THE ROLE OF INTERNATIONAL MIGRATION IN MAINTAINING THE POPULATION SIZE OF HUNGARY BETWEEN 2000–2050

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INTRODUCTION[1]

Fertility plays an outstanding role among the phenomena determining the number as well as the sex and age distribution of the population. However, fertility is not the only factor of population dynamics. Mortality and international migration also significantly affect both population size, as well as composition. From these three components of population dynamics, we focus on the role international migration might play between 2000 and 2050 in maintaining Hungary's population size.

Hungary's male population has been decreasing since 1980, and the total population of both sexes since 1981. There is a consensus in Hungary that population decline indicates unfavourable socio-economic consequences. Therefore, among other goals modern population policy aims at the maintenance of population size, and its target is to slow down, stop and reverse the country's population decline. Principally it can be ensured by higher fertility, lower mortality and / or positive net migration.

The idea of compensating the decline with immigration is not new to Hungary. This 'method' has been used in our history several times with different aims and causes. Immigrants were necessary for repopulating the country after various catastrophes (1239–1290, 1550–1670). They had a crucial role in populating areas that had been rarely inhabited previously. The Cumanians, the Jazygians and, after the end of the Turkish occupation, the Germans provide examples of immigrant groups that repopulated Hungarian territory. This form of international migration played a significant role in the growth of Hungary's population and affected the sex and age composition as well (Tóth 2001).

International migration was critical for sustaining Hungary's population not only in the distant past, but also in the 20th century. For example, at the end of World War II, Székelys from Bukovina in Eastern Transylvania were resettled in Hungary. Of course, there are substantial differences between these historic examples of one-time settlements and today's seemingly natural international migration (Tóth 2000). Yet, even today significant resettlement takes place following wars and natural catastrophes.

[1] This study is based on the following paper published in Hungarian: Hablicsek and Tóth (2001). (Cseh-Szombathy and Tóth 2001, 395–428).

In this paper, we consider the potential of international migration to contribute positively to the population replacement in Hungary. This involves a break with the idea of closed population used until now in population projections. By elaborating population scenarios with possible migration patterns, we seek answers to the following questions:

a) Provided that the present immigration and emigration remain constant, how many years are needed to slow down or to stop the decline and the ageing of population?
b) In case we intend to have the same population size in 2050 as today and we intend to reach this goal by a one-time significant settling of migrants, then what number and composition (sex and age) of foreign citizens should be settled in 2000?
c) According to the baseline variant of Hungarian population projections what are the migration volumes that could offset the accelerating decrease and ageing of the population (Hablicsek 1998)?
d) What fertility, mortality and migration conditions could lead to a more sustainable development of the population?

In this paper the main tool for studying the demographic impact of international migration is the scenario-method. However, as a first experiment, this role is analysed only with regard to the population size and age structure. This means, among others, that we do not take into consideration the ratio of Hungarian and non-Hungarian emigration, or the composition of immigrants in terms of country of origin. We do not address the consequences for the communities left by the immigrants nor the possible consequences of increasing number of immigrants and thus their relative proportion in the population of Hungary – except for the simple demographic consequences. The main goal of the study is the identification of the general levels of the phenomena (first of all migration) necessary for having a more or less constant population size in Hungary in the next decades.

METHODOLOGICAL PROBLEMS

It is well-known that there are serious deficiencies of the data on population movement. International migration belongs to that category of phenomena most difficult to measure statistically. As a result, the interpretation of existing data is much more complicated than for other demographic data of population dynamics. Therefore an exact projection of migration and its effects on population development seems to be impossible. Furthermore, there is a danger that projections multiply errors in the measurement of current migration patterns. Thus we have to be very careful to formulate and apply assumptions on international migration.

Due to the difficulties in measuring migration processes accurately, data on migration show greater uncertainty than data on natural processes of population change. Perhaps the biggest problem for the analysis concerns the emigration and return of Hungarian citizens. Besides the small group of those declining their Hungarian citizenship, there is a lack of data on Hungarian citizens emigrating and then returning. We have neither annual breakdowns, nor total figures for any given time period.

It is not only the data on emigration by Hungarian citizens that raises concern, but the data on immigrating foreigners as well. Generally, these data are also incomplete and inexact. For instance, the data contains neither the number of those arriving here illegally, nor those with visa exemptions extending their stay in the country.

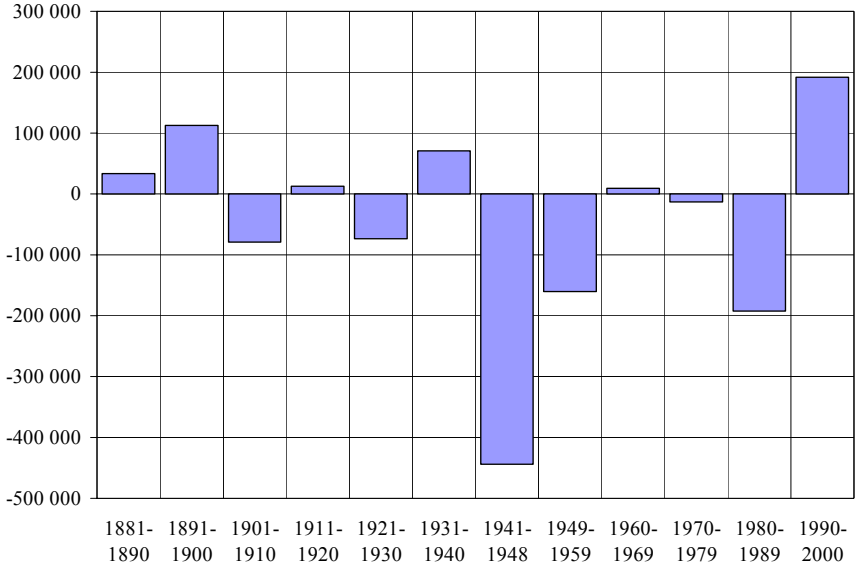
Because of the above circumstances, we cannot determine with any precision the real balance of migration to and from the country or the number of those participating in international migration. And thus, we cannot answer unambiguously the question on whether the international net migration is positive or negative. Therefore, one may reasonably ask, whether the current state of our migration data allow us to use projection techniques in assessing potential role of international migration in reversing current population decline in Hungary.

Despite the possible inaccuracy, incompleteness, and uncertainties of the migration data, we can still arrive at a basic answer to our questions. Our objective is not to produce an exact estimation, but rather to formulate general tendencies from existing data. Our experiment will have proven successful if we can conclude some expectable tendencies of international migration as well as volume estimations of immigration which would be necessary to balance natural population decrease using the scenario method based on existing data.

MEASURING INTERNATIONAL MIGRATION

Census Net Migration

In the following, we briefly examine the effect of census net migration on the size of Hungary's population between 1881 and 2001. Census net migration is the difference between the change of population size and the sum of annual natural increases (the difference of live births and deaths in the given year) between two (successive) censuses. It is not a direct effect of international migration, because census errors from one side and births and deaths losses and surpluses caused by movement from the other side affect strongly these figures. Here and in the following parts of the study all the data refer to the recent territory of Hungary.



Source: Hablicsek and Tóth 1996, 162.

Figure 1
Migration balance between censuses, Hungary, 1881–2001

In the above figure, we can see, first of all, the fluctuating character of the migration differences over the last century. *However, significant negative net migration figures have been observed for certain time periods*. Emigration was outstandingly high after World War II and following the 1956 Revolution. Between 1960–1979 the census net migration is very small, while there are data on significant illegal emigration. The census net migration between 1980 and 1990 and also between 1990 and 2001 seem to mirror Hungary's socio-economic and political transformation starting in the last decade.

We can also use model estimations to measure the impact of international migration. For example, starting with the 1921 population figures and using the valid mortality and fertility parameters as assumptions for population projection, we can estimate a population development without migration. This scenario gives a population of 11.4 million by 1981, and one of 11.1 million for 1991, which is by 700 thousand persons (7 per cent of the recent population) higher than the census population. On this basis we can state that the impact of international migration was not negligible during the last century.

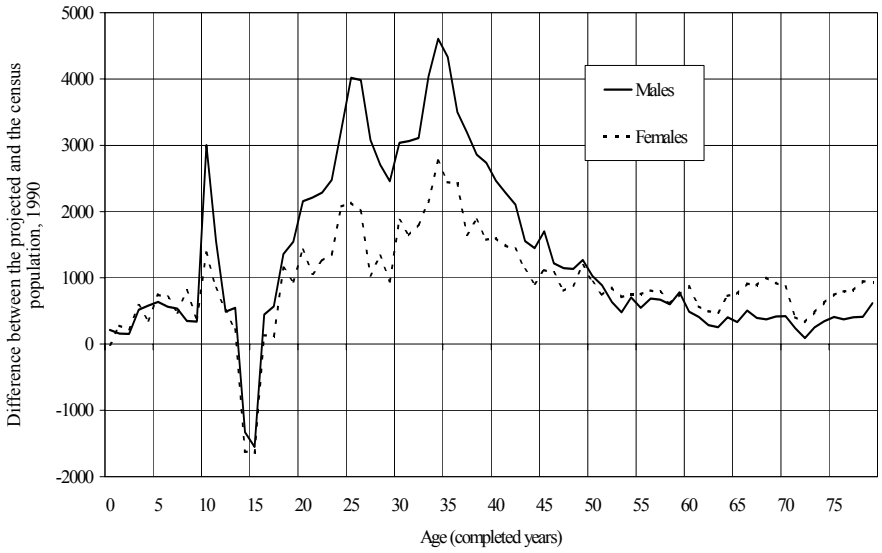
International Migration and the 1990 Census Population

Population figures between censuses are estimated in Hungary in a recursive way. Starting with the census figures and using the detailed data of occurring vital statistics one can estimate the population figures of the next years. Evidently, population at the next census and figures estimated by the method mentioned may differ from several causes. One of these is the population movement crossing the country's border. For example, the size of the population estimated from the 1980 census to 1 January 1990 was 10 million 567 thousand persons, while the census population was 'only' 10 million 375 thousand persons (Hablicsek and Tóth 1996, 163).

What explains this difference of 192 thousand? It seems obvious that international migration is the most important reason for the difference between the estimated and the census figures among those listed in the publications of the 1990 census. This conclusion is supported by looking at the differences between the expected and the census population by age and sex. These differences shape a curve more or less characteristic of the impact of migration in general[2].

Of course, the differences seen in Figure 2 between the projected and the census populations are not wholly the result of international migration. 'Irregularities' can be seen in the 10 year-old population where the projection is significantly higher than the census population, and in those aged 14–15 years where the census population exceeds the extrapolated one. Despite these, the projected population still shows a surplus, compared to the census population, and this difference seems to be result of emigration from Hungary.

[2] More accurately, the curves in Figure 2 are similar to age-specific migration patterns superposed between the censuses.



Source: Hablicsek and Tóth 2001, 401.

