quintile), the greater is the extent of wage mobility. Workers who remain in the same quintile in both years (i.e. lie on the matrix diagonal) display no wage mobility. Wage mobility (off the diagonal) may be upward (moving to a higher wage quintile) or downward (moving to a lower wage quintile).

### Spearman Rank Correlation Coefficient ( $S$ )

This is the well-known non-parametric measure of correlation equivalent to the Pearson correlation coefficient but computed on rank position rather than levels of a variable.<sup>3</sup>

$$S = 1 - \frac{6 \sum_{i=1}^N (rank_{it} - rank_{is})^2}{N(N^2 - 1)}$$

Rank<sub>it</sub> and rank<sub>is</sub> are percentile ranks of worker  $i$  in the wage distribution in time period  $t$  and  $s$ , respectively.  $N$  is the total number of workers in the sample.  $S$  is a



measure of wage immobility and ranges between zero (no wage immobility, i.e. maximal wage mobility) and unity (maximum wage immobility, i.e. no wage mobility). We compute alternative measures of  $S$  for  $t$  and  $s$  that are one and four years apart, i.e. wage mobility over one year and four year time periods.

## 6 Findings

### *Wage mobility in the public and private sectors, overall*

We first examine wage mobility in the public and private sectors as a whole. Mobility matrices for wage quintiles are shown in Table 1. More detailed, wage decile, matrices are shown in Appendix Table 2. Both sets of matrices confirm that wage mobility in the private sector exceeds wage mobility in the public sector.

The figures shown on the diagonals (in bold) represent the percentages of workers who are in the same wages quintile in the initial and final year. These diagonal values are consistently higher in the public sector matrix than in the private sector matrix, reflecting greater wage immobility in the public sector (greater wages mobility in the private sector). For example, 49.76 percent of public sector workers in the second wage quintile in 1988, remained in that quintile eight years later, compared with 43.21 percent of workers in the private sector.

Table 1 relates to wage mobility over seven years. The Spearman Rank Correlation Coefficient ( $S$ ) provides a more compact, synthetic measure of wage mobility. In Figure 1 we plot  $S$  coefficients for successive one and four year periods, for both the private and public sectors. Since  $S$  provides a measure of wage immobility, the lower is the curve, the higher is the level of wage mobility. The curves in the upper section of Figure 1, relating to successive one-year mobility periods, intertwine - indicating little difference in measured wage mobility between the two sectors. However, as the time interval over which  $S$  is measured is increased, wage mobility is seen to be greater.<sup>4</sup> For four-year time periods shown in the lower part of the figure wage mobility shown to be very much higher in both sectors;  $S$  ranges from 0.92 to 0.96 for one-year wage

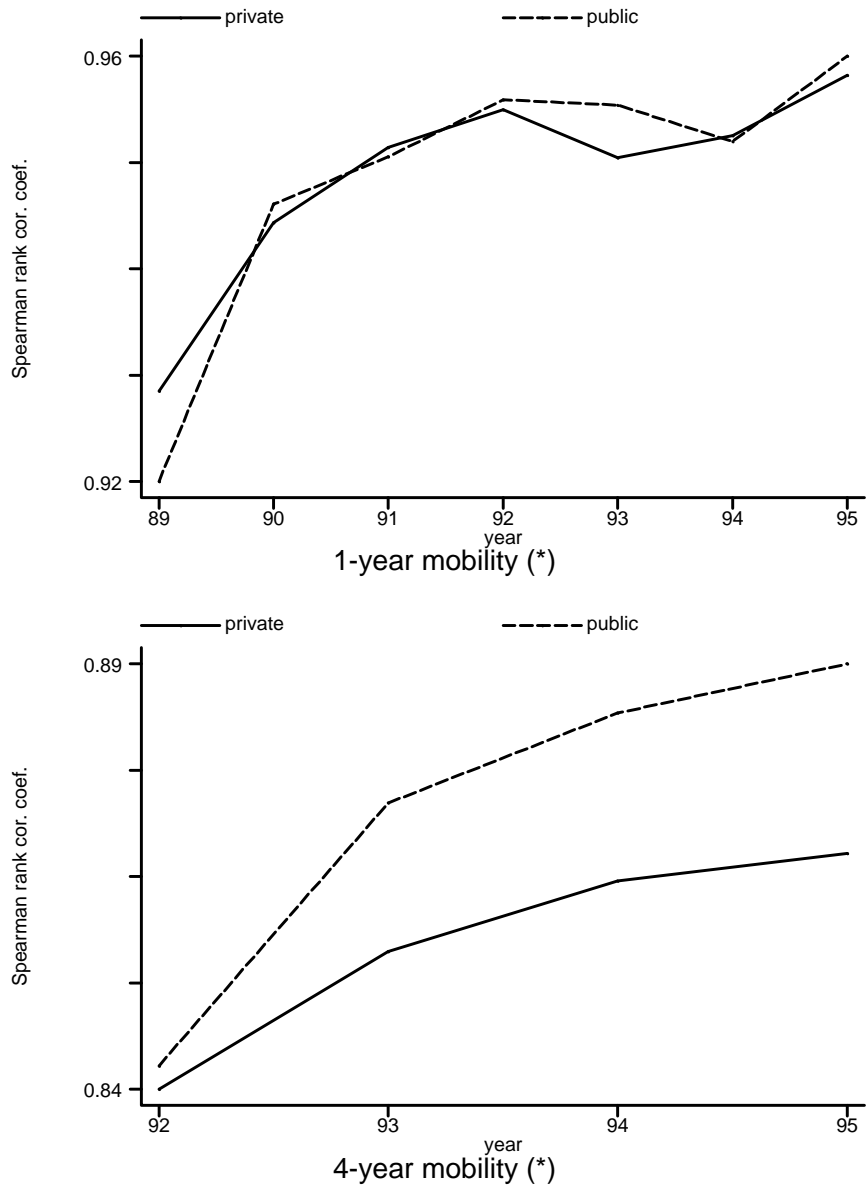
mobility and from 0.84 to 0.89 for four-year wage mobility.<sup>5</sup> More important, private sector wage mobility is substantially in excess of wage mobility in the public sector, confirming results from other wage mobility studies.

