

THE „WAVE APPROACH” IN MIGRATION RESEARCH WAVES OF IMMIGRATION TO ISRAEL, 1974 – 2001

Introduction

Every stream of migration starts, surges, and eventually ebbs. The term „waves of migration is commonly used, and mechanism of migration waves is repeatedly referred in the literature. Faist (2000) describes the formation of a migration wave and shows process behind it. Massey (1988) proposes a cumulative causality approach that depicts the mechanism through which a migration wave develops. It has been noted that migration streams from most European countries in the nineteenth century followed an inverted „U shape (Akerman, 1976; Massey, 1988; Hatton, and Williamson, 1998). This was accounted for the role of demographic factors such as growing impending migrants stock, which was responsible for the upswing of migrations, followed by a weakening of these forces due to a strong convergence of European real wages with those in the New World, causing the migration to fade. It was also observed that rates of out-migration follow a trajectory that moves from low to high to low values, yielding an inverted U-shaped curve which Martin and Taylor (1996) have called the „migration hump. Important efforts to investigate migration waves have been made in order to determine wave-like changes in the rates of emigration (Locher, 2000, 2001, 2002). It is known that during the development of a migration wave, both the volume and the composition of the migration stream undergo noticeable changes. The discovery of regularities in these phenomena may be useful not only in theoretical research but also in the practical forecasting of migration processes. This paper tries to pull attention to some of such regularities checking them on Israeli immigration data. The analysis of other data sets must check and clarify the hypotheses formulated here.

Flows of information play an essential role in the formation of migration streams. Hatton (1995) examined this phenomenon with regard to emigration from the United Kingdom in the nineteenth century. Epstein and Hillman (1998) proposed a model of informational cascades in migration, in which making decisions about migration depends on information flows. Analysis of informational flows at different stages of the migration process indicates some critical steps, interactions, and decision-making from the point of view of individual migrants (Benson-Rea and Rawlinson, 2003). This model aims to explain an increase in migration rates over time. There is an additional aspect of functioning of informational flows in migration formation: the information obtained by would-be migrants might be imperfect. Such „mistaken migrants are frequently found

in the stream of return migration (Borjas and Bratsberg, 1996). In case, when the migration was planned to be permanent, the volume of return migration may serve as an indicator of the quality of information that was available to people at the time of their emigration.

Selectivity in migration – that is, the composition of migration streams – has received considerable attention from researchers. Migrant selectivity is usually understood as an array of migrants’ demographic, economic, social, and other characteristics, which are measured with respect to relevant characteristics of the sending and/or receiving populations. All researchers agree that migration is selective in the sense that every migration stream involves some population groups more than others; Borjas (1999) presents theoretical models of the subject. Numerous studies have been dedicated to discovering regularities in migration selectivity, including classic works on laws of migrations by Ravenstein (Grigg, 1977), on migration differentials (Thomas, 1938), and on migration theory (Lee, 1966). A long list of migration generalizations was provided by Pierson (1973).

Selectivity is frequently studied in the context of differences between migrants and stayers or between migrants and natives of places of destination (Borjas, 1987; Chiswick, 1999; Zavodny, 2001). Numerous studies have used the theory of Roy (1951), to demonstrate that migrants are differed from the native population in non-random ways. Within the framework of this theory, Borjas (1987) studied the skill differentials between immigrants and natives in wage distribution to emphasize that migrants are non-randomly selected from the native population. The composition of the migration flows by skills is determined by individuals’ positions in their home-country wage distribution and the cross-country variance differential. A method frequently used to examine whether immigrants are selected from the high or low levels of a skill is to compare them to natives in the destination country. This method is based on the presumption that there must be a strong positive correlation between the earnings a worker may expect in the home country and the earnings he or she may expect in the destination country. Borjas (1987, 1991) and Cobb-Clark (1993) estimated this for immigrants and natives in the United States, using data from decennial censuses or from the Current Population Survey. Jasso, Rosenzweig, and Smith (2000) used a similar method for legal permanent residents in the USA, using current data from the Immigration and Naturalization Service. Positively selected migrants expected to have greater success in their adjustment in the destination country (Chiswick, 1999). Some studies