Figure 2
Differences by gender and age between the population projected from the 1980 census and the population of the 1990 census (1 January 1990)

The Immigrants and Foreigners with Permanent Residence in Hungary

For the purpose of the analysis, we divide those arriving to the country into three general categories. The first one contains those with an official immigrant status. The second category covers those who reside in the country longer than one year for reasons other than immigration. The third group are citizens who were naturalised between 1990 and 1997. This last category includes both individuals moving from immigrant status to Hungarian citizenship as well as re-naturalised Hungarians.

In order to determine what net migration figure we shall use in our analysis, let us examine what data characterised international migration in Hungary between 1990 and 1997.

Entries

Between 1990 and 1997, the aggregate number of immigrants (category 1) and those residing in the country for longer than one year (category 2) was 139,970. The number of persons with immigrant status was 79,527, while the number of those belonging to the second group was 60,443. The majority, 56.8 percent, of the migrants belonged to the first group. This is important to note because new Hungarian citizens are essentially recruited from this group.

Table 1
Number of entries by status and gender (1990–1997)

Year	Entries (number)						
	Immigrant status		Other status		Together		Total
	Male	Female	Male	Female	Male	Female	
1990	11 188	10 995	6 299	4 197	17 487	15 192	32 679
1991	7 763	6 990	4 698	2 743	12 461	9 733	22 194
1992	4 905	5 235	3 061	1 831	7 966	7 066	15 032
1993	4 850	5 340	3 647	2 064	8 497	7 404	15 901
1994	3 525	4 163	4 732	2 834	8 257	6 997	15 254
1995	2 488	3 289	5 896	3 337	8 384	6 626	15 010
1996	2 019	2 816	6 038	3 630	8 057	6 446	14 503
1997	1 650	2 311	3 287	2 149	4 937	4 460	9 397
1990–97	38 388	41 139	37 658	22 785	76 046	63 924	139 970

Source: Hablicsek and Tóth 2001, 402.

Table 2
Distribution of entries by status and gender (1990–1997)

Year	Entries (percentage of total)						
	Immigrant status		Other status		Together		Total
	Male	Female	Male	Female	Male	Female	
1990	34.2	33.6	19.3	12.8	53.5	46.5	100
1991	35.0	31.5	21.2	12.4	56.1	43.9	100
1992	32.6	34.8	20.4	12.2	53.0	47.0	100
1993	30.5	33.6	22.9	13.0	53.4	46.6	100
1994	23.1	27.3	31.0	18.6	54.1	45.9	100
1995	16.6	21.9	39.3	22.2	55.9	44.1	100
1996	13.9	19.4	41.6	25.0	55.6	44.4	100
1997	17.6	24.6	35.0	22.9	52.5	47.5	100
1990–97	27.4	29.4	26.9	16.3	54.3	45.7	100

Source: Hablicsek and Tóth 2001, 403.

Concerning the sex distribution of migrants for the entire period, the sex ratio differs more or less significantly among arrivals with the immigrant status and other entrants. 54.3 percent (76,046 persons) of the total migrants are male, while 45.7 percent of them (63,924 persons) are female. However, there is a female surplus in the immigrant status category, the proportion of men is 48.3 percent, while that of the women is 51.7 percent. Among other entrants not having immigrant status but residing in Hungary for more than one year, however, males represent a significantly greater share. In this group (category 2), men account for 62.3 percent. It clearly reflects the different labour market situation of men and women in Hungary. The vast majority of this category are employees and occasionally managers (along with their family members) of multinational firms and other companies and institutions. However, latest information shows a more balanced sex distribution also in the group of asylum seekers.

The development of annual numbers of those in immigrant status and other arrivals depict two distinct patterns. For both men and women, the number of those receiving an immigrant status decreased gradually from 1990 onwards. In the case of other entries, there have been fluctuations. The number of men in this category decreased significantly from 1990 to the end of 1992. In 1993, however, there were almost six hundred more men in this category than in the preceding year. From here on, their number has increased year by year. At the end of 1996, men remaining in Hungary for more than one year without immigration status surpassed six thousand again (6038). Since then, however, the observed figures show a significant decline. It is important to note that the annual trends have been similar for women.

Between 1990 and 1997, 139,970 persons entered Hungary for a period longer than one year from at least 164 different countries. The wide variety in the countries of origin might suggest that Hungary is extremely attractive. However, there were only 13 countries from which at least one thousand migrants arrived. It takes 87.7 percent of all migrants to Hungary and only 12.3 percent arrived from the remaining 151 countries. Considering only migrants arriving from the seven neighbouring countries, we account for 100,917 or 72.1 percent of the migrants. Among those arriving from the neighbouring countries, 72,258 persons have been granted immigrant status. This means that 71.6 percent of those arriving from the neighbouring seven countries supposedly came with the intention to become a Hungarian citizen.

New Citizens

The migrant status can be terminated in basically two ways. One is when a foreigner permanently residing in Hungary leaves the country, the other is

when person with immigrant status applies for Hungarian citizenship and receives it at the end of the official procedure (Parragi 1993, 249; Parragi and Ugróczky 1994, 248).

During the examined eight years, the migrant status of 108,233 persons was terminated. 29,681 persons, or 27.4 percent of these, left the country. The rest (78,552 persons) became Hungarian citizens. Among people with an immigrant status, the percentage of those not receiving Hungarian citizenship and leaving the country instead is insignificant. They accounted for only 1.6 percent of those in the immigrant status category (79,527 persons).

In the following, we take a closer look at the data of the citizens of the 119 countries from which the new Hungarian citizens were naturalised between 1990 and 1997. There is a central group of countries from where new Hungarian citizens have arrived. They are the neighbouring countries. Among the 78,552 persons who received Hungarian citizenship, 69,253 persons, that is 88.2 percent of the new citizens, were previously the citizens of one of the seven neighbouring countries. Although we lack data on the nationality of entrants, we can assume that the vast majority of migrants from neighbouring countries are of Hungarian origin.

The distribution of the new citizens by age and sex is shown in Table 3. Between 1990 and 1997, 53.4 percent of all the persons receiving Hungarian citizenship were women. So while 45.7 percent of the total migrants were women, there are almost eight percent more women than men among the new citizens. (Recall that, within the immigrant status group, the proportion of women is 51.7 percent.)

15.4 percent of the new citizens are younger than 19, 74.3 percent are between 20 and 59 years of age, while the proportion of those over 59 is 9.5 percent. We do not know the number of the families and the number of children per family, nonetheless we find the proportion of those younger than 19 (12,702 persons) significant.

Table 3
Age and gender composition of persons receiving Hungarian citizenship (1990–1997)

Age	Men		Women		Total	
	Number	Percent	Number	Percent	Number	Percent
0–4	346	0.9	367	0.9	713	0.9
5–9	1 493	4.1	1 315	3.1	2 808	3.6
10–14	2 082	5.7	2 046	4.9	4 127	5.3
15–19	2 530	6.9	2 488	5.9	5 018	6.4
20–24	2 590	7.1	2 415	5.8	5 005	6.4
25–29	4 487	12.3	5 018	12.0	9 505	12.2
30–34	4 121	11.3	4 668	11.1	8 789	11.2
35–39	3 867	10.6	4 777	11.4	8 644	11.1
40–44	3 988	10.9	5 329	12.7	9 317	11.9
45–49	3 302	9.0	4 323	10.3	7 625	9.7
50–54	2 605	7.1	2 986	7.1	5 591	7.2
55–59	1 698	4.6	1 849	4.4	3 547	4.5
60–64	1 015	2.8	1 302	3.1	2 317	3.0
65–69	696	1.9	984	2.3	1 680	2.1
65–70	538	1.5	813	1.9	1 351	1.7
75–79	382	1.0	555	1.3	937	1.2
80–84	230	0.6	289	0.7	519	0.7
85–89	181	0.5	208	0.5	389	0.5
90–94	79	0.2	146	0.3	225	0.3
95–	32	0.1	83	0.2	115	0.1
Total	36 262	100.0	41 961	100.0	78 223	100.0

Source: Hablicsek and Tóth 2001, 405.

Exits

Two clearly distinguishable groups of emigrants can be established: Hungarian citizens leaving the country and foreigners returning to the country of origin or moving to another country. Let us consider the data available immediately before 1990 and between 1990–1997.

Concerning emigration of Hungarian citizens, we have to rely on estimates, despite the change of law after the establishment of the conditions of free travel abroad in 1997, which requires Hungarian citizens to report to their local government office their residence abroad for periods longer than three months[3]. This system does not work. Therefore, with the exceptions of those who re-

[3] See the following acts and regulations on the entrance, the stay and immigration of foreign citizens: Act 1993/LXXXVI. Governmental Decree no.64/1994 (April 30.), Decree of the Ministry of Interior 9/1994. (April 30.).

nounce their Hungarian citizenship, we do not have exact information on emigrants beside this group. We can only suppose that there were at least as many emigrants annually after1990 as before 1990.

Between 1960 and 1990, the number of legal and illegal emigrants fluctuated between 1,405 and 6,555 persons annually. The arithmetic average of these two extreme values is close to 4,000. On this basis, we can suppose that after 1990 the annual increase in the number of Hungarian citizens residing abroad for an extended period along with those renouncing their Hungarian citizenship probably could not have been less than three-four thousand persons. This also means that between 1990–1997 at least 24,000 Hungarian citizens left the country.

Besides 'stating' the annual number of emigrant Hungarian citizens it is also necessary for us to determine the annual number of non-Hungarian citizens leaving the country. Without this estimate we cannot determine the balance of international migration.

Prior to the change of political and economic systems, that is before 1990, immigrants lived in Hungary as well. In 1989, for example, 1,441 Hungarian citizens left the country legally and illegally. In addition, 1,368 persons terminated their Hungarian citizenship. Thus, the number of Hungarian citizens leaving the country was 2,809. In the same year, 901 Hungarian citizens returned among those who had previously emigrated. Together with naturalisation and re-naturalisation, 1083 persons became Hungarian citizens. Finally, 23,493 immigrants were registered in 1989. Thus, the total number of migrants entering Hungary as a result of international migration was 25,477 (24,493+901+1,083), and of this the number of foreign citizens was 23,493. All this meant that the balance of international migration in 1989 was positive. Migration increased the population of the country by 22,668 (25,477–2,809) persons. This figure provides a starting point for our analysis.

As previously mentioned, 29,681 persons left the country from among the entrants in the examined eight years. This means that 21.2 percent of the total 'entrants', that is almost every fifth 'entrant', leaves Hungary for some reason. (We state this simply as a fact without further interpretation even though we are well aware that from the point of view of domestic migration policy, the nationality, age, and occupation of entrants deciding to leave as well as the duration of their stay are important.)

Table 4
Number of the exits by the status of entry and by gender (1990–1997)

Year	Exits of foreigners from the status group of				Together		Total
	immigrants		others				
	Male	Female	Male	Female	Male	Female	
1990	32	31	7 010	3 013	7 042	3 044	10 086
1991	85	68	3 006	1 701	3 091	1 769	4 860
1992	75	56	2 848	1 269	2 923	1 325	4 248
1993	90	66	1 601	867	1 691	933	2 624
1994	95	73	1 409	599	1 504	672	2 176
1995	25	36	1 228	471	1 253	507	1 760
1996	203	177	1 354	652	1 557	829	2 386
1997	84	87	1 001	372	1 085	459	1 544
1990–97	692	594	19 452	8 944	20 146	9 538	29 684

Source: Hablicsek and Tóth 2001, 407.