**Table 1**  
**Wage mobility matrices**  
**Public versus private sectors, 1988-1995**

<b>Public Sector</b>					
<b>Wage quintile in 1988</b>	<b>Wage quintile in 1995</b>				
	<b>1<sup>st</sup></b>	<b>2<sup>nd</sup></b>	<b>3<sup>rd</sup></b>	<b>4<sup>th</sup></b>	<b>5<sup>th</sup></b>
<b>1<sup>st</sup></b>	<b>67.77</b>	20.17	7.72	1.97	2.36
<b>2<sup>nd</sup></b>	23.26	<b>49.76</b>	21.77	4.10	1.10
<b>3<sup>rd</sup></b>	4.73	24.68	<b>40.69</b>	24.13	5.76
<b>4<sup>th</sup></b>	2.44	3.47	25.00	<b>45.74</b>	23.34
<b>5<sup>th</sup></b>	1.81	1.89	4.81	24.05	<b>67.43</b>

Private Sector					
Wage quintile in 1988	Wage quintile in 1995				
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>
1 <sup>st</sup>	<b>65.41</b>	22.34	7.08	3.1	2.07
2 <sup>nd</sup>	24.37	<b>42.31</b>	22.93	7.8	2.6
3 <sup>rd</sup>	5.92	26.21	<b>38.24</b>	23.07	6.55
4 <sup>th</sup>	2.82	6.71	26.57	<b>41.48</b>	22.09
5 <sup>th</sup>	1.47	2.41	5.2	24.22	<b>66.69</b>

**Figure 1**  
**Earnings (im)mobility (Spearman rank correlation coefficient),**  
**private versus public sectors, Israel, 1988-1995.**



\* The x-axis indicates the end year.

*Wage mobility: the role of sectoral concentration*

Both the public and private are internally diverse; in each case, parts of the sector is highly concentrated while other parts display low concentration. How does concentration affect wages mobility in these sub-sectors?

Wage mobility matrices for 1988-1995, based on decile transitions, are computed for each of the four sub-sectors: Private sector, low concentration; Private sector, high concentration; Public sector, low concentration and Public sector, high concentration. Detailed transition wage matrices are given in Appendix Table 3; the results are summarized in Table 2. For ease of comparison, only the diagonal cells of the decile matrices (representing wages immobility) are presented in the table; the lower are the values of these cells, the greater is wage mobility.

The importance of partitioning the public and private sectors by extent of concentration is apparent from the Table 2 results. For both the private and public sector groupings, wage mobility in the low concentration sub-sector exceeds that in the high concentration sub-sector. This result is consistent for virtually all decile pairs, both public and private (the one exception is the fifth decile in the public sector grouping).