have found a positive selection of migrants respective to their former non-migrant compatriots (Bailey, 1993; Borjas, 1987, 1991; Islam and Choudhury, 1990; Hvidt, 1975), while others have found a negative selection (Borjas, 1990; Greenwood et al., 1996; Zavodny, 2001). Similar findings were published concerning the selectivity of migrants in respect to receiving populations. Some studies allow for both sides of the selectivity process: that is, they look at both the sending and the receiving populations (e.g., Feliciano, 2005). There are fewer references in the literature to possible relationships between the development of migration waves and the evolution of migrants' selectivity. Borjas and Bronars (1991) suggest that in the case of sequential family migration, family members who are best suited for migration will be the first to move, with less-suited family members then following.

Migration Waves and Wave-like Pattern of Migrants' Selectivity

The migration stream appears as response to real and/or imagined pull and/or push factors under existing conditions in places of origin and destination, and along routes of migration streams. The migration expands until the region of arrival attains a point of saturation and/or until the pool of prospective out-migrants in the region of departure runs low. When this happens, the migration stream gradually diminishes. This wave-shaped phenomenon is accounted for by negative feedback in the migration process, involving the demand/supply of migrants, information flows, and other factors.

The migrants' composition changes as a wave of migration develops. Seemingly, these changes present certain regularities, which generally speaking may be described as follows. Selectivity of migrants evolves in wave-like manner in which the migrants' characteristics align themselves with the factors of migration. At the initial onset of a migration wave, several definite types of people migrate – alienated persons that are weakly connected with their place of residence, people motivated by *Wanderlust*, ideological migrants, and the like. Next, people who receive information about a place of destination that they consider reliable, from previous migrants or from other sources, begin to migrate. They believe that migration will improve their living conditions in its important aspects. These people conform maximally to the specific type of migration stream, i.e., to the main factors that generate the migration stream. If the main factors attract qualified professionals, their per cent among the migrants will increase; if they attract unskilled workers, this component will increase, and so on. As the migration stream gathers strength, the degree of migrants' conformity to the migration factors rises. In the final phase of the migration wave, the migration stream includes, in greater part, people who for various reasons could not or did not want migrate earlier and do not correspond to the main factors of the migration stream. Now the migrants' conformity to the main factors of the

migration wave becomes low. Thus, the conformity of migrants' characteristics to the generating force of the migration stream is higher near the peak of the migration wave and lower at its beginning and its end. At each stage, migrants who have properties fitting the given stage are selected. At the outskirts of migration wave may be seen deviations from the expected pattern of wave selectivity. It may be explained by interference with a new beginning wave of migration between the same places of origin and destination. During this process, two interrelated waves are emerging: a wave of migration and a corresponding wave of change in migrants' selectivity.

Positively selected migrants originate among owners of higher human and social capital. They will be more represented among the migrants at the peak of the migration wave. Negatively selected migrants are those with lower human and social capital in the place of origin. At the closing stage of the migration wave, there will be more persons with low social capital, those who have difficulties in decision-making due to various reasons – personal, psychological, or social. Thus, we suppose that usually a share of the positively selected migrants grows at the peak of migration wave though they may not constitute a majority. Consequently, defining if the observed set of migrants has been selected positively or negatively depends on the stage of migration wave from which the studied set of the migrants has been drawn; and, therefore, the conclusions about the character of selectivity in the entire migration stream may turn out to be erroneous.

There is a supplementary basis for more positive selection of migrants around the peak of a migration wave. Each population has a socio-demographic core, comprising those people who are maximally integrated from the economic, societal, and demographic points of view. For most populations of the developed countries, the core may be defined as people who are educated, married, and younger or middle-aged. They have higher productive and reproductive potential, and are usually less prone to migrate, due to possible problems with transferability of their human and social capital. The prospective migrants are „heavier”, whether they carry their considerable capital in all its forms with them or are compelled to leave it behind. This „burden” prevents them from leaving the places of origin until the generative and shaping factors of the migration system does not bring them into motion. The „heavier” migrants need more information about transferability of their capital into the place of destination in order to make a migration decision. With amplification of the migration wave, the stream of migration drags more persons out from the socio-demographic core of the sending population; those who would not have migrated with a lower strength of migration. The share of „heavier” migrants is growing. These migrants are stronger than other in the stream, and they can take more places in the migration channel. The „heavier” migrants may not be leading migrants, and they usually constitute a minority in the migration stream.