The number and percentage of entrants with an immigrant or other status who decide to leave the country are critical indicators for our analysis. While 1,285 of those belonging to the first group, that is only 1.6 percent of those with immigrant status, decided to leave the country, 28,396 or 47 percent of those belonging to the second group left. Men comprised the majority of those leaving from both groups. However, while men accounted for 53.8 percent of those leaving with immigrant status, they accounted for 68.5 percent of the emigrants from the 'other entrants' category (Hablicsek and Tóth 2002).

Table 5
Distribution of annual number of exits by the status of entry and by gender (1990–1997)

Year	Exits of foreigners from the status group of (percentage of total)						Total
	Immigrant		Other		Together		
	Male	Female	Male	Female	Male	Female	
1990	0.3	0.3	69.5	29.9	69.8	30.2	100
1991	1.8	1.4	61.9	35.0	63.6	36.4	100
1992	1.8	1.3	67.0	29.9	68.8	31.2	100
1993	3.4	2.5	61.0	33.0	64.4	35.6	100
1994	4.4	3.4	64.8	27.5	69.1	30.9	100
1995	1.4	2.0	69.7	26.7	71.2	28.8	100
1996	8.5	7.4	56.7	27.3	65.3	34.7	100
1997	5.4	5.6	64.8	24.1	70.3	29.7	100
1990–97	2.3	2.0	65.5	30.1	67.9	32.1	100

Source: Hablicsek and Tóth 2001, 408.

Among the entrant foreigners, 139,970 remained in Hungary during the eight years from 1990 to 1997. Of this group, 56.1 percent or 78,552 persons received their Hungarian citizenship. Thus, they 'exchanged' their immigrant status for citizen status (category 3).

* * *

The data presented to this point provides important clues for the interpretation of Hungary's 'pull' effect. Two factors from among the numerous components seem to be the most critical.

One of these – and presently we find this one the decisive one – is the peace treaties after each of the two world wars, as a result of which significant numbers of people of Hungarian origin live in the neighbouring countries as minorities. As previously noted, 56.8 percent of those who migrated to Hungary had immigrant status.

The other factor is the new political and economic system formed after 1990. This new situation made it possible for foreign employers and employees (and their family members) to appear in the domestic labour market.

COMPOSITION OF THE MIGRANT POPULATION – ASSUMPTIONS FOR PROJECTION

Migration not only affects the size of the entire population, but the composition as well. For instance, it is well-known that the special age structure of the migrants certainly has an effect on the age pyramid of the country's population, making it younger in most of the cases. Besides this, immigration and emigration composition can also differ from one another by sex and age and by other characteristics.

Other than the direct effect on the population, migration may have more distant – so called multiplicative – effects. For example, immigrants may have newborns and some of them may die, thus there would be more children born in the country and more people would die. Of course, the effects concerning emigration would be opposite. Therefore, the population growth and structure may be modified also indirectly by migration, even substantially in the longer run, depending on the difference between reproduction characteristics of the migrant and the native population. Thus, it is not simple to assess the impact of migration on the population. The full future effects are impossible to estimate without some kind of projections.

The data available on international migration requires a projection method as simple as possible in terms of population movement. It means that assumed net migration figures will be added to the population by sex and age. Thus, we

should have assumptions on the total volume of net migration, on the ratio of sexes and on the age distribution of the migrants. Usually, the volume of the net migration should be included to the main hypotheses of the projection and suppositions on sex and age distribution are variables in the background.

Proportion of the Sexes

On the basis of the migration data of Hungary, it seems, that we have to dismiss the hypothesis that men and women participate in migration more or less equally. As we have mentioned, between 1990–1997, the overall share of males among the total immigrants was 54.3%, thus significantly exceeding that of the females. The difference is even more obvious among those not arriving with the aim of immigration (category 2): the proportion of males among them was 62%. At the same time, there was a small female majority in the case of those with an immigrant status (52% female).

In the case of those leaving the country, the situation is slightly different. While the sex ratio among those leaving the country with an immigrant status category continues to be similar (53% men, 47% women), the sex ratio among those leaving the country looks very different: more than 2/3 of them are men. This ratio, however, does not play a significant role in the overall proportion of sexes because of the recognized and assumed low volume of emigration (3,000 persons annually).

It should be noted, however, that the proportion of sexes is much more balanced looking at net migration figures. The difference of male immigrants and those emigrated is 55,942 between 1990–1999, while this difference is 54,386 among females. It means that, under normal conditions, we can assume an equal share of men and women participating in international migration in Hungary. However, using very different assumptions on migration, it seems better to apply the observed male-female participation rates. Thus, 54 per cent of males and 46 per cent of females as constant proportions are set for immigration and 62 and 38 per cent for emigration, respectively.

Composition by Age

Besides the distribution by sex, the other important effect of international migration is related to the age composition of migrants. The mobile population is usually young, sometimes very young.

If we examine the averages of age composition, migrants appear older in the case of Hungary. The average age of the migrants is rather high. The average age of entrants is 32–33 years, while that of the exiting population is 35–37 years. At the same time, in 1998 the average age of the Hungarian population was 36.3 in the case of men, and 40.2 for women (Table 6).

Table 6
Average age of migrants (1990–1997) and the national average (1998) (age in years)

Average between 1990–1997	Entrants		Exiting population	
	Men	Women	Men	Women
Immigrant status	32.4	33.0	33.9	32.6
Other administrative status	34.6	32.0	36.8	35.2
Total	33.5	32.7	36.7	35.0
Population of Hungary	36.3	40.2		

Source*:* Hablicsek and Tóth 2001, 410.

As far as the age difference between the entrants and the exiting population is concerned, the data, at least for the foreigners, are very familiar. From among the foreigners arriving with the aim of immigration, the low number of those exiting the country stay in Hungary only for a short time, as transit migrants. The situation is different with the foreigners who come with purpose other than immigration and then leave the country. It seems that they wait a couple of years before migrating further or returning to their country of origin. On the whole, we can find the average difference in age between those arriving and then leaving to be 3.2 years in the case of men and 2.3 years in that of women.

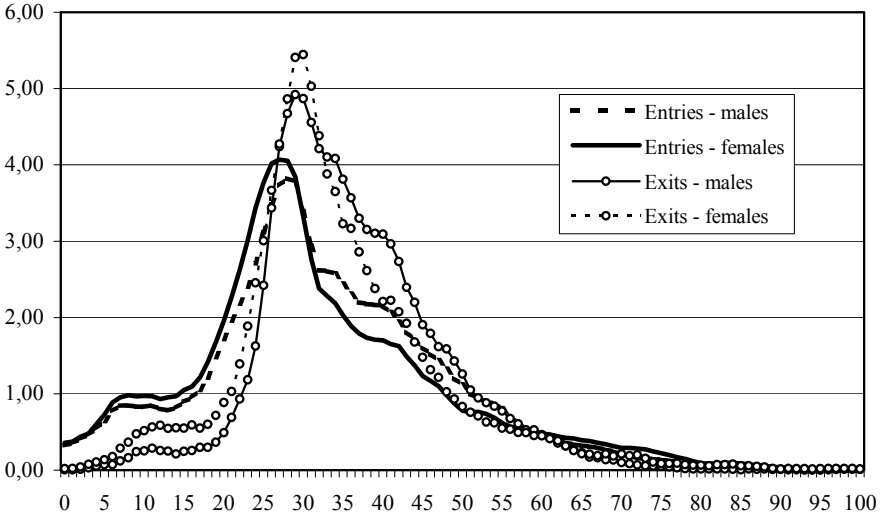
Table 7
Distribution of migrants by broad age groups

Age group	Proportion of the entering and exiting foreigners (%)					
	Immigrant status		Other status		Total	
	Male	Female	Male	Female	Male	Female
			Entries			
Total	100.0	100.0	100.0	100.0	100.0	100.0
0–19	22.7	20.6	8.3	13.1	15.6	17.9
20–39	48.3	50.5	60.6	63.8	54.4	55.2
40–64	24.2	22.6	29.4	20.5	26.8	21.9
65+	4.7	6.3	1.7	2.6	3.2	5.0
			Exits			
Total	100.0	100.0	100.0	100.0	100.0	100.0
0–19	17.2	21.5	2.9	6.5	3.4	7.4
20–39	51.7	50.7	63.8	66.4	63.3	65.5
40–64	28.9	23.6	31.8	24.1	31.7	24.1
65+	2.2	4.2	1.5	2.9	1.5	3.0

Source: Hablicsek and Tóth 2001, 411.

A more detailed picture can be seen from the distribution by larger age groups (Table 7). A vast majority, 55–65 percent, of the entrants belong to the age group of 20–39. The share of entrants in older working ages (between 40–64) is also rather high, 20–30 percent. However, the proportion of younger age groups and especially of elderly is low.

The distribution of the entering and the exiting population by single ages gives a more complete picture about the age characteristics of the migrants. Here, because of the small number of cases, it is necessary to make some corrections beforehand where 3-term moving averages have been used. The smoothed age distributions are shown by Figure 3.



Smoothed by 3-term moving average.
Source: *Hablicsek–Tóth* (2001) p. 412.

Figure 3
Age distribution of entering and exiting foreign citizens

We supposed the same age distribution for emigrating Hungarian citizens as for the foreign exiting population.

STARTING POINTS, ADDITIONAL ASSUMPTIONS FOR THE SCENARIOS

For measuring future consequences of international migration we can use two basic methods. First, we can elaborate assumptions on international migration beside ones on fertility and mortality, then prepare scenarios (projections) and analyse the results. Second, we can make inverse scenarios (projections). Assuming a special result of the population projection we can find the appropriate migration (fertility, mortality) hypotheses.

As a first method national population projections provide starting points for the analyses. These widely used, regularly updated projections contain basic assumptions for international migration. Variants with or without migration or variants with different migration assumptions can be compared for the analyses of migration effects. It is also possible to change the original hypotheses of the national projections and apply, for example, higher or lower migration volumes.

Second, in case of inverse projections, we have some questions concerning future population development. One such basic question for the developed countries can be the following: How the population size can be maintained, what assumptions lead to a more or less stable total population size. In the introduction of the study such kinds of questions have been asked. In these cases the result of the scenario i.e. the population stagnation is assumed, and the challenge is to determine the appropriate assumptions using a goal seeking process in general.

Basic Migration Hypotheses of the National Population Projection

The most recent projections of the Demographic Research Institute of the Hungarian Central Statistical Office applied three migration hypotheses (Hablicsek 1998). We consider these as basic assumptions. As far as the volume of migration is concerned, these can be calculated by the help of the table below:

Table 8
Basic migration scenarios and their components

Components of the scenario	Low	Medium	High
Total entrants	4000	12000	20000
Exiting foreigners	4000	3000	2000
Exiting Hungarian citizens	5000	4000	3000
Net migration	*-5000*	*5000*	*15000*

Source: Hablicsek Tóth 2001, 413.