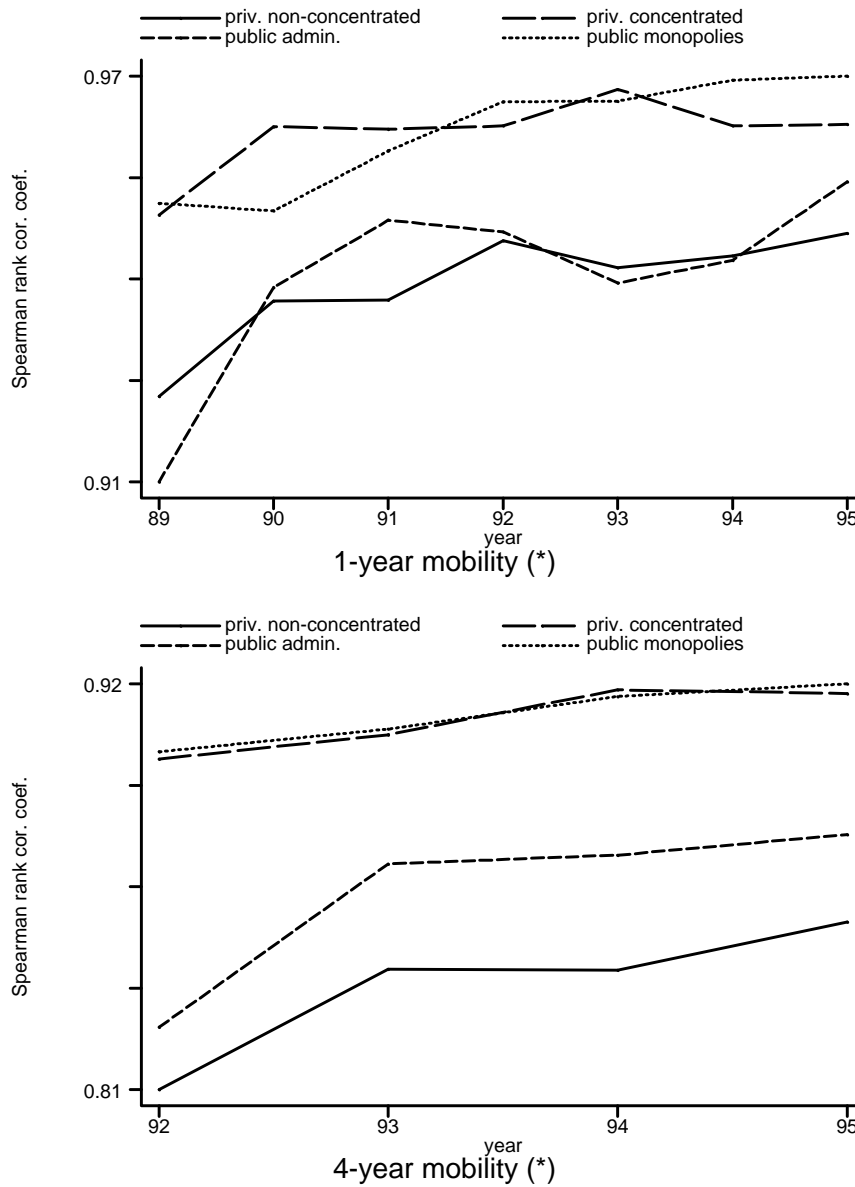
**Table 2****Wage mobility matrices for public and private sector groupings, diagonal cells****Decile transition, 1988-1995**

<b>Percentage of workers in each decile remaining in the same decile</b>	<b>Sectoral Grouping</b>			
	<b>Private</b>		<b>Public</b>	
	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>
	<b>Low concentration</b>	<b>Highly concentrated</b>	<b>Low concentration</b>	<b>Highly concentrated</b>
1 <sup>st</sup> decile	52.7	61.3	53.5	65.6
2 <sup>nd</sup> decile	31.4	37.3	26.4	37.5
3 <sup>rd</sup> decile	22.4	28.4	25.7	29.7
4 <sup>th</sup> decile	21.1	24.0	22.6	25.3
5 <sup>th</sup> decile	16.6	22.7	25.7	18.0
6 <sup>th</sup> decile	16.5	23.9	25.0	29.7
7 <sup>th</sup> decile	19.6	28.1	23.9	24.4
8 <sup>th</sup> decile	24.2	29.9	30.1	37.5
9 <sup>th</sup> decile	33.5	40.2	37.8	48.4
10 <sup>th</sup> decile	54.7	67.0	58.5	73.2

The table also shows that the finding of higher wage mobility in the private than the public sector, noted in the previous section, is generally preserved even after partitioning on the basis of concentration. For low concentration sectors, the value in Column (3) exceeds that in Column (1) for each decile (except for the second decile). Similar results are found for highly concentrated sectors, shown in Columns (4) and (2): exceptions are deciles 5 and 7.

**Figure 2**

**Earnings (im)mobility (Spearman rank correlation coefficient), by sector:  
private high and low concentration, public high and low concentration,  
Israel, 1988-1995.**



\* The x-axis indicates the end year.



These findings are generally consistent with the Spearman rank correlation coefficients, for the four sub-sector groupings, that are plotted in Figure 2.

The upper panel relates to one-year wage mobility. Low-concentrated private and public sub-sectors each display greater earnings mobility than their high-concentration counterpart sub-sectors; this confirms our finding that the level of sub-sectoral concentration plays a central explanatory role in accounting for between sectoral differences in wage mobility. However, little difference is displayed in wage mobility between either of the two low concentration or the high concentration sub-sectors.

*S* curves for four-year periods are plotted in the lower panel of Figure 2. Again, for both the private and the public sectoral divisions, wage mobility is greater in the low-concentration sub-sector than in the high-concentration sector. While high concentration public and private sub-sector curves still coincide (as for the one-year curves), clear differences in the low concentration curves now emerge; wage mobility in the low concentrated private sector grouping is significantly greater than wage mobility in the low concentration public sector. Overall, the effect of sectoral concentration dominates over the public/private sectoral division, in accounting for wage mobility differences.