„Heavier” migrants have more ability to seize a place in the migration channel. They will also usually be strong migrants, so their share in the migration stream is expected to grow with the surge of the migration wave. If there exists a clear selective push/pull factor, the share of responding migrants will grow with a surge of migration. When specific generative factors general demographic pressures do not exist, the responding migrants cannot be detected, but the share of stronger migrants will still be higher at the peak of the wave.

Data

To examine the hypothesis presented above, we use published statistical data on immigration to Israel between 1974 and 2001. Israel provides a good source of data for the research of migration streams, since data in machine-readable form about all legal immigrants has been gathered in several governmental institutions, including the Ministry of Absorption and the Israeli Central Bureau of Statistics, since the late 1960s. We chose a number of migration streams for which the data was maximally complete. Naturally, these were the main migration streams to Israel. The data for immigration from the USSR/FSU (former Soviet Union) was available for the years 1974 – 2001. For other main migration streams, the published data that are needed for the purpose of analysis were available only for the period 1974 – 1991.

We briefly describe the waves of immigration to Israel, and finally present the findings of our study. During the years 1967 – 2001, more than 1.6 million people have immigrated to Israel. We shall consider some of the main streams of Jewish immigration to Israel, referred to in Hebrew as *Aliyah*. These streams differed one from another in their volume, intensity, and composition. Since most of the streams are characterized by a comparatively high proportion of professionals among the immigrants, we will confine our research to such waves. The socio-demographic cores of all sending populations of immigrants to Israel are similar. However, different streams of immigration to Israel differ in their percentage of professionals.

The demand for professionals was important in all periods of immigration to Israel, because human capital is a staple resource in its economy, but the level of this demand has changed during the years under consideration. Flows of highly skilled migrants are driven largely by industry and market requirements (Iredale, 2001). Immigration to Israel resulted not only from such requirements, but also by strong push factors, which brought the mass exodus from the USSR/FSU. Israeli researchers regard the immigration to Israel as mass migration of skilled workers (Paltiel, 2001). In typology of skilled migrations by migrants' motivation (Iredale, 2001), Jewish immigration to Israel may be qualified as „ethical emigration”, which falls somewhere between „forced emigration” and „brain drain”, depending on the country of origin.

Immigration from USA

The Jewish population of the USA through the years under consideration stood at about 5.5 million. Jews in the USA are an ethnic group that is highly integrated into American society (Steinlight, 2004). The total number of American immigrants who arrived in Israel between 1974 and 1991 was 42,016. This volume is lower than that from the Soviet Union, but higher than that from France, the United Kingdom, or any single Latin American country, including Argentina. Taking into account the size of American Jewish population, the number of immigrants looks rather low. The propensity to move to Israel from the USA is based on Zionist idealism, the development of education programs in Israel, and the maturation of a generation of graduates of Jewish day schools and other intensive Jewish learning programs in the United States (Rebhun and Waxman, 2000; Waxman, 1989). The increase in the number of American immigrants occurred when the total volume of immigration to Israel had slowed down, thus producing significant growth in their relative share of the total *Aliyah*. This was a consequence of Israeli immigration policy, which slowed immigration from secure countries at times when immigration from distressed regions was possible. This policy is a major cause of the origin of the waves of immigration from the USA. Despite sharp fluctuations from the mid-1970s to the 1990s in the annual number of American immigrants, the overall pattern is one of decline, from almost 3,000 per year in 1974 – 1979 to an average of just over 2,000 in the following decade. The decline in the volume of American immigrants in the 1980s was modest in comparison to the trends of the total *Aliyah*. These differences strengthened both the proportion of Americans among all immigrants (with an unparalleled value of 20.7 per cent of total immigrants in 1986) and their influence on the Jewish population growth. The growth in the volume of the *Aliyah* from the USA may result from the decrease of the *Aliyah* from other places of origin.