The medium variant is based on the most recent observations. The significant immigration in the early years of the 1990s fell to 15 thousand persons by the middle of the decade, and fell below 10 thousand persons by 1997. According to the hypothesis, its future level will be around the average of 1996 and 1997. Therefore, the number of exiting foreigners – taking into account the estimated arrival-exit ratio of 4:1 – can be taken as being 3,000 persons annually. The number of exiting Hungarian citizens is annually 4,000 according to the medium hypothesis. Together this supports the medium (baseline) assumption of a moderate, 5,000 person migration surplus annually.

The low variant, on the other hand, supposes a migration deficit. According to this hypothesis, immigration further decreases and will be permanently at a level below that of the most recent years. At the same time, the decreasing attractiveness of Hungary from the point of view of migration also implies an increasing emigration of foreign and Hungarian citizens as well. Together, the result is an annual deficit of 5,000 persons.

Whereas in the high variant – resulting from among other things a successful EU accession – the number of immigrants increases and stays permanently at the level of the beginning of the 1990s. The number of exiting foreigners changes proportionately, while the number of Hungarian citizens exiting, as a result of economic prosperity in this variant, decreases.

In the National Population Projections the male and female participation in international migration is assumed to be equal. The future age distribution is the same shown in Figure 3.

In the projection, we suppose that fertility and mortality of the entering and the exiting population will correspond to that of the national average. This also means – according to our assumptions – international migration does not modify the average intensities of the phenomena, even in the case of large volumes. However, it can be projected that, as a result of the younger and more concentrated age distribution, there will be more children born and relatively less people dying in the population increased by the migrants. Thus, migration changes the national tendencies not only by its annual volume, but also through certain multiplicative effects.

Migration hypotheses have to be added to corresponding fertility and mortality assumptions to create projection variants. Here the main assumption of the national projections is that economic prosperity is accompanied by demographic consolidation. Thus higher migration volumes are related to higher number of children, whereas low fertility and migration deficit represent another scenario connecting more or less with deteriorating future perspectives. The characteristics of each variant are presented in the following table:

Table 9
Variants of national population projections

	Young	Baseline	Old
Fertility	High	Medium	Low
Life expectancy	Low	Medium	High
Net international migration	High	Medium	Low

Source: Hablicsek and Tóth 2001, 414.

For a better understanding of the different variants it is important to clarify the fertility and mortality assumptions of the National Population Projections. It is well-known that the first decade of the economic transition of Hungary – the 1990s – can be characterized by a falling total fertility rate and a stagnation of mortality. The levels at the end of the century are 1.3 by TFR and 66.8 and 75.3 years by male and female life expectancy, respectively. These levels are assumed to change more or less gradually up to their final values in 2050. Total fertility rate is assumed to be 1.3, 1.6 and 1.9, while male life expectancy at birth is set to 67, 75 and 83 years, and the female one to 77, 82 and 87 years.

Special Migration Scenarios

Naturally, beside the assumed migration hypotheses, other volumes of net migration are also possible. Because of Hungary's specific history, there is a significant population in the surrounding countries whose mother tongue and ethnicity is Hungarian. According to this, for example, in case of an economic success story, or simply a policy supporting immigration, the migration inflow can be significantly higher than in the national projections based on data of the 1990s. It is not excluded that net migration can also counterbalance the natural decrease of the population.

In the following, we shall outline three such possibilities in the form of scenarios. In a fourth case, we look for a more balanced scenario that considers simultaneous changes in fertility, mortality and international migration. The goal of all these scenarios is to analyze the maintenance of the population size in the long run. The following variants will be examined:

Immigration variant
Settlement variant
Migration target variant
Sustainable variant

Immigration Variant

Here we consider within what period of time immigration based on current trends can slow or even reverse the decline and/or ageing of the population in Hungary. For this purpose we combined the average migration characteristics observed in the period between 1990–1997 with the baseline variant of the national population projections and extended its time period to 2100.

The main idea behind this variant is the assumption of a continuous and significant immigration surplus. It supposes a turn in demographic thinking and history in Hungary characterised mainly by emigration in the 20th century. Only the last decade of the century showed an immigration surplus in the first years due to the impact of the Balkan war. Between 1990 and 1997 the migration figures can be summarized as follows. The average annual number of entrants was 17,500 persons, while 3,700 foreign citizens left the country. Adding to this the Hungarian emigration calculated at a level of 3,000 persons, the migration gain is estimated to 10,800 persons annually. This level is supposed to remain till 2050.

The immigration scenario combines this migration assumption with the medium fertility and mortality hypotheses (average number of children: 1.6, average life expectancy at birth: 75 and 82 years). The calculations should be continued for the period after 2050 as well. With regard to this scenario it is assumed that migration surpluses of the 1990s are insufficient for a sustainable population growth.

Settlement Variant

In this scenario, we combine the baseline population projection with a one-time very significant immigration, i.e. with a large scale settlement movement. The question is what effects such a settlement would have on the overall population. Such a scenario might occur, for example, if Hungary becomes a member of the European Union within a couple of years, whereas the inhabitants of the surrounding countries expect a more distant accession. In this case, Hungary might experience significant migration pressure.

Such jumps in population development seem to be quite unrealistic. However, statistics often produce such dramatic changes. For example, population size and structure are estimated in Hungary from the latest census and vital statistics. Therefore, there is a smaller or greater difference between the estimated and surveyed figures at the next census. In 2001, the population size estimated was 10 million while the preliminary census figure is 10.2 million.

In this scenario, we examine how many foreign citizens should be settled down in Hungary in the year 2000 in order to reverse the current declining

trend. It is obvious that, to pose the question sensibly, some complementary assumptions are necessary. We suppose that the fertility and the mortality of the population entering for a one-time settlement do not differ from those of the Hungarians. Furthermore, we are looking for a one-time migration volume that would result in a total national population of just 10 million in 2050.

Migration Target Variant

Here we are looking for what constant annual volume of net migration would be necessary for maintaining a population figure of 10 million in 2050. We have to stress the word 'constant', because we do not want to counterbalance the natural decrease annually. We are looking for a level combined with the baseline variant of the national population projections, which, in its total effect, would maintain the population size over the next 50 years.

Thus, this variant would show a kind of a migration limit value which in a certain period of time – in the next half century – would balance the population decline and the increasing ageing of the population. The assumption behind this variant is that the necessary migration surplus is too high in the light of Hungarian circumstances (economic possibilities, social attitudes, etc.). Therefore immigration itself is insufficient for a sustainable population growth.

Sustainable Variant

As a consensus among Hungarian demographers, a more promising policy approach requires simultaneous change in all three basic demographic components: fertility, mortality and international migration. Recent trends, like the significant population decline, reinforce the validity of this position. One of the first steps to elaborate a more complex population policy is to determine the extent of the changes in demographic trends necessary for maintaining sustainable population development. Here, the question is, what rise in fertility, additional decrease of mortality, and increase in migration surplus are needed to stop the decline of the population.

Obviously, for a better posed question we should have additional assumptions on the participation or weight of the factors. The simplest weighting of the components is that one phenomenon, e.g. fertility brings the whole necessary effect and the other two components influence the population growth normally (i.e. as in the baseline scenario). In case of migration, it is the migration target variant defined above. Two additional scenarios can be prepared on this basis: a fertility and a mortality target variant, in what fertility (mortality) changes in such a way that the population size is kept on 10 million by 2050.

We can create also more sophisticated variants, too. Among them, the so called sustainable variant will be presented. Here each phenomenon has approximately the same magnitude of effect. Levels of fertility, mortality, net migration shall be calculated to achieve a third of the desired effect, to stop the decrease of the population at the recent level until the middle of the century.

RESULTS OF THE PROJECTIONS, SCENARIOS

National Population Projection

The size of the population, according to the baseline variant, is 10 million 46 thousand persons at the beginning of the year 2000. By 2010, the number is projected to be already substantially below 10 million (9.66 million), and by 2050 may decrease to 8 million. We have to stress that this number contains a not negligible migration surplus, calculated for 1997–2050, which – together with the multiplicative effect (because of the age composition of the immigrants, there is also a surplus in births) – totals 300 thousand persons. Contrasted with this, the size of the population by 2050 is 7.4 million in the old variant and 8.8 million in the young variant.

Thus, for this period of time, the three projection variants define a narrow interval of 7.4–8.8 million persons for the population size, with the difference between the baseline and the extreme variants being 0.6–0.7 million persons, which is hardly more than a statistical margin of error.

The scenarios show rather interesting relations between the fertility and mortality levels and the sizes of the population. We have already suggested that the effect of mortality and fertility on the population may be in balance. To a certain extent the increase of the life expectancy may balance the decrease in the number of children in the long term, by increasing the number of people having a longer life span. Obviously, this has a price: additional (serious) ageing of the population.

Limit of the Population Size

To estimate the limits of population size, we also prepared the low and high scenarios in which the highest number of children is combined with the highest life expectancy and the largest immigration surplus. And the other way around: for the minimum development of the population we supposed the lowest number of children, life expectancy and immigration surplus.

According to this the lowest number of population appears to be 6.0 million by 2050, while the maximum population of Hungary may be 10.4 million per-

sons by the middle of this century on the basis of conditions which seem almost impossible.

Demographic Trends

The development of the number of births will be characterized by low level and fluctuations. In the baseline variant, the annual number of births will be around 90–95 thousand newborns until 2015, and then will gradually decrease to 70 thousand by 2050. This level, together with the by then actual life expectancies, projects a population of 5–6 million people by 2100, thus showing a further significant decrease of the population. The halting of the decrease of the population in the medium variant is not ensured even in the very long run.

Table 10
Main results of the national population projections
Baseline variant

Characteristic at January 1 or during previous year (1000 persons, percentage)	2000	2010	2020	2030	2040	2050
Size of population	10045,9	9657,8	9342,4	8977,1	8508,0	8040,9
Number of live births	92,3	96,5	93,0	79,8	76,3	72,8
Number of deaths	138,8	135,2	129,0	128,5	129,3	124,7
Net migration	5,0	5,0	5,0	5,0	5,0	5,0
Natural increase	-46,5	-38,7	-36,0	-48,7	-53,0	-51,9
Population growth	-41,5	-33,7	-31,0	-43,7	-48,0	-46,9
Total fertility rate	1.3	1.4	1.6	1.6	1.6	1.6
Life expectancy at birth – male	66.8	68.4	70.5	72.4	73.9	75.0
Life expectancy at birth – female	75.3	76.8	78.4	79.8	81.0	81.8
Size of the age group 0–19	2370,1	2041,3	1894,7	1824,1	1646,3	1534,1
Size of the age group 20–64 year olds	6205,8	6108,7	5717,4	5348,3	4949,1	4411,0
Size of the age group 65–x year olds	1470,0	1507,8	1730,3	1804,6	1912,6	2095,9
Percentage of the age group 0–19	23.6	21.1	20.3	20.3	19.4	19.1
Percentage of the age group 20–64	61.8	63.3	61.2	59.6	58.2	54.9
Percentage of the age group 65–x	14.6	15.6	18.5	20.1	22.5	26.1

The number of births in the old variant falls dramatically in the next half-century. The annual number of births decreases to 74 thousand by 2020, to 51 thousand by 2040, and to 44 thousand by 2050. All this indicates a population less and less able to reproduce itself. The 44 thousand births projected for 2050 is less than the number of newborn girls in 1997.