## References

- Aaberge, R., Bjorklund, A., Jantti, M., Palme, M., Pedersen, P.J., Smith, N. and Wennemo, T., 2002, "Income Inequality and Income Mobility in the Scandinavian Countries Compared to the United States", *Review of Income and Wealth*, Vol.48 (4): 443-469.
- Burkhauser, R.V., Holtz-Eakin, D. and Rhody, S.E., 1997, "Labor Earnings Mobility and Inequality in the United States and Germany During the Growth of the 1980s", *International Economic Review*, Vol.38 (4): 775-794.
- Buschinsky, M., Fields, G.S., Fougere, D. and Kramarz, F., 2003, "Francs or Ranks? Earnings Mobility in France, 1967-1999", London: The Centre for Economic Policy Research, Discussion Paper no. 3937.
- Cardoso, A.R., 2006, "Wage Mobility: Do Institutions Make a Difference", *Labour Economics*, Vol.13: 387-404.
- Conover, W.J., 1999. *Practical Nonparametric Statistics*, Third Edition. New York: John Wiley.
- Dickens, R., 2000, "Caught in a Trap? Wage Mobility in Great Britain: 1975-1994", *Economica*, Vol. 67: 477-497.
- Gottschalk, P., 1997, "Inequality, Income Growth and Mobility: The Basic Facts", *Journal of Economic Perspectives*, Vol. 11 (2): 21-40.
- Neuman, S. and Ziderman, A., 2003, "Work Histories of Israeli Men and Women, 1983-1995", The Pinhas Sapir Center for Development, Tel-Aviv University, Discussion Paper no. 6-2003.
- OECD (Organization for Economic Co-operation and Development), 1997, "Earnings Mobility: Taking a Longer-Run View", *Employment Outlook*, July, Paris, OECD: 27-61.
- Raferzeder, T. and Winter-Ember, R., 2006, "Who is on the Rise in Austria: Wage Mobility and Mobility Risk", *Journal of Economic Inequality*, .
- Romanov, D., and Zussman, N., 2003, "Labor Income Mobility and Employment Mobility in Israel, 1993-1996", *Israel Economic Review*, Vol.1: 81-102.

**Appendix Table 1**  
**Sectoral groupings,**  
**Standard Industrial Classification, 1993 (SIC)**

<b>Low Concentrated</b>		<b>High Concentrated</b>	
<b>Public administration</b> (sample size = 2963)		<b>Public: monopolistic</b> (sample size = 1277 )	
SIC digit	SIC classification	SIC digit	SIC classification
77	Public administration	400	Electricity
		410, 610	Water
		603	Railways
		650	National port and national courier activities
<b>Private: low concentrated</b> (sample size = 4836)		<b>Private: high concentrated</b> (sample size = 2038)	
SIC digit	SIC classification	SIC digit	SIC classification
17	Textiles	13	Other mining and quarrying
18	Outwear (not knitted)	16	Beverages & tobacco
19	Footwear, leather	210	Basic manufacture of paper and cardboard
202	Builders' carpentry		
222	Printing	221	Publishing periodicals
223	Publishing recorded media	243	Pesticides and disinfectants
246	Soap, detergents	353	Building of ships and boats
248	Chemical products n.e.c.	355	Manufacture of aircraft
25	Plastic and rubber products	358	Manufacture of other transport equipment
260-262	Glass, ceramics		
28	Metal products	670	Commercial banks
29	Machinery and equipment		
30	Office machinery and computers		
31	Electric motors		
32	Electronical components		
350-351	Motor vehicles, bodies and parts		
36	Furniture		
38	Jewelry, gold and silver articles		
390-395	Manufacturing n.e.c.		
450-458	Building		
501-502	Motor vehicles sales and repair		
550	Hotels		
550-563, 568	Restaurants, dining services		
633	Travel and tourist agencies		
720-723	Computers		
760-761, 763	Business activities		

## Appendix Table 2

### Mobility matrices, decile transition

#### Private and public sectors, 1988-1995

##### Private

		To decile									
From decile		1	2	3	4	5	6	7	8	9	10
1		55.35	20.10	9.02	4.51	3.07	2.13	1.82	1.44	1.25	1.31
2		22.51	32.85	19.87	11.29	5.96	3.01	1.69	1.25	0.88	0.69
3		9.21	23.43	22.56	19.24	10.59	7.27	3.20	2.51	1.19	0.81
4		4.38	11.71	21.10	21.73	16.78	11.21	6.32	3.57	2.00	1.19
5		2.38	4.89	13.43	20.70	20.51	16.06	11.54	6.21	2.76	1.51
6		1.82	2.76	6.64	11.65	19.80	20.11	16.60	11.78	6.27	2.57
7		1.57	1.94	2.76	5.39	13.85	18.86	21.93	16.98	12.03	4.70
8		0.82	1.32	2.19	3.07	5.45	14.98	20.25	24.45	19.56	7.90
9		0.63	0.44	1.07	1.50	2.13	4.70	13.53	24.56	31.89	19.55
10		1.32	0.56	1.38	0.88	1.88	1.69	3.13	7.21	22.19	59.75

##### Public

		To decile									
From decile		1	2	3	4	5	6	7	8	9	10
1		59.37	17.48	8.19	4.25	2.99	2.36	1.10	0.94	1.57	1.73
2		23.82	34.86	17.51	10.41	6.15	3.94	1.10	0.79	1.10	0.32
3		5.67	25.35	29.61	17.80	10.55	6.77	2.52	0.63	0.63	0.47
4		3.16	12.32	25.12	27.01	16.59	9.64	3.48	1.58	0.95	0.16
5		2.52	4.10	11.20	23.19	24.13	14.35	11.04	5.68	3.00	0.79
6		1.10	1.74	4.26	10.73	19.24	23.66	19.87	11.67	5.52	2.21
7		1.42	1.42	1.74	3.31	11.04	23.19	25.24	17.98	8.99	5.68
8		0.95	1.10	0.63	1.26	5.84	9.94	23.66	24.61	20.82	11.2
9		1.26	0.95	0.16	0.79	1.58	3.47	8.04	28.39	36.44	18.93
10		0.79	0.63	1.58	1.26	1.89	2.68	3.94	7.73	20.98	58.52