Immigration from Argentina

In 1982, there were about 230,000 Jews in Argentina (Schmelz and DellaPergola, 1985). The population presented the modern demographic patterns characteristic of more developed regions of the world. Financially, Argentinean Jews belonged to the middle or upper class. Argentinean Jewry does not suffer from anti-Semitism or other forms of ethnic discrimination. Sum excesses, however, had place in some years during the 1970s and 1980s. In the 1970s, Argentina was ruled by a military dictatorship responsible for the disappearance of innumerable Argentinean citizens, including many Jews. After the Junta seized the power in 1976, the wave of immigration to Israel surged, but it gradually faded by 1981. Argentinean Jews were involved in a struggle against the Junta, and about 15 – 20 per cent of guerrilla fighters killed in the early stages of the „dirty war” were Jewish.

In 1982, Argentina was defeated in the war with the United Kingdom over the Falkland Islands (Malvinas), and this forced the collapse of the Junta and led to calls in favour of free elections to re-establish a legally constituted civilian government. Economically, 1982 was hard for Latin America, and it resulted in a new wave of immigration to Israel. The next wave was connected to worsening economic conditions in Argentina. In an effort to improve Argentina's public image, marked as it was by anti-Semitism and the presence in the country of Nazi criminals, in 1988 the parliament passed a law against racism and anti-Semitism. The Jewish collectives were highly assimilated from their beginning in Latin America. Jewish communities were shrinking at the rate of about one per cent a year (Schmelz et al., 1985). Religion did not play an important role in the life of highly secularized Latin American Jewry (Elkin, 1985). In the absence of a religious nucleus in the communities, Zionism took its place as an organizing ideology. In the period considered, 23,902 immigrants from Argentina came to Israel. On average, about 1,000 people moved to Israel from Argentina each year, a stream of rather high migration intensity relative to the size of the Jewish population. The intensity of immigration to Israel was highest for Argentina, apart from the almost total exodus of Soviet Jewry.

Immigration from France

In the early 1980s, the Jewish community in France comprised approximately 535,000 people (Benbassa, 1999). The majority of the community, approximately 350,000 people, lived in Paris and the surrounding areas. In the 1980s, 45% of French Jews held university degrees, 25% had secondary education, and 12% had technical or commercial training. The majority of Jews belonged to the middle class, with a high proportion (about 30%) of salaried employees, tradespeople, and shopkeepers.

During the period under consideration in this paper (1974 – 1991), 22,976 Jews immigrated from France to Israel. Immigration to Israel was relatively attractive to French Jews, only immediately after the Six Day War. However, some young French Jews were deeply involved in the student unrest of May 1968 (Benbassa, 1999). The interest in Aliyah weakened during the 1970s and 1980s as it was found in the surveys of the Jewish population (Allouche-Benayoun, 1992). Only in 1983 did the number of immigrants to Israel exceed 2,000. As in the case of American Jewry, the increase of the number of immigrants from France may be an outcome of the decline of Aliyah from other countries.

Immigration from USSR/FSU

Emigration from the USSR became possible in the 1960s, was strengthened in the 1970s, then factually being seized by the Soviet authorities in the eighties and eventually at the end of the decade was transformed into a mass exodus, mainly to Israel. Emigration of Jews was allowed after the Six-Day War in September 1968.

Between 1968 and 1983, more than 250,000 Jews left the Soviet Union, about two-thirds of them for Israel. The emigration started from the periphery of the Soviet Union; diffused to its core; and eventually, in the 1990s, ended up as an almost total exodus of the Jewish population, including many non-Jewish relatives of Jews. The year 1976 saw the lowest number of emigrants from the USSR in the 1970s. The following year, a wave of immigration started, which was dramatically reduced in 1980 by the Soviet authorities. Emigration from the USSR increased again only in 1987.

Between 1989 and 2001, about a million people from the Soviet Union and the former Soviet Union (FSU) immigrated to Israel. More than one migration wave developed during the 1990s. For research purposes, the entire period can be divided into sub-periods that were differentiated by the waves of immigration in these years. The sub-periods are distinct in terms of migrants' characteristics. The first sub-period peaked in 1990, when Jewish immigration attained a record level. The next sub-period included 1994, when immigration increased insignificantly relative to 1993. The resulting weak wave was caused, among other things, by the passage of a new emigration law in Russia, the war in Chechnya, and a government crisis in Russia in September 1993. The last sub-period witnessed a strong wave of immigration that crested in 1999, as migration decisions made in the previous year were implemented and as Russia, along with several post-Soviet countries with strong economic ties to Russia, endured a year of financial crisis.