The young variant shows a completely different picture. The number of births in this variant varies around 105 thousand persons, thus the reproduction of the population – after a longer transition period – is ensured.

The annual number of deaths stays at the 1990s level of 145–150 thousand persons in the young variant (very modest increase in the life expectancy). In the baseline projection, the number of deaths decreases gradually to the level of 130 thousand. In the old variant, this figure manifests approximately 110 thousand after 2015, based on the assumed steady rise in life expectancy.

It is well-known, that the natural increase of the population has switched to a natural decrease in Hungary since the beginning of the 1980s, i.e. number of deaths exceeded the number of births in the last two decades. The total natural decrease between 1980 and 2000 reached 470 thousand, 4.5 per cent of the population.

In spite of the fact that we assumed a significant migration surplus, and calculated with improving mortality, low fertility continues to produce a population decline all the way to 2050. The average annual rate of decrease during this period is approximately 40–45 thousand persons in the baseline variant, however, with fluctuations. The rate of decline decreases after a temporary period in the young variant, while increases according to the old scenario. By 2050, the annual population decrease reaches the level of 20 thousand persons in the young variant and 70 thousand (!) persons in the old one.

Development of the Age Composition

National population projections emphasize processes affect the population figures and ratios, but the initial population structure and socio-cultural interpretation do as well. When the starting population is old, we can expect a low number of births even in case of relatively high fertility and a high number of deaths also under very good health conditions. Thus, we have to face a decline because the initial population is old. Furthermore, under modern demographic conditions the decline of an old population even accelerates the ageing process.

The solution seems to be obvious: more births and young immigrants are needed. However, the demographic transition shows that special attention must be paid to mortality, too. One of the essential features of the transformation of mortality in the 20th century is the increase of the number of survivors, the survival of a larger and larger proportion of the newborn babies till a higher and higher age. Thus the age pyramid ‘stretches’ upward, and if the level of fertility does not become too low, this process may accommodate even an average number of children substantially below the replacement level.

What can we do, however, if the population becomes too old, i.e. when economic and social consequences of ageing appear to be too serious? One

particular solution is the reinterpretation of who is old. Redefinition of the old and the working age groups (and creating the appropriate conditions) may help in sustaining the country's development.

In other words, we should understand that ageing is not a completely unfavourable process. On the contrary, it is part of the demographic transition, the basic process of the population development in the last two centuries. It is important to emphasize, since otherwise the future looks dark: the ageing process will not only continue, but enter a new phase. All these are illustrated with the development of the age pyramid of the population (Figure 4).

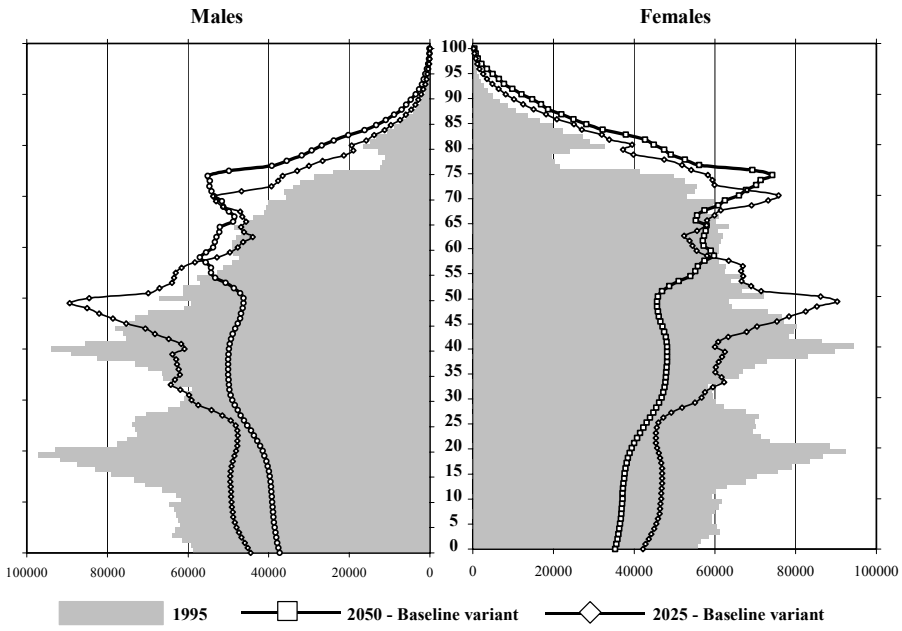


Figure 4
Age pyramid of the population, 1995, 2025, 2050
Baseline variant

The number of persons between the age of 0–19 will be definitely less than the present level. In the old variant (with the lowest fertility), the number of persons in this age group decreases by half in 50 years. The medium/base variant also shows a substantial decrease, and the number of persons in the age group does not reach the 1995 level in 2050 even in the young variant.

The relative proportion of the age group 0–19 in the population shows a similar picture to that of their absolute number. The share of young people decreases rapidly from their present 26 percent, and will be approximately 21 percent around 2010. In the medium/base variant it further decreases from this level to 19 percent. In the old variant, however, this share decreases to below 14 percent by 2050, while in the young variant it rebounds and approaches 24 percent.

The working age population (those between 20–64) decreases significantly after 2010, as the large cohorts born in the 1950s leave the workforce. Following this, another decrease may be expected when the generations born in the 1970s retire. Using the medium/base variant we project that about three-quarters of the present population may be in this group by 2050.

The size of the older population will be rather cyclical. The number of those in the age group of 65 or older will increase by one and half times (while, in the old variant, almost doubles) by 2050.

The inverse combination of the improvement of mortality with the low number of children clearly represents one possible direction of demographic development. In this scenario, the old age welfare systems and their financing in the present system are fundamentally endangered as the number and proportion of the elderly grow to an extreme level.

The share of the 65 year-old and older population grows even in the young variant, from 14 percent to 19 percent. The share of this age group within the total population may be much larger, 26 percent in the basic variant and 36 (!) percent in the old variant at the end of the period. It is possible that, by 2050, instead of the present 30 percent, half of the population will be over the age of 50.

The dependency ratio decreases in the next two decades. It goes down from the present 0.7 level to below 0.6. Unfortunately, however, low fertility and the resulting decline in younger generations is the cause. It seems, that – considering the decrease of dependency 'desirable'–, the population has 'reacted' to the challenges of the change in the political and economic system by decreasing the number of children.

This picture, however, changes as we approach 2050, and shows an opposite tendency. The rate of dependency increases in all the variants, especially in the old variant. In this period, growth of the older population exceeds the counterveiling effect of the low number of children. As a result of this, the decrease of the number of children proves to be an ineffective strategy for reducing the dependency ratio.

This highlights two significant characteristics of demographic trends. First, after the first and the second demographic transition, dependency between the generations should become stronger. Therefore, it may not be so unrealistic as

it may appear today for the life expectancy and the number of children to increase at the same time.

Second, it is obvious that increasing life expectancies creates a new situation in the division of the life course into phases. Using the mortality hypothesis of the medium/base variant along with the present ages of retirement, we calculated the average period that the pension system and the old age provision systems in general should provide for. By the middle of the next century, these systems must provide at least 22 years of life annuity and services for the average male pensioner and 37 years for the average female pensioner. From today's perspective, this is clearly not sustainable. As we see, the length of the active period of life cannot stay unchanged as life expectancy increase.

This is an important lesson learned from the scenarios. If the low fertility variant prevails, then only the extension of the active life phase to older and older ages secures a large enough working age population to support the elderly. However, if the active phase of the life cycle is not extended, the level of employment will not be sufficient to provide support for an increasingly old population with increasing life spans. If live spans are increasingly extended under conditions of low fertility, this will have a catastrophic impact on the old age support systems.

Immigration Variant

In this variant, we examine what effect higher net migration figures similar to those experienced in the 1990s will have on future population development. Using the average annual migration figures of the 90s (thus including the significant migration wave of 1990–91), the net migration figure exceeds 10 thousand persons (it is 10800 persons on average). This level is set for the migration assumption of the immigration scenario presented below.

The above presented baseline variant of national projections includes an annual surplus of 5,000 entrants into Hungary. Thus, immigration variant, applying the medium fertility and mortality assumptions, examines to what extent a higher immigration volume will change the size and the structure of the population till the middle of the next century.

Table 11 summarises the results of the scenario. The size of the population is 8.4 million persons by the middle of the next century, which is by 300–400 thousand higher than that of the baseline variant (8.0 million). This means, however, that immigration volume observed in the 1990s is not sufficient to stabilise the population size in the future.

Table 11
Main results of population scenarios
*Immigration variant**

Characteristic at January 1 or during previous year (1000 persons, percentage)	2000	2010	2020	2030	2040	2050
Size of population	10045,9	9718,6	9468,8	9170,4	8767,5	8364,4
Number of live births	92,3	97,5	94,7	82,0	79,1	76,1
Number of deaths	138,8	135,6	129,8	129,9	131,3	127,7
Net migration	10,8	10,8	10,8	10,8	10,8	10,8
Natural increase	-46,5	-38,1	-35,1	-47,9	-52,3	-51,6
Population growth	-35,7	-27,3	-24,3	-37,1	-41,5	-40,8
Total fertility rate	1.3	1.4	1.6	1.6	1.6	1.6
Life expectancy at birth – male	66.8	68.4	70.5	72.4	73.9	75.0
Life expectancy at birth – female	75.3	76.8	78.4	79.8	81.0	81.8
Size of the age group 0–19 year olds	2370,1	2052,4	1920,6	1864,7	1698,0	1597,0
Size of the age group 20–64 year olds	6205,8	6155,7	5810,8	5485,3	5125,4	4617,1
Size of the age group 65–x year olds	1470,0	1510,5	1737,4	1820,4	1944,2	2150,3
Percentage of the age group 0–19	23.6	21.1	20.3	20.3	19.4	19.1
Percentage of the age group 20–64	61.8	63.3	61.4	59.8	58.5	55.2
Percentage of the age group 65–x	14.6	15.5	18.3	19.9	22.2	25.7

* Net migration equals the average volume observed between 1990–1997.

Naturally, the question arises: if not in the next 50 years, then when will this annual 10 thousand migration surplus be sufficient to maintain the population size? According to the calculations, certainly not before 2100. Namely, the projection with unchanged conditions (using the same characteristics as for 2050) shows a slowly changing demographic situation until 2100. The size of the population decreases to 6 million, and the annual decreases are not lower than 30 thousand persons. Another 50–80 years would have to pass until the size of the population would decrease to a level that the present 11 thousand person migration surplus can influence the annual rate of growth substantially.