**Appendix Table 3**

**Mobility matrices, decile transition**

**Private low and high concentration, and public low and high concentration,**

**1988-1995**

**Private low concentration**

From decile	To decile									
	1	2	3	4	5	6	7	8	9	10
1	52.69	21.49	8.06	5.17	3.31	2.69	2.07	1.86	1.65	1.03
2	21.49	31.40	18.80	11.36	7.02	4.55	2.27	1.45	0.83	0.83
3	8.07	22.15	22.36	16.15	13.46	7.87	4.35	2.90	2.07	0.62
4	5.99	11.16	21.90	21.07	16.12	10.74	6.61	4.13	1.86	0.41
5	4.55	6.83	12.63	17.81	16.56	19.46	11.18	6.83	2.48	1.66
6	1.65	3.51	6.20	13.43	19.42	16.53	18.80	10.95	6.61	2.89
7	1.86	2.27	3.93	7.85	11.98	18.18	19.63	20.25	9.09	4.96
8	1.45	0.83	3.11	2.69	6.83	12.22	19.25	24.22	18.43	10.97
9	1.03	0.21	1.65	2.27	3.51	4.75	11.16	20.04	33.47	21.90
10	1.24	0.21	1.24	2.28	1.66	3.11	4.76	7.25	23.60	54.66

**Private high concentration**

From decile	To decile									
	1	2	3	4	5	6	7	8	9	10
1	61.27	20.10	8.82	3.92	2.45	0.98	1.96	0	0.49	0
2	17.65	37.25	18.14	13.24	6.86	2.94	2.94	0.49	0.49	0
3	10.78	21.08	28.43	16.18	10.78	8.33	3.43	0.49	0.49	0
4	1.47	16.18	22.55	24.02	15.69	12.25	3.92	2.94	0.98	0
5	2.46	2.96	14.78	25.12	22.66	16.75	7.39	5.42	2.46	0
6	1.46	0.49	4.88	10.73	22.93	23.90	19.51	10.73	3.41	1.95
7	1.97	0.49	1.48	5.42	12.81	21.18	28.08	21.18	5.91	1.48
8	0	0.98	0	1.47	4.41	11.76	24.51	29.90	21.08	5.88
9	1.47	0	0.49	0	0.98	1.96	7.35	24.02	40.20	23.53
10	1.48	0.49	0.49	0	0	0	0.99	4.93	24.63	67.00

**Public low concentration**

From decile	To decile									
	1	2	3	4	5	6	7	8	9	10
1	53.54	23.91	6.06	5.39	3.03	3.37	1.68	1.35	0.67	1.01

2	24.66	26.35	24.66	8.45	8.78	3.38	2.36	0.68	0.34	0.34
3	7.43	26.01	25.68	17.91	10.81	6.08	3.72	1.69	0	0.68
4	3.37	11.45	19.19	22.56	17.17	13.13	9.43	2.36	1.35	0
5	3.72	6.42	14.19	22.30	25.68	14.53	7.77	2.70	2.36	0.34
6	1.69	2.70	6.08	12.84	17.23	25.00	15.88	8.78	6.76	3.04
7	1.68	1.01	2.69	6.73	9.76	19.87	23.91	19.53	11.11	3.70
8	1.01	0.34	0.68	1.01	4.39	9.46	23.31	30.07	19.26	10.47
9	1.35	0.34	0	1.01	1.35	2.03	7.09	27.03	37.84	21.96
10	1.69	1.35	0.68	2.03	1.69	3.04	5.07	5.74	20.27	58.45

**Public high concentration**

		To decile									
From decile	1	2	3	4	5	6	7	8	9	10	
1	65.63	21.88	5.47	3.13	0.78	0.78	0	0.78	1.56	0	
2	25.00	37.50	17.97	12.50	3.13	1.56	0.78	1.56	0	0	
3	6.25	30.47	29.69	16.41	9.38	5.47	1.56	0	0	0.78	
4	0	6.30	24.41	25.20	29.13	7.87	5.51	1.57	0	0	
5	1.56	3.13	14.06	24.22	17.97	25.00	9.38	3.13	0.78	0.78	
6	0.78	0	5.47	13.28	17.97	29.69	18.75	7.81	4.69	1.56	
7	0	0	3.15	3.15	14.96	13.39	24.41	23.62	14.96	2.36	
8	0	0	0	1.56	3.91	10.16	25.78	37.50	13.28	7.81	
9	0.78	0	0	0	1.56	3.91	10.94	21.09	48.44	13.28	
10	0	0.79	0	0	1.57	2.36	2.36	3.15	16.54	73.23	

---

## Footnotes

<sup>1</sup> Buchinsky et al., (2003) claim that “for no other country in the world is such information (administrative records) available for a nationally-representative sample of the working population” (page 2). Clearly, they were unaware that such a data set has been available in Israel since 2002.