Coefficient of Wave Similarity (CWS)

In recent years, a progress has been made in methods of comparing time series (Hetland, 2004). These approaches are based on rather complex mathematical methods and, as a rule, require lengthy series of data. Such series rarely exist in the context of migration processes. This may be due to the nature of migration processes, since the time-span of these processes includes independent or weakly dependent migration streams, each of which has to be examined in isolation from the others.

We need to compare short segments of paired time series, at times numbering only three consequent members in each of them, and to check if the expected behavior of migration selectivity will be found in a majority of cases. For this aim, we propose to use a simple coefficient of wave similarity, which is described below.

In cases where one wishes to estimate the similarity of sequences, a coefficient that is analogous to coefficients used for the comparison of the similarity of binary series is appropriate. In its simple form, such a coefficient calculates the number of coincidences between respective values in two binary sequences. In the following table, two columns with six members per column are presented, and the number of concurrences in values is three. Thus, the coefficient of similarity of the sequences is 0.5.

1	1
0	1
0	0
1	1
1	0
0	1

When comparing different waves of migration over time, and when comparing changes in different characteristics of one migration wave, the time aspect is very important. This aspect is lacking in the coefficient described above. Therefore, this study suggests the use of a coefficient of wave similarity (CWS) for time sequences that takes into account the time aspect of the development of a migration wave.

The number of characteristics of a migration process is measured, and the values of each characteristic are recorded at the same time. One of the time sequences is assumed to be the main wave; the others are the waves of its characteristics. The wave to be considered is selected in the main time series. For the same period, a time series for the describing characteristic is selected, and the following calculations are made: If the value in two consecutive values of the sequence is larger than the previous value, the calculated parameter is assigned the value of '1'; and if it is smaller than the previous value, the parameter is assigned the value of '0'. Zero change is considered a positive change. This elicits two new sequences that are composed of ones and zeroes. For these sequences, one additional auxiliary parameter is calculated in the following way: if the corresponding members of both sequences have identical values, the parameter is assigned the value of '1'; and if the values are different, then the parameter is assigned the value of '-1'. The results obtained are added up, and the sum is divided by the length of the sequences. The result of this operation is called the **Coefficient of Wave Similarity (CWS)**. The CWS will be equal to '1' in the case of full phase coincidence of waves, and '-1' in the case of total anti-phase. Values close to zero signal a lack of coincidence between the main wave and the wave of characteristics change.

Coefficient of wave similarity is computed by formula:

$$CWS = \frac{(n - k) - k}{n};$$

where n is a length of considered sequence, and k is a number of discrepancies between the two waves.

$$k = \frac{n(1 - CWS)}{2};$$

per cent of concordances (p) having CWS known, is calculated as:

$$p = \frac{(CWS + 1) * 100}{2}$$

Any positive value of CWS means that more than half the pairs in the two series were concordant, and that the waves are similar during more than fifty percent of the time of their development.

The CWS allows us to compare the similarity of waves irrespective of their amplitude. This is both a shortcoming and an advantage of the method. The CWS method, however, has several limitations. The CWS value depends on the number of members in the sequences, as well as on parity in the number of members of even and odd sequences. The factor may be zero only in a case where the length of the sequence is expressed by an even number. The factor quickly decreases commensurate with the number of discrepancies between values of the series, so that a value close to 0.3 signifies about 60 percent agreement between the examined waves. Despite these limitations, CWS may be a convenient tool for the analysis of migration processes. We here apply it to the analysis of immigration to Israel.