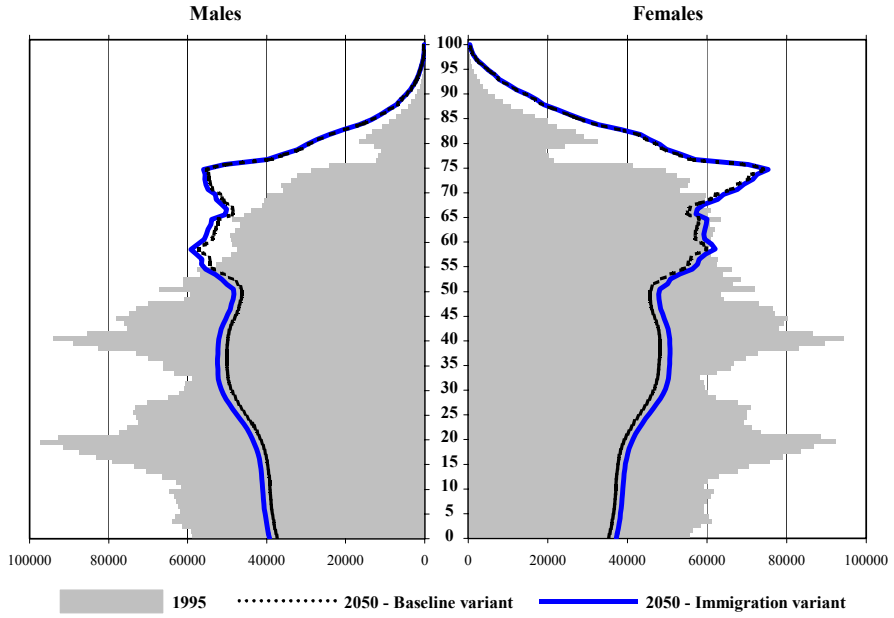


Figure 5
Age pyramid of the population in 1995 and 2050
Immigration variant

Settlement Variant

In this variant, while we consider the migration pattern experienced in the 1990s as valid after 2000, we assume that in 2000 there is a one-time large inflow. We know that this is a completely unrealistic assumption: it falls into the category of 'almost impossible' events.

Applying the goal seeking method, we can determine this one-time volume necessary to keep the population size above the 'magic' level of ten million persons until 2050. This volume is estimated at 1.8 million persons. This amount of immigrants should have arrived in 2000 for the size of the population not to decrease below 10 million by 2050 under fertility, mortality and migration hypotheses of the immigration variant.

This 'settlement' would increase the size of the population immediately to 11.8 million by 2001. The working age population would rise by 1.4 million because of the special age composition of the immigrants.

The subsequent demographic development would be characterised by two traits. First, in the short run, the number of births would increase since a large number of 'settled' women would be in their childbearing age. Second, in the long run, the number of elderly and the number of deaths would increase significantly. The rate of population decline would accelerate from the point when those entering in 2000 would reach the older age groups. By 2050, the percentage of the elderly would be larger than in the baseline variant of the national population projections.

A one-time, large volume immigration does not solve the country's demographic problems either. The size of the population may increase, but most probably at the cost of great tensions mainly in the area of economic activity. However, in the long run, the decrease of the population would become even more rapid compared with the baseline scenario.

Table 12
Main results of population scenarios
*Settlement variant**

Characteristic at January 1 or during previous year (1000 persons, percentage)	2000	2010	2020	2030	2040	2050
Size of population	10045,9	11646,2	11433,7	11074,4	10591,6	10021,5
Number of live births	92,3	121,2	108,3	96,9	95,6	88,0
Number of deaths	138,8	149,0	146,8	151,6	159,5	162,1
Net migration	1793,3	10,8	10,8	10,8	10,8	10,8
Natural increase	-46,5	-27,8	-38,5	-54,7	-63,9	-74,0
Population growth	1746,8	-17,0	-27,7	-43,9	-53,1	-63,2
Total fertility rate	1.3	1.4	1.6	1.6	1.6	1.6
Life expectancy at birth – male	66.8	68.4	70.5	72.4	73.9	75.0
Life expectancy at birth – female	75.3	76.8	78.4	79.8	81.0	81.8
Size of the age group 0–19 year olds	2370,1	2433,1	2362,8	2177,8	1990,8	1904,7
Size of the age group 20–64 year olds	6205,8	7605,3	7161,5	6757,0	6072,5	5361,1
Size of the age group 65–x year olds	1470,0	1607,8	1909,4	2139,6	2528,3	2755,7
Percentage of the age group 0–19	23.6	20.9	20.7	19.7	18.8	19.0
Percentage of the age group 20–64	61.8	65.3	62.6	61.0	57.3	53.5
Percentage of the age group 65–x	14.6	13.8	16.7	19.3	23.9	27.5

* One-time, large volume immigration surplus in 2000 and annual migration volumes in line with the average level of 1990–1997 are sufficient to maintain the population size of 10 million till 2050.

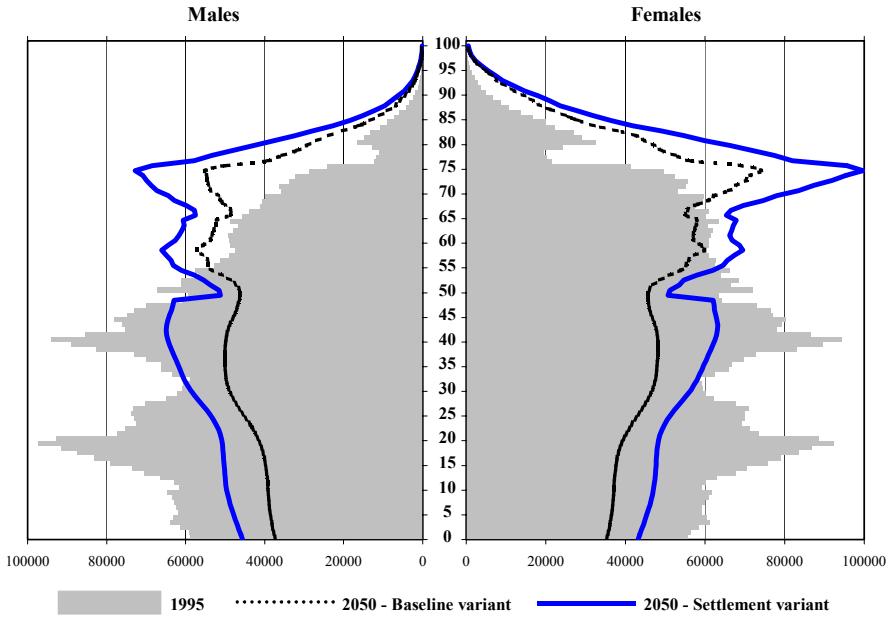


Figure 6
Age pyramid of the population in 1995 and 2050
Settlement variant

Migration Target Variant

Alternative migration policies exist to the one-time settlement policy. If a country 'organizes itself' to ensure the necessary annual migration surpluses, 'erosion' of the country's population may be stopped in the long run. The necessary migration volumes, naturally, depend on the demographic condition of the given country. Where the population is younger and there are still reproduction reserves, then even a minor migration surplus is sufficient to balance the natural decrease. In Hungary, however, this is not the case. In the course of its demographic development in the 20th century, the reserves for population growth have disappeared almost completely. Thus, only a relatively high annual migration surplus could maintain the current level of the population. According to this scenario, this annual net migration volume is 40 thousand persons. If we consider the volume of emigration as well, this may mean 47 thousand immigrants and 7 thousand emigrants annually. Thus, the international

migration affecting Hungary would have to rise to and stay permanently at this level in the next 50 years – even with a relatively low fertility and slowly improving life expectancies – to maintain the population at 10 million persons.

The actualisation of this target variant would modify the demographic development in two phases. At first, migration would only counter-balance the annual natural decrease. Later on, however, on the basis of the larger and larger accumulation of the number of immigrants, other important changes would also take place. The age composition would be modified, the population would be younger and there would be a greater number of working-age persons. However, sustainable reproduction would not be formed even in this case. The decrease of the population would begin after 2050 even in this scenario, and the decrease by 2100 would equal more than one million persons.

Table 13
Main results of population scenarios
*Migration target variant**

Characteristic at January 1 or during previous year (1000 persons, percentage)	2000	2010	2020	2030	2040	2050
Size of population	10045,9	10027,3	10111,1	10152,7	10085,8	10007,2
Number of live births	92,3	102,3	103,3	93,0	93,1	93,0
Number of deaths	138,8	137,5	133,9	136,6	141,7	143,0
Net migration	40,3	40,3	40,3	40,3	40,3	40,3
Natural increase	-46,5	-35,2	-30,6	-43,6	-48,5	-50,0
Population growth	-6,2	5,2	9,7	-3,3	-8,2	-9,7
Total fertility rate	1.3	1.4	1.6	1.6	1.6	1.6
Life expectancy at birth – male	66.8	68.4	70.5	72.4	73.9	75.0
Life expectancy at birth – female	75.3	76.8	78.4	79.8	81.0	81.8
Size of the age group 0–19 year olds	2370,1	2108,4	2051,6	2070,0	1959,8	1915,9
Size of the age group 20–64 year olds	6205,8	6394,6	6285,5	6181,5	6020,9	5663,8
Size of the age group 65–x year olds	1470,0	1524,3	1774,0	1901,1	2105,1	2427,6
Percentage of the age group 0–19	23.6	21.0	20.3	20.4	19.4	19.1
Percentage of the age group 20–64	61.8	63.8	62.2	60.9	59.7	56.6
Percentage of the age group 65–x	14.6	15.2	17.5	18.7	20.9	24.3

* The constant annual migration surplus is sufficient to maintain the population size of 10 million until 2050.

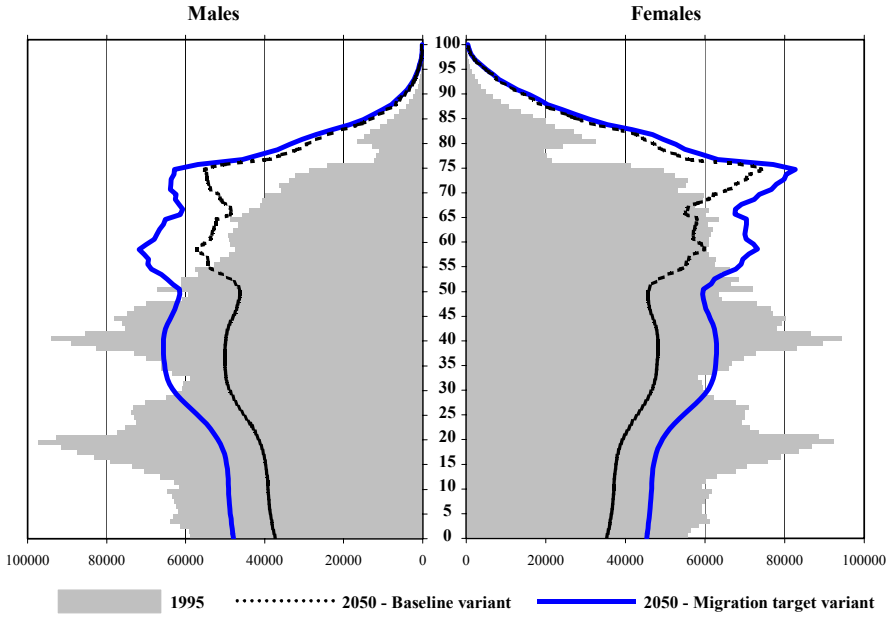


Figure 7
Age pyramid of the population in 1995 and 2050
Migration target variant

Thus, increased migration with at least an annual net migration figure of 40 thousand persons, might stabilize the population for an extended period of time. This might change one of the negative tendencies in Hungary's 20th century demographic development: the emigrant character of the country. This kind of a permanent immigration volume would have a positive impact on the country's demographic development in the long run, but still would not eliminate the causes of the population decline. And though this 40 thousand-person volume most probably exceeds the country's current capacities, the demographic facts show that Hungary should make efforts to raise immigration to substantially higher levels. This requires formulating adequate migration policies into the country's long-term strategy.