<sup>2</sup> The assignment of sectors into low and high concentration was based on the various sources. For the private sector, information on CR3 in Manufacturing was provided by the Israel Antitrust Authority; the identification of CR3 for the Banking sector is based on data provided by the Bank of Israel; our general knowledge was used for such sectors as Restaurants, Hotels, Motor Vehicles Sales and Repair, which are composed of many small enterprises. For the public sector, Public Administration, spread through numerous government offices and service centres, is defined as low concentrated; public monopolies that are country-wide, are highly concentrated. Sectors that are ambiguous with regard to level of concentration were excluded from the low-high concentration comparison.

<sup>3</sup> For an explanation of Spearman’s rho, see Conover (1999), p. 314-315

<sup>4</sup> A number of studies have been restricted to one-year wage mobility measures, usually because of (longitudinal) data limitations; the use of such short time horizons are unlikely to produce reliable findings. Two and three year wage mobility graphs are available from the authors

<sup>5</sup> Clearly, *S* curves relating to two and three year time periods lie between the curves plotted in Figure 1.



**Bar-Ilan University**  
**Department of Economics**  
**WORKING PAPERS**

---

- 1-01 **The Optimal Size for a Minority**  
Hillel Rapoport and Avi Weiss, January 2001.
- 2-01 **An Application of a Switching Regimes Regression to the Study of Urban Structure**  
Gershon Alperovich and Joseph Deutsch, January 2001.
- 3-01 **The Kuznets Curve and the Impact of Various Income Sources on the Link Between Inequality and Development**  
Joseph Deutsch and Jacques Silber, February 2001.
- 4-01 **International Asset Allocation: A New Perspective**  
Abraham Lioui and Patrice Poncet, February 2001.
- 5-01 **מודל המועדון והקהילה החרדית**  
יעקב רוזנברג, פברואר 2001.
- 6-01 **Multi-Generation Model of Immigrant Earnings: Theory and Application**  
Gil S. Epstein and Tikva Lecker, February 2001.
- 7-01 **Shattered Rails, Ruined Credit: Financial Fragility and Railroad Operations in the Great Depression**  
Daniel A. Schiffman, February 2001.
- 8-01 **Cooperation and Competition in a Duopoly R&D Market**  
Damiano Bruno Silipo and Avi Weiss, March 2001.
- 9-01 **A Theory of Immigration Amnesties**  
Gil S. Epstein and Avi Weiss, April 2001.
- 10-01 **Dynamic Asset Pricing With Non-Redundant Forwards**  
Abraham Lioui and Patrice Poncet, May 2001.
- 11-01 **Macroeconomic and Labor Market Impact of Russian Immigration in Israel**  
Sarit Cohen and Chang-Tai Hsieh, May 2001.

Electronic versions of the papers are available at  
[http://www.biu.ac.il/soc/ec/wp/working\\_papers.html](http://www.biu.ac.il/soc/ec/wp/working_papers.html)

- 12-01 **Network Topology and the Efficiency of Equilibrium**  
Igal Milchtaich, June 2001.
- 13-01 **General Equilibrium Pricing of Trading Strategy Risk**  
Abraham Lioui and Patrice Poncet, July 2001.
- 14-01 **Social Conformity and Child Labor**  
Shirit Katav-Herz, July 2001.
- 15-01 **Determinants of Railroad Capital Structure, 1830–1885**  
Daniel A. Schiffman, July 2001.
- 16-01 **Political-Legal Institutions and the Railroad Financing Mix, 1885–1929**  
Daniel A. Schiffman, September 2001.
- 17-01 **Macroeconomic Instability, Migration, and the Option Value of Education**  
Eliakim Katz and Hillel Rapoport, October 2001.
- 18-01 **Property Rights, Theft, and Efficiency: The Biblical Waiver of Fines in the Case of Confessed Theft**  
Eliakim Katz and Jacob Rosenberg, November 2001.
- 19-01 **Ethnic Discrimination and the Migration of Skilled Labor**  
Frédéric Docquier and Hillel Rapoport, December 2001.
- 1-02 **Can Vocational Education Improve the Wages of Minorities and Disadvantaged Groups? The Case of Israel**  
Shoshana Neuman and Adrian Ziderman, February 2002.
- 2-02 **What Can the Price Gap between Branded and Private Label Products Tell Us about Markups?**  
Robert Barsky, Mark Bergen, Shantanu Dutta, and Daniel Levy, March 2002.
- 3-02 **Holiday Price Rigidity and Cost of Price Adjustment**  
Daniel Levy, Georg Müller, Shantanu Dutta, and Mark Bergen, March 2002.
- 4-02 **Computation of Completely Mixed Equilibrium Payoffs**  
Igal Milchtaich, March 2002.
- 5-02 **Coordination and Critical Mass in a Network Market – An Experimental Evaluation**  
Amir Etziony and Avi Weiss, March 2002.