Index of Migrants' Composition

In order to evaluate migrants' selectivity, it is necessary to define a measure for this phenomenon. For this purpose, we use the Index of Migrants' Composition. The definition of the index should be specific for each migration stream depending on its generative and shaping factors. We define here this index in such a way that it can be used for testing our proposition on available data. Therefore, the index must reflect the belonging of the migrants to the socio-demographic core of the sending population. For the majority of migration streams, we can say that selectivity of migrants is more positive when the percentage of persons aged 60 and over is low and a share of high-skilled migrants is higher. Jewish migrations are still usually family migrations so we take into account this aspect of migrants' composition. Accordingly, we define the Index of Migrants' Composition as a product of the percentage of academic and professional workers among migrants who worked before the migration; the percentages of married women and of married men among migrants aged 15 and older, divided by the percentage of migrants aged sixty and older. (The data is presented in Supplement 1. Tables I – IV.) The index is computed for a specified time interval; in our case, a calendar year.

$$IMC = \frac{P * M_M * M_F}{A_{60+}}$$

(In order to get the values of IMC in the range between zero and one as they reported in the supplement, the result of calculation must be divided by 100*100.)

Where IMC – Index of Migrants' Composition,

P – the percentage of academic and professional workers among migrants who worked before the migration;

M_F – the percentages of married women among migrants aged 15 and older,

Supplement 1.

Table 1

Immigration to Israel from USSR/FSU

Immigration to Israel from USSR/FSU						
Year	Total of Aliyah	The percentage of academic and professional workers among migrants who worked before the migration	Percent of persons aged 60+	Percent of Married Men	Percent of Married Women	Index of Migrants' Composition
1974	16816	23.4	15.0	68.5	60.9	0.65
1975	8531	25.9	17.1	65.8	56.4	0.56
1976	7279	26.3	18.9	67.0	56.3	0.53
1977	8348	28.0	19.7	70.7	56.9	0.57
1978	12192	28.4	18.2	70.9	53.9	0.60
1979	17614	28.1	18.0	73.1	60.8	0.69
1980	7570	28.9	21.9	72.7	60.5	0.58
1981	1770	40.0	26.2	63.7	53.3	0.52
1982	782	40.9	27.0	63.5	46.8	0.45
1983	399	45.3	24.5	66.2	51.5	0.63
1984	367	40.9	25.6	62.1	45.9	0.46
1985	362	44.3	19.3	64.7	45.7	0.68
1986	202	32.9	31.2	59.4	39.4	0.25
1987	2096	42.5	21.0	62.3	54.7	0.69
1988	2283	42.8	21.0	64.7	59.1	0.78
1989	12932	38.9	17.2	72.7	62.0	1.02
1990	185227	39.1	17.7	75.5	64.0	1.07
1991	147839	35.5	19.3	70.1	58.6	0.76
1992	65093	32.1	20.1	64.2	55.1	0.56
1993	66145	26.4	19.9	63.9	52.7	0.45
1994	68079	28.0	20.0	63.2	54.2	0.59
1995	64847	25.7	19.0	63.7	51.8	0.45
1996	59049	27.1	18.3	63.5	52.3	0.49
1997	54618	26.7	16.5	63.3	53.1	0.54
1998	46032	26.0	16.3	64.6	53.6	0.55
1999	66848	27.3	16.2	67.2	55.7	0.63
2000	50817	27.0	16.6	64.9	54.4	0.57
2001	33549	26.0	15.4	63.7	53.6	0.58

Table II

Immigration to Israel from USA

Immigration to Israel from USA						
Year	Total of Aliyah	The percentage of academic and professional workers among migrants who worked before the migration				
		Percent of persons aged 60+	Percent of Married Men	Percent of Married Women	Index of Migrants' Composition	
1974	3089	23.1	11.0	48.6	45.2	0.46
1975	2803	18.0	9.1	43.5	43.1	0.37
1976	2700	19.3	9.3	47.0	46.2	0.45
1977	2571	18.2	11.0	47.0	44.6	0.35
1978	2921	20.7	10.1	49.0	48.1	0.48
1979	2950	16.5	9.2	39.7	49.3	0.35
1980	2312	19.5	8.5	50.7	51.7	0.60
1981	2384	19.7	9.1	41.0	46.0	0.41
1982	2693	25.1	9.1	51.5	52.1	0.74
1983	3469	31.0	9.0	55.6	51.9	0.99
1984	2581	33.3	14.4	55.3	53.7	0.69
1985	1915	29.4	13.1	52.3	57.2	0.67
1986	1968	32.8	9.0	55.5	59.8	1.21
1987	1818	17.3	12.7	54.1	56.9	0.42
1988	1551	16.5	10.4	50.6	49.3	0.40
1989	1383	22.0	11.6	49.1	47.1	0.54
1990	1370	25.9	9.5	50.4	49.9	0.69
1991	1538	29.4	8.7	51.9	53.3	0.93

M_M - the percentages of married men among migrants aged 15 and older,

A_{60+} - the percentage of migrants aged sixty and older.