Sustainable Variant

Sustainable development basically means that today's generations leave such conditions to their descendants under which balanced social and economic development can be sustained. Concerning the country's population, this would mean first of all making efforts to achieve a situation in which the simple population replacement is guaranteed.

Obviously, sustainable development means more than simply maintaining the size of the population. Still, if the population size is maintained through the equal improvement of all three demographic components, this would lead to exactly that kind of sustainable demographic development we have in mind.

Let us examine, however, whether it is possible to reach the desired scenario through the modification of only one component at a time. In the previous variant, we saw that one of the possibilities is a migration gain exceeding 40 thousand persons annually. What changes would be necessary to achieve the same effect if only fertility or mortality was modified?

Fertility

Similar to the migration target variant, we defined a fertility target scenario. The goal of this scenario is to find such a future trend of fertility which, together with the medium assumption on mortality and zero migration, would result in a population size more or less constant around 10 million. Of course, there is an infinite number of such paths. We can find, however, a trend in line with the baseline projection. The results of the scenario are presented in Table 14 and Figure 8.

As far as the number of children is concerned, replacement of the population would imply having simple reproduction in the 2010s, and, by the middle of the next century, reaching a high fertility rate of 2.5 children.

Seeing the present tendencies, we do not have to demonstrate the unlikely character of this assumption. Thus, this scenario proves that it is unlikely for Hungary to stop the anticipated population decline exclusively through increased fertility.

Table 14
Main results of population scenarios
*Sustainable variant – fertility**

Characteristic at January 1 or during previous year (1000 persons, percentage)	2000	2010	2020	2030	2040	2050
Size of population	10045,9	9751,2	9728,9	9751,2	9784,7	10009,3
Number of live births	92,3	121,5	135,1	127,0	141,9	153,4
Number of deaths	138,8	135,1	128,7	128,0	128,7	124,1
Net migration	0,0	0,0	0,0	0,0	0,0	0,0
Natural increase	-46,5	-13,6	6,4	-1,0	13,2	29,3
Population growth	-46,5	-13,6	6,4	-1,0	13,2	29,3
Total fertility rate	1.3	1.8	2.3	2.5	2.5	2.5
Life expectancy at birth – male	66.8	68.4	70.5	72.4	73.9	75.0
Life expectancy at birth – female	75.3	76.8	78.4	79.8	81.0	81.8
Size of the age group 0–19 year olds	2370,1	2171,2	2359,9	2577,9	2605,0	2794,1
Size of the age group 20–64 year olds	6205,8	6075,9	5646,6	5381,0	5284,6	5153,4
Size of the age group 65–x year olds	1470,0	1504,1	1722,5	1792,3	1895,2	2061,8
Percentage of the age group 0–19	23.6	22.3	24.3	26.4	26.6	27.9
Percentage of the age group 20–64	61.8	62.3	58.0	55.2	54.0	51.5
Percentage of the age group 65–x	14.6	15.4	17.7	18.4	19.4	20.6

* The increase of the number of children is sufficient in itself to maintain the population size of 10 million until 2050.

However, if such a scenario would develop in the future, not only the population decline would be stopped in the long run, but very remarkable changes would take place in the age structure. The population would rejuvenate in such a way that the share of youth and the elderly would increase significantly and only the proportion of the middle age group would decrease. The share of elderly would grow to 20.6 per cent, while the proportion of those aged below 20 to 27.9 per cent. The average age of the population would still increase from 38.7 years (2000) to 39.4 years (2050).

Obviously, the changes would lead to a high dependency ratio. The rate of dependency (the quotient of those below and above the working ages to those aged 20–64) is 0,68 in 2000 and would be 0,82 in 2050.

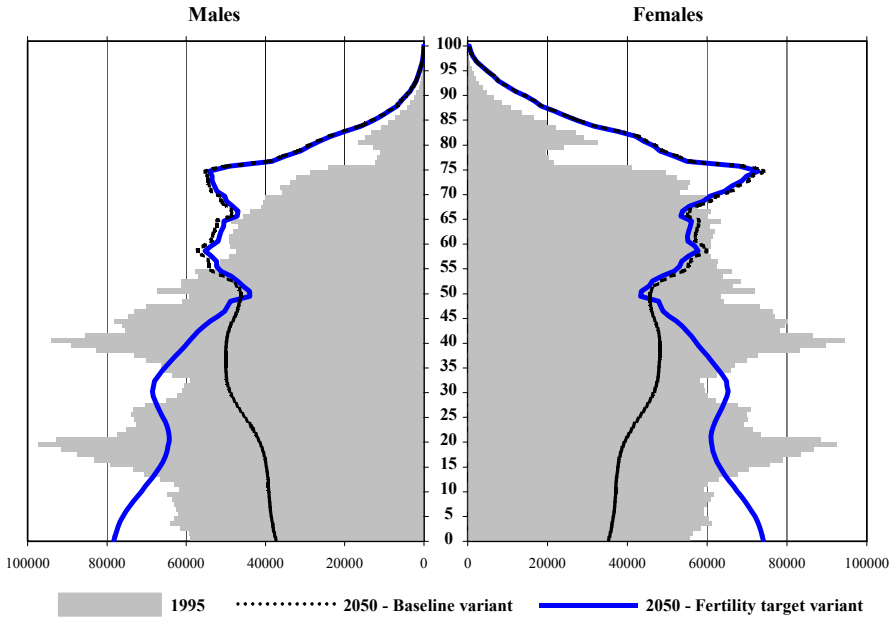


Figure 8
Age pyramid of the population in 1995 and 2050
Fertility target variant

Mortality

It is widely known that the improvement of mortality no longer leads to reproduction reserves under modern conditions. We should not underestimate its effect, however, since different cohorts have significantly different life expectancies. Even the experiences of countries pioneering the second demographic transition show that mortality may or should have a role in maintaining the size of the population.

If, however, mortality would be the sole factor in maintaining the population, then an extreme increase in life expectancy would be necessary. According to the calculations, in this case, average life expectancy at birth would have to approach 100 years.

Such a variant, naturally, would imply an extreme ageing of the population. The number of those over 65 would surpass 40 percent, as practically nobody would die before the age of 50. The age pyramid would ‘stretch’ upward, there

would be four-five generations living in one population. The average age of the population would grow by 15–16 years to above 54 years.

Very dramatic changes would take place in the dependency ratio, too. It would be 1,27 in 2050. Due such an increase the burden of the elderly would be hard to manage. This scenario especially would imply a necessary redefinition of the broad age groups. If we define those aged 0–19 as young, we should define those in the 20–77 age group as middle-aged maintaining the ratio of the middle aged on the level in 2000. If, however, the upper limit of the youth increases to 29 (as a consequence of longer education, for example), the middle age group should be defined at 30–83 years under the conditions mentioned.

Table 15
Main results of population scenarios
*Sustainable variant – mortality**

Characteristic at January 1 or during previous year (1000 persons, percentage)	2000	2010	2020	2030	2040	2050
Size of population	10045,9	9739,2	9724,6	9821,8	9928,0	10003,5
Number of live births	92,3	95,5	91,0	77,2	73,2	69,1
Number of deaths	138,8	107,3	82,7	67,0	62,6	68,1
Net migration	0,0	0,0	0,0	0,0	0,0	0,0
Natural increase	-46,5	-11,9	8,3	10,2	10,6	1,0
Population growth	-46,5	-11,9	8,3	10,2	10,6	1,0
Total fertility rate	1.3	1.4	1.6	1.6	1.6	1.6
Life expectancy at birth – male	66.8	72.5	78.7	84.7	90.3	95.5
Life expectancy at birth – female	75.3	80.9	86.6	92.1	97.4	102.3
Size of the age group 0–19 year olds	2370,1	2027,3	1868,0	1782,4	1590,7	1465,7
Size of the age group 20–64 year olds	6205,8	6128,8	5789,6	5448,1	5026,3	4405,9
Size of the age group 65–x year olds	1470,0	1583,1	2067,1	2591,2	3310,9	4131,9
Percentage of the age group 0–19	23.6	20.8	19.2	18.1	16.0	14.7
Percentage of the age group 20–64	61.8	62.9	59.5	55.5	50.6	44.0
Percentage of the age group 65–x	14.6	16.3	21.3	26.4	33.3	41.3

* The increase of the life expectancy is sufficient in itself to maintain the population size of 10 million until 2050.

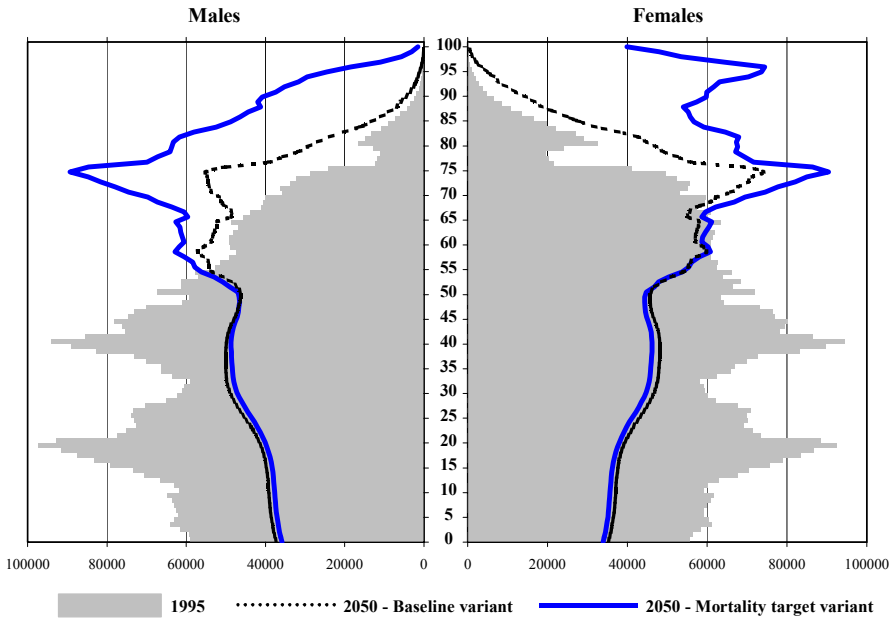


Figure 9
Age pyramid of the population in 1995 and 2050
Mortality target variant

Main Variant

Finally, let us present the variant which divides the 'duties' of stopping the decrease of the population equally among the three demographic components. This scenario contains such changes whereby fertility, mortality and migration have more or less the same volume effect in maintaining the size of the population. This we call the sustainable variant.