- 6-02 **Inviting Competition to Achieve Critical Mass**  
Amir Etziony and Avi Weiss, April 2002.
- 7-02 **Credibility, Pre-Production and Inviting Competition in a Network Market**  
Amir Etziony and Avi Weiss, April 2002.
- 8-02 **Brain Drain and LDCs' Growth: Winners and Losers**  
Michel Beine, Frédéric Docquier, and Hillel Rapoport, April 2002.
- 9-02 **Heterogeneity in Price Rigidity: Evidence from a Case Study Using Micro-Level Data**  
Daniel Levy, Shantanu Dutta, and Mark Bergen, April 2002.
- 10-02 **Price Flexibility in Channels of Distribution: Evidence from Scanner Data**  
Shantanu Dutta, Mark Bergen, and Daniel Levy, April 2002.
- 11-02 **Acquired Cooperation in Finite-Horizon Dynamic Games**  
Igal Milchtaich and Avi Weiss, April 2002.
- 12-02 **Cointegration in Frequency Domain**  
Daniel Levy, May 2002.
- 13-02 **Which Voting Rules Elicit Informative Voting?**  
Ruth Ben-Yashar and Igal Milchtaich, May 2002.
- 14-02 **Fertility, Non-Altruism and Economic Growth: Industrialization in the Nineteenth Century**  
Elise S. Brezis, October 2002.
- 15-02 **Changes in the Recruitment and Education of the Power Elites in Twentieth Century Western Democracies**  
Elise S. Brezis and François Crouzet, November 2002.
- 16-02 **On the Typical Spectral Shape of an Economic Variable**  
Daniel Levy and Hashem Dezhbakhsh, December 2002.
- 17-02 **International Evidence on Output Fluctuation and Shock Persistence**  
Daniel Levy and Hashem Dezhbakhsh, December 2002.
- 1-03 **Topological Conditions for Uniqueness of Equilibrium in Networks**  
Igal Milchtaich, March 2003.
- 2-03 **Is the Feldstein-Horioka Puzzle Really a Puzzle?**  
Daniel Levy, June 2003.

- 3-03 **Growth and Convergence across the US: Evidence from County-Level Data**  
Matthew Higgins, Daniel Levy, and Andrew Young, June 2003.
- 4-03 **Economic Growth and Endogenous Intergenerational Altruism**  
Hillel Rapoport and Jean-Pierre Vidal, June 2003.
- 5-03 **Remittances and Inequality: A Dynamic Migration Model**  
Frédéric Docquier and Hillel Rapoport, June 2003.
- 6-03 **Sigma Convergence Versus Beta Convergence: Evidence from U.S. County-Level Data**  
Andrew T. Young, Matthew J. Higgins, and Daniel Levy, September 2003.
- 7-03 **Managerial and Customer Costs of Price Adjustment: Direct Evidence from Industrial Markets**  
Mark J. Zbaracki, Mark Ritson, Daniel Levy, Shantanu Dutta, and Mark Bergen, September 2003.
- 8-03 **First and Second Best Voting Rules in Committees**  
Ruth Ben-Yashar and Igal Milchtaich, October 2003.
- 9-03 **Shattering the Myth of Costless Price Changes: Emerging Perspectives on Dynamic Pricing**  
Mark Bergen, Shantanu Dutta, Daniel Levy, Mark Ritson, and Mark J. Zbaracki, November 2003.
- 1-04 **Heterogeneity in Convergence Rates and Income Determination across U.S. States: Evidence from County-Level Data**  
Andrew T. Young, Matthew J. Higgins, and Daniel Levy, January 2004.
- 2-04 **"The Real Thing:" Nominal Price Rigidity of the Nickel Coke, 1886-1959**  
Daniel Levy and Andrew T. Young, February 2004.
- 3-04 **Network Effects and the Dynamics of Migration and Inequality: Theory and Evidence from Mexico**  
David McKenzie and Hillel Rapoport, March 2004.
- 4-04 **Migration Selectivity and the Evolution of Spatial Inequality**  
Ravi Kanbur and Hillel Rapoport, March 2004.
- 5-04 **Many Types of Human Capital and Many Roles in U.S. Growth: Evidence from County-Level Educational Attainment Data**  
Andrew T. Young, Daniel Levy and Matthew J. Higgins, March 2004.

- 6-04 **When Little Things Mean a Lot: On the Inefficiency of Item Pricing Laws**  
Mark Bergen, Daniel Levy, Sourav Ray, Paul H. Rubin and Benjamin Zeliger,  
May 2004.
- 7-04 **Comparative Statics of Altruism and Spite**  
Igal Milchtaich, June 2004.
- 8-04 **Asymmetric Price Adjustment in the Small: An Implication of Rational Inattention**  
Daniel Levy, Haipeng (Allan) Chen, Sourav Ray and Mark Bergen, July 2004.
- 1-05 **Private Label Price Rigidity during Holiday Periods**  
Georg Müller, Mark Bergen, Shantanu Dutta and Daniel Levy, March 2005.
- 2-05 **Asymmetric Wholesale Pricing: Theory and Evidence**  
Sourav Ray, Haipeng (Allan) Chen, Mark Bergen and Daniel Levy,  
March 2005.
- 3-05 **Beyond the Cost of Price Adjustment: Investments in Pricing Capital**  
Mark Zbaracki, Mark Bergen, Shantanu Dutta, Daniel Levy and Mark Ritson,  
May 2005.
- 4-05 **Explicit Evidence on an Implicit Contract**  
Andrew T. Young and Daniel Levy, June 2005.
- 5-05 **Popular Perceptions and Political Economy in the Contrived World of Harry Potter**  
Avichai Snir and Daniel Levy, September 2005.
- 6-05 **Growth and Convergence across the US: Evidence from County-Level Data (revised version)**  
Matthew J. Higgins, Daniel Levy, and Andrew T. Young , September 2005.
- 1-06 **Sigma Convergence Versus Beta Convergence: Evidence from U.S. County-Level Data (revised version)**  
Andrew T. Young, Matthew J. Higgins, and Daniel Levy, June 2006.
- 2-06 **Price Rigidity and Flexibility: Recent Theoretical Developments**  
Daniel Levy, September 2006.
- 3-06 **The Anatomy of a Price Cut: Discovering Organizational Sources of the Costs of Price Adjustment**  
Mark J. Zbaracki, Mark Bergen, and Daniel Levy, September 2006.