Instead of the percentage of academic and professional workers, it might have been better to use the percentage of persons having a high number of years of schooling; however, we did not have the required data. We cannot take the occupations of migrants before emigration alone as a measure of positive or negative selectivity, because if the migrants were older, the prospects to use their human capital would be low. We

see that the percentage of persons with academic professions among the immigrants from the USSR during the 1970s was high and steadily rising, but their ages were high and steadily rising as well; thus, it is difficult to refer to a positive selection of migrants. The index of migrants' composition in a migration stream may be especially helpful in such cases.

Comparison of the Waves

We compare the waves of immigration to Israel with the waves in change of Index of Migrants' Composition for these waves using the Coefficient of Wave Similarity. The waves in immigration were selected from the data in

Immigration to Israel from France

Immigration to Israel from France						
Year	Total of Aliyah	The percentage of academic and professional workers among migrants who worked before the migration				
		Percent of persons aged 60+	Percent of Married Men	Percent of Married Women	Index of Migrants' Composition	
1974	1345	9.1	8.7	40.0	35.8	0.15
1975	1382	10.5	6.4	36.1	34.9	0.21
1976	1416	16.2	9.6	37.3	35.9	0.23
1977	1226	13.8	9.1	38.3	33.0	0.19
1978	1302	15.1	10.4	42.8	39.1	0.24
1979	1648	14.9	9.3	39.7	36.2	0.23
1980	1430	13.0	10.6	38.5	33.2	0.16
1981	1430	17.7	10.8	41.0	39.4	0.26
1982	1682	17.4	11.2	40.0	36.4	0.23
1983	2094	21.0	9.1	46.3	40.1	0.43
1984	1539	22.6	8.5	44.0	38.9	0.45
1985	1017	24.0	10.2	53.8	52.7	0.67
1986	927	22.1	6.6	54.7	49.1	0.90
1987	888	8.8	11.4	45.9	47.0	0.17
1988	920	9.5	11.3	46.0	50.5	0.20
1989	900	13.7	10.9	41.0	36.2	0.19
1990	864	21.1	9.5	41.2	37.7	0.35
1991	966	20.8	8.8	38.6	38.3	0.35

the Supplement 1. Since the margins of sub-periods are difficult to determine, there is always an element of arbitrariness in their choice. We present the values of CWS for the selected waves in Tables 1 – 4 below.

In eleven of fourteen observed waves, the CWS was higher than zero, showing different degrees of similarity between the waves of migration and selectivity. We use the sign test to check the wave hypothesis. We assign '+' to CWS higher than zero: that is, when there is a concordance between the waves of at least 50%; and assign '-' to other values of CWS. We can consider this as an experiment with results of type „positive” and

Table 1.

USSR/FSU				
Period	1976-1986	1986-1992	1992-1998	1998-2001
CWS	0.60	1.0	-0.33	0.33

Table 2.

USA			
Period	1977-1980	1980-1985	1985-1990
CWS	-0.33	0.6	0.2

Table IV

Immigration to Israel from Argentina

Immigration to Israel from Argentina						
Year	Total of Aliyah	The percentage of academic and professional workers among migrants who worked before the migration	Percent of persons aged 60+	Percent of Married Men	Percent of Married Women	Index of Migrants' Composition
1974	1625	26.8	12.6	60.3	58.3	0.75
1975	892	28.1	14.1	55.3	49.1	0.54
1976	1616	34.7	11.7	54.9	55.0	0.90
1977	2158	33.1	11.3	56.2	52.4	0.86
1978	1960	24.0	15.0	57.5	53.9	0.50
1979	1577	23.5	17.4	56.7	55.3	0.42
1980	1036	21.3	20.0	55.0	49.7	0.29
1981	949	23.0	16.0	48.7	51.8	0.36
1982	1169	23.5	11.0	54.1	53.0	0.61
1983	1283	25.4	10.3	50.4	49.2	0.61
1984	841	20.1	14.4	45.5	45.3	0.29
1985	836	34.5	12.8	48.2	48.8	0.63
1986	772	25.0	16.1	45.7	49.7	0.35
1987	1078	18.0	11.3	50.0	52.2	0.42
1988	1546	18.5	9.0	48.7	54.8	0.55
1989	1853	23.4	8.8	52.1	51.5	0.71
1990	2045	25.9	10.6	52.1	51.5	0.65
1991	666	19.0	18.5	45.8	44.7	0.21