In this variant, the number of children increases continuously, slowly but not necessarily approaching the level of simple reproduction. The final number of children settles at around a level of 1.9 from the 2030s. Life expectancy also increases gradually, to over 80 years in the case of both sexes, and to almost 90 years in the case of women. Neither does the immigration surplus seem so impossible to reach as in the single other variants: the annual gain is 13–14 thousand persons, which involves a still considerable, 20 thousand-person immigration volume.

This variant shows to be balanced in all respects. The number of births may be permanently over 100 thousand persons, and the natural decrease, if it occurs at all, is not disturbingly significant either. The size of the population would be more or less maintained after 2050 as well. Under these conditions, the Hungarian population would be approximately 9.7 million persons even by 2100.

Table 16
Main results of population scenarios
*Sustainable variant – all three components together**

Characteristic at January 1 or during previous year (1000 persons, percentage)	2000	2010	2020	2030	2040	2050
Size of population	10045,9	9841,8	9867,9	9936,2	9960,1	10029,3
Number of live births	92,3	106,9	111,2	100,5	103,3	105,3
Number of deaths	138,8	126,6	115,1	111,0	112,9	108,9
Net migration	13,5	13,5	13,5	13,5	13,5	13,5
Natural increase	-46,5	-19,6	-3,8	-10,6	-9,6	-3,6
Population growth	-33,0	-6,1	9,7	2,9	3,9	9,9
Total fertility rate	1.3	1.5	1.8	1.9	1.9	1.9
Life expectancy at birth – men	66.8	69.7	73.2	76.5	79.3	81.8
Life expectancy at birth – women	75.3	78.1	81.1	83.9	86.5	88.6
Size of the age group 0–19 year olds	2370,1	2108,4	2110,2	2175,1	2085,6	2081,2
Size of the age group 20–64 year olds	6205,8	6196,2	5909,2	5691,2	5501,3	5165,6
Size of the age group 65–x year olds	1470,0	1537,3	1848,5	2070,0	2373,3	2782,5
Percentage of the age group 0–19	23.6	21.4	21.4	21.9	20.9	20.8
Percentage of the age group 20–64	61.8	63.0	59.9	57.3	55.2	51.5
Percentage of the age group 65–x	14.6	15.6	18.7	20.8	23.8	27.7

* The increase of the number of children, the life expectancy, and the net migration together are sufficient to maintain the population size of 10 million until 2050.

The changes in the age structure are less dramatic than in the other variants. The proportion of those aged 65 and over would remain under 30 per cent, the share of the youth above 20 per cent. However, the dependency ratio is the second highest among the presented scenarios.

Modern populations are beyond a long period of demographic transition and this period may be characterised by a low dependency. More sustainable future development, however, requires higher reproduction, which will lead to higher dependency. Thus, our sustainable variant shows that for a more balanced future population development modern populations should gradually accommodate a higher burden of support.

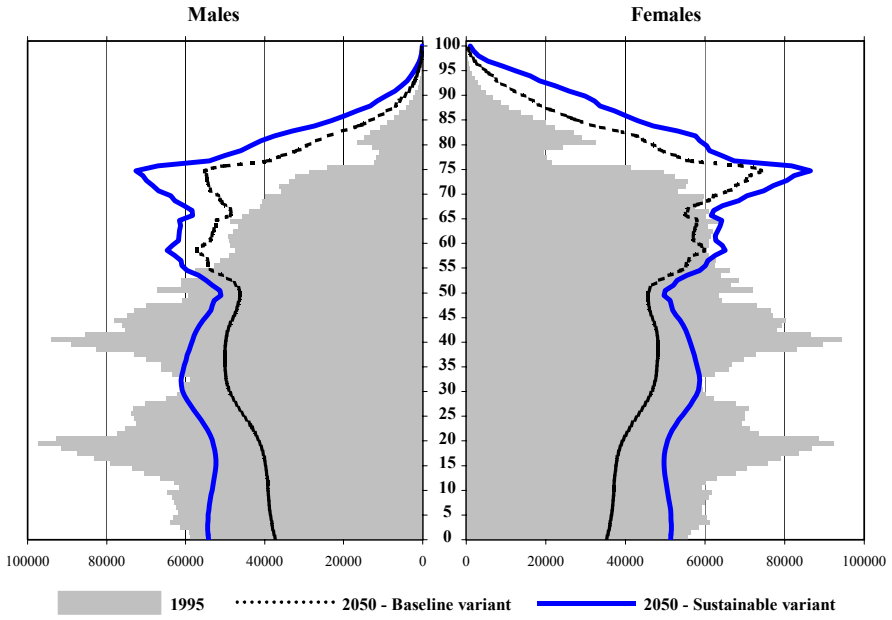


Figure 10
Age pyramid of the population in 1995 and 2050
Sustainable variant

CONCLUSION

In the above paper, primarily the role of migration in maintaining the size of the population has been studied. The main method of examination has been the use of population projections, scenarios. We have abandoned the concept of a closed population, and analysed the volume and rate of migration that might be expected over the next 50 years and the effects of migration on the Hungarian demographic trends. The approach involved projections with both realistic and almost impossible assumptions.

The baseline variant of the national population projections shows a rather pessimistic picture in this respect. Even using the immigration surplus of the most recent years along with the most realistic fertility and mortality rates, these calculations result in a population of 8 million by 2050 which means a 20 per cent decline as compared to the recent one.

The possible role of international migration in maintaining the population is outlined in four variants or migration scenarios.

In the immigration scenario we projected the high annual migration surplus of 10 thousand persons experienced in the 1990s. This scenario does not modify the future of the population substantially, and can slow the population's decrease only at a much later point (two hundred years later) when the overall population size is already significantly lower.

The settlement scenario assumed a one-time large immigration. For the population not to decrease below 10 million by 2050, 1.8 million immigrants should have arrived in 2000. However, even this would not maintain the number of the population in the longer run. Instead, the decrease of the population becomes much more intensive after a certain time.

With the migration target variant, we looked for a constant immigration level at which the number of the population would stay around 10 million until 2050. This would mean a net migration figure of 40 thousand persons annually, with a possible volume of annual immigration around 47 thousand persons. This immigration volume would bring positive elements into demographic development on the long run, but it would still not eliminate the causes of the decrease of the population. Although this magnitude of 40 thousand migrants annually seems to exceed the current country's capacities, because of its demographic situation. Hungary has to make efforts to intensify immigration to levels substantially higher than today's.

Besides migration, we also examined the role of fertility and mortality in maintaining the size of the population. According to this, a fertility rate of 2.5 children, an average life expectancy around 100 years and a constant migration surplus of 40 thousand persons are equivalent from the point of view of maintaining the size of the population. These extreme values demonstrate that sustainable, long term demographic development can only be achieved through simultaneous and gradual changes in all three components.

The sustainable variant, which may be considered as the final conclusion of this study, supposes an annual immigration of 20 thousand persons, the gradual achievement of 1.9 average number of children, and an average life expectancy exceeding 80 years. The realisation of such a variant would bring a permanent and significant reversal of current negative Hungarian population trends.

Translated by

BIBLIOGRAPHY

Cseh-Szombathy, L. and P. P. Tóth. (eds). 2001. *Népesedés és népesedéspolitika*. (Population and Population Policy.) Budapest: Századvég.

Hablicsek, L. 1998. *Demográfiai forgatókönyvek, 1997–2050*. (Demographic Scenarios, 1997–2050.) Budapest: KSH NKI.

Hablicsek, L. and P. P. Tóth. 1996. A nemzetközi vándorlás hatása a magyarországi népesség számának alakulására 1994–2010 között. (The Role of international migration in maintaining Hungary's population size between 1994–2010.) In: Sik, E. and J. Tóth (eds.). *Táborlakók, diaszpórák, politikák*. (Residents of camps, diasporas and policies.) Budapest: MTA Politikai Tudományok Intézete: 161–179.

Hablicsek, L. and P. P. Tóth. 2001. A nemzetközi vándorlás szerepe a magyarországi népesség megőrzésében 1999–2050 között. (The Role of International Migration in Maintaining Hungary's Population Between 1999–2050.) In Cseh-Szombathy, L. and P. P. Tóth. (eds). 2001. *Népesedés és népesedéspolitika*. (Population and population policy.) Budapest: Századvég: 395–428.

Hablicsek, L. and P. P. Tóth. 2002. Migrációs potenciál a mai Magyarországon – továbbszámítások és becslések. (Migration Potential in Today's Hungary – Projections and Estimates.) In Prager, L. (ed.) 2002. *A munkaerő szabad áramlása – Magyarországról nézve*. (The free movement of labour from the perspective of Hungary.) A Miniszterelnöki Hivatal Integráció Stratégiai Munkacsoportjának kiadványa (80): 23–45.

Ormos, M. and B. K. Király (eds.) 2001. *Hungary: Government and Politics 1848–2000*. New York: Columbia University Press.

Parragi, M. (ed.) 1993. *A magyar állampolgárságra vonatkozó jogszabályok*. (Legal Regulations on Hungarian citizenship.) Budapest: Szemimpex Kiadó.

Parragi, M. and M. Ugróczky (eds.) 1994. *A magyar állampolgárságra vonatkozó jogszabályok*. (Legal regulations on Hungarian citizenship.) Budapest, Szemimpex Kiadó.

Prager, L. (ed.) 2002. *A munkaerő szabad áramlása – Magyarországról nézve*. (The free movement of labour from the perspective of Hungary.) A Miniszterelnöki Hivatal Integráció Stratégiai Munkacsoportjának kiadványa (80).

Spéder, Zs. and P. P. Tóth. (eds.) 2000. *Emberi viszonyok*. (Human Relationships.) Budapest: Andorka Rudolf Társadalomtudmányi Társaság – Századvég Kiadó.

Sik, E. and J. Tóth. (eds.) *Táborlakók, diaszpórák, politikák*. (Residents of camps, diasporas and policies.) Budapest: MTA Politikai Tudományok Intézete.

Tóth, P. P. 2000. Nemzetközi vándorlás és Magyarország. (International migration and Hungary.) In Spéder, Zs. and P. P. Tóth. (eds.) 2000. *Emberi viszonyok*. (Human Relationships.) Budapest: Andorka Rudolf Társadalomtudmányi Társaság – Századvég Kiadó: 369–387.

Tóth, P. P. 2001. Hungary's Population since 1850. In Ormos, M. and B. K. Király (eds.) 2001. *Hungary: Government and Politics 1848–2000*. New York: Columbia University Press: 622–624.