- 4-06 **Holiday Non-Price Rigidity and Cost of Adjustment**  
Georg Müller, Mark Bergen, Shantanu Dutta, and Daniel Levy.  
September 2006.
- 2008-01 **Weighted Congestion Games With Separable Preferences**  
Igal Milchtaich, October 2008.
- 2008-02 **Federal, State, and Local Governments: Evaluating their Separate Roles in US Growth**  
Andrew T. Young, Daniel Levy, and Matthew J. Higgins, December 2008.
- 2008-03 **Political Profit and the Invention of Modern Currency**  
Dror Goldberg, December 2008.
- 2008-04 **Static Stability in Games**  
Igal Milchtaich, December 2008.
- 2008-05 **Comparative Statics of Altruism and Spite**  
Igal Milchtaich, December 2008.
- 2008-06 **Abortion and Human Capital Accumulation: A Contribution to the Understanding of the Gender Gap in Education**  
Leonid V. Azarnert, December 2008.
- 2008-07 **Involuntary Integration in Public Education, Fertility and Human Capital**  
Leonid V. Azarnert, December 2008.
- 2009-01 **Inter-Ethnic Redistribution and Human Capital Investments**  
Leonid V. Azarnert, January 2009.
- 2009-02 **Group Specific Public Goods, Orchestration of Interest Groups and Free Riding**  
Gil S. Epstein and Yosef Mealem, January 2009.
- 2009-03 **Holiday Price Rigidity and Cost of Price Adjustment**  
Daniel Levy, Haipeng Chen, Georg Müller, Shantanu Dutta, and Mark Bergen,  
February 2009.
- 2009-04 **Legal Tender**  
Dror Goldberg, April 2009.
- 2009-05 **The Tax-Foundation Theory of Fiat Money**  
Dror Goldberg, April 2009.

- 2009-06      **The Inventions and Diffusion of Hyperinflatable Currency**  
Dror Goldberg, April 2009.
- 2009-07      **The Rise and Fall of America's First Bank**  
Dror Goldberg, April 2009.
- 2009-08      **Judicial Independence and the Validity of Controverted Elections**  
Raphaël Franck, April 2009.
- 2009-09      **A General Index of Inherent Risk**  
Adi Schnytzer and Sara Westreich, April 2009.
- 2009-10      **Measuring the Extent of Inside Trading in Horse Betting Markets**  
Adi Schnytzer, Martien Lamers and Vasiliki Makropoulou, April 2009.
- 2009-11      **The Impact of Insider Trading on Forecasting in a Bookmakers' Horse Betting Market**  
Adi Schnytzer, Martien Lamers and Vasiliki Makropoulou, April 2009.
- 2009-12      **Foreign Aid, Fertility and Population Growth: Evidence from Africa**  
Leonid V. Azarnert, April 2009.
- 2009-13      **A Reevaluation of the Role of Family in Immigrants' Labor Market Activity: Evidence from a Comparison of Single and Married Immigrants**  
Sarit Cohen-Goldner, Chemi Gotlibovski and Nava Kahana, May 2009.
- 2009-14      **The Efficient and Fair Approval of "Multiple-Cost-Single-Benefit" Projects Under Unilateral Information**  
Nava Kahana, Yosef Mealem and Shmuel Nitzan, May 2009.
- 2009-15      **Après nous le Déluge: Fertility and the Intensity of Struggle against Immigration**  
Leonid V. Azarnert, June 2009.
- 2009-16      **Is Specialization Desirable in Committee Decision Making?**  
Ruth Ben-Yashar, Winston T.H. Koh and Shmuel Nitzan, June 2009.
- 2009-17      **Framing-Based Choice: A Model of Decision-Making Under Risk**  
Kobi Kriesler and Shmuel Nitzan, June 2009.
- 2009-18      **Demystifying the 'Metric Approach to Social Compromise with the Unanimity Criterion'**  
Shmuel Nitzan, June 2009.

2009-19      **On the Robustness of Brain Gain Estimates**

Michel Beine, Frédéric Docquier and Hillel Rapoport, July 2009.

2009-20      **Wage Mobility in Israel: The Effect of Sectoral Concentration**

Ana Rute Cardoso, Shoshana Neuman and Adrian Ziderman, July 2009.

2009-21      **Intermittent Employment: Work Histories of Israeli Men and Women, 1983–1995**

Shoshana Neuman and Adrian Ziderman, July 2009.