„negative”, when we check the number of „positive” results. A critical region is $R < 4$ for a one-tailed test for 14 tries with a significance level $< p = 0.05 > 0.029$ (Walpole and Myers, 1978, Table 15). Thus, the sign test supports the proposed hypothesis.

Conclusions and Future Considerations

Our study found a certain degree of consistency in the observed wave-like changes in migrants' characteristics and the waves of migration. This suggests that special approaches may be used to seek such phenomena in the data. Methods of pattern recognition in statistical series may be especially useful. In sum, the

Table 3.

France				
Period	1974-1977	1977-1980	1980-1987	1987-1990
CWS	1.0	0.33	-0.14	0.33

Table 4.

Argentina			
Period	1975-1981	1981-1986	1986-1991
CWS	0.33	0.2	0.6

development of statistical mathematical methods for the analysis of wave phenomena in migrations is essential.

The methods described here do have some shortcomings. Similarity measuring by CWS is inflexible: it does not allow for noise or short-term fluctuations or for phase shifts in time.

In order to use the wave approach for the analysis of migration processes, some changes in the collection and presentation of statistical data must be made. The collection and/or publication of time series are often interrupted when the magnitudes of observed facts seem to be too small, because they fall short of some level arbitrarily regarded as worthy of attention. No less frequently, the collection and/or publication of data does not begin until the observed phenomenon attains a level that is considered important enough for practical reasons. This rules out the very possibility of studying the wave character of migrations; hence, our insistence that the administrative approach of this type in gathering statistical data should be changed. In the present era, when information may be collected on digital media with immense capacities, such a change is feasible.

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Рисс І. „Хвилевий підхід” в дослідженні імміграції до Ізраїлю у 1974 – 2001 роках

Потоки міграції хвилеподібні за своєю природою. На властивий хвилі потік міграції впливає негативний

зворотний зв'язок у системі міграції, яка залучає двохтактні чинники, інформаційні потоки, та інші чинники. Ця стаття привертає увагу до можливих взаємин між змінами в обсягах міграції та виборі переселенців для міграції. Збільшення числа іммігрантів до Ізраїлю від кожної з чотирьох розглянутих країн, пов'язується зі збільшенням відсотка одружених, кваліфікованих іммігрантів і зменшенням частки старших за віком іммігрантів.

Ключові слова: хвилі міграції, вибірковість, імміграція до Ізраїлю.

Рисс И. „Волновой подход” в исследовании иммиграции в Израиль в 1974 – 2001 г.

Потоки миграции волноподобны по своей природе. Присущий волне поток миграции производит отрицательная обратная связь в системе миграции, которая вовлекает двухтактные факторы, информационные потоки, и другие факторы. Эта статья обращает внимание на возможные взаимоотношения между изменениями в объеме миграции и выборе переселенцев для миграции. Увеличение числа иммигрантов в Израиль от каждой из четырех рассматриваемых стран, связывается с увеличением доли женатых, квалифицированных иммигрантов и уменьшением доли старших по возрасту иммигрантов.

Ключевые слова: волны миграции, выборность, иммиграция в Израиль.

Riss I. The „Wave Approach” in Migration Research Waves of Immigration to Israel, 1974 – 2001

Migration streams are wave-like in their nature. A wave-shaped stream of migration is generated by negative feedback in migration system that involves push-pull factors, information flows, and other factors. This paper calls attention to possible interrelations between changes in volume of migration and selectivity of migrants as a wave of migration progresses. An increase in the number of im-migrants to Israel from each of the four countries considered is associated with an increase in the share of married, skilled immigrants and a decrease in the share of older immigrants.

Key words: migration waves, selectivity, immigration to Israel.

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